

**2024 Excess Days in Acute Care
Measures Updates and Specifications Report**

**Acute Myocardial Infarction (AMI)
Chronic Obstructive Pulmonary Disease (COPD)
Coronary Artery Bypass Grafting (CABG)
Heart Failure (HF)
Pneumonia
Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA)**

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Table of Contents

Table of Contents.....	2
List of Tables.....	5
List of Figures.....	8
1. EXECUTIVE SUMMARY.....	12
2. BACKGROUND AND OBJECTIVES	13
2.1. Background	13
2.2. Objectives	14
3. METHODS	15
3.1. Overview	15
3.2. Data Sources	15
3.3. Cohort	16
3.4. Outcome Definition	19
3.4.1 30-Day Timeframe.....	20
3.4.2 All-Cause Days in Acute Care.....	20
3.4.3 Transfers	20
3.4.4 Exposure Time.....	21
3.5. Risk Model Reselection/Risk Variable Selection.....	21
3.6. Statistical Analyses.....	22
3.6.1 Statistical Approach to Measure Calculation	22
3.6.2 Risk Adjustment Model Performance	23
3.6.3 Measure Score Reliability.....	23
3.6.4 Validity Testing.....	24
4. RESULTS	25
4.1. AMI EDAC Results	25
4.1.1 AMI EDAC Cohort	25
4.1.2 AMI EDAC Risk Variable Frequencies	25
4.1.3 AMI EDAC Model Odds Ratios.....	26
4.1.4 AMI EDAC Model Performance	27
4.1.5 AMI EDAC Distribution of Hospital Volume.....	28
4.1.6 AMI EDAC Measure Score Variance and Reliability.....	30
4.1.7 AMI EDAC Measure Validity	31
4.2. COPD EDAC Results	33
4.2.1 COPD EDAC Cohort	33
4.2.2 COPD EDAC Risk Variable Frequencies	33
4.2.3 COPD EDAC Odds Ratios	33
4.2.4 COPD EDAC Model Performance.....	36
4.2.5 COPD EDAC Distribution of Hospital Volume	37
4.2.6 COPD EDAC Measure Score Variance and Reliability	40
4.2.7 COPD EDAC Measure Validity.....	40
4.3. CABG EDAC Results	42

4.3.1	CABG EDAC Cohort.....	42
4.3.2	CABG EDAC Risk Variable Frequencies	42
4.3.3	CABG EDAC and Odds Ratios.....	42
4.3.4	CABG EDAC Model Performance.....	44
4.3.5	CABG EDAC Distribution of Hospital Volume	45
4.3.6	CABG EDAC Measure Score Variance and Reliability.....	47
4.3.7	CABG EDAC Measure Validity.....	48
4.3.8	CABG EDAC Measure Scores within Deciles of Hospital Volume.....	49
4.4.	HF EDAC Results.....	50
4.4.1	HF EDAC Cohort	50
4.4.2	HF EDAC Risk Variable Frequencies.....	51
4.4.3	HF EDAC Odds Ratios	51
4.4.4	HF EDAC Model Performance	54
4.4.5	HF EDAC Distribution of Hospital Volume	55
4.4.6	HF EDAC Measure Score Variance and Reliability	57
4.4.7	HF EDAC Measure Validity	58
4.5.	Pneumonia EDAC Results.....	58
4.5.1	Pneumonia EDAC Cohort	58
4.5.2	Pneumonia EDAC Risk Variable Frequencies.....	60
4.5.3	Pneumonia EDAC Odds Ratios	60
4.5.4	Pneumonia EDAC Model Performance.....	63
4.5.5	Pneumonia EDAC Distribution of Hospital Volume	64
4.5.6	Pneumonia EDAC Measure Score Variance and Reliability	66
4.5.7	Pneumonia EDAC Measure Validity	67
4.6.	THA/TKA EDAC Results.....	68
4.6.1	THA/TKA EDAC Cohort	68
4.6.2	THA/TKA EDAC Risk Variable Frequencies.....	69
4.6.3	THA/TKA EDAC Odds Ratios	69
4.6.4	THA/TKA EDAC Model Performance	70
4.6.5	THA/TKA EDAC Distribution of Hospital Volume	71
4.6.6	THA/TKA EDAC Measure Score Variance and Reliability	73
4.6.7	THA/TKA EDAC Measure Validity	74
4.6.8	THA/TKA EDAC Measure Scores within Deciles of Hospital Volume	75
5.	GLOSSARY	76
6.	REFERENCES	78
7.	APPENDICES	79
7.1.	Appendix A Definition of ED Visits and Observation Stays.....	79
7.2.	Appendix B Measure Specifications	81
	Appendix B.1 AMI EDAC Cohort and Outcome Specifications	81
	Appendix B.2 COPD EDAC Cohort and Outcome Specifications.....	83
7.3.	Appendix C Cohort and Outcome Specifications.....	85
	Appendix C.1 CABG EDAC Cohort and Outcome Specifications	85
	Appendix C.2 HF EDAC Cohort and Outcome Specifications.....	87

Appendix C.3	Pneumonia EDAC Cohort and Outcome Specifications	89
Appendix C.4	THA/TKA EDAC Cohort and Outcome Specifications.....	91
7.4.	Appendix D. Planned Readmission Algorithm	94

List of Tables

Table 2.1.1 – Summary of EDAC Measure Updates as Compared to Prior EDAC Versions	14
Table 3.2.1 – Medicare FFS and Advantage Claim Type Codes	16
Table 3.3.1 – Additional Criteria for Specific Cohorts	17
Table 4.1.1 – AMI EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022–December 30, 2022)	26
Table 4.1.2 – AMI EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)	27
Table 4.1.3 – AMI EDAC: Distribution of Hospital Admission Volume.....	29
Table 4.1.4 – AMI EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022–December 30, 2022) (N=3,333 hospitals). 29	
Table 4.1.5 – AMI EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one AMI admission).....	29
Table 4.1.6 – AMI EDAC: Between-Hospital Variance	31
Table 4.1.7 – AMI EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years).....	31
Table 4.1.8 – AMI EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years).....	31
Table 4.1.9 – AMI EDAC: Association (Pearson Correlation Coefficients) between AMI EDAC Measure Scores and Comparator Measures (AMI EDAC dates: January 1, 2022–December 30, 2022).....	32
Table 4.2.1 – COPD EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022–December 30, 2022)	34
Table 4.2.2 – COPD EDAC: C-Statistic and Predictive Ability (January 1, 2022 –December 30, 2022).....	36
Table 4.2.3 – COPD EDAC: Distribution of Hospital Admission Volume	38
Table 4.2.4 – COPD EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022–December 30, 2022) (N=4,296)	38
Table 4.2.5 – COPD EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022–December 30, 2022 (hospitals with at least one COPD admission)	38
Table 4.2.6 – COPD EDAC: Between-Hospital Variance.....	40
Table 4.2.7 – COPD EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)	40
Table 4.2.8 – COPD EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)	40
Table 4.2.9 – COPD EDAC: TEP Face Validity Voting Results	41
Table 4.2.10 – COPD EDAC: Association (Pearson Correlation Coefficients) between COPD EDAC Measure Scores and Comparator Measures (COPD EDAC dates: January 1, 2022–December 30, 2022)	41
Table 4.3.1 – CABG EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022–December 30, 2022)	43
Table 4.3.2 – CABG EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)	44
Table 4.3.3 – CABG EDAC: Distribution of Hospital Admission Volume	46
Table 4.3.4 – CABG EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022–December 30, 2022) (N=1,070)	46
Table 4.3.5 – CABG EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022–December 30, 2022 (hospitals with at least one CABG admission)	46
Table 4.3.6 – CABG EDAC: Between-Hospital Variance.....	47
Table 4.3.7 – CABG EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)	48
Table 4.3.8 – CABG EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)	48
Table 4.3.9 – CABG EDAC: TEP Face Validity Voting Results	48

Table 4.3.10 – CABG EDAC: Association (Pearson Correlation Coefficients) between CABG EDAC Measure Scores and Comparator Measures (CABG EDAC dates: January 1, 2022-December 30, 2022)	49
Table 4.3.11 – CABG EDAC: Mean Measure Scores within Deciles of Hospital CABG Volume (N=1,070 hospitals).....	49
Table 4.4.1 – HF EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)	51
Table 4.4.2 – HF EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022).....	54
Table 4.4.3 – HF EDAC: Distribution of Hospital Admission Volume	55
Table 4.4.4 – HF EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=4,304)	56
Table 4.4.5 – HF EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one HF admission)	56
Table 4.4.6 – HF EDAC: Between-Hospital Variance	57
Table 4.4.7 – HF EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)	58
Table 4.4.8 – HF EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)	58
Table 4.4.9 – HF EDAC: Association (Pearson Correlation Coefficients) between HF EDAC Measure Scores and Comparator Measures (HF dates: January 1, 2022-December 30, 2022)	58
Table 4.5.1 – Pneumonia EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022).....	60
Table 4.5.2 – Pneumonia EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022).....	63
Table 4.5.3 – Pneumonia EDAC: Distribution of Hospital Admission Volume	65
Table 4.5.4 – Pneumonia EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges, and Distribution of EDAC (January 1, 2022-December 30, 2022) (N=4,390)	65
Table 4.5.5 – Pneumonia EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one Pneumonia admission)	65
Table 4.5.6 – Pneumonia EDAC: Between-Hospital Variance	66
Table 4.5.7 – Pneumonia EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)	67
Table 4.5.8 – Pneumonia EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)	67
Table 4.5.9 – Pneumonia EDAC: Association (Pearson Correlation Coefficients) between Pneumonia Measure Scores and Comparator Measures (Pneumonia dates: January 1, 2022-December 30, 2022)	67
Table 4.6.1 – THA/TKA EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022).....	69
Table 4.6.2 – THA/TKA EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)...	70
Table 4.6.3 – THA/TKA EDAC: Distribution of Hospital Admission Volume	72
Table 4.6.4 – THA/TKA EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=3,116)	72
Table 4.6.5 – THA/TKA EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one THA/TKA admission).....	72
Table 4.6.6 – THA/TKA EDAC: Between-Hospital Variance	73
Table 4.6.7 – THA/TKA EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)	74
Table 4.6.8 – THA/TKA EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)	74
Table 4.6.9 – THA/TKA EDAC: TEP Face Validity Voting Results	74

Table 4.6.10 – THA/TKA EDAC: Association (Pearson Correlation Coefficients) between THA/TKA EDAC Measure Scores and Comparator Measures (THA/TKA EDAC dates: January 1, 2022-December 30, 2022)	75
Table 4.6.11 – THA/TKA EDAC: Mean Measure Scores within Deciles of Hospital THA/TKA Volume	75

List of Figures

Figure 4.1.1 – AMI EDAC Index Cohort January 1, 2022 – December 30, 2022.....	25
Figure 4.1.2 – AMI EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=226,980 admissions)	28
Figure 4.1.3 – AMI EDAC: Measure Score Distribution, January 1, 2022–December 30, 2022, for hospitals with at least one AMI admission (N=3,333)	30
Figure 4.2.1 – COPD EDAC Index Cohort January 1, 2022 – December 30, 2022	33
Figure 4.2.2 – COPD EDAC: Risk-Decile Plot, January 1, 2022 – December 30, 2022 (N=214,005 admissions)	37
Figure 4.2.3 – COPD EDAC: Measure Score Distribution, January 1, 2022–December 30, 2022, for hospitals with at least one admission (N=4,269 hospitals).....	39
Figure 4.3.1 – CABG EDAC Index Cohort January 1, 2022–December 30, 2022	42
Figure 4.3.2 – CABG EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=71,873 patients)..	45
Figure 4.3.3 – CABG EDAC: Measure Score Distribution, January 1, 2022 – December 30, 2022, for hospitals with at least one admission (N=1,070 hospitals).....	47
Figure 4.4.1 – HF EDAC Index Cohort January 1, 2022 – December 30, 2022	50
Figure 4.4.2 – HF EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=635,204)	55
Figure 4.4.3 – HF EDAC: Measure Score Distribution, January 1, 2022 – December 30, 2022, for hospitals with at least one admission (N=4,304)	57
Figure 4.5.1 – Pneumonia EDAC Index Cohort January 1, 2022–December 30, 2022.....	59
Figure 4.5.2 – Pneumonia EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=559,333)	64
Figure 4.5.3 – Pneumonia EDAC: Measure Score Distribution, January 1, 2022 – December 30, 2022, for hospitals with at least one admission (N=4,390)	66
Figure 4.6.1 – THA/TKA EDAC Index Cohort January 1, 2022–December 30, 2022.....	68
Figure 4.6.2 – THA/TKA EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=170,841 admissions)	71
Figure 4.6.3 – THA/TKA EDAC: Measure Score Distribution, January 1, 2022–December 30, 2022, for hospitals with at least one admission (N=3,116 hospitals).....	73

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1. EXECUTIVE SUMMARY

In this measure methodology and measure update report, we present current measure specifications and testing results for three existing 30-day Risk-Standardized Excess Days in Acute Care (EDAC) measures in [CMS' Inpatient Quality Reporting \(IQR\) Program](#), and three new EDAC measures not yet in any CMS program. The three existing measures are for acute myocardial infarction (AMI), heart failure (HF), and pneumonia; the three new measures address chronic obstructive pulmonary disease (COPD), coronary artery bypass graft surgery (CABG), and total hip arthroplasty (THA)/total knee arthroplasty (TKA).

The EDAC measures capture an important post-discharge quality signal of risk-adjusted, all-cause days in acute care, within 30-days following a hospitalization for the aforementioned conditions and procedures. The key features of all of the EDAC measures described in this report are:

- **Cohort:** Includes both Medicare Advantage (MA) and Medicare-Fee-For-Service (FFS) beneficiaries.
- **Outcome:** All-cause acute care visits within 30 days after discharge (or until death if earlier), including unplanned inpatient stays (counted in days), observation stays (counted in hours and rounded to the nearest integer of days), and ED visits (counted as one day).
- **Risk adjustment:** Risk variables, based primarily on International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, were empirically identified, and include patients' age, comorbidities, and indicators of patient frailty. The risk adjustment model also accounts for post-discharge death.
- **Measure score:** Ratio of each hospital's days in acute care ("predicted days") to each hospital's "expected" days that each hospital's patients would have been expected to spend if discharged from an average performing hospital ("expected days").

Measure testing results described in this report show good model performance, large between-hospital variance, good reliability, and empiric validity, for all six EDAC measures. Therefore, we believe these measures could provide insights for improving quality of care and are suitable for use in public reporting at the hospital level.

2. BACKGROUND AND OBJECTIVES

2.1. Background

In 2013, 2014, and 2015, CMS began publicly reporting hospital 30-day risk-standardized readmission rates (RSRRs) for patients discharged from acute-care hospitals for THA/TKA, COPD, and CABG, respectively. These readmission measures, which capture 30-day unplanned inpatient admissions following discharge from a previous admission, joined existing readmission measures for AMI, HF, and pneumonia. The readmission measures are used within the [Hospital Readmission Reduction Program \(HRRP\)](#), a Medicare value-based purchasing program that encourages hospitals to improve communication and care coordination to better engage patients and caregivers in discharge plans and, in turn, reduce avoidable readmissions.¹

Excess Days in Acute Care (EDAC) measures, in contrast to readmission measures, capture a more complete picture of post-discharge outcomes that better informs patients and the public about care quality and incentivizes global improvement in transitional care. EDAC measures have the following advantages over readmission measures: (1) EDAC measures capture all post-discharge outcomes that matter to patients, such as having to return to the hospital as an inpatient, go to the ED, or spend time in the hospital under observation, following an initial inpatient admission. Hospitals with higher rates of observation stays in the post-discharge period may have lower readmission rates that do not fully reflect their quality of care; EDAC measures address this limitation. (2) Because they count days of readmission rather than a binary outcome (i.e., any versus no readmission), EDAC measures capture the full length of stay that can reflect variation in hospital quality. (3) EDAC measures capture multiple events; for example, some patients have multiple hospital visits in 30 days which are not captured by readmission measures. (4) EDAC measures account for time at risk of an event (that is, survival time) whereas readmission measures count patients who die post-discharge (and therefore have less opportunity for readmission) as being at the same risk for readmission as those who survive the full measurement period.

In this report we describe improvements to the existing EDAC measures (AMI, HF, pneumonia), and the development of three new EDAC measures for COPD, CABG, and THA/TKA (inpatient procedures only) using the updated approach. EDAC measure updates are outlined in [Table 2.1.1](#) and these updates have been applied to all EDAC measures described in this report.

Table 2.1.1 – Summary of EDAC Measure Updates as Compared to Prior EDAC Versions

Type of Update	Description of Update	Prior Approach	Reason for Change
Cohort	Includes both Fee-for-Service (FFS) and Medicare Advantage (MA) beneficiaries	Included only FFS beneficiaries	Reflects increasing proportion of MA beneficiaries in the Medicare population and ensures that hospital quality is measured across all Medicare beneficiaries
Weighting of days in the outcome	Emergency Department (ED) visits are now counted as one day; observation stays are counted in hours and rounded up to nearest integer	ED visits were counted as a half day; observation stays were counted in hours and rounded up to nearest half day	Reflects impact and experience of patients, and allows for ease of model computation
Risk adjustment variables	Risk adjustment variables are now primarily individual ICD-10 codes	Variables were defined by CMS' Condition Categories (CC) variables that are groups of ICD-10 codes	Leverage the specificity of ICD-10 codes for better model performance
Model update	Binomial model specification for estimating days in acute care	Hurdle model specification	Computation and model performance advantage
EDAC measure score	Calculated as the ratio between the predicted and expected days in acute care	Calculated as the difference between the predicted and expected days in acute care	Aligns with other CMS publicly reported measures

2.2. Objectives

The objectives of this report are, for all EDAC measures covered in this report, to:

1. Describe the methodology that applies to all EDAC measures.
2. Provide detailed measure specifications for all EDAC measures.
3. Provide measure testing results that demonstrate the measures' reliability and validity.

3. METHODS

3.1. Overview

Below we describe the components of six hospital-level quality measures that capture comprehensive post-discharge outcomes (Excess Days in Care, or EDAC), one each for patients hospitalized for AMI, COPD, CABG, HF, pneumonia, and THA/TKA. The EDAC measures apply to Medicare (FFS and MA) beneficiaries at least 65 years old who have been admitted to a non-federal acute care hospital in the United States (U.S.). These measures were developed and aligned with the cohort definition and risk-adjustment strategy from CMS' related readmission measures for the same conditions and procedures. The EDAC measures report a collective set of adverse outcomes that can occur post-discharge: ED visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge and do not count planned readmissions in the measure outcome since they are generally not a signal of quality of care. Publicly reported versions of these measures will include admissions for Veterans Health Administration (VHA) hospitals, but the measures and the results described in this report do not include them.

The outcome for all EDAC measures is defined as all-cause days spent in acute care (i.e., ED visits, observation stays, and readmissions). The outcome is adjusted to account for age, sex (CABG only), and comorbidities, and incorporates exposure time to account for survival times shorter than 30 days. The final measure score is risk-standardized and reported as the ratio between the predicted and expected number of days in acute care.

3.2. Data Sources

For this report, we use data for index admissions with a discharge date from January 1 to December 30, 2022 (CY 2022) and extracted all necessary data described below. We extracted all claims and beneficiary enrollment data for FFS and MA beneficiaries as well as Medicare provider history data from the CMS Integrated Data Repository (IDR).

- For **cohort** construction the EDAC measures use enrollment data and hospital inpatient claims.
- For **risk adjustment**, the measures use inpatient and outpatient facility, professional, and durable medical equipment (DME) claims data up to 12 months prior to the index admission; age and, when appropriate, sex, are from enrollment data.
- For **outcome** derivation, we use hospital inpatient, outpatient, and professional claims up to 30-days post-index admission.
- To map National Provider Identifier (NPIs) to CMS Certification Number (CCNs) for MA claims where CCNs are not available, we use provider history data that details the association between the CCN and NPI over time.

The hospital inpatient/outpatient claims, professional claims, and DME claims can be identified using the claim types in [Table 3.2.1](#).

Table 3.2.1 – Medicare FFS and Advantage Claim Type Codes

Type of Claim	FFS	Hospital-submitted MA	MAO-submitted (Encounter) MA
Inpatient	60	62, 63, 64	4011, 4041
Outpatient Facility	40	-	4012 – 4014, 4022, 4023, 4034, 4043, 4071 – 4077, 4079, 4083, 4085, 4089
Professional	71, 72	-	4700
DME	81, 82	-	4800

Notably, most MA beneficiary inpatient admissions have two claim submission sources: Medicare Advantage Organization (MAO)-submitted encounter claims and hospital-submitted claims. Both types of claims are information-only (i.e., not billing) that include items and services provided. CMS requires MAOs, and hospitals that receive disproportionate-share hospital or medical education payments from Medicare to submit information-only claims for inpatient stays for MA beneficiaries. We use both sources for cohort and outcome derivation.

There are benefits of including both inpatient claims sources for MA beneficiaries. All hospitals submit inpatient claims to MAO, not all hospitals are required to submit claims for MA beneficiaries (i.e., those that do not receive disproportionate-share hospital or medical education payments from Medicare), so MAO-submitted claims capture additional admissions not found in the hospital-submitted claims. However, there are also benefits in including the hospital-submitted claims. Hospital-submitted claims are timelier than MAO-submitted claims, which is advantageous for reporting deadlines for CMS hospital outcome measures. In addition, a small proportion of admissions were only found in the hospital-submitted claims. Further, unlike MAO-submitted claims which are associated with a NPI, hospital-submitted claims are already associated with a CCN used to identify hospitals in the CMS outcome measures. Therefore, if an admission was found in both datasets, we used the claim found in the hospital-submitted data. For a small portion of admissions with only MAO-submitted claims, we obtained the CCN using the IDR provider history data using the NPI, claim discharge date, provider history begin (effective) date, and provider history end (obsolete) date.

Admissions with only MAO-submitted claims that we could not map to a CCN were not included (<5% of all MA admissions). Because CMS' hospital measures used for public reporting are limited to short-term acute care hospitals and critical access hospitals, we used the CCN taxonomy to further restrict the claims to those filed by acute care hospitals (3rd and 4th digit as '01') and critical access hospitals (3rd and 4th digit as '13').

3.3. Cohort

The cohorts described in this report include hospital inpatient admissions with discharge dates from January 1 to December 30, 2022 (CY 2022). An index admission is the hospitalization to which the EDAC outcome is attributed, and to identify index admissions for the EDAC measures we use the same inclusion and exclusion criteria previously developed for the currently publicly reported FFS-only readmission measures.² We list the inclusion and exclusion criteria that apply to all measures below and show measure-specific criteria in [Table 3.3.1](#). Full inclusion and exclusion criteria for each measure are also provided in [Appendix C](#).

Inclusion Criteria for All EDAC Measures

- Enrolled in Medicare FFS or MA for the 12 months prior to the date of the admission and during the index admission.
- Aged 65 or over.
- Discharged alive from a non-federal short-term acute care hospital.

Exclusion Criteria for All EDAC Measures

- Discharged against medical advice (AMA).
- Without at least 30 days post-discharge enrollment.
- With a principal diagnosis code of COVID-19 (International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM] code U07.1) or with a secondary diagnosis code of COVID-19 coded as present on admission (POA) on the index admission claim.

Table 3.3.1 – Additional Criteria for Specific Cohorts

Measure	Inclusion	Exclusion
AMI	• Having a principal discharge diagnosis of AMI. • Not transferred to another acute care facility.	• Patients admitted and discharged from a hospital on the same calendar day. • AMI admissions within 30 days of discharge from a prior AMI index admission.
CABG	• Having a qualifying isolated CABG surgery* during the index admission.	• Admissions for subsequent qualifying CABG procedures* (any that follow the initial index procedure) during the measurement period.
COPD	• Principal discharge diagnosis of COPD <u>or</u> a principal discharge diagnosis of acute respiratory failure and a secondary diagnosis of COPD with exacerbation. • Not transferred to another acute care facility.	• COPD admissions within 30 days of discharge from a prior COPD index admission.
HF	• Having a principal discharge diagnosis of HF. • Not transferred to another acute care facility.	• Admissions with a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or up to 12 months prior to the index admission. • HF admissions within 30 days of discharge from a prior HF index admission.

Measure	Inclusion	Exclusion
Pneumonia	• Diagnosis coding that meets one of the two following requirements: (1) Principal discharge diagnosis of pneumonia; or (2) Principal discharge diagnosis of sepsis (that is not severe); and a secondary diagnosis of pneumonia coded as POA, but without a secondary diagnosis of sepsis that is both severe and coded as POA. • Not transferred to another acute care facility for the pneumonia.	• Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission.
THA/TKA	• Having a qualifying elective primary THA/TKA inpatient procedure** during the index admission. • Not transferred from another acute care facility for the THA/TKA.	• Patients admitted for the index procedure and subsequently transferred to another acute care facility. • Patients with more than two THA/TKA procedure codes during the index admission. • Admissions for another THA/TKA within 30 days of discharge from a prior THA/TKA index admission.

***Qualifying isolated CABG surgery:**

Isolated CABG surgeries are defined as those CABG procedures performed without the following concomitant valve or other major cardiac, vascular, or thoracic procedures: valve procedures; atrial and/or ventricular septal defects; congenital anomalies; other open cardiac procedures; heart transplants; aorta or other non-cardiac arterial bypass procedures; head, neck, or intracranial vascular procedures; other chest and thoracic procedures.

The CABG surgery EDAC measure uses International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS) codes on claims to define a CABG surgery and to identify a CABG surgery as non-isolated (and disqualify the admission from cohort inclusion). These codes are listed in the [2023 CABG Readmission Measure Code Specifications Supplemental File](#) (the CABG readmission measures and the corresponding CABG EDAC measure use the same code sets).

****Qualifying THA/TKA:**

Elective primary THA/TKA procedures are defined as those THA/TKA procedures without the following: fracture of the pelvis or lower limbs coded in the principal or secondary discharge diagnosis fields on the index admission claim (Note: Periprosthetic fractures must be additionally coded as POA in order to disqualify a THA/TKA from cohort inclusion, unless exempt from POA reporting.); a concurrent partial hip or knee arthroplasty procedure; a concurrent revision, resurfacing, or implanted device/prosthesis removal procedure; mechanical complication coded in the principal discharge diagnosis field on the index admission claim; malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone

marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field on the index admission claim.

The THA/TKA EDAC measure uses ICD-10-PCS codes on claims to define a THA/TKA procedure. It also uses ICD-10-PCS codes as well as ICD-10-CM codes on claims to identify a THA/TKA procedure as non-elective or non-primary (and disqualify the admission from cohort inclusion). These codes are listed in the [2023 THA/TKA Readmission Measure Code Specifications Supplemental File](#) (the THA/TKA readmission measures and the corresponding THA/TKA EDAC measure use the same code sets).

3.4. Outcome Definition

The outcome is defined as the number of days the patient spends in acute care (ED treat-and-release visits, observation stays, and unplanned readmissions) within 30 days after the date of discharge from an index admission (defined separately for each EDAC measure) for any cause.

- **ED visits:** We define an ED visit as a visit with revenue center codes '0450', '0451', '0452', '0456', '0459', or '0981'. See [Table A.1 in Appendix A for the code definitions](#). Each ED visit is counted as one day (1.0 day).
- **Observation stays:** We define an observation stay as a visit with revenue center code '0762' and a Healthcare Common Procedure Coding System (HCPCS) code 'G0378' (in the hospital outpatient data files) or when a facility claim is not available, Current Procedural Terminology (CPT) codes '99217' to '99220' or '99234' to '99236' (in the professional data files). This broad definition captures all post-discharge observation stays in the facility and professional data files. See [Table A.1 in Appendix A for the code definitions](#). Observation stays are recorded in terms of hours and rounded up to the nearest integer of days.
- **Readmission:** We define a readmission as any unplanned acute care hospital inpatient hospitalization within 30 days of the discharge date for the index hospitalization. "Planned" readmissions are those planned by providers for anticipated medical treatment or procedures that must be provided in the inpatient setting. To exclude planned readmissions, we use [CMS' Planned Readmission Algorithm version 4.0 2023](#).³ Readmissions are counted in days. Each rehospitalization is counted according to the length of stay, calculated as the discharge date minus the admission date, plus one day. Admissions that extend beyond the 30-day follow-up period are truncated on day 30. If a patient is readmitted to the same hospital on the same day of discharge for the same diagnosis as the index admission, the measure considers the patient to have had one single continuous admission. However, if the diagnosis of the readmission is different from the index admission, this is considered a readmission in the measure.
- **Overlapping outcomes:** When an ED visit, observation stay, or readmission overlaps with another event, we count only the most severe of the overlapping events. For example, we count only a readmission day if the readmission and either of observation stay or ED happens on the same day; we count only an observation day if the observation stay, and an ED visit happen on the same day.
- **Multiple events:** We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as one day. Similarly, if a patient has two hospitalizations within 30 days, the days spent in each are counted. We take this approach in order to capture the full patient experience in the post-discharge period.

- **COVID-19:** ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-19 (U07.1) on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are removed from the outcome.

3.4.1 30-Day Timeframe

The measure assesses eligible outcomes within a 30-day period from the date of discharge from an index hospitalization. We considered 30 days as a clinically reasonable timeframe for two reasons:

1. Within a 30-day timeframe, ED visits, observation stays, and readmissions are more likely attributable to the care received during the index admission and during the transition to the outpatient setting than outcomes occurring later post-discharge.
2. The 30-day timeframe is consistent with CMS' existing, publicly reported, Consensus-Based Entity-endorsed 30-day readmission measures.

Note that if a readmission or observation stay extends beyond 30 days, only that portion of the stay that occurs during the 30 days is included in the outcome. In addition, note that for patients who did not survive 30 days, we adjusted their total exposure period to reflect the number of days they survived.

3.4.2 All-Cause Days in Acute Care

We measure all-cause acute care utilization for several reasons. First, from the patient perspective, acute care utilization for any cause is undesirable. Second, limiting the measure to acute care utilization for the exacerbation of a specific condition or to a complication for a specific procedure may make it susceptible to gaming. Moreover, it is often hard to ascertain quality concerns and accountability based on the documented cause of a hospital visit.

3.4.3 Transfers

The measure considers multiple contiguous hospitalizations to be a single acute episode-of-care. Admissions to a hospital within one day of discharge from another hospital are considered transfers whether or not the first institution indicates intent to transfer the patient in the discharge disposition code. Days in acute care for transferred patients differ by measure and are outlined below.

AMI, COPD, HF, Pneumonia: For these measures, transfers are attributed to the hospital that ultimately discharges the patient to a non-acute care setting (for example, to home or to a skilled nursing facility). Thus, if a patient is admitted to Hospital A, transferred to Hospital B, and ultimately discharged from Hospital B to a non-acute care setting, all ED visits, observation stays, and readmissions within 30 days of discharge are attributed to Hospital B.

CABG Surgery: For this measure, transfers are attributed to the hospital where the eligible CABG is performed. A transfer from one hospital to another acute care facility after CABG surgery is most likely due to a complication of the CABG procedure or the perioperative care the patient received at the first hospital; and as such, the care provided by the hospital performing the CABG procedure likely dominates risk of the outcome, even among transferred patients. This is true also for patients that are transferred in from another hospital for their CABG surgery. Therefore, in a series of one or more transfers, **the first admission where an eligible CABG procedure was done is included in the cohort**, regardless of whether the patient is transferred in or transferred out. Furthermore, the measure attributes outcomes that occur within 30 days of discharge to the hospital that performed the first

(“index”) CABG surgery, even if it is not the discharging hospital. For example, if a patient is admitted to Hospital A and undergoes CABG surgery, and then is transferred to Hospital B, the Hospital A admission would be included in the cohort, and outcomes that occur within 30 days of discharge from the Hospital B admission would be attributed to Hospital A.

THA/TKA: In contrast with the CABG measure, THA/TKA admissions associated with transfers between two acute-care facilities are not considered (**transfers in from another acute care facility are not included and transfers out to another acute facility are excluded**). In cases where the THA/TKA procedure is performed at the receiving hospital, such procedures are not likely to be elective. When the THA/TKA procedure is performed at the transferring hospital, assignment of the outcome to the appropriate hospital is difficult.

3.4.4 Exposure Time

Because some patients do not survive 30 days from the index admission, not all patients are at risk for an acute event for the same amount of time. We calculated ‘exposure time’ as the number of days each patient survived after discharge, up to 30 days. This exposure time was incorporated as part of the outcome to reflect differential risk for EDAC after discharge. This differs from the existing CMS 30-day readmission measures, which considers all patients to be equally at risk for a hospital event regardless of survival time.

3.5. Risk Model Reselection/Risk Variable Selection

To account for differences in case mix among hospitals, the measures include an adjustment for factors such as age, comorbid diseases, and indicators of patient frailty, which are clinically relevant and have relationships with the outcome. For all six EDAC measures, we used the final risk-adjustment variables from the corresponding readmission measures. We describe the candidate risk variables and the main steps in the variable selection process below.

For candidate risk variables, we included all secondary ICD-10 codes documented as POA during the index admission, with the exception of the palliative care code Z51.5 which, effective October 1, 2021, was considered POA-exempt, and both principal and secondary ICD-10 codes in the 12 months prior to admission from inpatient, outpatient and professional provider claims. For procedure-specific measures, we additionally considered the principal discharge diagnosis code for the index admission. We also considered age, frailty, sex, an indicator for whether the admission was MA vs. FFS, and other non-individual-ICD variables from CMS’ existing publicly reported readmission measures.

The variable selection of individual ICD-10 codes mainly relied on a data-driven approach consisting of three key steps: 1) pre-processing, 2) evaluating variables’ association with outcome, and 3) assessing associations between other non-individual-code variables, including frailty, with the outcome. In pre-processing, we selected index and history (pre-index) codes based on their prevalence and combined pairs of index and pre-index variables based on their correlation with each other and their associations with the outcome. In the second step, we created 1,000 bootstrapped samples from the development cohort and selected variables based on the percentage of times each of the variables was significantly associated with outcome ($p < 0.05$). Age was forced into the model if it was not selected. In the final model, for all measures, we included a claims-based indicator of frailty that was developed for CMS’ Multiple Chronic Conditions (MCC) measure.⁴ Sex was included for the CABG measure only. Lastly, we included other non-individual-ICD variables from the current CMS readmission measures if their regression coefficients were statistically significant when added to the models.

In addition, to be consistent with current CMS policy, we forced the history of COVID-19 variable into the model for all measures. We also included an MA indicator (versus FFS) as a main effect. This was to adjust for the generally higher prevalence of comorbidities in the MA cohort, especially among the pre-index variables that were derived from services in the outpatient setting (e.g. physician visits).

3.6. Statistical Analyses

3.6.1 Statistical Approach to Measure Calculation

For the final risk-adjustment model, we used a hierarchical generalized linear model (HGLM). This consists of a Binomial model specified for days in acute care as a proportion of the number of exposure days (alive days up to 30 days post-discharge) and includes random effects for hospitals. This allowed us to account for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Explicitly, let Y_{ij} denote the number of days in acute care experienced by the i -th patient discharged from the j -th hospital, and ω_{ij} is the patient's exposure time (the number of days alive up to 30). Let π_{ij} denote the probability of receiving acute care per day for the i -th patient discharged from the j -th hospital, the Binomial model is as below:

$$Y_{ij} \sim \text{Bin}(\omega_{ij}, \pi_{ij})$$

$$\text{logit}(\pi_{ij} | X_{ij}) = X_{ij}C + v_j$$

where $v_j \sim N(C_0, \sigma^2)$ denotes the hospital-specific random effect for hospital j . X_{ij} is a vector of patient risk factors, and C is the vector of covariate coefficients.

We estimated the model and used the coefficient vectors C and the random effects v_j to calculate the predicted and expected days in acute care for each index admission, respectively. Specifically, the predicted number of days is calculated as:

$$\text{Predicted } P_{ij} = \text{logit}^{-1}(X_{ij}C + v_j) * \omega_{ij}$$

And, the expected number of days is calculated as:

$$\text{Expected } E_{ij} = \text{logit}^{-1}(X_{ij}C + C_0) * \omega_{ij}$$

where C_0 is the mean of the random effects v_j .

We then calculated the EDAC for the hospital j as:

$$EDAC_j = \sum(P_{ij}) / \sum(E_{ij})$$

where the sum is over all patients at hospital j .

3.6.2 Risk Adjustment Model Performance

To assess model performance, we assessed both model discrimination and calibration.

To assess **discrimination**, we computed two discrimination statistics for the EDAC measures' models, the c-statistic and predictive ability. The **c-statistic** is the probability that predicting the outcome is better than chance, which is a measure of how accurately a statistical model is able to distinguish between a patient with and without an outcome. **Predictive ability** measures the ability to distinguish high-risk subjects from low-risk subjects; therefore, for a model with good predictive ability we would expect to see a wide range in observed outcomes between the lowest and highest deciles of predicted outcomes. To calculate the predictive ability, we calculated the range of mean observed hospital visit ratios between the lowest and highest predicted deciles of hospital visit probabilities.

For model **calibration**, we assessed calibration plots, with mean predicted and mean observed days in acute care plotted against deciles of predicted days in acute care. The closer the predicted days are to the observed days, the better calibrated the model is.

We also calculated the distribution of hospital volume and EDAC measure scores among hospitals. In addition, to provide some insight into the relative contribution of each type of event to the overall outcome, we examined the distribution of days of ED visits, observation stays, and readmissions.

3.6.3 Measure Score Reliability

We calculated hospital-level signal-to-noise reliability to assess the precision of measure scores, using the following formula presented by Adams and colleagues (2010)⁵,

$$\frac{\sigma_{\text{facility-to-facility}}^2}{\sigma_{\text{facility-to-facility}}^2 + \frac{\sigma_{\text{facility-error}}^2}{n}}$$

Facility-to-facility variance is estimated from the hierarchical Binomial model, n is equal to each facility's observed case size, and the facility error variance is estimated using the variance of the logistic distribution ($\pi^2/3$).

We calculated reliability for two, and three years of data, and with three different volume minimums. The 2- and 3-year reliability was calculated by keeping the facility-to-facility variance constant and changing the facility's observed case size to what would be expected for a 2- or 3-year performance period. Signal-to-noise reliability scores can range from 0 to 1. A reliability of zero implies that all the variability in a measure is attributable to measurement error. A reliability of one implies that all the variability is attributable to real difference in performance.

3.6.4 Validity Testing

For the three new EDAC measures (CABG, COPD and THA/TKA), we systematically assessed the face validity of the measure score as an indicator of quality by soliciting the TEP members' agreement, via a survey, with the following statement: "Do you think the Excess Days in Acute Care (EDAC) measure score for [EDAC measure name] is a valid score to use to distinguish better and/or worse performance amongst hospitals?" We measured agreement using a six-point scale (strongly agree, moderately agree, somewhat agree, somewhat disagree, moderately disagree, strongly disagree).

For all measures, we also explored validation through meaningful comparisons with existing quality metrics where we would expect to see a relationship between measure scores. We examined relationships between EDAC measure scores and each related Risk-Standardized Readmission measure², Overall Hospital Quality Star Rating (hereafter "Star Rating")⁶ Standardized Readmission Group Scores (with and without the related readmission or EDAC measure as applicable), Star Rating Standardized Summary Scores (with and without the related readmission measure; and without the entire Readmission group Score). We hypothesized that the EDAC measures would be positively correlated (weakly to moderately) with the related readmission measure, and negatively correlated (weakly to moderately) with Star Rating-related measures. We calculated Pearson's correlation coefficients for the association between each of the EDAC measures and these existing quality measures on the same measured entities; dates of data overlapped but were not identical. We also note that the existing measures capture only FFS patients; the EDAC measures described here and used in these analyses include both FFS and MA patients. For the THA/TKA and CABG EDAC measures, we also examined the relationship between facility volume and measure scores; because there is some evidence for a relationship between volume and outcome for these procedures,^{7,8} we expected that facilities with higher surgical volume would have lower measure scores, and therefore be negatively correlated.

4. RESULTS

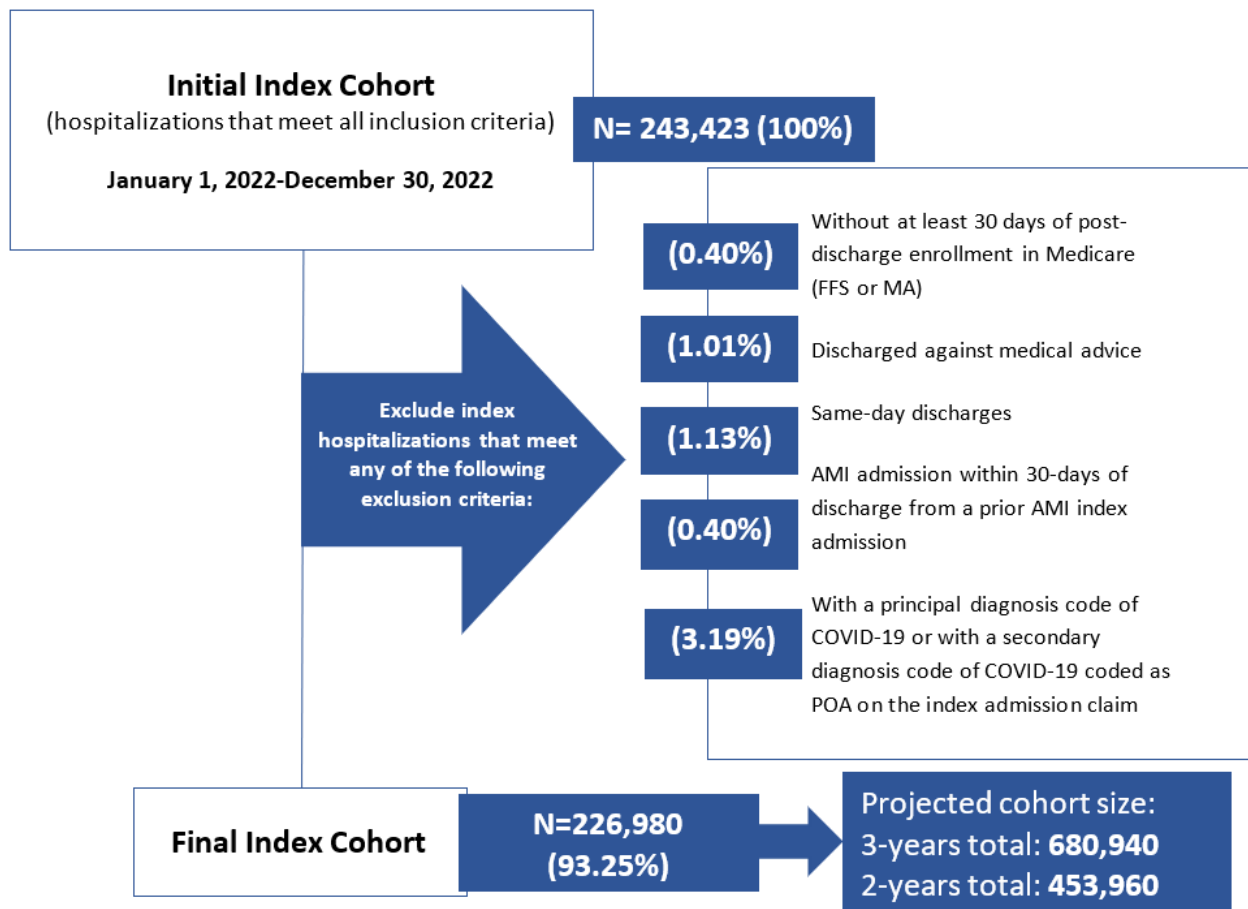
4.1. AMI EDAC Results

4.1.1 AMI EDAC Cohort

The inclusion and exclusion criteria for this measure are presented in [Section 3.3](#). The number and percentage of AMI admissions that met inclusion criteria, as well as each exclusion criterion in the January 1, 2022-December 30, 2022 dataset is presented in [Figure 4.1.1](#). In the 226,980 admissions in the final index cohort, 111,616 (49.2%) are Medicare FFS beneficiaries, and 115,364 (50.8%) are Medicare Advantage beneficiaries.

Admissions may have been counted in more than one exclusion category because they are not mutually exclusive.

Figure 4.1.1 – AMI EDAC Index Cohort January 1, 2022 – December 30, 2022



4.1.2 AMI EDAC Risk Variable Frequencies

[Table 4.1.1](#) shows the frequencies of all risk variables in the AMI measure risk model for the January 1, 2022-December 30, 2022 dataset.

4.1.3 AMI EDAC Model Odds Ratios

[Table 4.1.1](#) shows the risk-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the AMI EDAC model for the one year-period of January 1, 2022-December 30, 2022.

Table 4.1.1 – AMI EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)

Variable	Description	Frequency (%) (N=226,980)	OR (95% CI)
AGE	Age, mean (SD)	76.9 (7.7)	1.01 (1.00-1.01)
ICD-10 codes during the index admission			
D631	Anemia in chronic kidney disease	6.28	1.26 (1.24-1.28)
D638	Anemia in other chronic diseases classified elsewhere	1.80	1.29 (1.26-1.32)
D649	Anemia, unspecified	7.80	1.19 (1.18-1.21)
D72829	Elevated white blood cell count, unspecified	4.27	1.07 (1.04-1.09)
E43	Unspecified severe protein-calorie malnutrition	1.46	1.20 (1.17-1.23)
E782	Mixed hyperlipidemia	8.74	0.90 (0.89-0.92)
E785	Hyperlipidemia, unspecified	60.80	0.92 (0.91-0.93)
E871	Hypo-osmolality and hyponatremia	6.78	1.28 (1.27-1.30)
G250	Essential tremor	0.53	0.86 (0.81-0.91)
G40909	Epilepsy, unspecified, not intractable, without status epilepticus	1.35	1.28 (1.24-1.32)
I10	Essential (primary) hypertension	36.14	0.80 (0.79-0.81)
I120	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease	1.06	1.31 (1.27-1.35)
I313	Pericardial effusion (noninflammatory)	0.73	1.41 (1.36-1.46)
I429	Cardiomyopathy, unspecified	3.66	1.08 (1.06-1.10)
I4891	Unspecified atrial fibrillation	6.35	1.12 (1.10-1.14)
I5021	Acute systolic (congestive) heart failure	5.42	1.19 (1.17-1.21)
I5023	Acute on chronic systolic (congestive) heart failure	6.26	1.22 (1.21-1.24)
I5033	Acute on chronic diastolic (congestive) heart failure	4.03	1.20 (1.18-1.22)
I5043	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure	3.61	1.22 (1.20-1.24)
I513	Intracardiac thrombosis, not elsewhere classified	0.51	1.30 (1.24-1.36)
I5181	Takotsubo syndrome	1.54	0.79 (0.76-0.82)
I739	Peripheral vascular disease, unspecified	4.58	1.09 (1.07-1.11)
N170	Acute kidney failure with tubular necrosis	1.43	1.45 (1.41-1.49)
N179	Acute kidney failure, unspecified	16.96	1.14 (1.13-1.15)
R338	Other retention of urine	0.78	1.34 (1.29-1.39)
R54	Age-related physical debility	0.71	1.19 (1.13-1.24)
R7303	Prediabetes	2.88	0.79 (0.76-0.81)
Z515	Encounter for palliative care	2.98	0.83 (0.81-0.86)
Z66	Do not resuscitate	8.99	0.94 (0.93-0.96)

Variable	Description	Frequency (%) (N=226,980)	OR (95% CI)
ICD-10 codes in the 12 months prior to admission			
D509	Iron deficiency anemia, unspecified	9.00	1.19 (1.18-1.21)
D649	Anemia, unspecified	18.09	1.20 (1.19-1.21)
F17210	Nicotine dependence, cigarettes, uncomplicated	9.00	1.25 (1.23-1.27)
I10	Essential (primary) hypertension	77.38	1.14 (1.13-1.16)
I160	Hypertensive urgency	4.48	1.24 (1.22-1.26)
I2111	ST elevation (STEMI) myocardial infarction involving right coronary artery	4.71	0.87 (0.85-0.89)
I213	ST elevation (STEMI) myocardial infarction of unspecified site	17.82	1.04 (1.03-1.06)
J90	Pleural effusion, not elsewhere classified	11.77	1.22 (1.21-1.23)
Z888	Allergy status to other drugs, medicaments and biological substances	7.16	1.22 (1.21-1.24)
ICD-10 codes either during the index admission or 12 months prior to admission			
E1122	Type 2 diabetes mellitus with diabetic chronic kidney disease	23.56	1.20 (1.18-1.21)
I130	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	20.08	1.12 (1.11-1.13)
I350	Nonrheumatic aortic (valve) stenosis	9.28	1.11 (1.10-1.13)
I480	Paroxysmal atrial fibrillation	18.15	1.18 (1.17-1.20)
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	7.20	1.25 (1.23-1.27)
Other risk variables			
AMI_ANT	Anterior myocardial infarction	7.53	1.20 (1.17-1.22)
AMI_OTH	Non-anterior location of myocardial infarction	14.30	1.05 (1.03-1.06)
HXCABG	History of PTCA	15.46	1.00 (0.99-1.01)
HXPTCA	History of CABG	27.35	1.02 (1.01-1.03)
HX_COVID	History of COVID-19	15.23	1.06 (1.05-1.07)
MA	MA (versus FFS)	50.83	1.03 (1.02-1.04)
MCCFI	Multiple Chronic Conditions Frailty Index	22.52	1.29 (1.28-1.30)

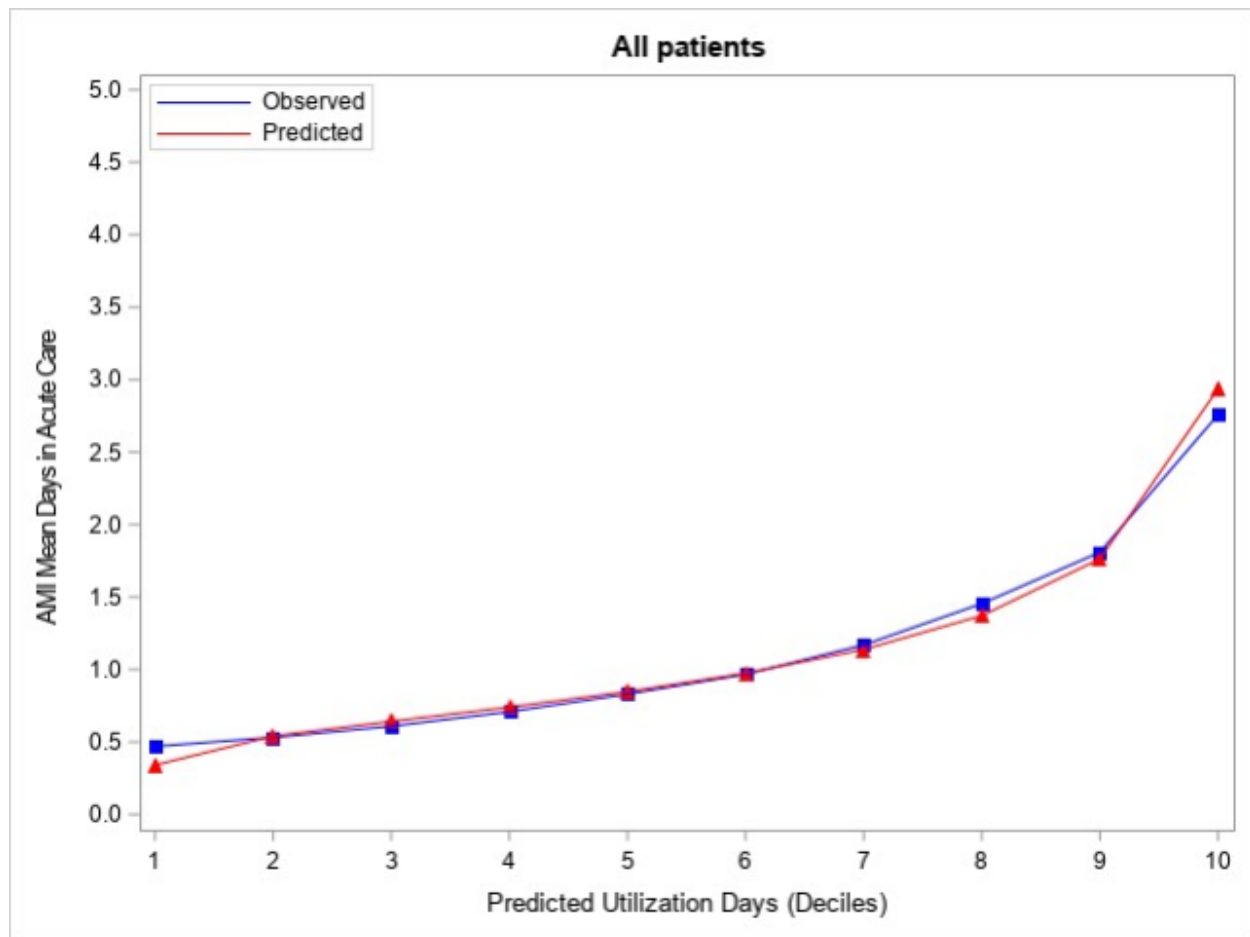
4.1.4 AMI EDAC Model Performance

[Table 4.1.2](#) shows model performance statistics (c-statistic and predictive ability); [Figure 4.1.2](#) shows the risk-decile plot for all patients in the AMI cohort.

Table 4.1.2 – AMI EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)

Statistic	Value
C-statistic	0.677
Predictive ability	1.4%-10.1%

Figure 4.1.2 – AMI EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=226,980 admissions)



4.1.5 AMI EDAC Distribution of Hospital Volume

For the January 1, 2022–December 30, 2022 dataset:

- [Table 4.1.3](#) shows the distribution of hospital admission volume.
- [Table 4.1.4](#) shows the hospital-level distribution of unadjusted outcomes. The national mean AMI *observed* days in acute care for the January 1, 2022–December 30, 2022 dataset was 115.63 days per 100 discharges.
- [Table 4.1.5](#) shows the distribution of hospital-level AMI EDAC measure scores.
- [Figure 4.1.3](#) shows the overall distribution of hospital-level AMI EDAC measure scores.

Table 4.1.3 – AMI EDAC: Distribution of Hospital Admission Volume

Characteristic	January 1, 2022-December 30, 2022
Number of hospitals	3,333
Mean number of admissions (SD)	68.1 (91.6)
Range (min.-max.)	817 (1-818)
25th percentile	3
50th percentile	29
75th percentile	102

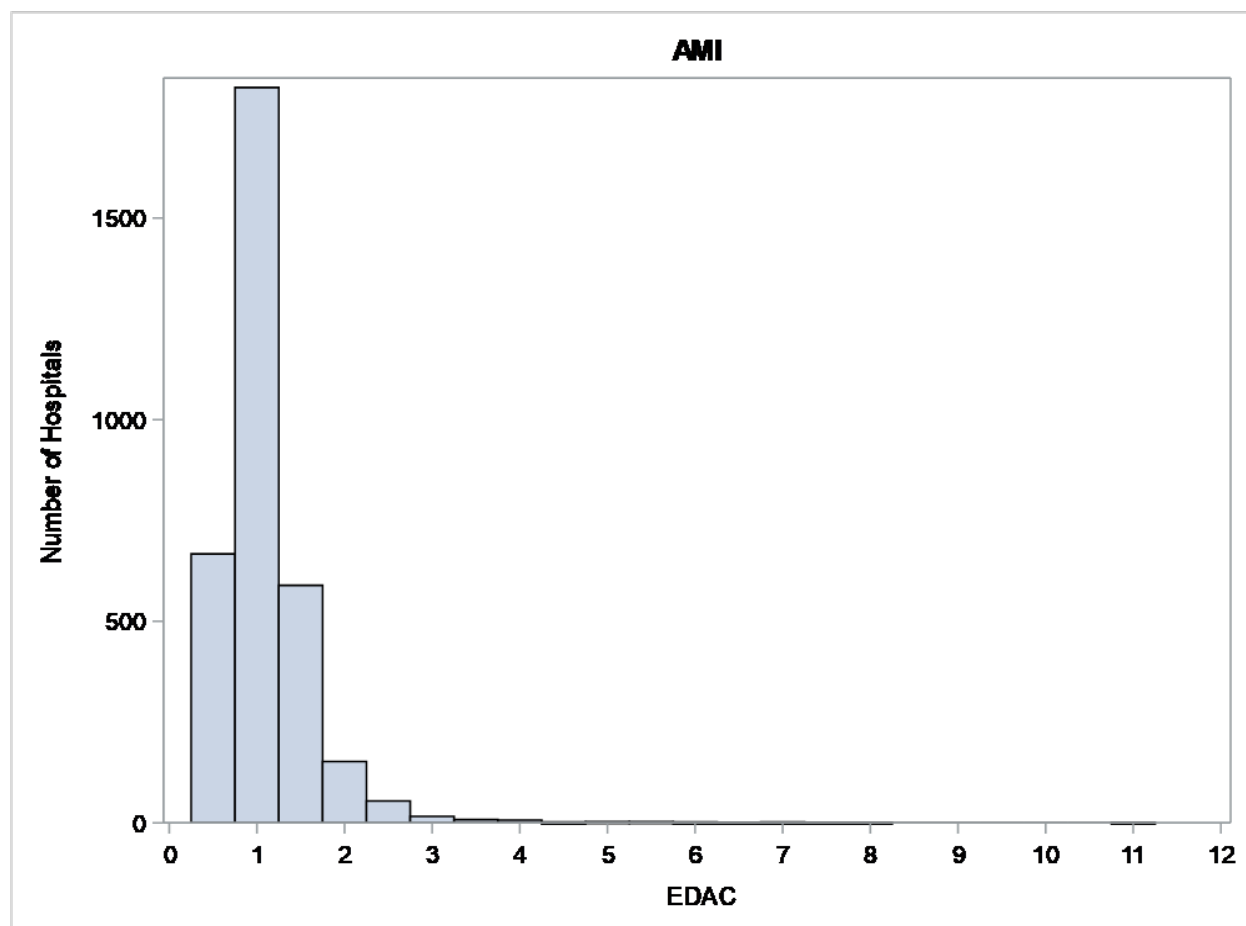
Table 4.1.4 – AMI EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=3,333 hospitals)

Characteristic	Mean (SD)	Median (Q1, Q3)	Range
Observed Days in Acute Care	115.63 (128.57)	100.00 (51.81, 141.38)	2,200.00
ED Days	22.35 (30.48)	17.29 (7.55, 25.00)	400.00
Observation Days	17.47 (34.74)	9.84 (0.00, 19.35)	600.00
Readmission Days	84.19 (119.86)	70.00 (0.00, 106.98)	2,200.00

Table 4.1.5 – AMI EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one AMI admission)

Characteristic	AMI EDAC Measure Score
Number of hospitals	3,333
Mean (SD)	1.10 (0.58)
Range (min.-max.)	10.71 (0.28-11.00)
25th percentile	0.79
50th percentile	0.97
75th percentile	1.25

Figure 4.1.3 – AMI EDAC: Measure Score Distribution, January 1, 2022–December 30, 2022, for hospitals with at least one AMI admission (N=3,333)



4.1.6 AMI EDAC Measure Score Variance and Reliability

[Table 4.1.6](#) shows the between-hospital variance.

[Table 4.1.7](#) and [4.1.8](#) show the distribution of facility-level signal-to-noise reliability (see [Methods](#) section for details) for different minimum case volumes for the AMI EDAC measure, for two- and three-year projections from one year of data (January 1, 2022-December 30, 2022).

Table 4.1.6 – AMI EDAC: Between-Hospital Variance

Characteristic	Value
Between-hospital variance (SE)	0.242 (0.010)

Table 4.1.7 – AMI EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)

Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.650 (0.320)	0.128-0.992	0.306	0.810	0.938
>=25	0.899 (0.080)	0.657-0.992	0.869	0.927	0.958
>=50	0.922 (0.049)	0.786-0.992	0.897	0.935	0.960
>=100	0.941 (0.028)	0.880-0.992	0.920	0.946	0.964

Table 4.1.8 – AMI EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)

Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.700 (0.298)	0.181-0.995	0.399	0.865	0.958
>=25	0.916 (0.078)	0.665-0.995	0.894	0.947	0.970
>=50	0.936 (0.048)	0.790-0.995	0.917	0.952	0.972
>=100	0.953 (0.027)	0.883-0.995	0.936	0.959	0.974

4.1.7 AMI EDAC Measure Validity

Empiric Validity

[Table 4.1.9](#) provides Pearson correlation coefficients that show the relationship between the AMI EDAC measure score and related measures (see [Methods](#) section for details).

Table 4.1.9 – AMI EDAC: Association (Pearson Correlation Coefficients) between AMI EDAC Measure Scores and Comparator Measures (AMI EDAC dates: January 1, 2022-December 30, 2022)

Comparison Measure	Number of Hospitals	Pearson Correlation Coefficient	p-value
Risk-Standardized AMI Readmission	3,159	0.125	<.0001
Star Rating Standardized Readmission Group Scores	3,264	-0.103	<.0001
Star Rating Standardized Readmission Group Scores Excluding AMI Readmission	3,264	-0.088	<.0001
Star Rating Standardized Summary Scores	3,290	-0.094	<.0001
Star Rating Standardized Summary Scores Excluding AMI Readmission	3,290	-0.088	<.0001
Star Rating Standardized Summary Scores Excluding Readmission Measure Group	3,290	-0.063	.0003

Star Rating Data from the July 2024 release on Hospital Compare.

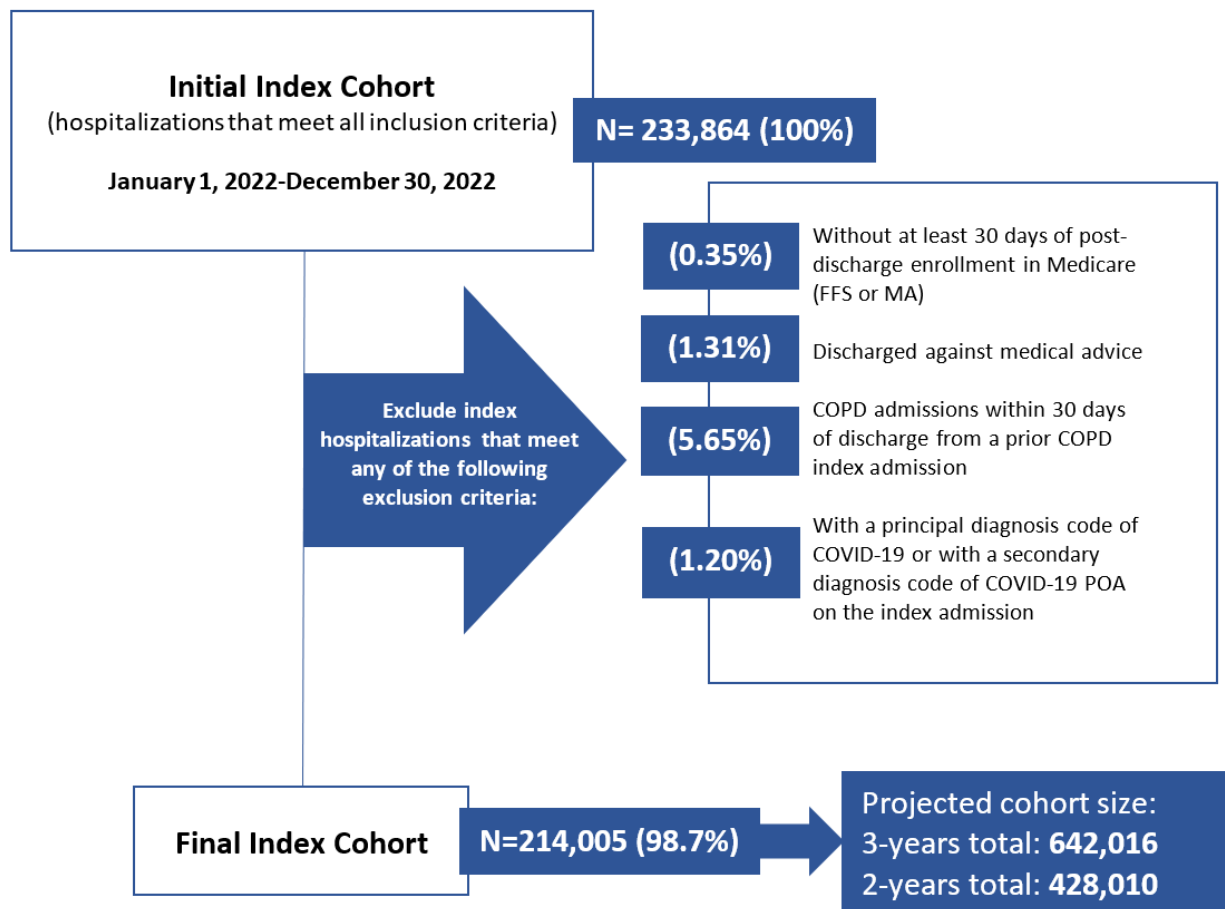
4.2. COPD EDAC Results

4.2.1 COPD EDAC Cohort

The inclusion and exclusion criteria for this measure are presented in [Section 3.3](#). The number and percentage of COPD admissions that met inclusion criteria, as well as each exclusion criterion in the January 1, 2022-December 30, 2022 dataset is presented in [Figure 4.2.1](#). In the 214,005 admissions in the final index cohort, 103,485 (48.4%) are Medicare FFS beneficiaries, and 110,520 (51.6%) are Medicare Advantage beneficiaries.

Admissions may have been counted in more than one exclusion category because they are not mutually exclusive.

Figure 4.2.1 – COPD EDAC Index Cohort January 1, 2022 – December 30, 2022



4.2.2 COPD EDAC Risk Variable Frequencies

[Table 4.2.1](#) shows the frequencies of all risk variables in the COPD EDAC measure risk model for the January 1, 2022-December 30, 2022 dataset.

4.2.3 COPD EDAC Odds Ratios

Table 4.2.1 shows the risk-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the COPD EDAC model over for the one year-period of January 1, 2022-December 30, 2022.

Table 4.2.1 – COPD EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)

Variable	Description	Frequency (%) (N=214,005)	OR (95% CI)
AGE	Age, mean (SD)	75.5 (7.2)	1.00 (1.00 -1.00)
ICD-10 codes during the index admission			
B9789	Other viral agents as the cause of diseases classified elsewhere	0.92	0.81 (0.77-0.84)
C3411	Malignant neoplasm of upper lobe, right bronchus or lung	0.53	1.19 (1.14-1.24)
D649	Anemia, unspecified	8.93	1.10 (1.09-1.12)
D751	Secondary polycythemia	0.75	0.76 (0.72-0.80)
E875	Hyperkalemia	5.13	1.22 (1.20-1.24)
F17210	Nicotine dependence, cigarettes, uncomplicated	23.82	0.92 (0.90-0.93)
G629	Polyneuropathy, unspecified	2.84	1.05 (1.03-1.08)
G928	Other toxic encephalopathy	1.12	1.01 (0.98-1.04)
I480	Paroxysmal atrial fibrillation	11.24	1.19 (1.18-1.21)
I4891	Unspecified atrial fibrillation	7.97	1.12 (1.11-1.14)
I5031	Acute diastolic (congestive) heart failure	0.93	1.20 (1.16-1.24)
J101	Influenza due to other identified influenza virus with other respiratory manifestations	1.63	0.83 (0.81-0.86)
J209	Acute bronchitis, unspecified	5.57	0.86 (0.85-0.88)
J90	Pleural effusion, not elsewhere classified	2.37	1.21 (1.19-1.24)
Z515	Encounter for palliative care	4.04	0.85 (0.83-0.87)
Z66	Do not resuscitate	14.01	0.92 (0.91-0.93)
Z720	Tobacco use	0.97	0.91 (0.87-0.95)
Z7984	Long term (current) use of oral hypoglycemic drugs	10.29	0.89 (0.88-0.91)
Z87891	Personal history of nicotine dependence	42.94	0.93 (0.92-0.93)
ICD-10 codes in the 12 months prior to admission			
D649	Anemia, unspecified	26.93	1.16 (1.15-1.17)
E440	Moderate protein-calorie malnutrition	3.71	1.14 (1.13-1.16)
E871	Hypo-osmolality and hyponatremia	14.58	1.13 (1.12-1.14)
F17210	Nicotine dependence, cigarettes, uncomplicated	29.51	1.08 (1.07-1.09)
F32A	Depression, unspecified	16.77	1.08 (1.07-1.09)
F410	Panic disorder [episodic paroxysmal anxiety]	2.58	1.11 (1.09-1.13)
F419	Anxiety disorder, unspecified	28.08	1.07 (1.06-1.08)
H9190	Unspecified hearing loss, unspecified ear	3.15	1.10 (1.08-1.12)
I160	Hypertensive urgency	3.93	1.09 (1.07-1.10)
I509	Heart failure, unspecified	32.55	1.16 (1.15-1.17)

Variable	Description	Frequency (%) (N=214,005)	OR (95% CI)
J440	Chronic obstructive pulmonary disease with (acute) lower respiratory infection	25.58	1.06 (1.05-1.07)
J449	Chronic obstructive pulmonary disease, unspecified	82.77	1.08 (1.07-1.09)
J8410	Pulmonary fibrosis, unspecified	6.48	1.12 (1.10-1.13)
J90	Pleural effusion, not elsewhere classified	19.17	1.18 (1.17-1.19)
J9600	Acute respiratory failure, unspecified whether with hypoxia or hypercapnia	9.27	1.05 (1.04-1.06)
J9602	Acute respiratory failure with hypercapnia	12.40	1.07 (1.06-1.09)
J9620	Acute and chronic respiratory failure, unspecified whether with hypoxia or hypercapnia	7.81	1.06 (1.04-1.07)
J9621	Acute and chronic respiratory failure with hypoxia	31.71	1.06 (1.05-1.08)
J9622	Acute and chronic respiratory failure with hypercapnia	16.21	1.08 (1.07-1.09)
M542	Cervicalgia	9.44	1.06 (1.05-1.07)
M7989	Other specified soft tissue disorders	11.16	1.11 (1.10-1.13)
R0689	Other abnormalities of breathing	5.63	1.10 (1.09-1.12)
R079	Chest pain, unspecified	38.19	1.11 (1.10-1.12)
R0902	Hypoxemia	32.14	0.99 (0.99-1.00)
R1084	Generalized abdominal pain	5.10	1.18 (1.16-1.20)
R627	Adult failure to thrive	2.70	1.22 (1.20-1.24)
R918	Other nonspecific abnormal finding of lung field	46.08	1.10 (1.09-1.11)
T380X5A	Adverse effect of glucocorticoids and synthetic analogues, initial encounter	6.07	1.10 (1.09-1.12)
Z0000	Encounter for general adult medical examination without abnormal findings	19.81	0.95 (0.94-0.96)
Z1231	Encounter for screening mammogram for malignant neoplasm of breast	12.44	0.83 (0.82-0.84)
Z515	Encounter for palliative care	5.27	1.11 (1.09-1.13)
Z716	Tobacco abuse counseling	3.30	1.09 (1.07-1.11)
Z7951	Long term (current) use of inhaled steroids	24.61	1.06 (1.05-1.07)
Z7952	Long term (current) use of systemic steroids	11.86	1.16 (1.15-1.18)
Z9114	Patient's other noncompliance with medication regimen	4.18	1.23 (1.21-1.25)
Z9119	Patient's noncompliance with other medical treatment and regimen	5.54	1.17 (1.15-1.18)
Z9981	Dependence on supplemental oxygen	34.44	1.08 (1.07-1.09)
ICD-10 codes either during the index admission or 12 months prior to admission			
C3490	Malignant neoplasm of unspecified part of unspecified bronchus or lung	5.77	1.16 (1.15-1.18)
E1122	Type 2 diabetes mellitus with diabetic chronic kidney disease	16.08	1.15 (1.14-1.16)
N184	Chronic kidney disease, stage 4 (severe)	5.06	1.21 (1.19-1.23)
N2581	Secondary hyperparathyroidism of renal origin	2.97	1.22 (1.19-1.24)

Variable	Description	Frequency (%) (N=214,005)	OR (95% CI)
Other risk variables			
MCCFI	Multiple Chronic Conditions Frailty Index	61.60	1.22 (1.21-1.23)
HX_SA	Sleep-disordered breathing	27.17	0.96 (0.95-0.97)
HX_MV	History of mechanical ventilation	15.51	1.07 (1.06-1.08)
HX_COVID	History of COVID-19	23.47	1.02 (1.01-1.02)
MA	MA (versus FFS)	51.64	0.98 (0.97-0.98)

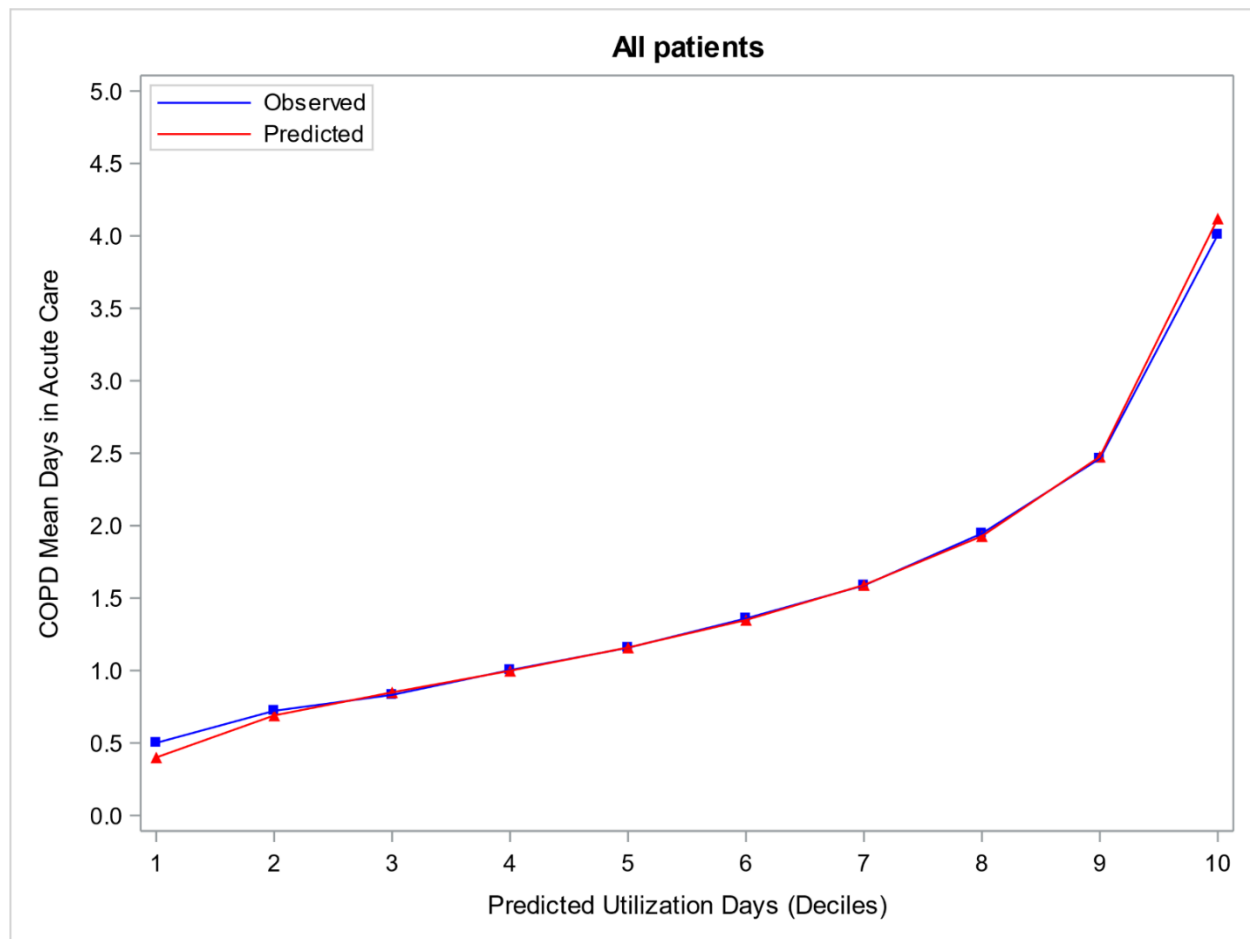
4.2.4 COPD EDAC Model Performance

[Table 4.2.2](#) shows model performance statistics (c-statistic and predictive ability); [Figure 4.2.2](#) shows the risk-decile plot for all patients in the COPD EDAC cohort.

Table 4.2.2 – COPD EDAC: C-Statistic and Predictive Ability (January 1, 2022 –December 30, 2022)

Statistic	Value
C-statistic	0.660
Predictive ability	1.6%-13.9%

Figure 4.2.2 – COPD EDAC: Risk-Decile Plot, January 1, 2022 – December 30, 2022 (N=214,005 admissions)



4.2.5 COPD EDAC Distribution of Hospital Volume

For the January 1, 2022-December 30, 2022 dataset:

- [Table 4.2.3](#) shows the distribution of hospital admission volume.
- [Table 4.2.4](#) shows the hospital-level distribution of unadjusted outcomes. The national mean COPD *observed* days in acute care for the January 1, 2022-December 30, 2022 dataset was 137.57 days per 100 discharges.
- [Table 4.2.5](#) shows the distribution of hospital-level COPD EDAC measure scores.
- [Figure 4.2.3](#) shows the overall distribution of hospital-level COPD EDAC measure scores.

Table 4.2.3 – COPD EDAC: Distribution of Hospital Admission Volume

Characteristic	January 1, 2022-December 30, 2022
Number of hospitals	4,269
Mean number of admissions (SD)	50.1 (57.9)
Range (min.-max.)	669 (1-670)
25th percentile	9
50th percentile	28
75th percentile	74

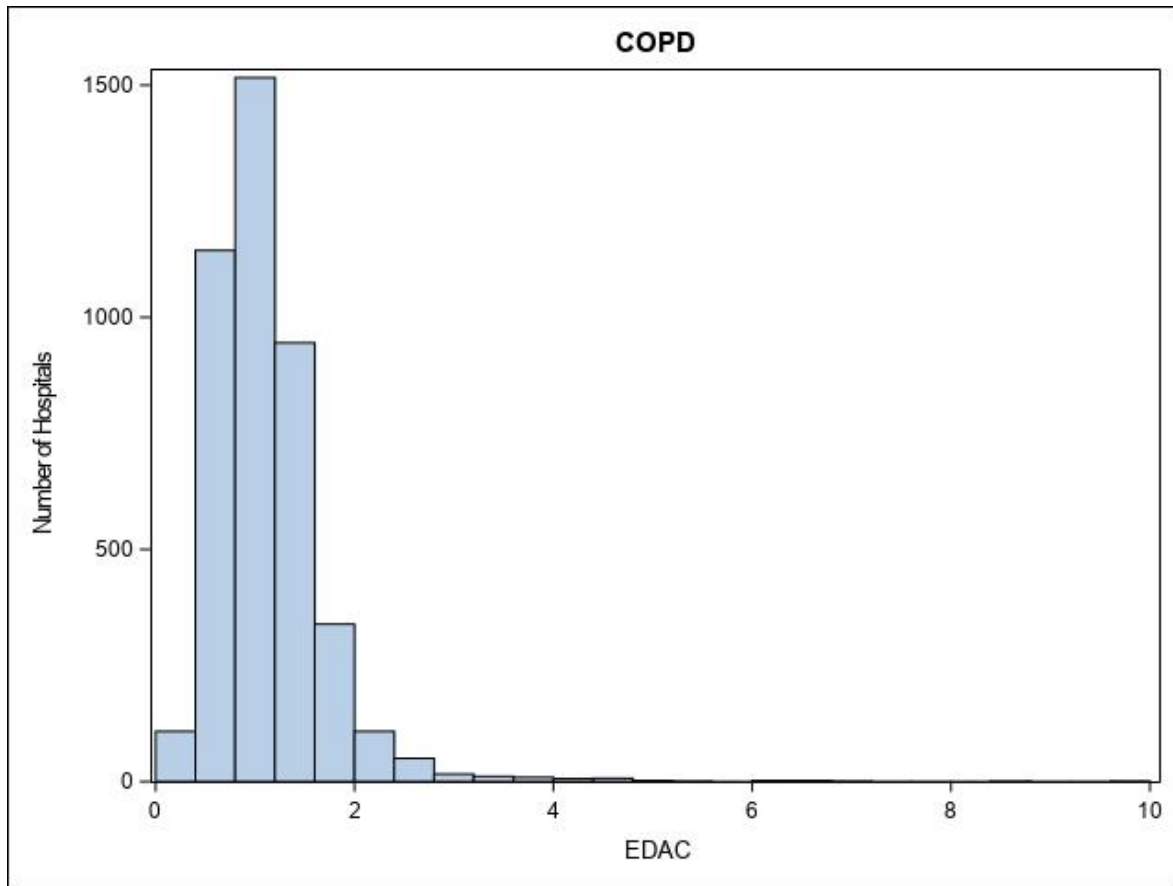
Table 4.2.4 – COPD EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=4,296)

Characteristic	Mean (SD)	Median (Q1, Q3)	Range
Observed Days in Acute Care	137.57 (120.07)	132.26 (73.33, 179.79)	3,000.00
ED Days	22.57 (21.36)	18.68 (11.43, 28.57)	300.00
Observation Days	13.76 (22.18)	9.09 (0.00, 18.52)	500.00
Readmission Days	109.89 (114.98)	103.25 (45.45, 150.00)	3,000.00

Table 4.2.5 – COPD EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022–December 30, 2022 (hospitals with at least one COPD admission)

Characteristic	COPD EDAC Measure Score
Number of hospitals	4,269
Mean (SD)	1.12 (0.59)
Range (min.-max.)	9.62 (0.23, 9.85)
25th percentile	0.75
50th percentile	1.03
75th percentile	1.34

Figure 4.2.3 – COPD EDAC: Measure Score Distribution, January 1, 2022–December 30, 2022, for hospitals with at least one admission (N=4,269 hospitals)



4.2.6 COPD EDAC Measure Score Variance and Reliability

[Table 4.2.6](#) shows the between-hospital variance.

[Tables 4.2.7](#) and [4.2.8](#) show the distribution of facility-level signal-to-noise reliability (see [Methods](#) section for details) for different minimum case volumes for the COPD EDAC measure, for two- and three-year projections from one year of data (January 1, 2022-December 30, 2022).

Table 4.2.6 – COPD EDAC: Between-Hospital Variance

Characteristic	Value
Between-hospital variance (SE)	0.298 (0.010)

Table 4.2.7 – COPD EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)

Minium Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.748 (0.228)	0.154-0.992	0.620	0.836	0.931
>=25	0.882 (0.078)	0.702-0.992	0.830	0.907	0.945
>=50	0.918 (0.043)	0.819-0.992	0.889	0.927	0.951
>=100	0.942 (0.021)	0.901-0.992	0.925	0.942	0.959

Table 4.2.8 – COPD EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)

Minium Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.800 (0.204)	0.214-0.995	0.710	0.884	0.953
>=25	0.898 (0.078)	0.710-0.995	0.845	0.927	0.960
>=50	0.929 (0.045)	0.822-0.995	0.900	0.943	0.965
>=100	0.951 (0.022)	0.902-0.995	0.935	0.955	0.969

4.2.7 COPD EDAC Measure Validity

Face Validity

[Table 4.2.9](#) shows the results of the TEP face validity vote, where [TEP members](#) indicated their agreement with the following statement: “Do you think the Excess Days in Acute Care (EDAC) measure score [for COPD EDAC] is a valid score to use to distinguish better and/or worse performance amongst hospitals?” Twelve TEP members responded to the TEP survey; 11 of 12 (91.7%) agreed (strongly, moderately, or somewhat) with the face validity of the measure.

Table 4.2.9 – COPD EDAC: TEP Face Validity Voting Results

Response Category	Number	Frequency
Strongly Disagree	0	0%
Moderately Disagree	0	0%
Somewhat Disagree	1	8.3%
Somewhat Agree	3	25.0%
Moderately Agree	6	50.0%
Strongly Agree	2	16.7%

Empiric Validity

[Table 4.2.10](#) provides Pearson correlation coefficients that show the relationship between the COPD EDAC measure score and related measures (see [Methods](#) section for details).

Table 4.2.10 – COPD EDAC: Association (Pearson Correlation Coefficients) between COPD EDAC Measure Scores and Comparator Measures (COPD EDAC dates: January 1, 2022-December 30, 2022)

Comparison Measure	Number of Hospitals	Pearson Correlation Coefficient	p-value
Risk-Standardized COPD Readmission	4,166	0.145	<.0001
Star Rating Standardized Readmission Group Scores	4,064	-0.200	<.0001
Star Rating Standardized Readmission Group Scores Excluding COPD Readmission	4,064	-0.190	<.0001
Star Rating Standardized Summary Scores	4,184	-0.145	<.0001
Star Rating Standardized Summary Scores Excluding COPD Readmission	4,184	-0.142	<.0001
Star Rating Standardized Summary Scores Excluding Readmission Measure Group	4,184	-0.083	<.0001

Star Rating Data from the July 2024 release on Hospital Compare.

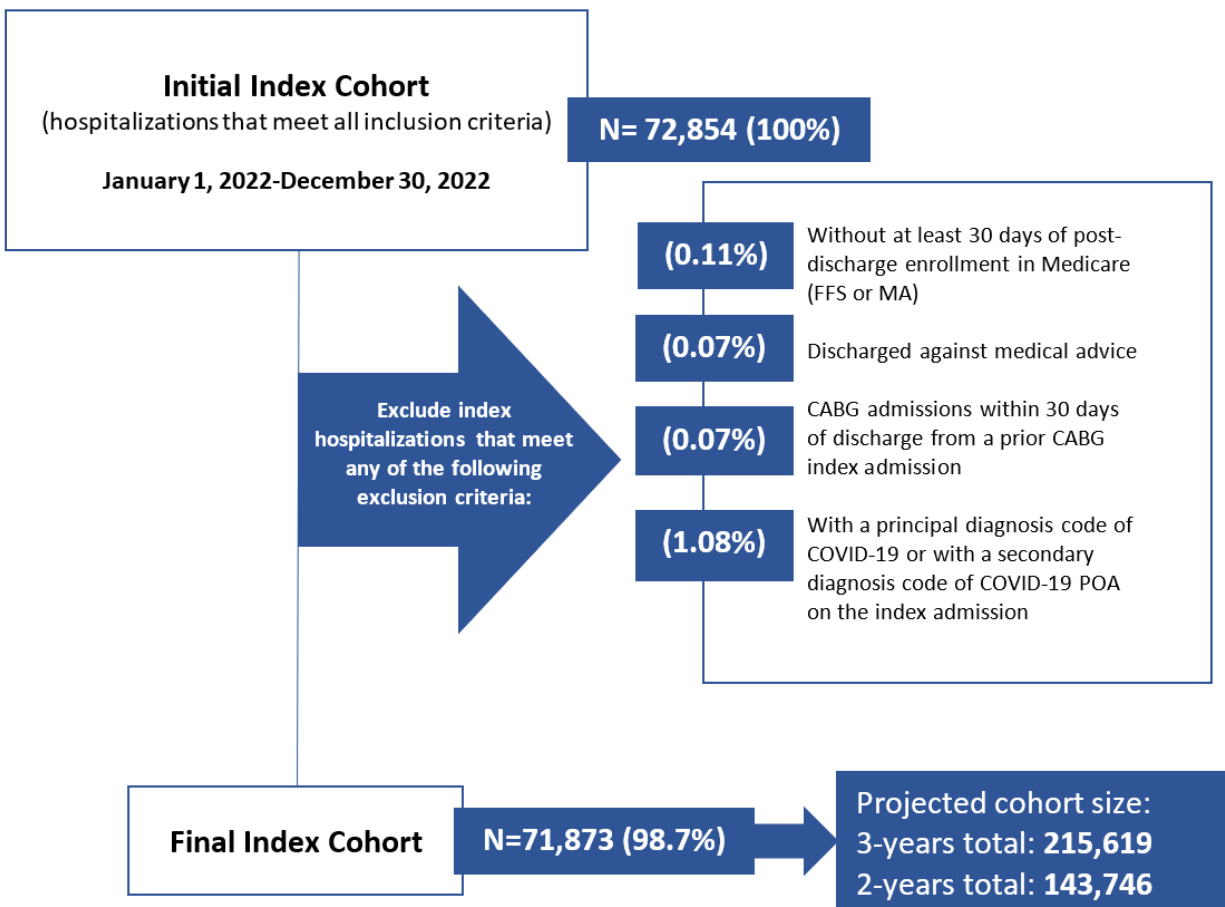
4.3. CABG EDAC Results

4.3.1 CABG EDAC Cohort

The inclusion and exclusion criteria for this measure are presented in [Section 3.3](#). The number and percentage of CABG admissions that met inclusion criteria, as well as each exclusion criterion in the January 1, 2022–December 30, 2022, dataset is presented in [Figure 4.3.1](#). In the 71,873 admissions in the final index cohort, 36,121 (50.3%) are Medicare FFS beneficiaries, and 35,752 (49.7%) are Medicare Advantage beneficiaries.

Admissions may have been counted in more than one exclusion category because they are not mutually exclusive.

Figure 4.3.1 – CABG EDAC Index Cohort January 1, 2022–December 30, 2022



4.3.2 CABG EDAC Risk Variable Frequencies

[Table 4.3.1](#) shows the frequencies of all risk variables in the CABG EDAC measure risk model for the January 1, 2022–December 30, 2022 dataset.

4.3.3 CABG EDAC and Odds Ratios

Table 4.3.1 shows the risk-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the CABG EDAC model over for the one year-period of January 1, 2022-December 30, 2022.

Table 4.3.1 – CABG EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)

Variable	Description	Frequency (%) (N=71,873)	OR (95% CI)
AGE	Age, mean (SD)	73.3 (5.2)	1.02 (1.02-1.02)
ICD-10 codes during the index admission			
E8339	Other disorders of phosphorus metabolism	0.98	1.38 (1.30- 1.47)
I10	Essential (primary) hypertension	47.04	0.84 (0.82-0.85)
I161	Hypertensive emergency	1.17	1.35 (1.27-1.43)
I2109	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall	0.75	1.40 (1.30-1.51)
I313	Pericardial effusion (noninflammatory)	0.61	1.24 (1.14-1.35)
I319	Disease of pericardium, unspecified	0.57	1.17 (1.07-1.12)
J189	Pneumonia, unspecified organism	1.18	1.27 (1.20-1.35)
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	0.58	1.33 (1.23-1.44)
J449	Chronic obstructive pulmonary disease, unspecified	11.35	1.09 (1.07-1.12)
K5900	Constipation, unspecified	2.65	1.05 (1.00-1.10)
M1990	Unspecified osteoarthritis, unspecified site	8.24	0.85 (0.82-0.87)
N170	Acute kidney failure with tubular necrosis	1.13	1.24 (1.17-1.32)
N179	Acute kidney failure, unspecified	7.89	1.15 (1.12-1.18)
Z6842	Body mass index [BMI] 45.0-49.9, adult	0.86	1.39 (1.30-1.49)
Z7901	Long term (current) use of anticoagulants	9.27	1.27 (1.24-1.30)
Z7982	Long term (current) use of aspirin	48.07	0.80 (0.78-0.81)
Z79899	Other long term (current) drug therapy	32.77	0.85 (0.83-0.92)
Z87891	Personal history of nicotine dependence	33.60	0.91 (0.89-0.92)
Z9114	Patient's other noncompliance with medication regimen	0.72	1.35 (1.25-1.46)
ICD-10 codes in the 12 months prior to admission			
D649	Anemia, unspecified	12.50	1.14 (1.11-1.16)
E1140	Type 2 diabetes mellitus with diabetic neuropathy, unspecified	7.31	1.19 (1.15-1.22)
E1169	Type 2 diabetes mellitus with other specified complication	8.52	1.01 (0.99-1.04)
E860	Dehydration	3.42	1.31 (1.27-1.36)
I081	Rheumatic disorders of both mitral and tricuspid valves	3.45	1.01 (0.97-1.05)
I160	Hypertensive urgency	3.12	1.20 (1.16-1.25)
I739	Peripheral vascular disease, unspecified	14.17	1.08 (1.06-1.10)
I959	Hypotension, unspecified	3.69	1.24 (1.20-1.28)
J449	Chronic obstructive pulmonary disease, unspecified	13.39	1.21 (1.18-1.24)
N289	Disorder of kidney and ureter, unspecified	3.13	0.99 (0.95-1.03)

Variable	Description	Frequency (%) (N=71,873)	OR (95% CI)
R059	Cough, unspecified	9.20	1.13 (1.10-1.16)
R0602	Shortness of breath	37.80	1.08 (1.06-1.10)
R109	Unspecified abdominal pain	7.62	1.24 (1.21-1.28)
R300	Dysuria	2.99	1.01 (0.97-1.06)
Z0000	Encounter for general adult medical examination without abnormal findings	24.83	0.91 (0.89-0.93)
Z125	Encounter for screening for malignant neoplasm of prostate	10.67	0.96 (0.93-0.99)
ICD-10 codes either during the index admission or 12 months prior to admission			
E1151	Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene	11.98	1.16 (1.13-1.19)
E1165	Type 2 diabetes mellitus with hyperglycemia	26.56	1.11 (1.09-1.13)
E6601	Morbid (severe) obesity due to excess calories	11.19	1.17 (1.14-1.20)
E871	Hypo-osmolality and hyponatremia	8.10	1.16 (1.13-1.19)
I130	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	12.30	1.32 (1.29-1.35)
I25118	Atherosclerotic heart disease of native coronary artery with other forms of angina pectoris	31.93	0.94 (0.93-0.96)
Z6841	Body mass index [BMI] 40.0-44.9, adult	4.76	1.29 (1.24-1.33)
Other risk variables			
MCCFI	MCC Frailty	7.21	1.22 (1.19-1.25)
MALE	Male	74.27	0.78 (0.77-0.80)
HX_SHOCK	Cardiogenic Shock	7.82	1.31 (1.28-1.35)
HX_COVID	History of COVID	16.66	1.01 (0.99-1.03)
MA	MA (versus FFS)	49.74	1.12 (1.10-1.14)

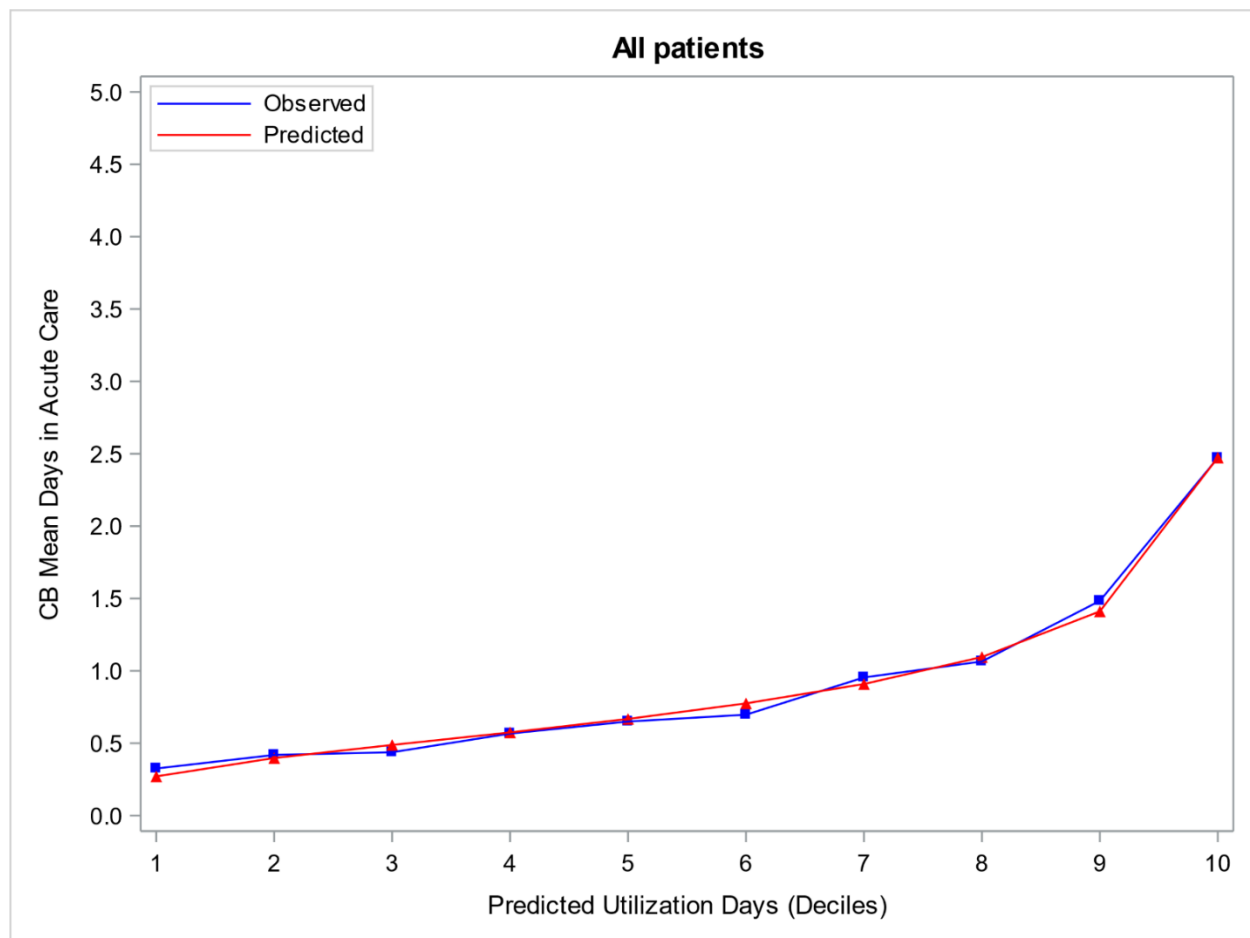
4.3.4 CABG EDAC Model Performance

[Table 4.3.2](#) shows model performance statistics (c-statistic and predictive ability); [Figure 4.3.2](#) shows the risk-decile plot for all patients in the CABG EDAC cohort.

Table 4.3.2 – CABG EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)

Statistic	Value
C-statistic	0.652
Predictive ability	1.0%-8.5%

Figure 4.3.2 – CABG EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=71,873 patients)



4.3.5 CABG EDAC Distribution of Hospital Volume

For the January 1, 2022–December 30, 2022 dataset:

- [Table 4.3.3](#) shows the distribution of hospital admission volume.
- [Table 4.3.4](#) shows the hospital-level distribution of unadjusted outcomes. The national mean CABG *observed* days in acute care for the January 1, 2022–December 30, 2022 dataset was 100.25 days per 100 discharges.
- [Table 4.3.5](#) shows the distribution of hospital-level CABG EDAC measure scores.
- [Figure 4.3.3](#) shows the overall distribution of hospital-level CABG EDAC measure scores.

Table 4.3.3 – CABG EDAC: Distribution of Hospital Admission Volume

Characteristic	January 1, 2022-December 30, 2022
Number of hospitals	1,070
Mean number of admissions (SD)	67.2 (57.7)
Range number of admissions (min.-max.)	490 (1-491)
25th percentile	28
50th percentile	52
75th percentile	90

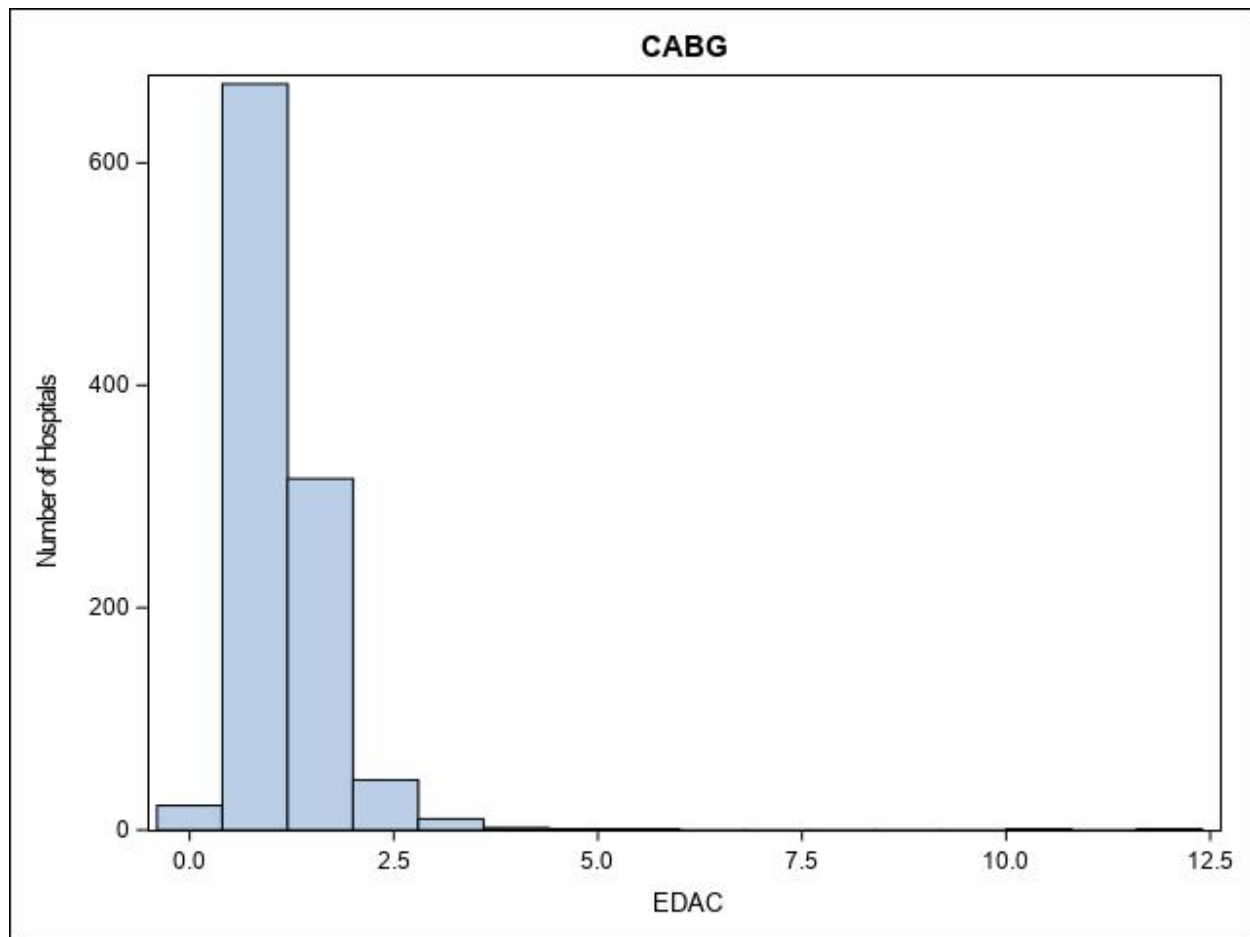
Table 4.3.4 – CABG EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=1,070)

Characteristic	Mean (SD)	Median (Q1, Q3)	Range
Observed Days in Acute Care	100.25 (114.03)	85.68 (60.00, 119.81)	2,600.00
ED Days	16.89 (14.30)	15.54 (10.81, 21.13)	300.00
Observation Days	10.24 (10.80)	7.94 (2.88, 13.94)	125.00
Readmission Days	78.75 (113.34)	65.70 (38.00, 93.86)	2,600.00

Table 4.3.5 – CABG EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022–December 30, 2022 (hospitals with at least one CABG admission)

Characteristic	CABG EDAC Measure Score
Number of hospitals	1,070
Mean (SD)	1.13 (0.69)
Range (min.-max.)	11.80 (0.24-12.04)
25th percentile	0.75
50th percentile	0.99
75th percentile	1.37

Figure 4.3.3 – CABG EDAC: Measure Score Distribution, January 1, 2022 – December 30, 2022, for hospitals with at least one admission (N=1,070 hospitals)



4.3.6 CABG EDAC Measure Score Variance and Reliability

[Table 4.3.6](#) shows the between-hospital variance.

[Tables 4.3.7](#) and [4.3.8](#) shows the distribution of facility-level signal-to-noise reliability (see methods section for details) for different minimum case volumes for the CABG EDAC measure, for two- and three-year projections from one year of data (January 1, 2022-December 30, 2022).

Table 4.3.6 – CABG EDAC: Between-Hospital Variance

Characteristic	Value
Between-hospital variance (SE)	0.269 (0.015)

Table 4.3.7 – CABG EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)

Minium Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.835 (0.179)	0.140-0.988	0.820	0.895	0.936
>=25	0.889 (0.066)	0.680-0.988	0.851	0.907	0.940
>=50	0.906 (0.046)	0.803-0.988	0.873	0.914	0.944
>=100	0.934 (0.024)	0.891-0.988	0.915	0.935	0.953

Table 4.3.8 – CABG EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)

Minium Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.874 (0.163)	0.197-0.992	0.873	0.927	0.957
>=25	0.915 (0.061)	0.688-0.992	0.893	0.934	0.958
>=50	0.927 (0.043)	0.806-0.992	0.899	0.937	0.960
>=100	0.943 (0.025)	0.893-0.992	0.924	0.947	0.964

4.3.7 CABG EDAC Measure Validity

Face Validity

[Table 4.3.9](#) shows the results of the TEP face validity vote, where [TEP members](#) indicated their agreement with the following statement: “Do you think the Excess Days in Acute Care (EDAC) measure score [for CABG EDAC] is a valid score to use to distinguish better and/or worse performance amongst hospitals?” Twelve TEP members responded to the TEP survey; 11 of 12 (91.67%) agreed (strongly, moderately, or somewhat) with the face validity of the measure.

Table 4.3.9 – CABG EDAC: TEP Face Validity Voting Results

Response Category	Number	Frequency
Strongly Disagree	0	0%
Moderately Disagree	0	0%
Somewhat Disagree	1	8.3%
Somewhat Agree	2	16.8%
Moderately Agree	3	25.0%
Strongly Agree	6	50.0%

Empiric Validity

[Table 4.3.10](#) provides Pearson correlation coefficients that show the relationship between the CABG EDAC measure score and related measures (see [Methods](#) section for details).

Table 4.3.10 – CABG EDAC: Association (Pearson Correlation Coefficients) between CABG EDAC Measure Scores and Comparator Measures (CABG EDAC dates: January 1, 2022-December 30, 2022)

Comparison Measure	Number of Hospitals	Pearson Correlation Coefficient	p-value
Risk-Standardized CABG Readmission	1,061	0.212	<.0001
Star Rating Standardized Readmission Group Scores	1,061	-0.138	<.0001
Star Rating Standardized Readmission Group Scores Excluding CABG Readmission	1,061	-0.108	0.0004
Star Rating Standardized Summary Scores	1,061	-0.073	0.0169
Star Rating Standardized Summary Scores Excluding CABG Readmission	1,061	-0.061	0.0467
Star Rating Standardized Summary Scores Excluding Readmission Measure Group	1,027	-0.017	0.5733

Star Rating Data from the July 2024 release on Hospital Compare.

4.3.8 CABG EDAC Measure Scores within Deciles of Hospital Volume

[Table 4.3.11](#) shows mean CABG EDAC measure scores within deciles of hospital CABG volume. The Pearson correlation coefficient for the association between CABG measure scores and hospital procedural CABG volume is -0.077 ($p < 0.05$).

Table 4.3.11 – CABG EDAC: Mean Measure Scores within Deciles of Hospital CABG Volume (N=1,070 hospitals)

Volume Decile	Number of Hospitals	Volume Range	Mean CABG EDAC Measure Score
1	105	1 - 11	1.10
2	107	12 - 23	1.13
3	113	24 - 33	1.06
4	105	34 - 41	1.06
5	107	42 - 52	1.07
6	108	53 - 65	1.05
7	102	66 - 81	1.06
8	110	82 - 102	1.06
9	106	103 - 137	1.01
10	107	138 - 491	1.02

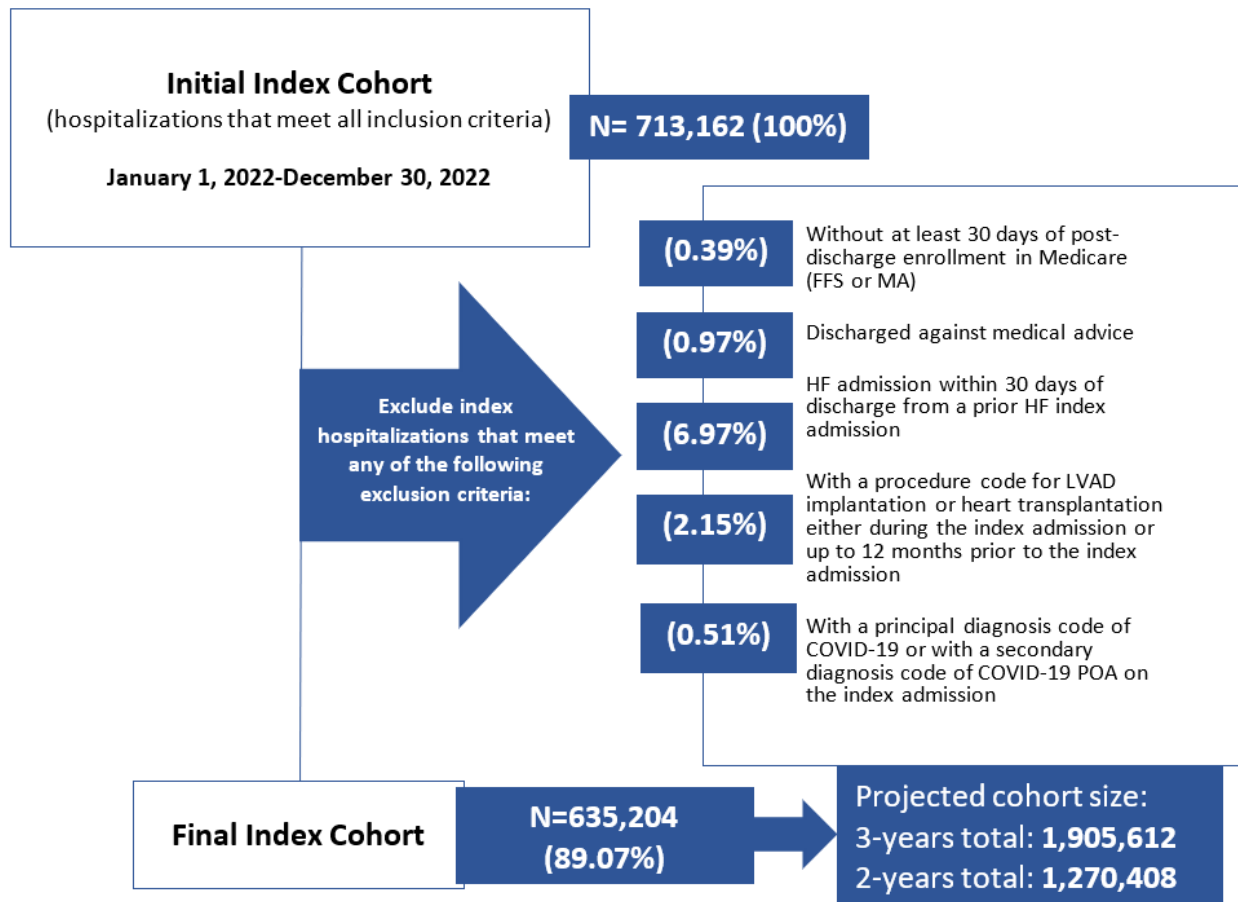
4.4. HF EDAC Results

4.4.1 HF EDAC Cohort

The inclusion and exclusion criteria for this measure are presented in [Section 3.3](#). The number and percentage of HF admissions that met inclusion criteria, as well as each exclusion criterion in the January 1, 2022-December 30, 2022 dataset is presented in [Figure 4.4.1](#).

In the 635,204 admissions in the final index cohort, 326,130 (51.3%) are Medicare FFS beneficiaries, and 309,074 (48.7%) are Medicare Advantage beneficiaries.

Figure 4.4.1 – HF EDAC Index Cohort January 1, 2022 – December 30, 2022



4.4.2 HF EDAC Risk Variable Frequencies

[Table 4.4.1](#) shows the frequencies of all risk variables in the HF measure risk model for the January 1, 2022-December 30, 2022 dataset.

4.4.3 HF EDAC Odds Ratios

[Table 4.4.1](#) shows the risk-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the HF model for the one year-period of January 1, 2022-December 30, 2022.

Table 4.4.1 – HF EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)

Variable	Description	Frequency (%) (N=635,204)	OR (95% CI)
AGE	Age, mean (SD)	79.8 (8.4)	1.00 (1.00-1.00)
ICD-10 codes during the index admission			
B961	Klebsiella pneumoniae [K. pneumoniae] as the cause of diseases classified elsewhere	0.67	1.10 (1.08-1.13)
C7951	Secondary malignant neoplasm of bone	0.56	1.27 (1.24-1.31)
D469	Myelodysplastic syndrome, unspecified	0.51	1.33 (1.30-1.36)
D539	Nutritional anemia, unspecified	2.05	1.11 (1.10-1.13)
D631	Anemia in chronic kidney disease	14.37	1.10 (1.09-1.11)
D638	Anemia in other chronic diseases classified elsewhere	3.86	1.12 (1.11-1.13)
D649	Anemia, unspecified	11.53	1.07 (1.07-1.08)
E119	Type 2 diabetes mellitus without complications	9.52	0.95 (0.94-1.95)
E440	Moderate protein-calorie malnutrition	2.08	1.09 (1.08-1.10)
E6601	Morbid (severe) obesity due to excess calories	10.28	0.96 (0.95-0.97)
E669	Obesity, unspecified	12.24	0.95 (0.94-0.95)
E871	Hypo-osmolality and hyponatremia	10.94	1.20 (1.19-1.21)
E875	Hyperkalemia	7.41	1.10 (1.10-1.11)
E8809	Other disorders of plasma-protein metabolism, not elsewhere classified	1.65	1.20 (1.18-1.22)
F319	Bipolar disorder, unspecified	0.78	1.23 (1.21-1.25)
G40909	Epilepsy, unspecified, not intractable, without status epilepticus	1.67	1.09 (1.07-1.10)
I160	Hypertensive urgency	4.17	0.86 (0.85-0.87)
I161	Hypertensive emergency	2.90	0.88 (0.87-0.90)
I214	Non-ST elevation (NSTEMI) myocardial infarction	2.47	1.15 (1.13-1.16)
I21A1	Myocardial infarction type 2	7.25	1.08 (1.08-1.09)
I248	Other forms of acute ischemic heart disease	6.27	1.05 (1.05-1.06)
I428	Other cardiomyopathies	6.47	0.93 (0.93-0.94)
I493	Ventricular premature depolarization	2.87	0.93 (0.92-0.94)
I5021	Acute systolic (congestive) heart failure	3.32	0.91 (0.90-0.92)
I5031	Acute diastolic (congestive) heart failure	5.27	0.91 (0.90-0.92)

Variable	Description	Frequency (%) (N=635,204)	OR (95% CI)
I5041	Acute combined systolic (congestive) and diastolic (congestive) heart failure	0.99	0.92 (0.90-0.94)
I959	Hypotension, unspecified	2.90	1.13 (1.12-1.15)
J189	Pneumonia, unspecified organism	7.83	1.05 (1.04-1.06)
J440	Chronic obstructive pulmonary disease with (acute) lower respiratory infection	3.78	0.99 (0.98-1.00)
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	9.85	1.08 (1.07-1.08)
J918	Pleural effusion in other conditions classified elsewhere	3.62	1.14 (1.13-1.16)
J9611	Chronic respiratory failure with hypoxia	3.58	1.10 (1.09-1.11)
J9621	Acute and chronic respiratory failure with hypoxia	12.68	1.09 (1.09-1.10)
K219	Gastro-esophageal reflux disease without esophagitis	23.80	0.98 (0.98-0.99)
K5900	Constipation, unspecified	4.07	1.08 (1.07-1.09)
N170	Acute kidney failure with tubular necrosis	1.37	1.35 (1.33-1.37)
N179	Acute kidney failure, unspecified	28.28	1.18 (1.17-1.18)
N189	Chronic kidney disease, unspecified	7.62	1.04 (1.03-1.04)
R001	Bradycardia, unspecified	2.20	0.90 (0.89-0.91)
R1310	Dysphagia, unspecified	1.71	1.19 (1.17-1.21)
R7303	Prediabetes	1.18	0.89 (0.87-0.91)
R791	Abnormal coagulation profile	1.91	1.08 (1.07-1.10)
Z515	Encounter for palliative care	5.39	0.75 (0.74-0.76)
Z66	Do not resuscitate	17.09	0.90 (0.90-0.91)
Z7401	Bed confinement status	0.91	1.19 (1.17-1.21)
Z794	Long term (current) use of insulin	15.24	1.03 (1.02-1.03)
Z7984	Long term (current) use of oral hypoglycemic drugs	12.94	0.94 (0.94-0.95)
Z79899	Other long term (current) drug therapy	30.81	0.94 (0.93-0.94)
Z85118	Personal history of other malignant neoplasm of bronchus and lung	0.99	1.05 (1.03-1.07)
Z87891	Personal history of nicotine dependence	30.28	0.94 (0.93-0.94)
ICD-10 codes in the 12 months prior to admission			
A419	Sepsis, unspecified organism	11.95	1.08 (1.07-1.09)
D509	Iron deficiency anemia, unspecified	19.72	1.05 (1.04-1.05)
D649	Anemia, unspecified	37.35	1.06 (1.05-1.06)
E11649	Type 2 diabetes mellitus with hypoglycemia without coma	5.53	1.08 (1.07-1.09)
E871	Hypo-osmolality and hyponatremia	18.41	1.06 (1.05-1.06)
E875	Hyperkalemia	16.90	1.08 (1.07-1.09)
E876	Hypokalemia	20.37	1.06 (1.06-1.07)
F17200	Nicotine dependence, unspecified, uncomplicated	5.16	1.09 (1.08-1.10)
F17210	Nicotine dependence, cigarettes, uncomplicated	9.47	1.06 (1.05-1.07)
F32A	Depression, unspecified	12.55	1.07 (1.06-1.08)
G4733	Obstructive sleep apnea (adult) (pediatric)	21.31	0.97 (0.97-0.98)

Variable	Description	Frequency (%) (N=635,204)	OR (95% CI)
I120	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease	5.34	1.12 (1.11-1.13)
I1310	Hypertensive heart and chronic kidney disease without heart failure, with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	3.22	0.98 (0.97-0.99)
I132	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease	6.09	1.05 (1.04-1.06)
I214	Non-ST elevation (NSTEMI) myocardial infarction	13.15	1.05 (1.04-1.06)
I248	Other forms of acute ischemic heart disease	6.62	1.08 (1.07-1.09)
I2510	Atherosclerotic heart disease of native coronary artery without angina pectoris	56.38	1.03 (1.02-1.03)
I350	Nonrheumatic aortic (valve) stenosis	13.14	1.07 (1.06-1.08)
I4891	Unspecified atrial fibrillation	48.56	1.04 (1.03-1.04)
I5022	Chronic systolic (congestive) heart failure	22.29	1.06 (1.06-1.07)
I5032	Chronic diastolic (congestive) heart failure	28.20	1.05 (1.05-1.06)
I5043	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure	15.73	1.05 (1.04-1.05)
I6782	Cerebral ischemia	4.35	1.09 (1.08-1.10)
I959	Hypotension, unspecified	12.87	1.09 (1.08-1.10)
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	16.72	1.06 (1.06-1.07)
J449	Chronic obstructive pulmonary disease, unspecified	34.79	1.06 (1.05-1.06)
J811	Chronic pulmonary edema	19.66	1.06 (1.05-1.06)
J9622	Acute and chronic respiratory failure with hypercapnia	4.37	1.09 (1.08-1.10)
K5730	Diverticulosis of large intestine without perforation or abscess without bleeding	10.09	0.99 (0.698-0.99)
K7460	Unspecified cirrhosis of liver	3.63	1.13 (1.12-1.15)
K921	Melena	5.91	1.07 (1.06-1.08)
L309	Dermatitis, unspecified	2.90	1.05 (1.04-1.07)
M542	Cervicalgia	8.70	1.07 (1.06-1.08)
N179	Acute kidney failure, unspecified	40.14	1.10 (1.09-1.10)
R000	Tachycardia, unspecified	11.41	1.06 (1.05-1.06)
R001	Bradycardia, unspecified	12.16	0.97 (0.96-0.98)
R0603	Acute respiratory distress	4.57	1.05 (1.04-1.06)
R072	Precordial pain	3.47	1.11 (1.10-1.12)
R0789	Other chest pain	19.87	1.07 (1.07-1.08)
R079	Chest pain, unspecified	39.96	1.05 (1.04-1.05)
R188	Other ascites	4.96	1.11 (1.10-1.12)
W19XXA	Unspecified fall, initial encounter	4.73	1.03 (1.02-1.04)
Z006	Encounter for examination for normal comparison and control in clinical research program	2.56	0.89 (0.88-0.90)

Variable	Description	Frequency (%) (N=635,204)	OR (95% CI)
Z1231	Encounter for screening mammogram for malignant neoplasm of breast	8.94	0.95 (0.94-0.96)
Z23	Encounter for immunization	61.05	1.00 (1.00-1.00)
Z515	Encounter for palliative care	5.18	1.11 (1.10-1.12)
Z66	Do not resuscitate	13.62	0.96 (0.95-0.97)
Z7952	Long term (current) use of systemic steroids	4.37	1.13 (1.12-1.14)
Z87891	Personal history of nicotine dependence	38.25	1.07 (1.06-1.07)
Z888	Allergy status to other drugs, medicaments and biological substances	11.65	1.08 (1.07-1.08)
Z9114	Patient's other noncompliance with medication regimen	4.99	1.13 (1.12-1.14)
Z9119	Patient's noncompliance with other medical treatment and regimen	4.53	1.12 (1.11-1.13)
ICD-10 codes either during the index admission or 12 months prior to admission			
E1122	Type 2 diabetes mellitus with diabetic chronic kidney disease	38.38	1.10 (1.09-1.10)
I480	Paroxysmal atrial fibrillation	41.14	1.03 (1.03-1.04)
I4820	Chronic atrial fibrillation, unspecified	23.16	1.02 (1.01-1.02)
J90	Pleural effusion, not elsewhere classified	43.99	1.08 (1.08-1.09)
N184	Chronic kidney disease, stage 4 (severe)	18.89	1.06 (1.06-1.07)
N185	Chronic kidney disease, stage 5	4.30	0.96 (0.95-0.97)
Z952	Presence of prosthetic heart valve	8.57	1.08 (1.08-1.09)
Z95810	Presence of automatic (implantable) cardiac defibrillator	11.41	1.09 (1.08-1.10)
Other risk variables			
HX_COVID	History of COVID-19	21.38	1.01 (1.00-1.01)
MA	MA (versus FFS)	48.66	1.01 (1.00-1.01)
MCCFI	Multiple Chronic Conditions Frailty Index	49.28	1.14 (1.14-1.15)

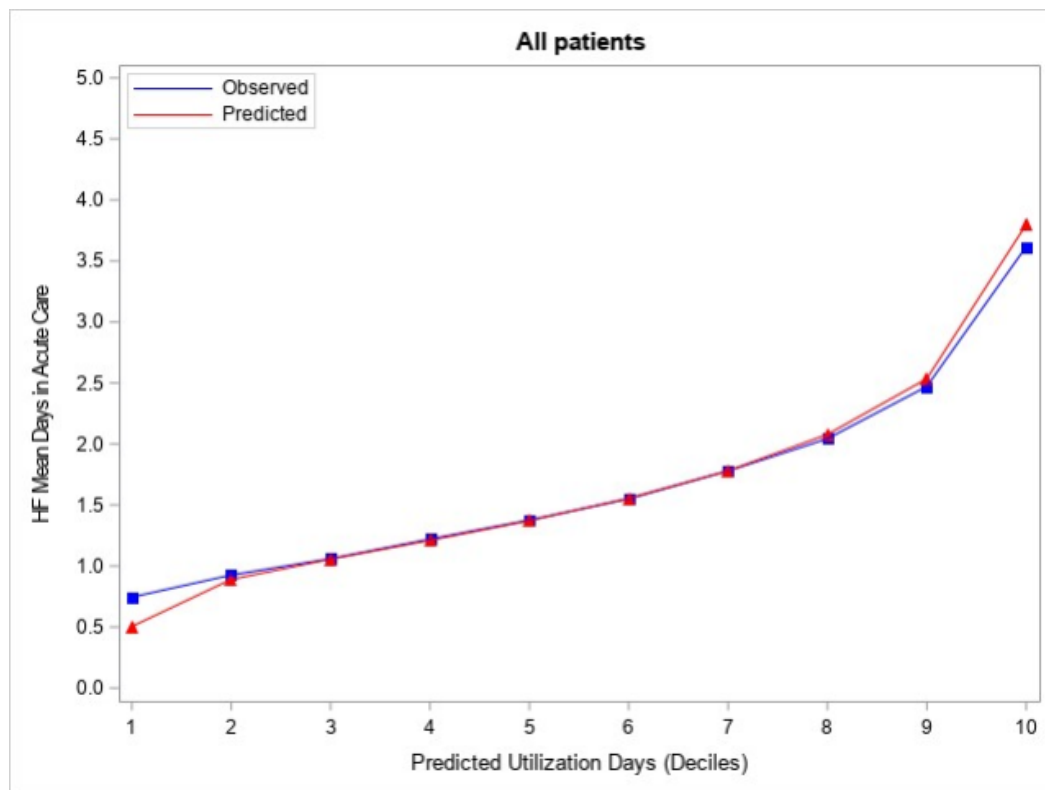
4.4.4 HF EDAC Model Performance

[Table 4.4.2](#) shows model performance statistics (c-statistic and predictive ability); [Figure 4.4.2](#) shows the risk-decile plot for all patients in the HF cohort.

Table 4.4.2 – HF EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)

Statistic	Value
C-statistic	0.642
Predictive ability	2.4%-12.7%

Figure 4.4.2 – HF EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=635,204)



4.4.5 HF EDAC Distribution of Hospital Volume

For the January 1, 2022–December 30, 2022 dataset:

- [Table 4.4.3](#) shows the distribution of hospital admission volume.
- [Table 4.4.4](#) shows the hospital-level distribution of unadjusted outcomes. The national mean HF *observed* days in acute care for the January 1, 2022–December 30, 2022 dataset was 159.73 days per 100 discharges.
- [Table 4.4.5](#) shows the distribution of hospital-level HF measure scores.
- [Figure 4.4.3](#) shows the overall distribution of hospital-level HF measure scores.

Table 4.4.3 – HF EDAC: Distribution of Hospital Admission Volume

Characteristic	January 1, 2022–December 30, 2022
Number of hospitals	4,304
Mean number of admissions (SD)	147.6 (197.7)
Range number of admissions (min.-max.)	2,692 (1-2,693)
25th percentile	13
50th percentile	65
75th percentile	215

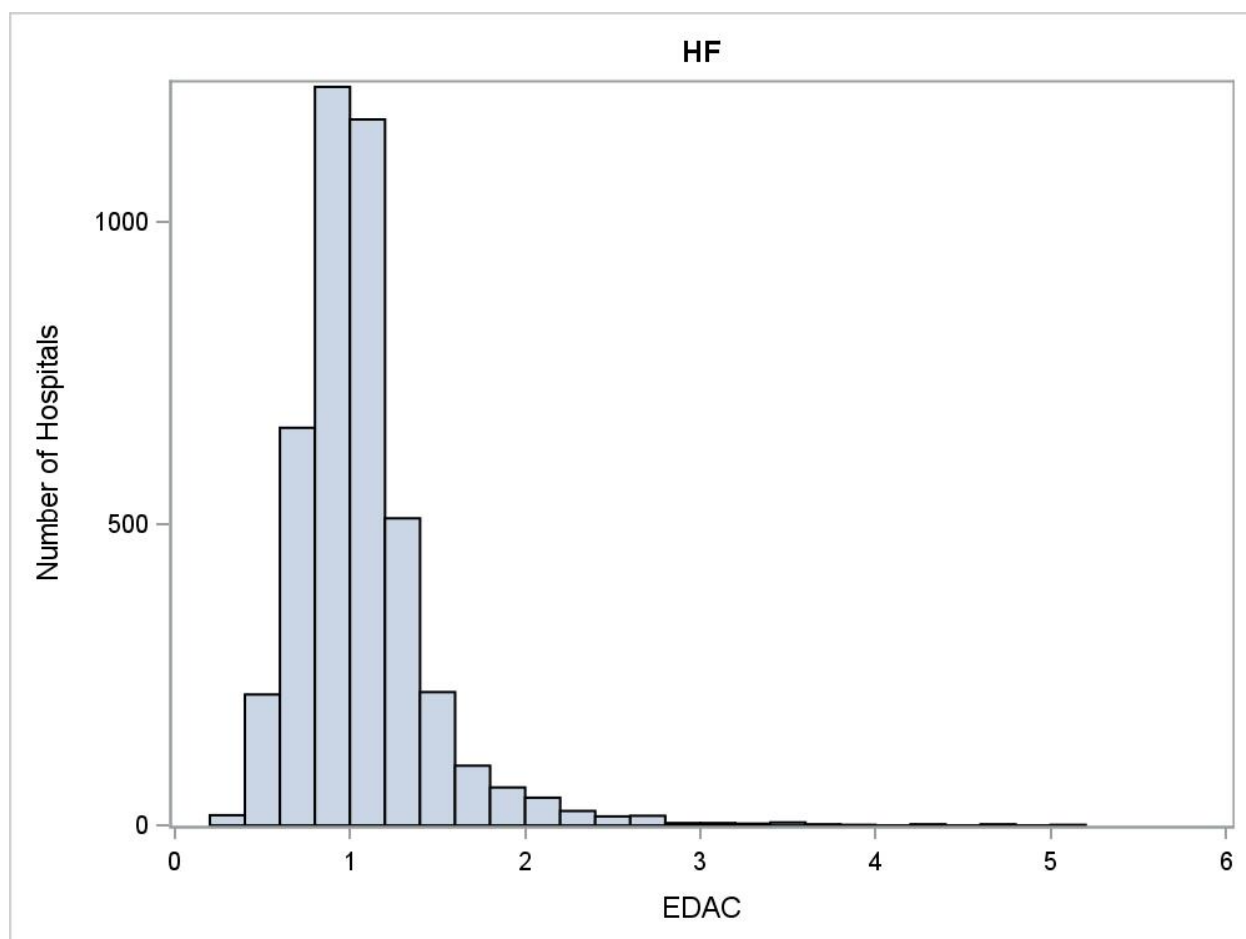
Table 4.4.4 – HF EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=4,304)

Characteristic	Mean (SD)	Median (Q1, Q3)	Range
Observed Days in Acute Care	159.73 (103.95)	156.17 (114.37, 193.34)	1,300.00
ED Days	23.78 (19.67)	19.53 (13.85, 28.33)	200.00
Observation Days	14.85 (19.88)	11.36 (4.15, 19.44)	600.00
Readmission Days	130.91 (100.22)	128.83 (84.62, 164.57)	1,300.00

Table 4.4.5 – HF EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one HF admission)

Characteristic	HF EDAC Measure Score
Number of hospitals	4,304
Mean (SD)	1.06 (0.39)
Range (min.-max.)	4.83 (0.29-5.11)
25th percentile	0.83
50th percentile	1.00
75th percentile	1.18

Figure 4.4.3 – HF EDAC: Measure Score Distribution, January 1, 2022 – December 30, 2022, for hospitals with at least one admission (N=4,304)



4.4.6 HF EDAC Measure Score Variance and Reliability

[Table 4.4.6](#) shows the between-hospital variance.

[Tables 4.4.7](#) and [4.4.8](#) shows the distribution of facility-level signal-to-noise reliability (see [Methods](#) section for details) for different minimum case volumes for the HF measure, for two- and three-year projections from one year of data (January 1, 2022-December 30, 2022).

Table 4.4.6 – HF EDAC: Between-Hospital Variance

Characteristic	Value
Between-hospital variance (SE)	0.150 (0.005)

Table 4.4.7 – HF EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)

Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.728 (0.272)	0.083-0.996	0.542	0.855	0.951
>=25	0.863 (0.128)	0.542-0.996	0.793	0.92	0.962
>=50	0.905 (0.078)	0.695-0.996	0.866	0.935	0.966
>=100	0.935 (0.043)	0.820-0.996	0.911	0.947	0.969

Table 4.4.8 – HF EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)

Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.776 (0.248)	0.120-0.997	0.639	0.899	0.967
>=25	0.878 (0.125)	0.551-0.997	0.814	0.939	0.973
>=50	0.917 (0.078)	0.699-0.997	0.880	0.951	0.976
>=100	0.944 (0.044)	0.823-0.997	0.923	0.960	0.978

4.4.7 HF EDAC Measure Validity

Empiric Validity

[Table 4.4.9](#) provides Pearson correlation coefficients that show the relationship between the HF measure score and related measures (see [Methods](#) section for details).

Table 4.4.9 – HF EDAC: Association (Pearson Correlation Coefficients) between HF EDAC Measure Scores and Comparator Measures (HF dates: January 1, 2022-December 30, 2022)

Comparison Measure	Number of Hospitals	Pearson Correlation Coefficient	p-value
Risk-Standardized HF Readmission	4,204	0.199	<.0001
Star Rating Standardized Readmission Group Scores	4,092	-0.192	<.0001
Star Rating Standardized Readmission Group Scores Excluding HF Readmission	4,092	-0.165	<.0001
Star Rating Standardized Summary Scores	4,211	-0.15	<.0001
Star Rating Standardized Summary Scores Excluding HF Readmission	4,211	-0.14	<.0001
Star Rating Standardized Summary Scores Excluding Readmission Measure Group	4,211	-0.087	<.0001

Star Rating Data from the July 2024 release on Hospital Compare.

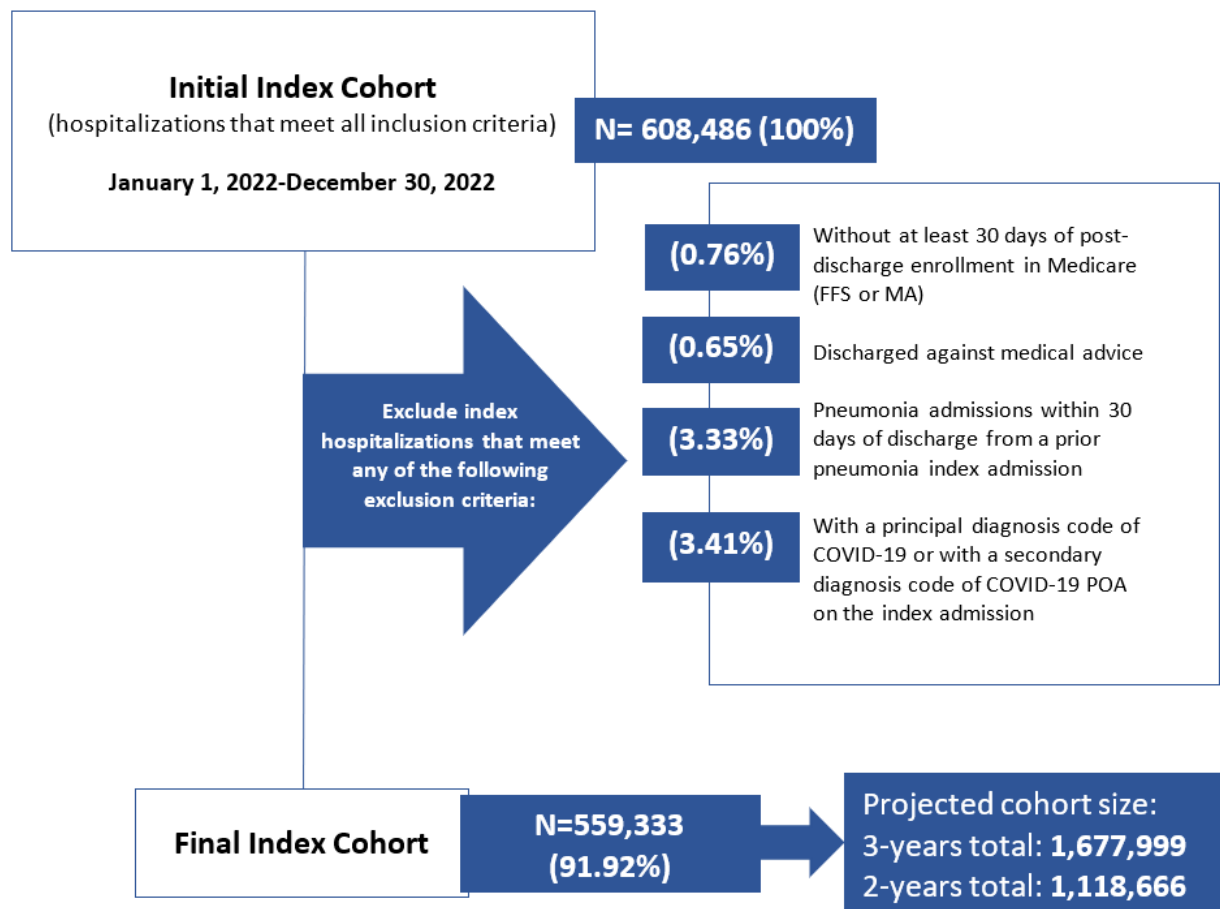
4.5. Pneumonia EDAC Results

4.5.1 Pneumonia EDAC Cohort

The inclusion and exclusion criteria for this measure are presented in [Section 3.3](#). The number and percentage of pneumonia admissions that met inclusion criteria, as well as each exclusion criterion in the January 1, 2022-December 30, 2022 dataset is presented in [Figure 4.5.1](#). In the 559,333 admissions in the final index cohort, 308,882 (55.2%) are Medicare FFS beneficiaries, and 250,451 (36.7%) are Medicare Advantage beneficiaries.

Admissions may have been counted in more than one exclusion category because they are not mutually exclusive.

Figure 4.5.1 – Pneumonia EDAC Index Cohort January 1, 2022-December 30, 2022



4.5.2 Pneumonia EDAC Risk Variable Frequencies

Table 4.5.1 shows the frequencies of all risk variables in the Pneumonia measure risk model for the January 1, 2022-December 30, 2022 dataset.

4.5.3 Pneumonia EDAC Odds Ratios

Table 4.5.1 shows the risk-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the Pneumonia model for the one year-period of January 1, 2022-December 30, 2022.

Table 4.5.1 – Pneumonia EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)

Variable	Description	Frequency (%) (N=559,333)	OR (95% CI)
AGE	Age, mean (SD)	79.1 (8.4)	1.00 (1.00-1.00)
ICD-10 codes during the index admission			
A0472	Enterocolitis due to Clostridium difficile, not specified as recurrent	0.53	1.31 (1.28-1.35)
B965	Pseudomonas (aeruginosa) (mallei) (pseudomallei) as the cause of diseases classified elsewhere	0.65	1.17 (1.15-1.20)
B9789	Other viral agents as the cause of diseases classified elsewhere	0.79	0.82 (0.80-0.84)
C7800	Secondary malignant neoplasm of unspecified lung	0.53	1.21 (1.18-1.25)
C787	Secondary malignant neoplasm of liver and intrahepatic bile duct	1.00	1.29 (1.27-1.32)
D469	Myelodysplastic syndrome, unspecified	0.56	1.29 (1.26-1.33)
D61818	Other pancytopenia	1.35	1.26 (1.24-1.28)
D62	Acute posthemorrhagic anemia	1.47	1.26 (1.24-1.28)
D638	Anemia in other chronic diseases classified elsewhere	3.87	1.11 (1.10-1.12)
D649	Anemia, unspecified	12.14	1.09 (1.08-1.10)
E11649	Type 2 diabetes mellitus with hypoglycemia without coma	1.27	1.20 (1.18-1.23)
E222	Syndrome of inappropriate secretion of antidiuretic hormone	1.19	1.16 (1.14-1.19)
E43	Unspecified severe protein-calorie malnutrition	6.79	1.18 (1.17-1.19)
E440	Moderate protein-calorie malnutrition	3.48	1.13 (1.12-1.15)
E870	Hyperosmolality and hypernatremia	3.28	1.28 (1.26-1.3)
E875	Hyperkalemia	4.74	1.16 (1.15-1.17)
E876	Hypokalemia	12.43	0.96 (0.95-0.97)
G893	Neoplasm related pain (acute) (chronic)	0.52	1.34 (1.31-1.38)
I080	Rheumatic disorders of both mitral and aortic valves	0.84	1.16 (1.14-1.19)
I130	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	13.93	1.06 (1.06-1.07)
I4891	Unspecified atrial fibrillation	10.56	1.06 (1.05-1.06)

Variable	Description	Frequency (%) (N=559,333)	OR (95% CI)
I5023	Acute on chronic systolic (congestive) heart failure	2.88	1.13 (1.12-1.15)
I5031	Acute diastolic (congestive) heart failure	1.41	1.14 (1.12-1.16)
I5033	Acute on chronic diastolic (congestive) heart failure	7.62	1.12 (1.11-1.13)
I5042	Chronic combined systolic (congestive) and diastolic (congestive) heart failure	1.50	1.12 (1.10-1.14)
I5043	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure	2.00	1.15 (1.14-1.17)
J13	Pneumonia due to Streptococcus pneumoniae	0.53	0.77 (0.74-0.80)
J159	Unspecified bacterial pneumonia	3.94	0.95 (0.94-0.97)
J40	Bronchitis, not specified as acute or chronic	0.55	0.82 (0.79-0.85)
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	16.82	1.02 (1.02-1.03)
J45909	Unspecified asthma, uncomplicated	3.36	0.92 (0.91-0.94)
J90	Pleural effusion, not elsewhere classified	5.40	1.26 (1.25-1.27)
J910	Malignant pleural effusion	0.51	1.58 (1.54-1.63)
J918	Pleural effusion in other conditions classified elsewhere	2.16	1.19 (1.17-1.20)
J9601	Acute respiratory failure with hypoxia	33.04	0.98 (0.97-0.98)
J9602	Acute respiratory failure with hypercapnia	2.47	1.14 (1.12-1.15)
J9622	Acute and chronic respiratory failure with hypercapnia	4.68	1.17 (1.15-1.18)
K5900	Constipation, unspecified	4.70	1.08 (1.07-1.09)
K7460	Unspecified cirrhosis of liver	1.23	1.15 (1.13-1.17)
L89154	Pressure ulcer of sacral region, stage 4	0.62	1.20 (1.18-1.23)
N170	Acute kidney failure with tubular necrosis	1.65	1.30 (1.28-1.32)
N179	Acute kidney failure, unspecified	21.75	1.09 (1.08-1.09)
R0902	Hypoxemia	6.70	0.92 (0.91-0.93)
R1310	Dysphagia, unspecified	6.74	1.15 (1.14-1.16)
R1312	Dysphagia, oropharyngeal phase	2.07	1.18 (1.16-1.20)
R188	Other ascites	0.74	1.27 (1.24-1.30)
R338	Other retention of urine	1.30	1.23 (1.21-1.25)
R339	Retention of urine, unspecified	1.59	1.14 (1.12-1.16)
T451X5A	Adverse effect of antineoplastic and immunosuppressive drugs, initial encounter	1.27	1.08 (1.06-1.10)
Z515	Encounter for palliative care	7.54	0.77 (0.76-0.77)
Z66	Do not resuscitate	19.82	0.88 (0.87-0.88)
Z6820	Body mass index [BMI] 20.0-20.9, adult	0.73	1.02 (0.99-1.04)
Z6843	Body mass index [BMI] 50.0-59.9, adult	0.75	1.12 (1.09-1.14)
Z7401	Bed confinement status	2.21	1.13 (1.11-1.14)
Z7901	Long term (current) use of anticoagulants	20.01	1.00 (1.00-1.01)
Z9981	Dependence on supplemental oxygen	10.84	1.01 (1.00-1.02)
ICD-10 codes in the 12 months prior to admission			
D649	Anemia, unspecified	31.37	1.11 (1.10-1.11)

Variable	Description	Frequency (%) (N=559,333)	OR (95% CI)
D72829	Elevated white blood cell count, unspecified	12.83	1.07 (1.06-1.08)
E860	Dehydration	16.02	1.07 (1.06-1.07)
E871	Hypo-osmolality and hyponatremia	16.89	1.10 (1.09-1.10)
E875	Hyperkalemia	10.88	1.07 (1.06-1.07)
E876	Hypokalemia	17.69	1.05 (1.04-1.05)
F17210	Nicotine dependence, cigarettes, uncomplicated	11.34	1.10 (1.10-1.11)
F419	Anxiety disorder, unspecified	20.05	1.06 (1.05-1.07)
I120	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease	3.49	1.19 (1.17-1.20)
I160	Hypertensive urgency	3.49	1.07 (1.06-1.09)
I5033	Acute on chronic diastolic (congestive) heart failure	9.35	1.05 (1.04-1.06)
I509	Heart failure, unspecified	28.36	1.08 (1.07-1.08)
I6529	Occlusion and stenosis of unspecified carotid artery	2.71	0.96 (0.95-0.97)
J069	Acute upper respiratory infection, unspecified	7.20	0.93 (0.92-0.94)
J101	Influenza due to other identified influenza virus with other respiratory manifestations	2.61	0.84 (0.83-0.85)
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	21.37	1.05 (1.04-1.06)
J690	Pneumonitis due to inhalation of food and vomit	11.11	1.07 (1.06-1.08)
J849	Interstitial pulmonary disease, unspecified	4.29	1.09 (1.08-1.11)
J90	Pleural effusion, not elsewhere classified	25.64	1.14 (1.14-1.15)
J9622	Acute and chronic respiratory failure with hypercapnia	4.24	1.12 (1.11-1.14)
M47812	Spondylosis without myelopathy or radiculopathy, cervical region	5.46	1.03 (1.02-1.04)
M7989	Other specified soft tissue disorders	10.88	1.08 (1.07-1.08)
N179	Acute kidney failure, unspecified	26.71	1.05 (1.05-1.06)
N390	Urinary tract infection, site not specified	26.21	1.05 (1.04-1.05)
R000	Tachycardia, unspecified	14.62	1.07 (1.07-1.08)
R0600	Dyspnea, unspecified	24.19	1.05 (1.04-1.06)
R0602	Shortness of breath	55.29	1.07 (1.06-1.07)
R0789	Other chest pain	15.35	1.06 (1.05-1.07)
R079	Chest pain, unspecified	31.69	1.05 (1.04-1.05)
R109	Unspecified abdominal pain	17.12	1.09 (1.08-1.10)
R4182	Altered mental status, unspecified	22.62	1.10 (1.10-1.11)
R509	Fever, unspecified	15.92	0.96 (0.95-0.97)
R627	Adult failure to thrive	4.55	1.12(1.11-1.13)
R630	Anorexia	3.45	1.07 (1.06-1.09)
R918	Other nonspecific abnormal finding of lung field	50.52	1.06 (1.06-1.07)
R9389	Abnormal findings on diagnostic imaging of other specified body structures	4.01	1.07 (1.06-1.09)
R9431	Abnormal electrocardiogram [ECG] [EKG]	22.31	1.05 (1.05-1.06)

Variable	Description	Frequency (%) (N=559,333)	OR (95% CI)
Z0000	Encounter for general adult medical examination without abnormal findings	19.09	0.98 (0.98-0.99)
Z1211	Encounter for screening for malignant neoplasm of colon	4.36	0.91 (0.90-0.92)
Z1231	Encounter for screening mammogram for malignant neoplasm of breast	10.06	0.86 (0.85-0.87)
Z5111	Encounter for antineoplastic chemotherapy	4.56	1.16 (1.14-1.17)
Z7952	Long term (current) use of systemic steroids	6.25	1.12 (1.11-1.13)
Z87440	Personal history of urinary (tract) infections	4.68	1.05 (1.04-1.06)
Z87891	Personal history of nicotine dependence	36.95	1.06 (1.05-1.06)
Z881	Allergy status to other antibiotic agents	5.96	1.06 (1.05-1.07)
Z95810	Presence of automatic (implantable) cardiac defibrillator	2.94	1.11 (1.09-1.12)
ICD-10 codes either during the index admission or 12 months prior to admission			
C3490	Malignant neoplasm of unspecified part of unspecified bronchus or lung	4.80	1.12 (1.11-1.14)
D631	Anemia in chronic kidney disease	12.69	1.10 (1.09-1.11)
E1122	Type 2 diabetes mellitus with diabetic chronic kidney disease	21.14	1.08 (1.07-1.09)
I480	Paroxysmal atrial fibrillation	24.45	1.08 (1.08-1.09)
J8410	Pulmonary fibrosis, unspecified	6.32	1.09 (1.08-1.10)
N184	Chronic kidney disease, stage 4 (severe)	7.72	1.07 (1.06-1.08)
Z931	Gastrostomy status	3.57	1.34 (1.33-1.36)
Other risk variables			
HX_COVID	History of COVID-19	24.46	0.97 (0.96-0.97)
MA	MA (versus FFS)	44.78	1.00 (0.99-1.00)
MCCFI	Multiple Chronic Conditions Frailty Index	52.37	1.21 (1.20-1.21)

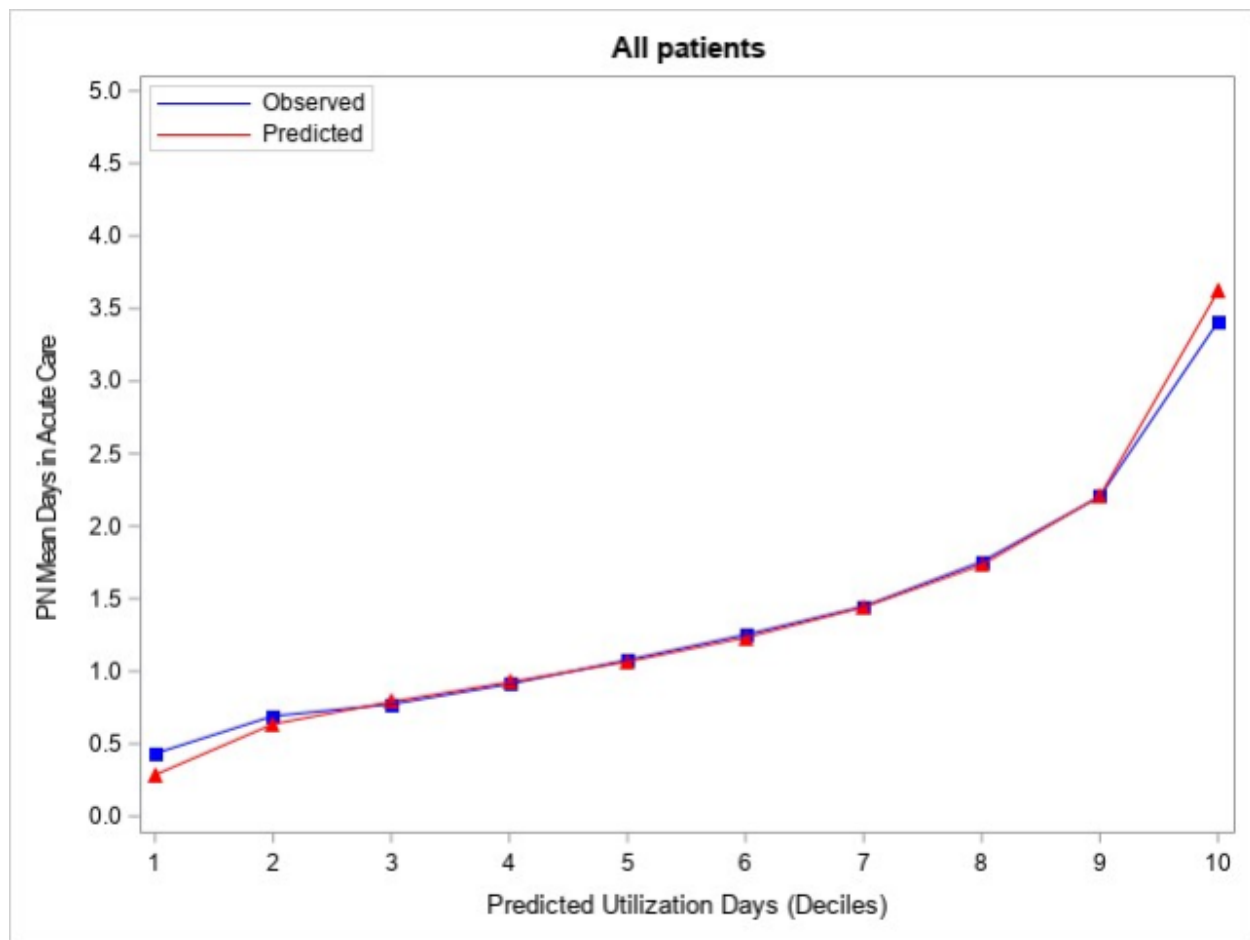
4.5.4 Pneumonia EDAC Model Performance

[Table 4.5.2](#) shows model performance statistics (c-statistic and predictive ability); [Figure 4.5.2](#) shows the risk-decile plot for all patients in the pneumonia cohort.

Table 4.5.2 – Pneumonia EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)

Statistic	Value
C-statistic	0.668
Predictive ability	1.7%-12.1%

Figure 4.5.2 – Pneumonia EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=559,333)



4.4.5 Pneumonia EDAC Distribution of Hospital Volume

For the January 1, 2022–December 30, 2022 dataset:

- [Table 4.5.3](#) shows the distribution of hospital admission volume.
- [Table 4.5.4](#) shows the hospital-level distribution of unadjusted outcomes. The national mean pneumonia *observed* days in acute care for the January 1, 2022–December 30, 2022 dataset was 124.69 days per 100 discharges.
- [Table 4.5.6](#) shows the distribution of hospital-level pneumonia measure scores.
- [Figure 4.5.3](#) shows the overall distribution of hospital-level pneumonia measure scores.

Table 4.5.3 – Pneumonia EDAC: Distribution of Hospital Admission Volume

Characteristic	January 1, 2022-December 30, 2022
Number of hospitals	4,390
Mean number of admissions (SD)	127.4 (152.1)
Range number of admissions (min.-max.)	2,413 (1-2,414)
25th percentile	21
50th percentile	69
75th percentile	188

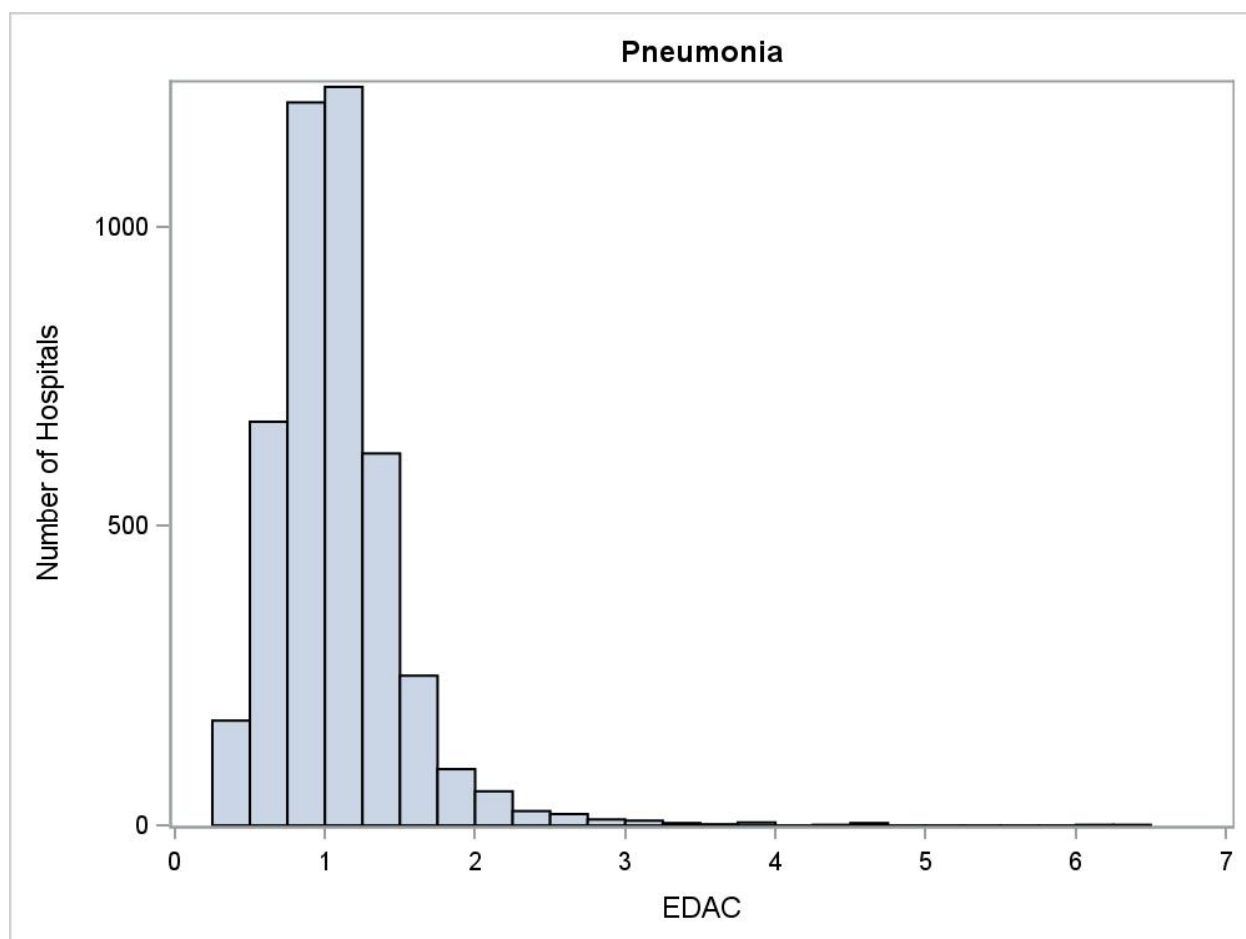
Table 4.5.4 – Pneumonia EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges, and Distribution of EDAC (January 1, 2022-December 30, 2022) (N=4,390)

Characteristic	Mean (SD)	Median (Q1, Q3)	Range
Observed Days in Acute Care	124.69 (85.30)	123.25 (84.29, 156.90)	2,625.00
ED Days	19.07 (15.16)	16.46 (11.70, 23.16)	200.00
Observation Days	10.69 (12.70)	8.14 (2.94, 14.29)	300.00
Readmission Days	101.67 (83.00)	100.00 (59.84, 133.33)	2,625.00

Table 4.5.5 – Pneumonia EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one Pneumonia admission)

Characteristic	Pneumonia Measure Score
Number of hospitals	4,390
Mean (SD)	1.08 (0.44)
Range (min.-max.)	6.22 (0.25-6.47)
25th percentile	0.81
50th percentile	1.03
75th percentile	1.25

Figure 4.5.3 – Pneumonia EDAC: Measure Score Distribution, January 1, 2022 – December 30, 2022, for hospitals with at least one admission (N=4,390)



4.5.6 Pneumonia EDAC Measure Score Variance and Reliability

[Table 4.5.6](#) shows the between-hospital variance.

[Tables 4.5.7](#) and [4.5.8](#) shows the distribution of facility-level signal-to-noise reliability (see [Methods](#) section for details) for different minimum case volumes for the Pneumonia measure, for two- and three-year projections from one year of data (January 1, 2022-December 30, 2022).

Table 4.5.6 – Pneumonia EDAC: Between-Hospital Variance

Characteristic	Value (SE)
Between-hospital variance (SE)	0.185 (0.006)

Table 4.5.7 – Pneumonia EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)

Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.796 (0.212)	0.101-0.996	0.702	0.886	0.955
>=25	0.873 (0.109)	0.593-0.996	0.806	0.920	0.960
>=50	0.911 (0.068)	0.737-0.996	0.869	0.936	0.964
>=100	0.939 (0.037)	0.849-0.996	0.917	0.950	0.968

Table 4.5.8 – Pneumonia EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)

Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.840 (0.186)	0.144-0.998	0.779	0.921	0.969
>=25	0.891 (0.104)	0.602-0.998	0.835	0.938	0.972
>=50	0.920 (0.069)	0.741-0.998	0.879	0.949	0.974
>=100	0.948 (0.037)	0.851-0.998	0.925	0.961	0.977

4.5.7 Pneumonia EDAC Measure Validity

Empiric Validity

[Table 4.5.9](#) provides Pearson correlation coefficients that show the relationship between the Pneumonia measure score and related measures (see [Methods](#) section for details).

Table 4.5.9 – Pneumonia EDAC: Association (Pearson Correlation Coefficients) between Pneumonia Measure Scores and Comparator Measures (Pneumonia dates: January 1, 2022-December 30, 2022)

Comparison Measure	Number of Hospitals	Pearson Correlation Coefficient	p-value
Risk-Standardized AMI Readmission	4,310	0.199	<.0001
Star Rating Standardized Readmission Group Scores	4,129	-0.223	<.0001
Star Rating Standardized Readmission Group Scores Excluding AMI Readmission	4,129	-0.166	<.0001
Star Rating Standardized Summary Scores	4,293	-0.168	<.0001
Star Rating Standardized Summary Scores Excluding AMI Readmission	4,293	-0.145	<.0001
Star Rating Standardized Summary Scores Excluding Readmission Measure Group	4,293	-0.102	<.0001

Star Rating Data from the July 2024 release on Hospital Compare.

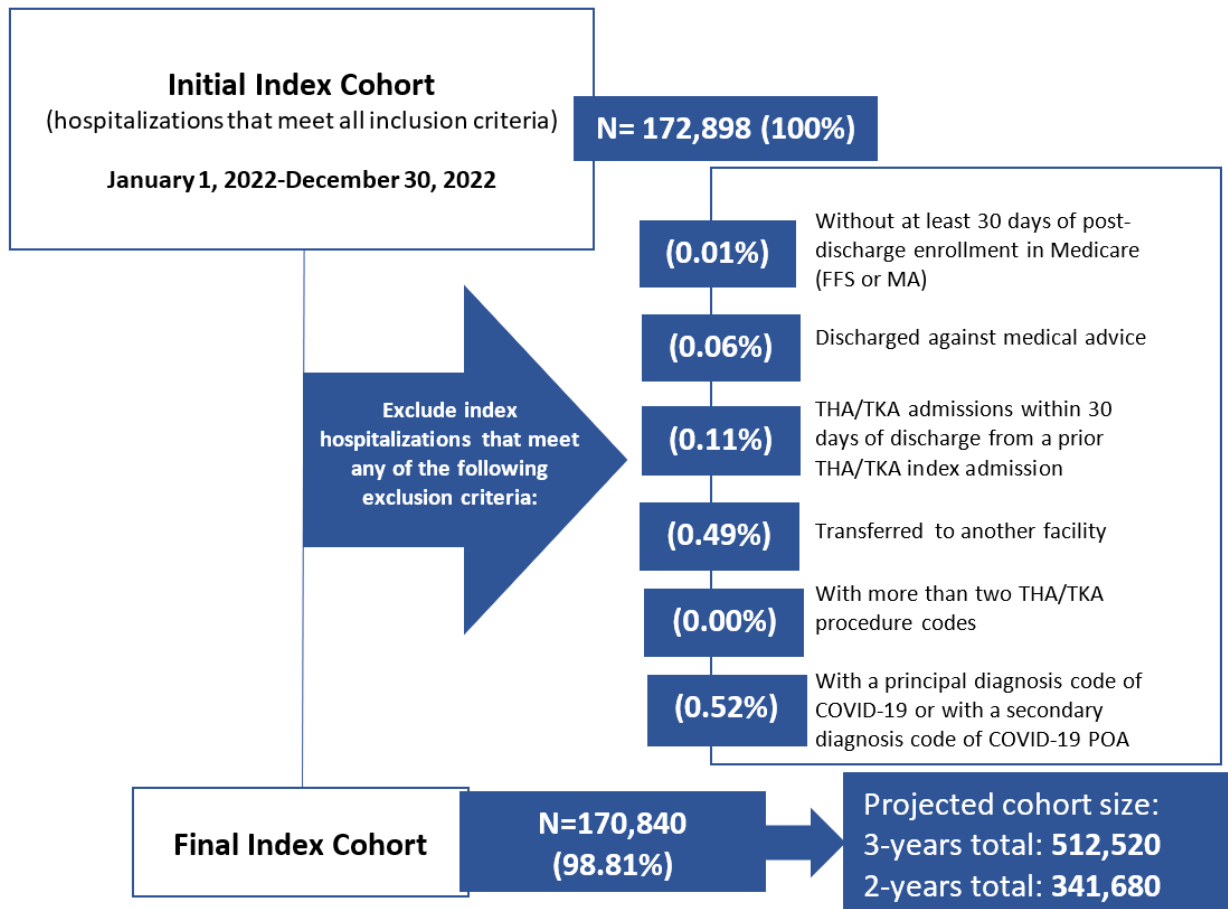
4.6. THA/TKA EDAC Results

4.6.1 THA/TKA EDAC Cohort

The inclusion and exclusion criteria for this measure are presented in [Section 3.3](#). The number and percentage of THA/TKA admissions that met inclusion criteria, as well as the percentage that met each exclusion criterion in the January 1, 2022–December 30, 2022 dataset is presented in [Figure 4.6.1](#). In the 170,840 admissions in the final index cohort, 106,894 (62.6%) are Medicare FFS beneficiaries, and 63,947 (37.4%) are Medicare Advantage beneficiaries.

Admissions may have been counted in more than one exclusion category because they are not mutually exclusive.

Figure 4.6.1 – THA/TKA EDAC Index Cohort January 1, 2022–December 30, 2022



4.6.2 THA/TKA EDAC Risk Variable Frequencies

Table 4.6.1 shows the frequencies of all risk variables in the THA/TKA EDAC measure risk model for the January 1, 2022-December 30, 2022 dataset.

4.6.3 THA/TKA EDAC Odds Ratios

Table 4.6.1 shows binomial model risk-adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the THA/TKA EDAC model over for the one year-period of January 1, 2022-December 30, 2022.

Table 4.6.1 – THA/TKA EDAC Cohort: Frequency of ICD-10-Based Risk Variables and Adjusted OR with 95% Confidence Intervals (Dates of Data: January 1, 2022-December 30, 2022)

Variable	Description	Frequency (%) (N=170,841)	OR (95% CI)
AGE	Age, mean (SD)	75.1 (6.3)	1.03 (1.03-1.03)
ICD-10 codes during the index admission			
E7800	Pure hypercholesterolemia, unspecified	13.44	0.90 (0.88-0.92)
F0390	Unspecified dementia without behavioral disturbance	1.69	1.34 (1.28-1.39)
F17210	Nicotine dependence, cigarettes, uncomplicated	3.28	1.17 (1.12-1.22)
F319	Bipolar disorder, unspecified	0.87	1.52 (1.43-1.62)
G20	Parkinson's disease	1.35	1.44 (1.36-1.51)
G40909	Epilepsy, unspecified, not intractable, without status epilepticus	0.99	1.28 (1.21-1.36)
H3530	Unspecified macular degeneration	0.75	1.05 (0.97-1.13)
I110	Hypertensive heart disease with heart failure	4.17	1.20 (1.16-1.24)
I509	Heart failure, unspecified	2.11	0.92 (0.88-0.96)
M25761	Osteophyte, right knee	1.76	0.86 (0.80-0.92)
N179	Acute kidney failure, unspecified	2.52	1.70 (1.64-1.75)
R338	Other retention of urine	0.80	1.18 (1.10-1.26)
R339	Retention of urine, unspecified	0.81	1.38 (1.29-1.47)
Z6842	Body mass index [BMI] 45.0-49.9, adult	1.28	1.21 (1.14-1.29)
Z955	Presence of coronary angioplasty implant and graft	5.46	1.15 (1.11-1.18)
Z9981	Dependence on supplemental oxygen	0.84	1.33 (1.26-1.41)
ICD-10 codes in the 12 months prior to admission			
D649	Anemia, unspecified	13.60	1.13 (1.11-1.16)
E875	Hyperkalemia	2.63	1.34 (1.29-1.38)
F17210	Nicotine dependence, cigarettes, uncomplicated	3.58	1.11 (1.07-1.16)
F331	Major depressive disorder, recurrent, moderate	3.16	1.22 (1.18-1.27)
H2513	Age-related nuclear cataract, bilateral	10.20	0.92 (0.90-0.95)
H5203	Hypermetropia, bilateral	2.86	0.88 (0.84-0.93)
I10	Essential (primary) hypertension	74.61	1.16 (1.14-1.19)
M25552	Pain in left hip	18.50	0.94 (0.93-0.96)
M542	Cervicalgia	7.43	1.05 (1.02-1.07)
M545	Low back pain	8.49	0.96 (0.93-0.98)

Variable	Description	Frequency (%) (N=170,841)	OR (95% CI)
M549	Dorsalgia, unspecified	5.09	1.22 (1.19-1.26)
M79605	Pain in left leg	4.87	1.22 (1.19-1.26)
N390	Urinary tract infection, site not specified	11.58	1.15 (1.12-1.17)
R000	Tachycardia, unspecified	3.31	1.26 (1.22-1.30)
R001	Bradycardia, unspecified	6.42	1.01 (0.99-1.04)
S0990XA	Unspecified injury of head, initial encounter	4.97	1.27 (1.23-1.30)
Z1231	Encounter for screening mammogram for malignant neoplasm of breast	29.91	0.82 (0.80-0.83)
Z885	Allergy status to narcotic agent	4.06	1.25 (1.21-1.29)
ICD-10 codes either during the index admission or 12 months prior to admission			
D696	Thrombocytopenia, unspecified	3.41	1.18 (1.14-1.22)
E6601	Morbid (severe) obesity due to excess calories	13.05	1.16 (1.13-1.18)
E871	Hypo-osmolality and hyponatremia	7.47	1.22 (1.19-1.25)
G2581	Restless legs syndrome	3.90	1.22 (1.18-1.26)
I480	Paroxysmal atrial fibrillation	11.55	1.26 (1.23-1.29)
I739	Peripheral vascular disease, unspecified	8.51	1.21 (1.18-1.24)
J449	Chronic obstructive pulmonary disease, unspecified	13.06	1.32 (1.30-1.35)
M069	Rheumatoid arthritis, unspecified	4.99	1.16 (1.13-1.20)
Z20822	Contact with and (suspected) exposure to COVID-19	56.88	1.13 (1.11-1.15)
Other risk variables			
MCCFI	MCC Frailty	22.50	1.16 (1.14-1.18)
PROC_THA	Elective THA procedure	43.68	1.10 (1.08-1.12)
HX_COVID	History of COVID	13.68	1.04 (1.02-1.06)
MA	MA (versus FFS)	37.43	1.17 (1.15-1.19)

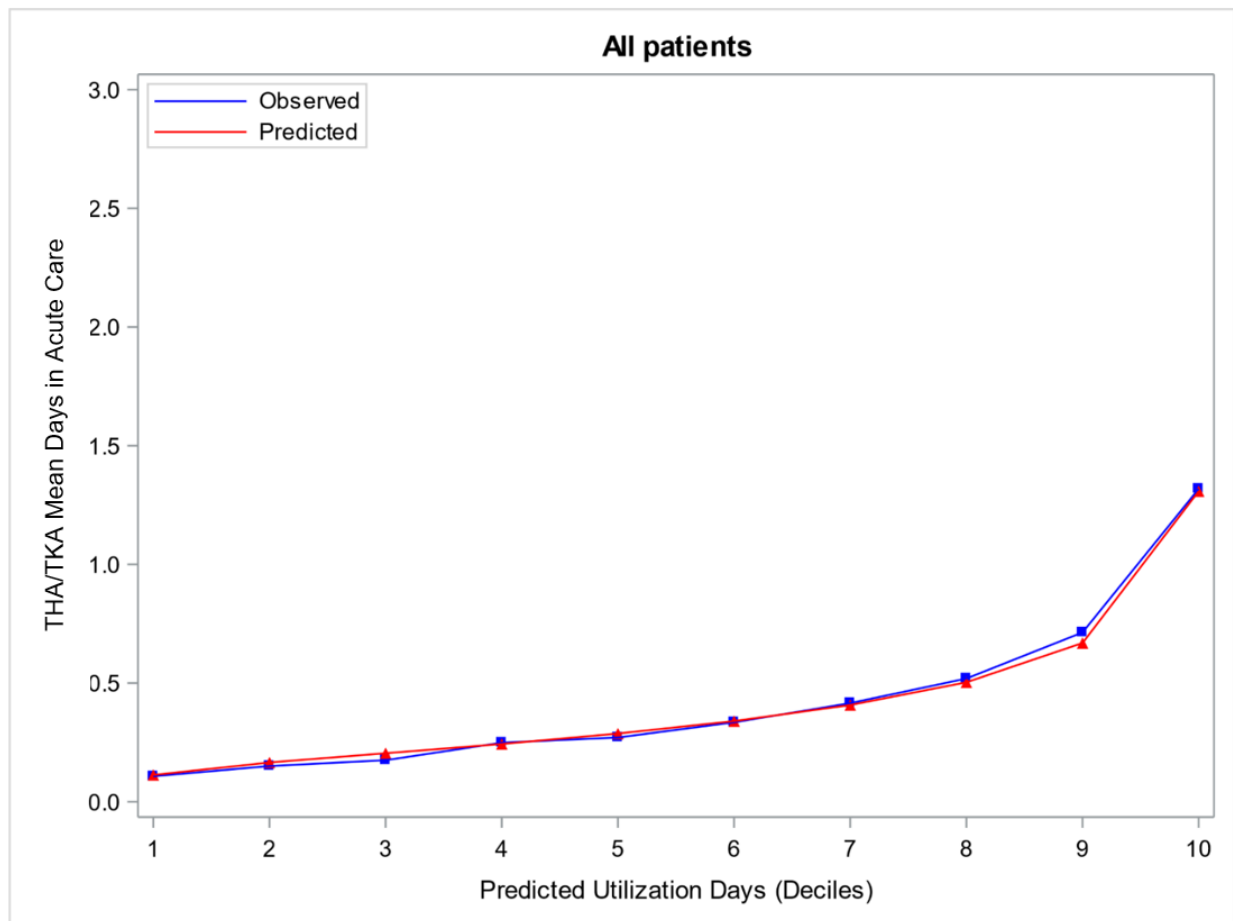
4.6.4 THA/TKA EDAC Model Performance

[Table 4.6.2](#) shows model performance statistics (c-statistic and predictive ability); [Figure 4.6.2](#) shows the risk-decile plot for all patients in the THA/TKA EDAC cohort.

Table 4.6.2 – THA/TKA EDAC: C-Statistic and Predictive Ability (January 1, 2022–December 30, 2022)

Statistic	Value
C-statistic	0.662
Predictive ability	0.3%-4.6%

Figure 4.6.2 – THA/TKA EDAC: Risk-Decile Plot, January 1, 2022–December 30, 2022 (N=170,841 admissions)



4.6.5 THA/TKA EDAC Distribution of Hospital Volume

For the January 1, 2022–December 30, 2022 dataset:

- [Table 4.6.3](#) shows the distribution of hospital admission volume.
- [Table 4.6.4](#) shows the hospital-level distribution of unadjusted outcomes. The national mean THA/TKA *observed* days in acute care for the January 1, 2022–December 30, 2022 dataset was 56.30 days per 100 discharges.
- [Table 4.6.5](#) shows the distribution of hospital-level THA/TKA EDAC measure scores.
- [Figure 4.6.3](#) shows the overall distribution of hospital-level THA/TKA EDAC measure scores.

Table 4.6.3 – THA/TKA EDAC: Distribution of Hospital Admission Volume

Characteristic	January 1, 2022-December 30, 2022
Number of hospitals	3,116
Mean number of admissions (SD)	54.8 (113.4)
Range number of admissions (min.-max.)	3,661 (1-3,662)
25th percentile	8
50th percentile	23
75th percentile	58

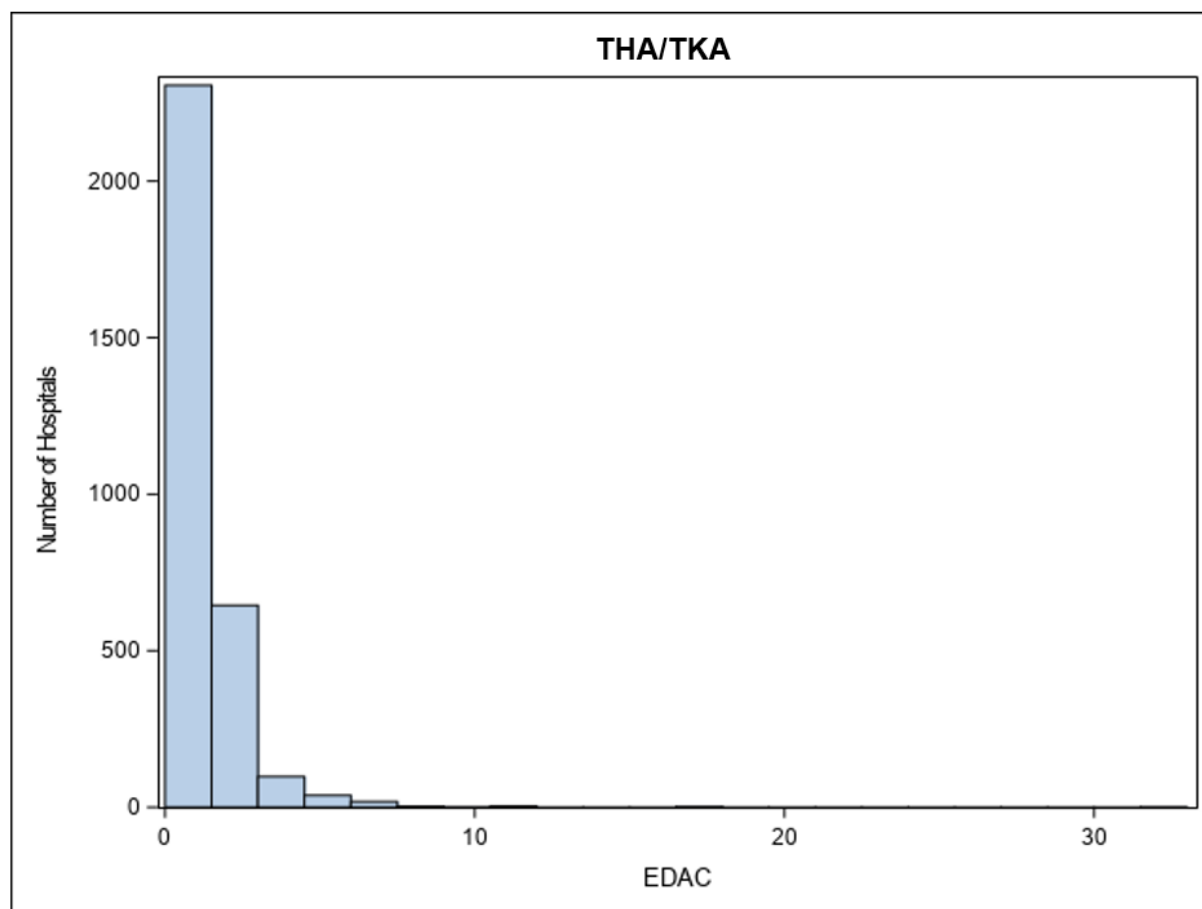
Table 4.6.4 – THA/TKA EDAC: Hospital-level Unadjusted Outcomes: ED Visits, Observations Stays, and Readmission Days per 100 Discharges (January 1, 2022-December 30, 2022) (N=3,116)

Characteristic	Mean (SD)	Median (Q1, Q3)	Range
Observed Days in Acute Care	56.30 (85.43)	37.50 (16.54, 68.18)	1,800.00
ED Days	12.58 (16.10)	9.63 (3.77, 16.22)	200.00
Observation Days	6.72 (20.46)	0.00 (0.00, 6.98)	600.00
Readmission Days	40.04 (78.24)	20.44 (0.00, 49.09)	1,600.00

Table 4.6.5 – THA/TKA EDAC: Distribution of Hospital EDAC Measure Scores, January 1, 2022 – December 30, 2022 (hospitals with at least one THA/TKA admission)

Characteristic	THA/TKA EDAC Measure Score
Number of hospitals	3,116
Mean (SD)	1.29 (1.25)
Range (min.-max.)	32.74 (0.17-32.91)
25th percentile	0.68
50th percentile	0.96
75th percentile	1.54

Figure 4.6.3 – THA/TKA EDAC: Measure Score Distribution, January 1, 2022–December 30, 2022, for hospitals with at least one admission (N=3,116 hospitals)



4.6.6 THA/TKA EDAC Measure Score Variance and Reliability

[Table 4.6.6](#) shows the between-hospital variance.

[Table 4.6.7](#) shows the distribution of facility-level signal-to-noise reliability (see [Methods](#) section for details) for different minimum case volumes for the THA/TKA EDAC measure, for two- and three-year projections from one year of data (January 1, 2022-December 30, 2022).

Table 4.6.6 – THA/TKA EDAC: Between-Hospital Variance

Characteristic	Value
Between-hospital variance (SE)	0.575 (0.021)

Table 4.6.7 – THA/TKA EDAC: Distribution of Signal-To-Noise Reliability (Projected to 2 Years)

Minium Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.805 (0.204)	0.259-0.999	0.736	0.889	0.953
>=25	0.927 (0.049)	0.820-0.999	0.891	0.938	0.968
>=50	0.952 (0.027)	0.897-0.999	0.932	0.955	0.975
>=100	0.971 (0.014)	0.946-0.999	0.959	0.971	0.983

Table 4.6.8 – THA/TKA EDAC: Distribution of Signal-To-Noise Reliability (Projected to 3 Years)

Minium Case Volume	Mean (SD)	Min-Max	25 th Percentile	50 th Percentile	75 th Percentile
>=1	0.849 (0.176)	0.344-0.999	0.807	0.923	0.968
>=25	0.938 (0.047)	0.825-0.999	0.909	0.951	0.977
>=50	0.957 (0.027)	0.899-0.999	0.936	0.963	0.980
>=100	0.974 (0.014)	0.947-0.999	0.963	0.975	0.986

4.6.7 THA/TKA EDAC Measure Validity

Face Validity

[Table 4.6.9](#) shows the results of the TEP face validity vote, where [TEP members](#) indicated their agreement with the following statement: “Do you think the Excess Days in Acute Care (EDAC) measure score [for THA/TKA EDAC] is a valid score to use to distinguish better and/or worse performance amongst hospitals?” Twelve TEP members responded to the TEP survey; 11 of 12 (91.7%) agreed (strongly, moderately, or somewhat) with the face validity statement for the measure.

Table 4.6.9 – THA/TKA EDAC: TEP Face Validity Voting Results

Response Category	Number	Frequency
Strongly Disagree	0	0%
Moderately Disagree	0	0%
Somewhat Disagree	1	8.3%
Somewhat Agree	2	16.7%
Moderately Agree	4	33.3%
Strongly Agree	5	41.7%

Empiric Validity

[Table 4.6.10](#) provides Pearson correlation coefficients that show the relationship between THA/TKA EDAC measure scores and related measures (see [Methods](#) section for details).

Table 4.6.10 – THA/TKA EDAC: Association (Pearson Correlation Coefficients) between THA/TKA EDAC Measure Scores and Comparator Measures (THA/TKA EDAC dates: January 1, 2022-December 30, 2022)

Comparison Measure	Number of Hospitals	Pearson Correlation Coefficient	p-value
Risk-Standardized THA/TKA Readmission	2,974	0.150	<.0001
Star Rating Standardized Readmission Group Scores	3,068	-0.103	<.0001
Star Rating Standardized Readmission Group Scores Excluding THA/TKA Readmission	3,068	-0.075	<.0001
Star Rating Standardized Summary Scores	3,076	-0.108	<.0001
Star Rating Standardized Summary Scores Excluding THA/TKA Readmission	3,076	-0.097	<.0001
Star Rating Standardized Summary Scores Excluding Readmission Measure Group	3,076	-0.079	<.0001

Star Rating Data from the July 2024 release on Hospital Compare.

4.6.8 THA/TKA EDAC Measure Scores within Deciles of Hospital Volume

[Table 4.6.11](#) shows mean THA/TKA EDAC measure scores within deciles of hospital THA/TKA volume. The Pearson correlation coefficient for the association between THA/TKA measure scores and hospital THA/TKA procedural volume is -0.066 (p<0.05).

Table 4.6.11 – THA/TKA EDAC: Mean Measure Scores within Deciles of Hospital THA/TKA Volume

Volume Decile	Number of Hospitals	Volume Range	Mean THA/TKA EDAC Measure Score
1	311	1-2	1.05
2	296	3-5	1.12
3	356	6-10	1.12
4	277	11-15	1.16
5	312	16-22	1.13
6	320	23-32	1.19
7	317	33-48	1.18
8	304	49-73	1.17
9	312	74-129	1.08
10	311	130-3,662	1.04

5. GLOSSARY

Acute care hospital: A hospital that provides inpatient medical care for surgery and acute medical conditions or injuries. Short-term acute care hospitals provide care for short-term illnesses and conditions. In contrast, long-term acute care hospitals generally treat medically complex patients who require long-stay hospital-level care, which is generally defined as an inpatient length of stay more than 25 days.

C-statistic: An indicator of the model's discriminant ability or ability to correctly classify those patients who have and have not had a qualifying event within 30 days. Potential values range from 0.5, meaning no better than chance, to 1.0, an indication of perfect prediction. Perfect prediction implies that patients' outcomes can be predicted completely by their risk factors, and physicians and hospitals play no role in their patients' outcomes.

Case mix: The particular illness severity, age, and, for some measures, gender characteristics of patients with index admissions at a given hospital.

Clinical Classification Software (CCS): Software maintained by the Agency for Healthcare Research and Quality (AHRQ) that groups thousands of individual procedure and diagnosis codes into clinically coherent, mutually exclusive procedure and diagnosis categories. AHRQ CCS categories are used to determine if a readmission is planned. AHRQ CCS procedure categories are used to define planned and potentially planned procedures. AHRQ CCS diagnosis categories are used to define acute diagnoses and complications of care that are considered unplanned, as well as a few specific types of care that are always considered planned (for example, maintenance chemotherapy). Mappings which show the assignment of ICD-10 codes to the AHRQ CCS diagnosis and procedure categories for 2023 public reporting are posted [here](#) on *QualityNet*.

Cohort: The index admissions used to calculate the measure after inclusion and exclusion criteria have been applied.

Comorbidities: Medical conditions the patient had in addition to their primary reason for admission to the hospital.

Complications: Medical conditions that may have occurred as a consequence of care rendered during hospitalization.

Condition Categories (CCs): Groupings of ICD-10-CM diagnosis codes into clinically relevant categories, from the HCC system. CMS uses modified groupings, but not the hierarchical logic of the system, to create risk factor variables. Mappings which show the assignment of ICD-10 codes to the CCs are available [here](#) on *QualityNet*.

Expected days: The average number of risk-adjusted days in acute care that a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix.

Index admission: Any admission included in the measure calculation as the initial admission for a specific condition or procedure (e.g., AMI, HF, THA/TKA, etc.) which is evaluated for the outcome.

Log-likelihood: The logarithm of a likelihood function, which is defined as a function of the parameters of a statistical model given data.

Medicare Fee-For-Service (FFS): Original Medicare plan in which providers receive a fee or payment directly from Medicare for each individual service provided.

Medicare Advantage (MA): Medicare Advantage is a type of Medicare health plan offered by a private company that contracts with Medicare. These plans include Part A, Part B, and usually Part D. Plans may offer some extra benefits that Original Medicare doesn't cover.

Outcome: The result of a broad set of healthcare activities that affect patients' well-being. For mortality measures, the outcome is mortality within 30 days of the start of the admission. For readmission measures, the outcome is readmission within 30 days of discharge. For complication measures, the outcome is complications within up to 90 days of admission. For excess days in acute care measures, the outcome is time spent back in the hospital in the emergency department, in observation, or inpatient admission within 30 days of discharge.

Planned readmissions: A readmission within 30 days of discharge from a short-term acute care hospital that is a scheduled part of the patient's plan of care. Planned readmissions are not captured in the outcomes of these measures.

Predicted days: The average number of risk-adjusted days a hospital's patients spent in acute care.

Risk adjustment: A method to account for variation in how sick patients were when they were admitted for their initial hospital stay. Patients' degree of sickness increases or decreases the probability of observing the measure's outcome. When rates are risk-adjusted, it means hospitals that usually take care of sicker patients won't have a worse rate just because their patients were sicker when they arrived at the hospital. When rates are risk-adjusted, it helps make comparisons among hospitals fair and meaningful.

Risk-adjustment variables: Patient demographics and comorbidities used to standardize rates for differences in case mix across hospitals.

Signal-to-noise Ratio: With respect to quality measurement, the signal is the information of interest and noise is the random, unwanted variation. The signal-to-noise ratio measures the strength of a desired signal relative to the background noise. The signal-to-noise ratio estimates the proportion of overall variability explained by the differences between entities.

Unplanned readmissions: Acute clinical events a patient experienced that require urgent rehospitalization. Unplanned readmissions are captured in the outcomes of these measures.

6. REFERENCES

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7. APPENDICES

7.1. Appendix A Definition of ED Visits and Observation Stays

Table A.1 — Codes Used to Define ED Visits and Observation Stays

Code (Code Type)	Description
ED Definition	
0450 (Revenue Center Code)	Emergency room-general classification
0451 (Revenue Center Code)	Emergency room- Emergency Medical Treatment and Active Labor Act (EMTALA) emergency medical screening services
0452 (Revenue Center Code)	Emergency room-ER beyond EMTALA screening
0456 (Revenue Center Code)	Emergency room-urgent care
0459 (Revenue Center Code)	Emergency room-other
0981 (Revenue Center Code)	Professional fees-emergency room
Observation Stay Definition	
0762 (Revenue Center Code)	Treatment or observation room-observation room
G0378 (Healthcare Common Procedure Coding System [HCPCS] Code)	Hospital observation service, per hour
99217 (Current Procedural Terminology [CPT] Code)	Observation care discharge day management
99218 (CPT Code)	Initial observation care, per day, for the evaluation and management of a patient which requires these 3 key components: A detailed or comprehensive history; A detailed or comprehensive examination; and Medical decision making that is straightforward or of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the problem(s) requiring admission to outpatient hospital "observation status" are of low severity. Typically, 30 minutes are spent at the bedside and on the patient's hospital floor or unit.
99219 (CPT Code)	Initial observation care, per day, for the evaluation and management of a patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the problem(s) requiring admission to outpatient hospital "observation status" are of moderate severity. Typically, 50 minutes are spent at the bedside and on the patient's hospital floor or unit.

Code (Code Type)	Description
99220 (CPT Code)	Initial observation care, per day, for the evaluation and management of a patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the problem(s) requiring admission to outpatient hospital "observation status" are of high severity. Typically, 70 minutes are spent at the bedside and on the patient's hospital floor or unit.
99234 (CPT Code)	Observation or inpatient hospital care, for the evaluation and management of a patient including admission and discharge on the same date, which requires these 3 key components: A detailed or comprehensive history; A detailed or comprehensive examination; and Medical decision making that is straightforward or of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually the presenting problem(s) requiring admission are of low severity. Typically, 40 minutes are spent at the bedside and on the patient's hospital floor or unit.
99235 (CPT Code)	Observation or inpatient hospital care, for the evaluation and management of a patient including admission and discharge on the same date, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually the presenting problem(s) requiring admission are of moderate severity. Typically, 50 minutes are spent at the bedside and on the patient's hospital floor or unit.
99236 (CPT Code)	Observation or inpatient hospital care, for the evaluation and management of a patient including admission and discharge on the same date, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually the presenting problem(s) requiring admission are of high severity. Typically, 55 minutes are spent at the bedside and on the patient's hospital floor or unit.

7.2. Appendix B Measure Specifications

Appendix B.1 AMI EDAC Cohort and Outcome Specifications

Cohort

Inclusion Criteria for AMI EDAC Measure

- **Principal discharge diagnosis of AMI**
 - Rationale: AMI is the condition targeted for measurement.
- **Enrolled in Medicare FFS or MA for the 12 months prior to the date of admission and during the index admission**
 - Rationale: Enrollment in Medicare (FFS or MA) in the prior 12 months ensures that the comorbidity data used in risk adjustment can be captured from inpatient, outpatient, and physician claims data for up to 12 months prior to the index admission, to augment the index admission claim itself.
- **Aged 65 or over**
 - Rationale: Patients younger than 65 are not included in the measure because they are considered to be too clinically distinct from patients 65 or over.
- **Discharged alive from a non-federal short-term acute care hospital**
 - Rationale: It is only possible for patients to be eligible for an ED visit, observation stay, or readmission if they are discharged alive.
- **Not transferred to another acute care facility**
 - Rationale: Hospitalizations that result in a transfer to another acute care facility are not included in the measure because the measure's focus is on admissions that result in discharge to a non-acute care setting (for example, to home or a skilled nursing facility).

Exclusion Criteria for AMI EDAC Measure

- **Without at least 30 days of post-discharge enrollment in Medicare FFS or MA**
 - Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.
- **Discharged against medical advice**
 - Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- **Same-day discharges**
 - Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these admissions are for clinically significant AMIs.
- **AMI admissions within 30 days of discharge from a prior AMI index admission**
 - Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of determination of the outcome. CMS does not want to potentially count the additional admission as both an index admission and an unplanned readmission outcome for the first admission.
- **With a principal diagnosis code of COVID-19 or with a secondary diagnosis code of COVID-19 coded as POA on the index admission claim**

- Rationale: COVID-19 patients are removed from the AMI cohort in response to the COVID-19 PHE.

The ICD-10-CM codes used to define the AMI cohort are outlined in the 2023 AMI EDAC Measure Code Specifications supplemental file posted [here](#) on *QualityNet*.

Outcome

Outcome Criteria for AMI EDAC Measure

- **All-cause days in acute care within 30 days from the date of discharge from an index admission**
 - Rationale: Days in acute care are defined as days spent in an ED, admitted to observation status, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index AMI hospitalization. From a patient's perspective, days in acute care from any cause is an adverse event. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.
- **ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-19 on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are not eligible and are excluded**
 - Rationale: COVID-19 ED visits, observation stays, and readmissions are not eligible for the EDAC outcome in response to the COVID-19 PHE.

Appendix B.2 COPD EDAC Cohort and Outcome Specifications

Cohort

Inclusion Criteria for COPD EDAC Measure

- **Principal discharge diagnosis of COPD or principal discharge diagnosis of acute respiratory failure with a secondary diagnosis of COPD with exacerbation**
 - Rationale: COPD is the condition targeted for measurement. Acute respiratory failure admissions with a secondary diagnosis of COPD are also included to capture the full spectrum of severity among patients hospitalized with exacerbations of COPD.
- **Enrolled in Medicare FFS or MA for the 12 months prior to the date of admission and during the index admission**
 - Rationale: Enrollment in Medicare (FFS or MA) in the prior 12 months ensures that the comorbidity data used in risk adjustment can be captured from inpatient, outpatient, and physician claims data for up to 12 months prior to the index admission, to augment the index admission claim itself.
- **Aged 65 or over**
 - Rationale: Patients younger than 65 are not included in the measure because they are considered to be too clinically distinct from patients 65 or over.
- **Discharged alive from a non-federal short-term acute care hospital**
 - Rationale: It is only possible for patients to be eligible for an ED visit, observation stay, or readmission if they are discharged alive.
- **Not transferred to another acute care facility**
 - Rationale: Hospitalizations that result in a transfer to another acute care facility are not included in the measure because the measure's focus is on admissions that result in discharge to a non-acute care setting (for example, to home or a skilled nursing facility).

Exclusion Criteria for COPD EDAC Measure

- **Without at least 30 days of post-discharge enrollment in Medicare FFS or MA**
 - Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.
- **Discharged against medical advice**
 - Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- **COPD admissions within 30 days of discharge from a prior COPD index admission**
 - Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of determination of the outcome. CMS does not want to potentially count the additional admission as both an index admission and an unplanned readmission outcome for the first admission.
- **With a principal diagnosis code of COVID-19 or with a secondary diagnosis code of COVID-19 coded as POA on the index admission claim**
 - Rationale: COVID-19 patients are removed from the COPD cohort in response to the COVID-19 PHE, and to maintain alignment with the COPD readmission measure included in the FY 2024 HRRP.

The ICD-10-CM codes used to define the COPD EDAC cohort are outlined in the 2023 COPD Readmission Measure Code Specifications supplemental file posted [here](#) on *QualityNet*. (We note that the Readmission and EDAC measures use the same inclusion and exclusion criteria.)

Outcome

Outcome Criteria for COPD EDAC Measure

- **All-cause days in acute care within 30 days from the date of discharge from an index admission**
 - Rationale: Days in acute care are defined as days spent in an ED, admitted to observation status, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization. From a patient's perspective, days in acute care from any cause is an adverse event. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.
- **ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-19 on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are not eligible and are excluded**
 - Rationale: COVID-19 ED visits, observation stays, and readmissions are not eligible for the EDAC outcome in response to the COVID-19 PHE.

7.3. Appendix C Cohort and Outcome Specifications

Appendix C.1 CABG EDAC Cohort and Outcome Specifications

Cohort

Inclusion Criteria for CABG EDAC Measure

- **Enrolled in Medicare FFS or MA for the 12 months prior to the date of admission and during the index admission**
 - Rationale: Enrollment in Medicare (FFS or MA) in the prior 12 months ensures that the comorbidity data used in risk adjustment can be captured from inpatient, outpatient, and physician claims data for up to 12 months prior to the index admission, to augment the index admission claim itself.
- **Aged 65 or over**
 - Rationale: Patients younger than 65 are not included in the measure because they are considered to be too clinically distinct from patients 65 or over.
- **Discharged alive from a non-federal short-term acute care hospital**
 - Rationale: It is only possible for patients to be eligible for an ED visit, observation stay, or readmission if they are discharged alive.
- **Having a qualifying isolated CABG procedure during the index admission**
 - Rationale: Isolated CABG surgery is the procedure targeted for measurement. Isolated CABG procedures are defined as those procedures performed without concomitant valve or other major cardiac, vascular, or thoracic procedures, because they represent a population of patients with higher risk. These procedure groups include:
 - valve procedures;
 - atrial and/or ventricular septal defects;
 - congenital anomalies;
 - other open cardiac procedures;
 - heart transplants;
 - aorta or other non-cardiac arterial bypass procedures;
 - head, neck, or intracranial vascular procedures; and
 - other chest and thoracic procedures.

Exclusion Criteria for CABG EDAC Measure

- **Without at least 30 days of post-discharge enrollment in Medicare FFS or MA**
 - Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.
- **Discharged against medical advice**
 - Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- **Admissions for subsequent qualifying CABG procedures during the measurement period**
 - Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery

admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.

- **With a principal diagnosis code of COVID-19 or with a secondary diagnosis code of COVID-19 coded as POA on the index admission claim**
 - Rationale: COVID-19 patients are removed from the CABG surgery cohort in response to the COVID-19 PHE, and to maintain alignment with CABG surgery readmission measure included in the FY 2024 HRRP.

The ICD-10 codes used to define the CABG EDAC surgery cohort are outlined in the 2023 CABG Surgery Readmission Measure Code Specifications supplemental file posted [here](#) on *QualityNet*. (We note that the Readmission and EDAC measures use the same inclusion and exclusion criteria.)

Outcome

Outcome Criteria for CABG EDAC Measure

- **All-cause days in acute care within 30 days from the date of discharge from an index admission**
 - Rationale: Days in acute care are defined as days spent in an ED, admitted to observation status, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization. From a patient's perspective, days in acute care from any cause is an adverse event. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.
- **ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-19 on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are not eligible and are excluded**
 - Rationale: COVID-19 ED visits, observation stays, and readmissions are not eligible for the EDAC outcome in response to the COVID-19 PHE.

Appendix C.2 HF EDAC Cohort and Outcome Specifications

Cohort

Inclusion Criteria for HF EDAC Measure

- **Principal discharge diagnosis of HF**
 - Rationale: HF is the condition targeted for measurement.
- **Enrolled in Medicare FFS or MA for the 12 months prior to the date of admission and during the index admission**
 - Rationale: Enrollment in Medicare (FFS or MA) in the prior 12 months ensures that the comorbidity data used in risk adjustment can be captured from inpatient, outpatient, and physician claims data for up to 12 months prior to the index admission, to augment the index admission claim itself.
- **Aged 65 or over**
 - Rationale: Patients younger than 65 are not included in the measure because they are considered to be too clinically distinct from patients 65 or over.
- **Discharged alive from a non-federal short-term acute care hospital**
 - Rationale: It is only possible for patients to be eligible for an ED visit, observation stay, or readmission if they are discharged alive.
- **Not transferred to another acute care facility**
 - Rationale: Hospitalizations that result in a transfer to another acute care facility are not included in the measure because the measure's focus is on admissions that result in discharge to a non-acute care setting (for example, to home or a skilled nursing facility).

Exclusion Criteria for HF EDAC Measure

- **Without at least 30 days of post-discharge enrollment in Medicare FFS or MA**
 - Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.
- **Discharged against medical advice**
 - Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- **HF admissions within 30 days of discharge from a prior HF index admission**
 - Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of determination of the outcome. CMS does not want to potentially count the additional admission as both an index admission and an unplanned readmission outcome for the first admission.
- **With a procedure code for LVAD implantation or heart transplantation either during the index admission or up to 12 months prior to the index admission**
 - Rationale: These patients represent a clinically distinct group.
- **With a principal diagnosis code of COVID-19 or with a secondary diagnosis code of COVID-19 coded as POA on the index admission claim**
 - Rationale: COVID-19 patients are removed from the HF cohort in response to the COVID-19 PHE.

The ICD-10 codes used to define HF cohort inclusions and exclusions are outlined in the 2023 HF EDAC Measure Code Specifications supplemental file posted [here](#) on *QualityNet*.

Outcome

Outcome Criteria for HF EDAC Measure

- All-cause days in acute care within 30 days from the date of discharge from an index admission
 - Rationale: Days in acute care are defined as days spent in an ED, admitted to observation status, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index HF hospitalization. From a patient's perspective, days in acute care from any cause is an adverse event. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.
- ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-19 on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are not eligible and are excluded
- Rationale: COVID-19 ED visits, observation stays, and readmissions are not eligible for the EDAC outcome in response to the COVID-19 PHE.

Appendix C.3 Pneumonia EDAC Cohort and Outcome Specifications

Cohort

Inclusion Criteria for Pneumonia EDAC Measure

- **Diagnosis coding that met one of the two following requirements:**
 - (1) Principal discharge diagnosis of pneumonia; or**
 - (2) Principal discharge diagnosis of sepsis (that is not severe); and**
 - A secondary diagnosis of pneumonia coded as POA; and**
 - No secondary diagnosis of sepsis that is both severe and coded as POA**
 - Rationale: Pneumonia is the condition targeted for measurement. Sepsis admissions with a secondary diagnosis of pneumonia, as described above, are also included in order for the measure to more fully reflect the population of patients being treated for pneumonia.
- **Enrolled in Medicare FFS or MA for the 12 months prior to the date of admission and during the index admission**
 - Rationale: Enrollment in Medicare (FFS or MA) in the prior 12 months ensures that the comorbidity data used in risk adjustment can be captured from inpatient, outpatient, and physician claims data for up to 12 months prior to the index admission, to augment the index admission claim itself.
- **Aged 65 or over**
 - Rationale: Patients younger than 65 are not included in the measure because they are considered to be too clinically distinct from patients 65 or over.
- **Discharged alive from a non-federal short-term acute care hospital**
 - Rationale: It is only possible for patients to be eligible for an ED visit, observation stay, or readmission if they are discharged alive.
- **Not transferred to another acute care facility**
 - Rationale: Hospitalizations that result in a transfer to another acute care facility are not included in the measure because the measure's focus is on admissions that result in discharge to a non-acute care setting (for example, to home or a skilled nursing facility).

Exclusion Criteria for Pneumonia EDAC Measure

- **Without at least 30 days of post-discharge enrollment in Medicare FFS or MA**
 - Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.
- **Discharged against medical advice**
 - Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- **Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission**
 - Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of determination of the outcome. CMS does not want to potentially count the additional admission as both an index admission and an unplanned readmission outcome for the first admission.
- **With a principal diagnosis code of COVID-19 or with a secondary diagnosis code of COVID-19 coded as POA on the index admission claim**

- Rationale: COVID-19 patients are removed from the pneumonia cohort in response to the COVID-19 PHE.

The ICD-10-CM codes used to define the pneumonia cohort are outlined in the 2023 Pneumonia EDAC Measure Code Specifications supplemental file posted [here](#) on *QualityNet*.

Outcome

Outcome Criteria for Pneumonia EDAC Measure

- **All-cause days in acute care within 30 days from the date of discharge from an index admission**
 - Rationale: Days in acute care are defined as days spent in an ED, admitted to observation status, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization. From a patient's perspective, days in acute care from any cause is an adverse event. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.
- **ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-1 on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are not eligible and are excluded**
 - Rationale: COVID-19 ED visits, observation stays, and readmissions are not eligible for the EDAC outcome in response to the COVID-19 PHE.

Appendix C.4 THA/TKA EDAC Cohort and Outcome Specifications

Cohort

Inclusion Criteria for THA/TKA EDAC Measure

- **Enrolled in Medicare FFS or MA for the 12 months prior to the date of admission and during the index admission**
 - Rationale: Enrollment in Medicare (FFS or MA) in the prior 12 months ensures that the comorbidity data used in risk adjustment can be captured from inpatient, outpatient, and physician claims data for up to 12 months prior to the index admission, to augment the index admission claim itself.
- **Aged 65 or over**
 - Rationale: Patients younger than 65 are not included in the measure because they are considered to be too clinically distinct from patients 65 or over.
- **Discharged alive from a non-federal short-term acute care hospital**
 - Rationale: It is only possible for patients to be eligible for an ED visit, observation stay, or readmission if they are discharged alive.
- **Having a qualifying elective primary THA/TKA procedure during the index admission**
 - Rationale: Elective primary THA or TKA is the procedure targeted for measurement. Elective primary THA/TKA procedures are defined as those THA/TKA procedures *without* the following:
- **Fracture of the pelvis or lower limbs coded in the principal or secondary discharge diagnosis fields on the index admission claim (Note: Periprosthetic fractures must be additionally coded as POA in order to disqualify a THA/TKA from cohort inclusion, unless exempt from POA reporting.)**
 - Rationale: Patients with fractures have higher mortality, complication, and readmission rates, and the procedures are typically not elective.
- **A concurrent partial hip or knee arthroplasty procedure**
 - Rationale: Partial arthroplasty procedures are done primarily for hip and knee fractures and are typically performed on patients who are older, frailer, and who have more comorbid conditions.
- **A concurrent revision, resurfacing, or implanted device/prosthesis removal procedure**
 - Rationale: Revision procedures may be performed at a disproportionately small number of hospitals and are associated with higher mortality, complication, and readmission rates. Resurfacing procedures are a different type of procedure involving only the joint's articular surface and are typically performed on younger, healthier patients. Elective procedures performed on patients undergoing removal of implanted device/prostheses procedures may be more complicated.
- **Mechanical complication coded in the principal discharge diagnosis field on the index admission claim**
 - Rationale: A complication coded as the principal discharge diagnosis suggests that the procedure was more likely the result of a previous procedure. These patients may require more technically complex arthroplasty procedures and may be at increased risk for readmission.
- **Malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field on the index admission claim**

- Rationale: Patients with these malignant neoplasms are at increased risk for readmission, and the procedure may not be elective.
- **Transfer from another acute care facility for the THA/TKA**
 - Rationale: The THA/TKA readmission measure does not include admissions for patients transferred to the index hospital, as they likely do not represent elective THA/TKA procedures.

Exclusion Criteria for THA/TKA EDAC Measure

- **Without at least 30 days of post-discharge enrollment in Medicare FFS or MA**
 - Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.
- **Discharged against medical advice**
 - Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.
- **Admitted for the index procedure and subsequently transferred to another acute care facility**
 - Rationale: Patients admitted for the index procedure and subsequently transferred to another acute care facility are excluded, as determining to which hospital the readmission outcome should be attributed is difficult.
- **With more than two THA/TKA procedure codes during the index admission**
 - Rationale: Although clinically possible, it is highly unlikely that patients would receive more than two elective THA/TKA procedures in one hospitalization. Coding in such cases may reflect a coding error.
- **THA/TKA admissions within 30 days of discharge from a prior THA/TKA index admission**
 - Rationale: Additional THA/TKA admissions within 30 days are excluded as index admissions because they are part of determination of the outcome. CMS does not want to potentially count the additional admission as both an index admission and an unplanned readmission outcome for the first admission.
- **With a principal diagnosis code of COVID-19 or with a secondary diagnosis code of COVID-19 coded as POA on the index admission claim**
 - Rationale: COVID-19 patients are removed from the THA/TKA cohort in response to the COVID-19 PHE.

The ICD-10 codes used to define the THA/TKA EDAC cohort are outlined in the 2023 THA/TKA Readmission Measure Code Specifications supplemental file [posted here on QualityNet](#). (We note that the Readmission and EDAC measures use the same inclusion and exclusion criteria.)

Outcome

Outcome Criteria for the THA/TKA EDAC Measure

- **All-cause days in acute care within 30 days from the date of discharge from an index admission**
 - Rationale: Days in acute care are defined as days spent in an ED, admitted to observation status, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization. From a patient's perspective, days in acute care from any cause is an adverse event. Multiple

events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

- **ED visits, observation stays, and readmissions with a principal diagnosis code of COVID-19 on the claim or with a secondary diagnosis code of COVID-19 on the claim (and coded as POA, in the case of readmissions) are not eligible and are excluded**
 - Rationale: COVID-19 ED visits, observation stays, and readmissions are not eligible for the EDAC outcome in response to the COVID-19 PHE.

7.4. Appendix D. Planned Readmission Algorithm

Figure PR.1 — Planned Readmission Algorithm Version 4.0 2023 Flowchart

