

Risk Adjusted Home Time as a Novel Hospital-Level Performance Metric for Pneumonia Hospitalization among Medicare Beneficiaries

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BACKGROUND

- The Hospital Readmissions Reduction Program (HRRP) implemented by the Centers for Medicare & Medicaid Services (CMS) financially penalizes hospitals with 30-day risk-standardized readmission rates (RSRR) that are higher than expected for common conditions such as pneumonia
- HRRP may have an unintended consequences if hospitals avoided readmitting patients who need inpatient stay
- The potential of mortality as a competing event to readmission makes it challenging to discern if the lower readmission rate is driven by better quality of care or post-discharge death.**

RATIONALE & OBJECTIVES

- Pneumonia is a leading cause of hospitalization and death among older adults.
- Recent studies have reported on home time, a novel patient-centered metric that considers both readmission and post-discharge mortality as an alternate to readmissions alone
- Home Time – Number of days spent alive and out of an acute care setting, skilled nursing facility (SNF), or a rehabilitation facility (LTAC) within 30 days of discharge from a pneumonia admission**
- Home time is especially relevant as a metric for pneumonia given the potential for high use of post-acute care facilities after discharge
- To assess home time within 30 days after discharge among pneumonia hospitalizations**

RETROSPECTIVE COHORT STUDY METHODS

Data Source: 100% CMS Medicare Provider Analysis and Review data

Inclusion Criteria: Medicare fee-for-service (FFS) beneficiaries > 65 years hospitalized with a primary or secondary discharge diagnosis of pneumonia between 01/01/2015 and 11/30/2017

Exclusion Criteria: Follow-up admissions in a patient within 30 days from index, discharge within 1 day of hospitalization, hospitals with ≤ 25 pneumonia admissions during study period

Statistical Analysis: Risk-standardized mortality rate (RSMR) and RSRR were calculated by previously published CMS methodology. Maximum likelihood estimates were generated using GLMMs with log link and Poisson distribution to calculate the risk-standardized home time (RSHT). Hospitals were ranked as low or high performers based on the quartile of their risk-standardized estimates. Hospital-level aggregated data was used for study analyses.

RESULTS (1,662,980 pneumonia admissions)

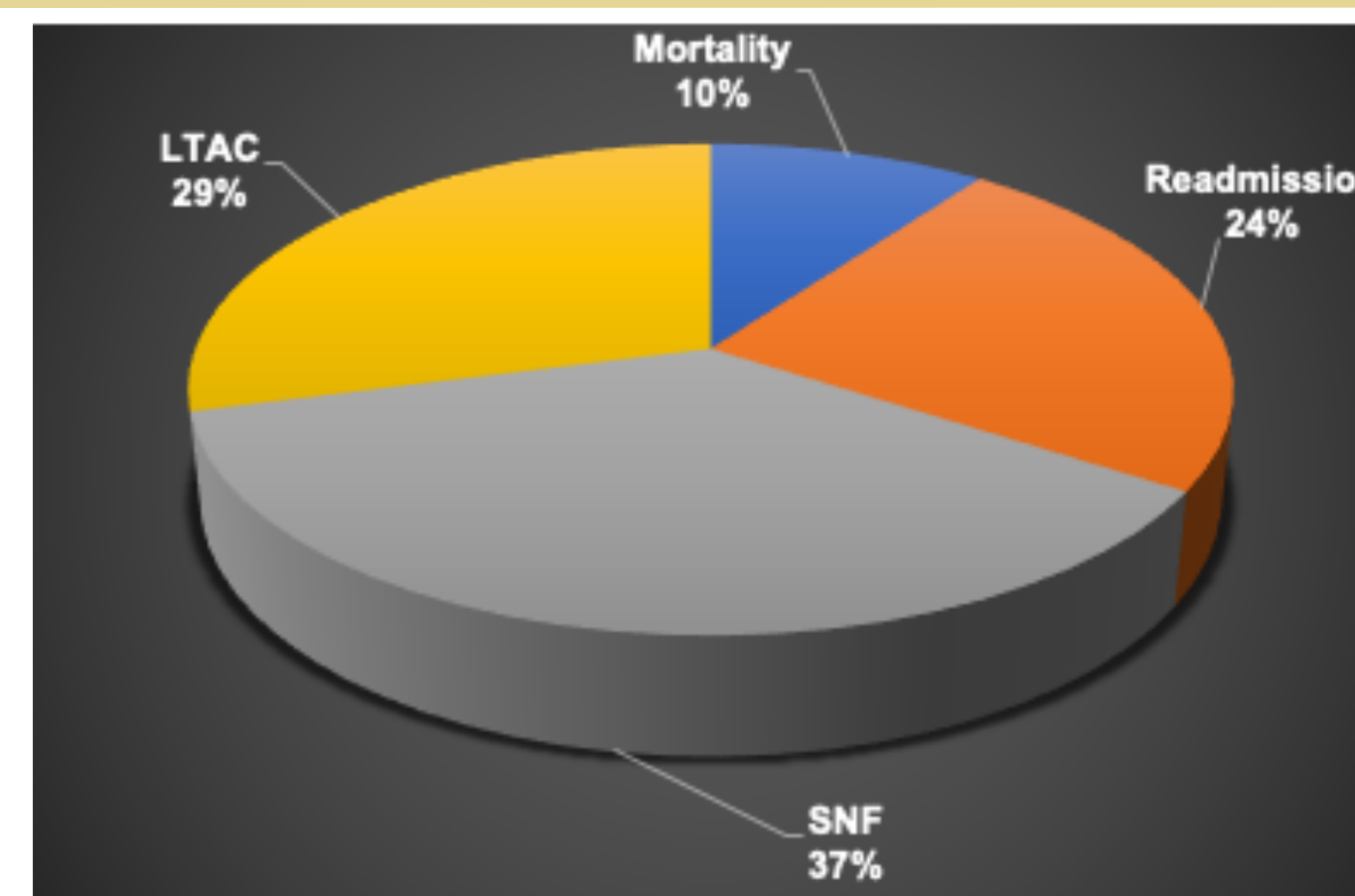


Figure 1. Pie-Chart for reasons attributed to loss of home time (Percentages indicate proportion of admissions)

Table. Characteristics across quartiles of 30-day risk-standardized home time

	Low performance (least time at home)		High performance (most time at home)	
	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Patient-level characteristics				
Number of Pneumonia patients	318,651	446,452	466,287	431,590
Age (mean, SD)	82.0 (8.3)	81.1 (8.3)	80.8 (8.3)	80.6 (8.3)
Female Sex (%)	52.9	52.6	52.4	52.1
Race (%)				
White	86.5	87.5	85.8	81.7
Black	7.5	8.0	8.7	8.2
Others	6.0	4.5	5.5	10.1
Diabetes (%)	32.9	32.8	32.8	33.0
Acute Myocardial Infarction (%)	2.7	2.5	2.4	2.4
Heart failure (%)	9.1	8.9	8.5	8.2
Chronic Kidney Disease (%)	6.4	6.6	6.7	7.0
Hypertension (%)	74.9	76.8	76.8	76.2
Chronic Obstructive Pulmonary Disease (%)	38.88	38.37	37.67	35.17
Charlson comorbidity index mean (SD)	0.65 (1.5)	0.67 (1.5)	0.67 (1.5)	0.67 (1.5)
Discharge to home %	34.0	38.5	41.6	45.5
Discharge to SNF/LTAC %	36.0	30.5	27.2	22.6
Hospital-level characteristics				
Median hospital Pneumonia volume (IQR)	311 (164-547)	481 (261-754)	501 (273-795)	449 (231-737)
Hospital size (mean, SD)	156 (138)	223 (192)	266 (248)	270 (261)
For profit ownership %	27.3	21.3	20.2	14.5
Rural hospital location %	40.9	26.9	18.9	16.1
Fully implemented EHR %	99.0	99.8	99.3	99.7
Teaching hospital %	34.9	53.1	57.7	61.5
Participation in bundle payment program %	14.9	26.3	27.6	32.3

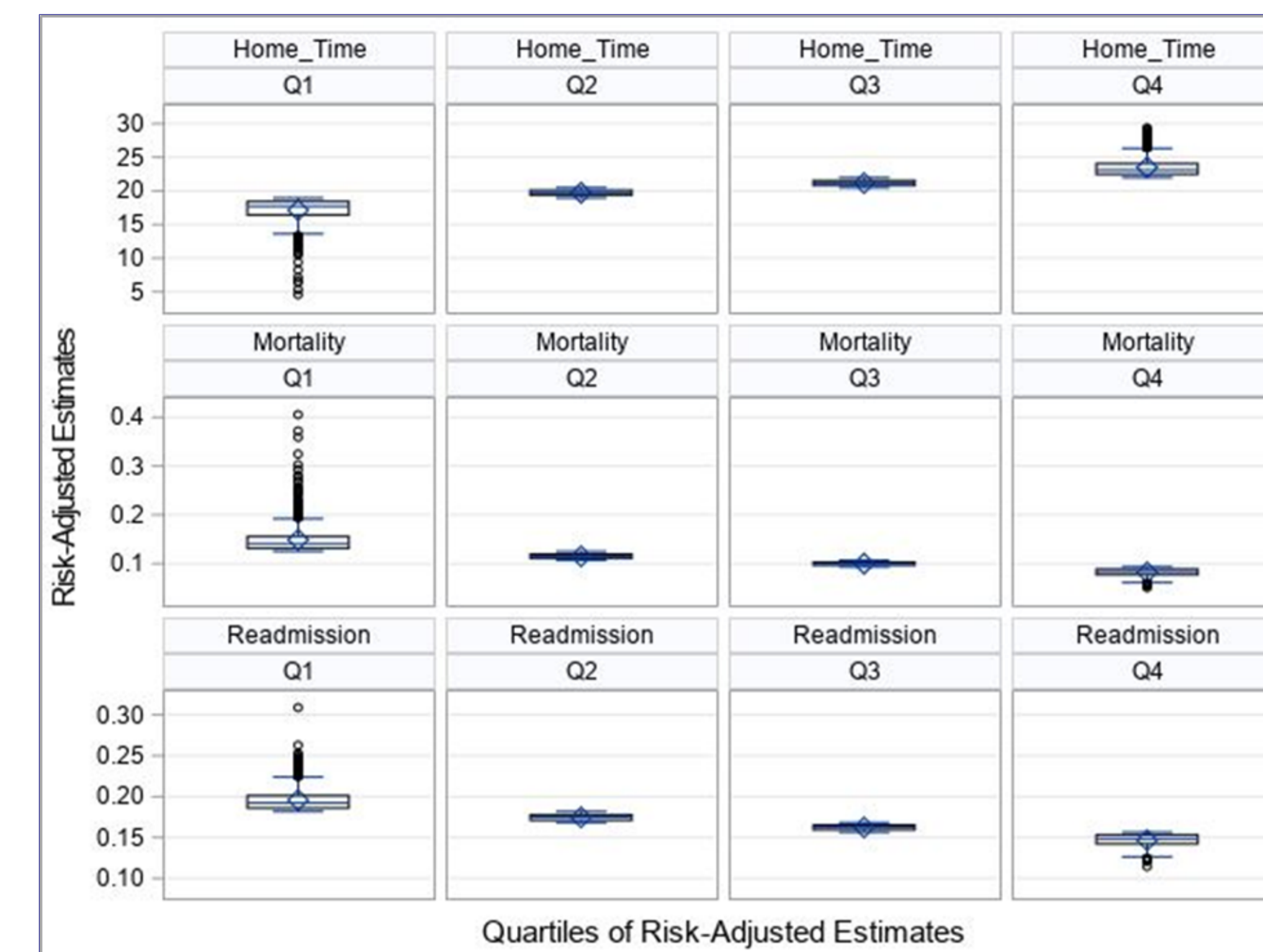


Figure 2. Box Plots of 30-day Risk-Adjusted Estimates

- Median RSHT - 20.5 d** (IQR: 18.9-21.9 d, range: 5-29 d)
- Median RSMR – 10.7%** (IQR: 9.3-12.5%, range: 5.1-40.6%)
- Median RSRR: 16.8%** (IQR: 15.7-18.2%, range: 11.5-30.9%)

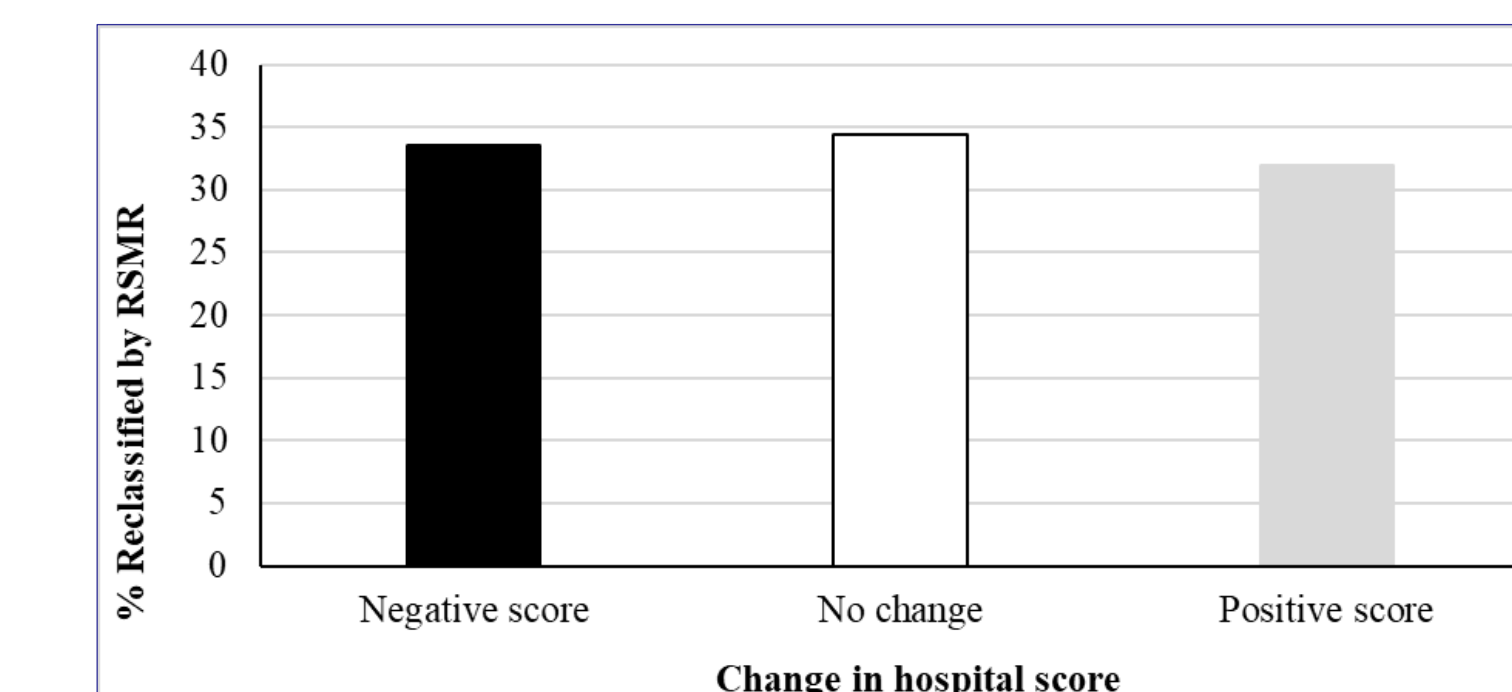
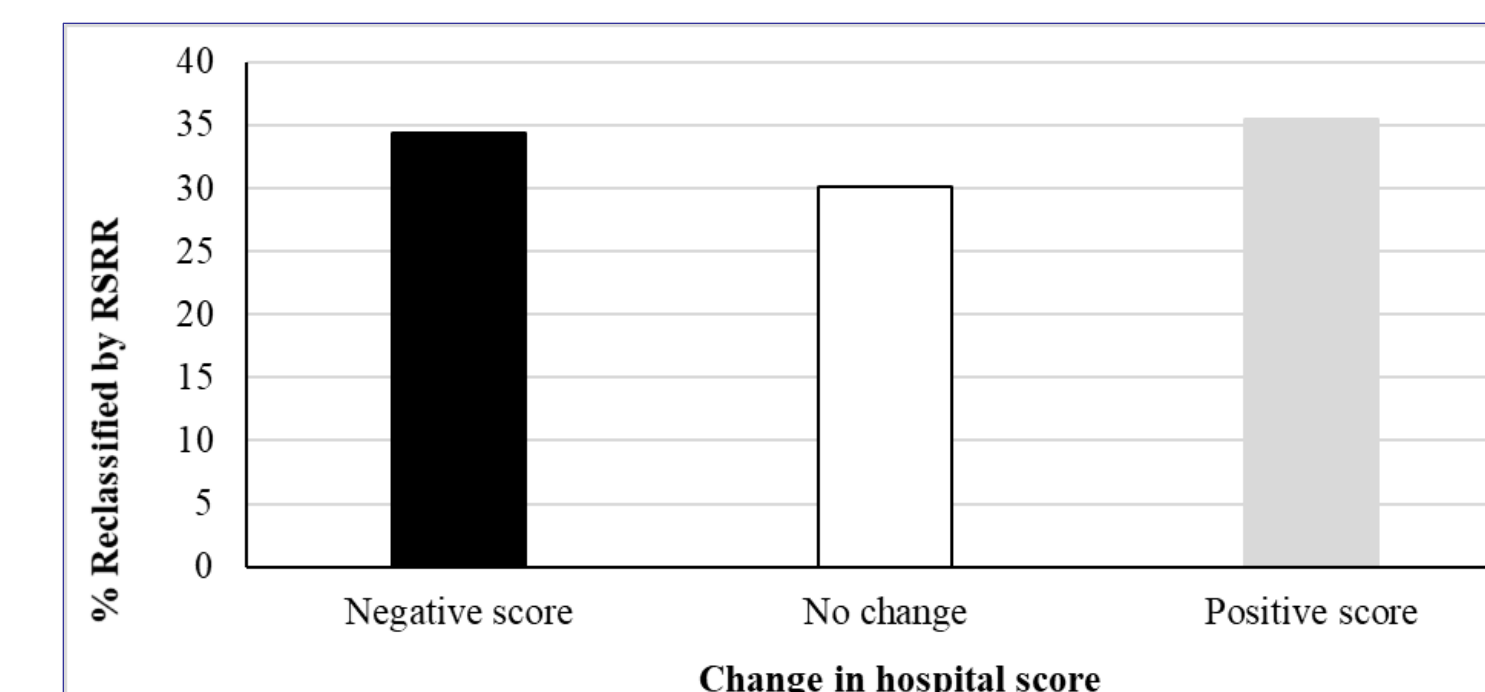


Figure 3. Reclassification of hospital ranks based on risk-standardized home time compared with A) risk-standardized readmission rate and B) risk-standardized mortality rate

- Performance up-classified:** RSHT/RSRR – 35.5%, RSHT/RSMR – 32.0%
- Performance down-classified:** RSHT/RSRR – 34.4%, RSHT/RSMR – 33.6%

SUMMARY

- 30-day home time is a novel, post-discharge, patient-centric, hospital-level quality metric that can be calculated with data that is readily available in CMS datasets, easy to interpret by providers and patients
- Home time metric accounts for post-discharge mortality and, facilitates reliable and credible inter-hospital comparisons
- Limitation** – does not differentiate between staying home after discharge, difficulty in accessing medical care, or end-of-life care