The Role of Analytics in the Development of a Successful Readmissions Program

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Background

- Section 3025 of the Affordable Care Act added a new section 1886(q) to the Social Security Act, establishing the Hospital Readmissions Reduction Program.
- Payment adjustments began with discharges on October 1, 2012.

Purpose

- Important part of CMS's continued efforts to link payment to the quality of hospital care.
- Strong financial incentive for hospitals to improve communication and care coordination efforts, and to better engage patients and caregivers, with respect to post-discharge planning.

CMS 30-Day Readmission Measures

30-day Risk-standardized Unplanned Readmission Measures	Hospital Readmissions Reduction Program	Hospital Inpatient Quality Reporting Program
Acute Myocardial Infarction	X	X
Heart Failure	X	X
Pneumonia	X	X
Chronic Obstructive Pulmonary Disease	X	X
Coronary Artery Bypass Graft	X	X
Primary, Elective Total Hip and/or Knee Arthroplasty	X	X
Acute Ischemic Stroke		X
Hospital-Wide All-Cause Readmission (HWR)		X

Design of the Readmission Measures

- Developed and calculated using Medicare claims
- Includes Medicare FFS patients 65+ years of age admitted for condition or procedure of interest
- Outcome is defined as all-cause unplanned readmission within 30 days of discharge from the index admission
- Risk-adjusted for hospitals' patient case mix
- Reported as risk-standardized readmission rate (RSRR)

Design of the Readmission Measures cont.

- Inclusion Criteria
- Discharged alive from a non-federal short-term acute care hospital with a qualifying condition or procedure of interest
- Aged 65 or over
- Enrolled in Medicare fee-for-service Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission
- Not transferred to another acute care facility (condition-specific readmission measures only)

Design of the Readmission Measures cont.

- Exclusion Criteria
  - Without at least 30 days of post-discharge enrollment in FFS Medicare
  - Discharged against medical advice (AMA)
  - Additional exclusions apply to specific measures

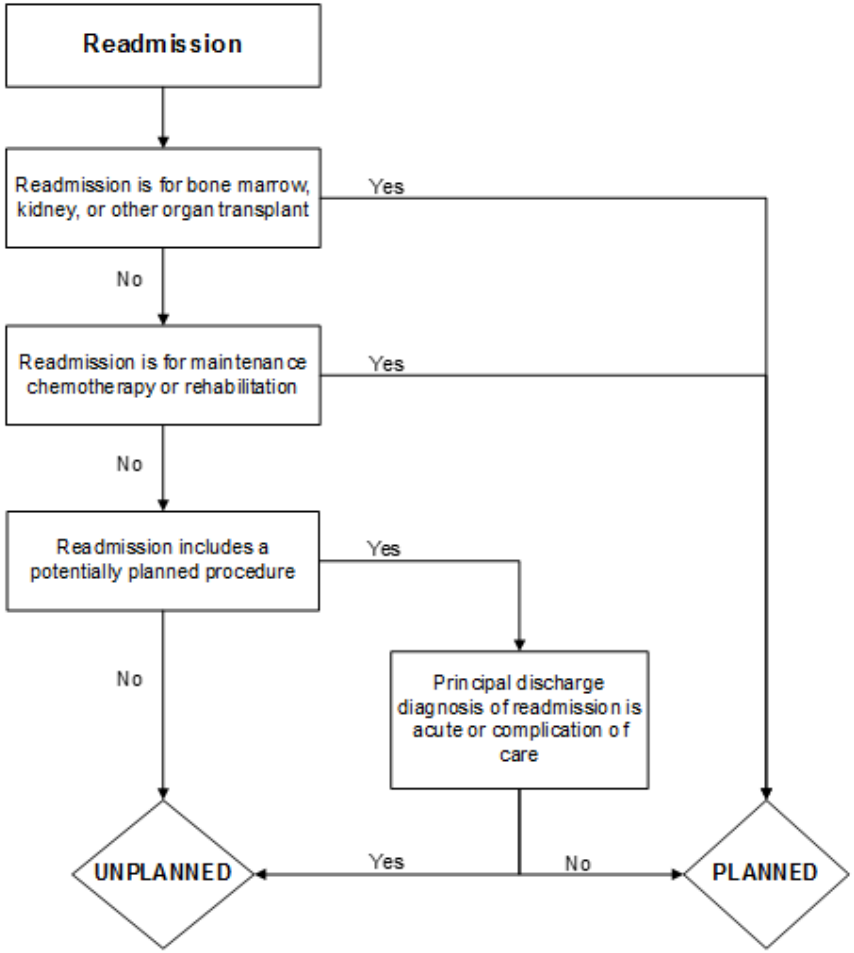
Outcome

- The measure counts:
  - Any unplanned readmission to a subsection (d) hospital
  - Includes readmissions for all causes, as long as unplanned
  - Planned readmission algorithm excludes admissions like planned procedures, chemotherapy, and rehabilitation.
- In cases of multiple unplanned readmissions within a 30-day period, CMS only counts one.

Planned Readmission Algorithm

- Planned readmissions within 30 days of discharge from an index admission are not counted in the outcome.
- Any readmission within 30 days of discharge from an index admission that occurs after a planned readmission is not counted in the outcome.
- Algorithm was developed with expert and public input to identify and exclude admissions that are typically planned in advance.
- Algorithm is designed to capture readmissions that arise from acute clinical events requiring urgent rehospitalization within 30 days of discharge in the outcome.

Planned Readmission Algorithm



Calculation of Risk-Standardized Readmission Rate

$$\text{Rate} = \frac{\text{Predicted Outcomes}}{\text{Expected Outcomes}} \times \text{National Observed Rate}$$

- The numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix.
- The denominator of the ratio is the number of outcomes expected on the basis of the nation's performance with that hospital's case mix.

Excess Readmission Ratio

- Measure of relative performance
- Calculated as ratio of predicted to expected readmissions
- Used to determine the payment adjustment
- To enter the payment adjustment:
  - ERR must be greater than 1
  - Case size must be greater than 24

Formula for Calculating Aggregate Payments for Excess Readmissions

FORMULAS TO CALCULATE THE READMISSIONS ADJUSTMENT FACTOR FOR FY 2017

Aggregate payments for excess readmissions = [sum of base operating DRG payments for AMI x (Excess Readmissions Ratio for AMI-1)] + [sum of base operating DRG payments for HF x (Excess Readmissions Ratio for HF-1)] + [sum of base operating DRG payments for PN x (Excess Readmissions Ratio for PN-1)] + [sum of base operating DRG payments for COPD) x (Excess Readmissions Ratio for COPD-1)] + [sum of base operating DRG payments for THA/TKA x (Excess Readmissions Ratio for THA/TKA-1)] + [sum of base operating DRG payments for CABG x (Excess Readmissions Ratio for CABG-1)].

*We note that if a hospital's excess readmissions ratio for a condition is less than/equal to 1, there are no aggregate payments for excess readmissions for that condition included in this calculation.

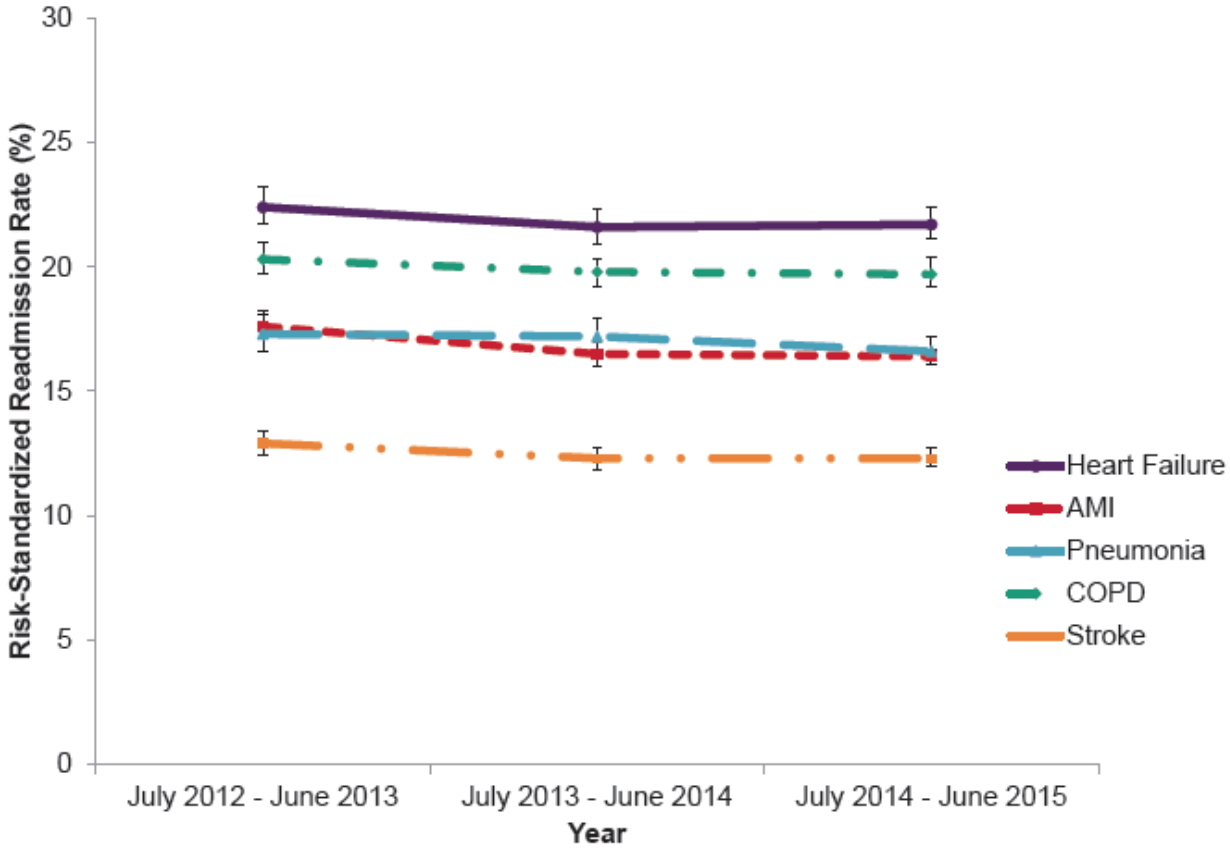
Aggregate payments for all discharges = sum of base operating DRG payments for all discharges.

Ratio = 1- (Aggregate payments for excess readmissions/Aggregate payments for all discharges).

Proposed Readmissions Adjustment Factor for FY 2017 is the higher of the ratio or 0.9700.

*Based on claims data from July 1, 2012 to June 30, 2015 for FY 2017.

Trends in Condition-Specific Readmission Rates



Trends in Procedure-Specific Readmission Rates

FIGURE 1. *Trend in the median hospital RSRR (%) for CABG, July 2012-June 2015.*

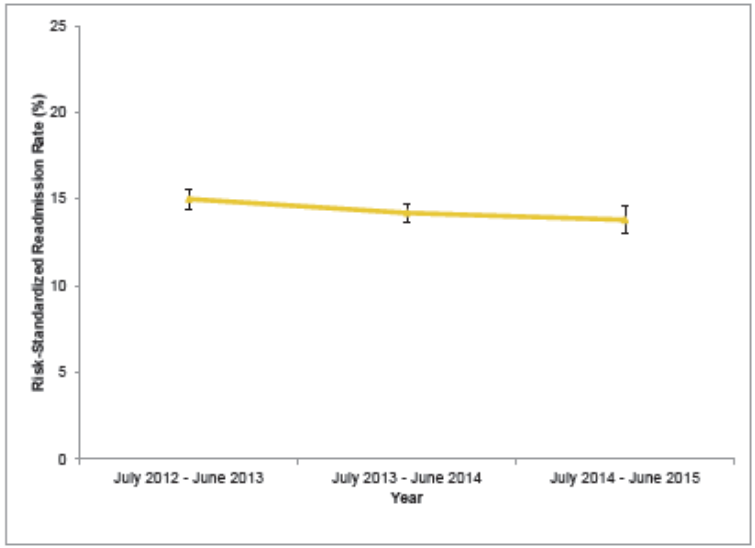
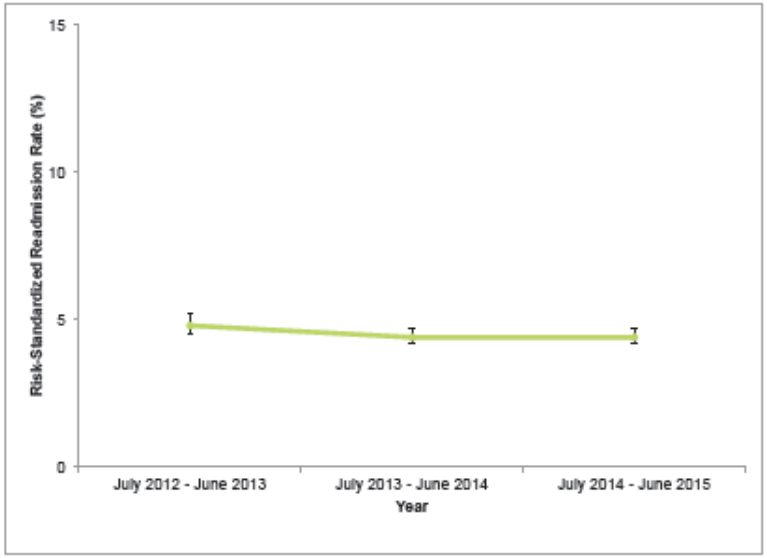
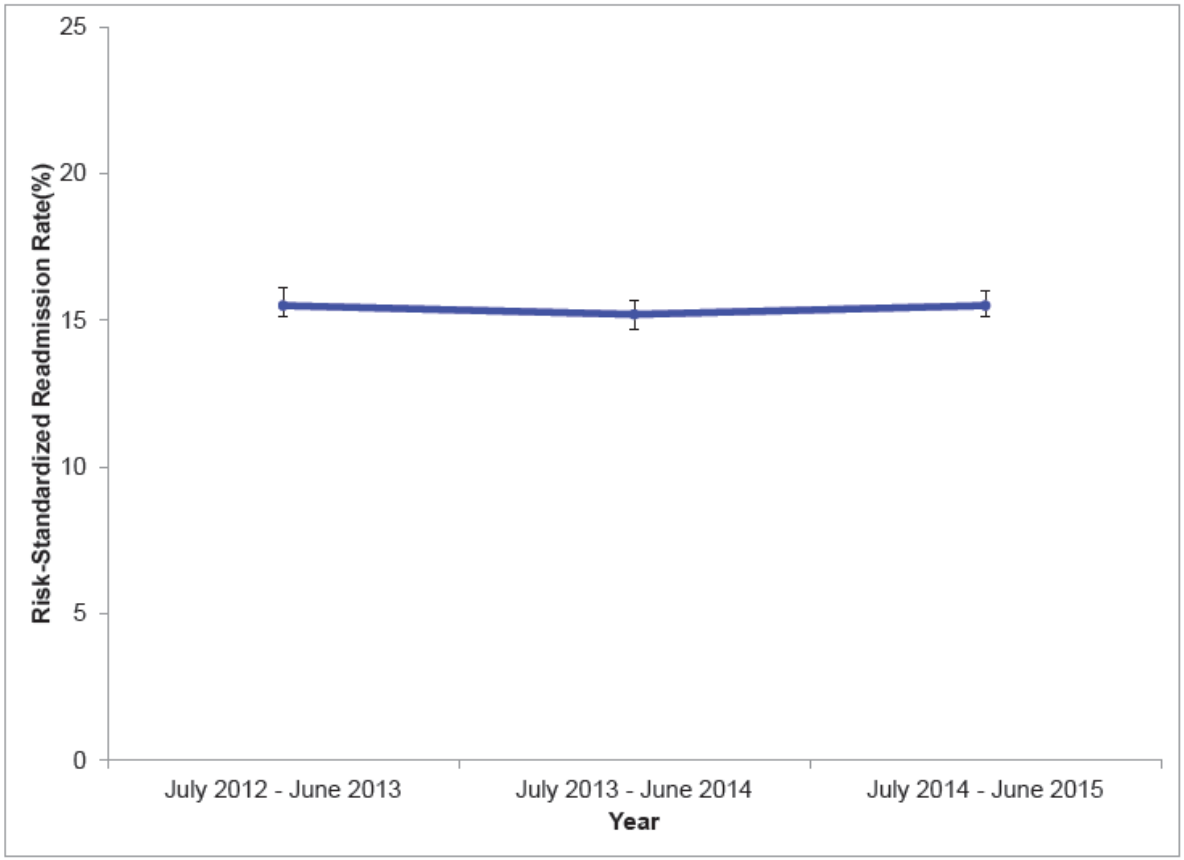


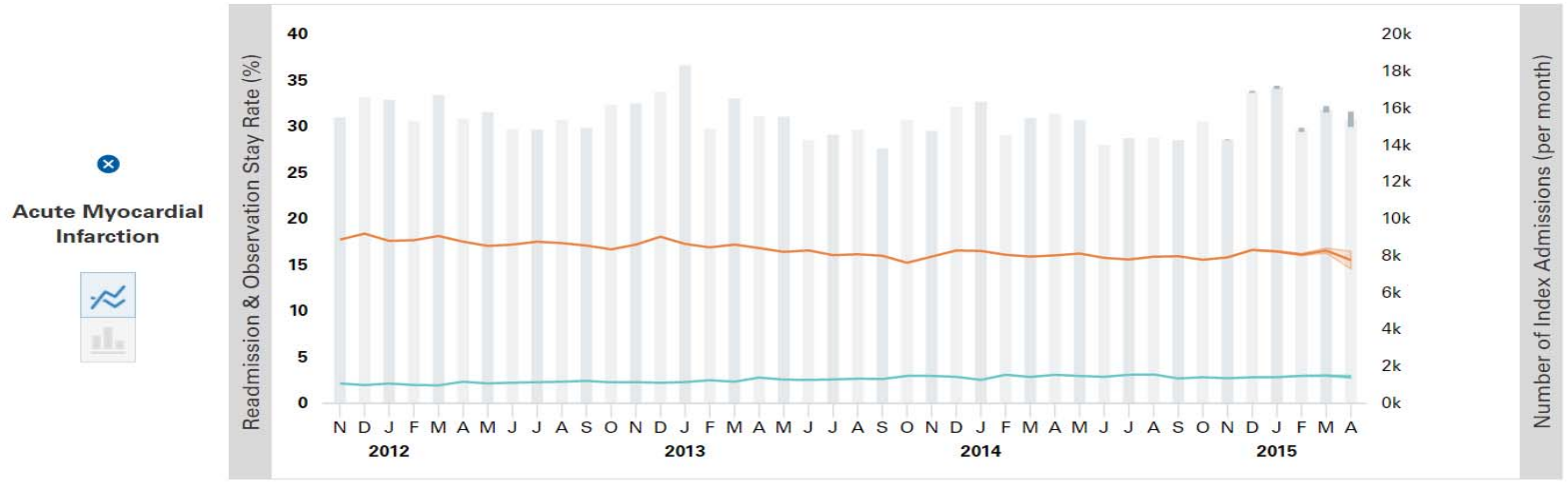
FIGURE 2. *Trend in the median hospital RSRR (%) for THA/TKA, July 2012-June 2015.*



Trends in Hospital-Wide Readmission Rates



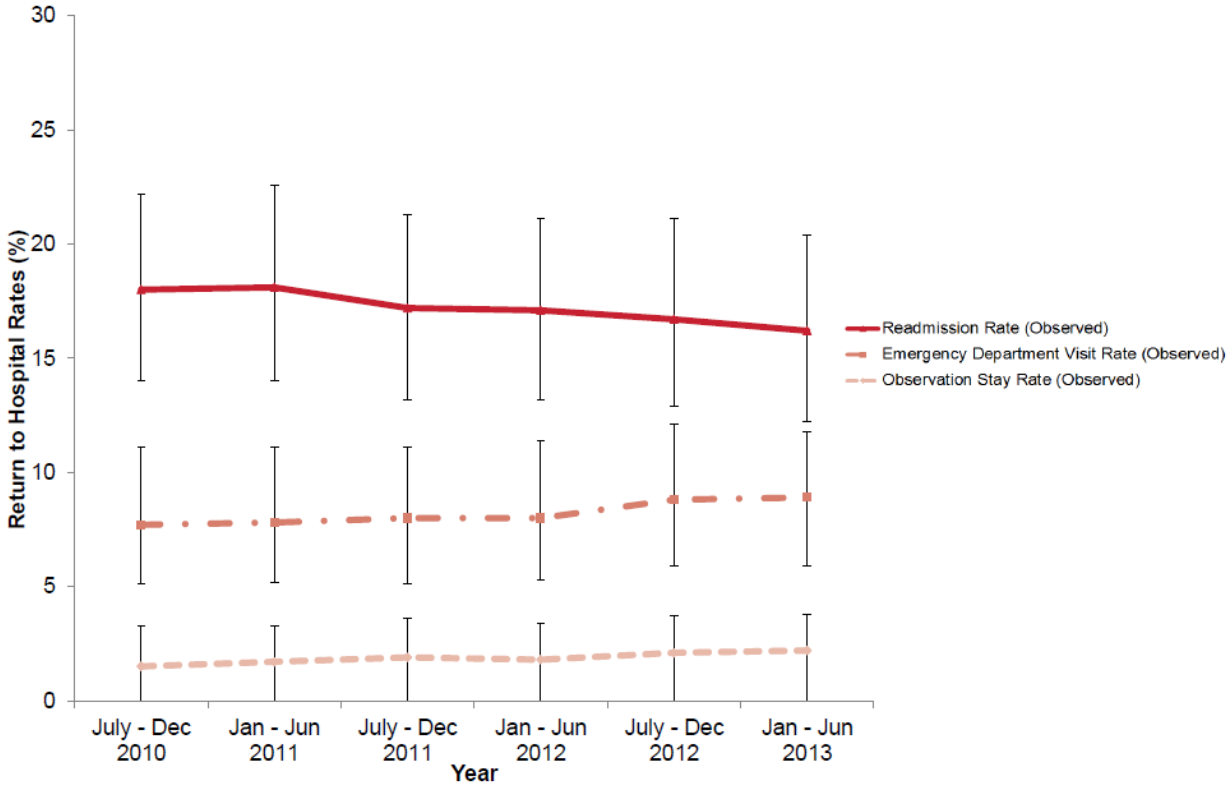
Chartbook Observation Stays/Readmissions over Time



- Examining the national admission count (grey bars), readmission rates (orange line), and observation stay rates (blue line) monthly can provide critical information about the current quality of healthcare.
- Using our interactive data visualization, we are able to zoom in and out of different time periods and examine up to three cohorts (AMI, heart failure, and pneumonia) at once.
- This allows CMS to be able to see quickly what is happening with readmissions and observations stays.

Chartbook Observation Stays Analyses

Trends in the median hospital's observed readmission rate, ED visit rate, and observation stay rate for the AMI readmission cohort, July 2010 – June 2013



Analyses from 2014 Medicare Hospital Quality Chartbook

Savings

- Hospitals with excess readmissions for any one of the conditions are subject to payment adjustment.
- Payment adjustment applies to all Medicare admissions for that year, not just readmissions.
- Payment adjustment is applied as a percentage reduction to the base operating DRG amount paid on each Medicare fee-for-service claim.

Fiscal Year (FY)	Number of Hospitals Subject to Adjustment	Estimated Savings for Medicare
FY 2013	2,214	$280 million
FY 2014	2,225	$227 million
FY 2015*	2,638	$424 million
FY 2016	2,666	$420 million

* Two additional readmission measures were added for FY 2015.

Measure Re-evaluation

- Annually enhance measures by responding to stakeholder input and incorporating advances in science or changes in coding
- Validate model performance and corresponding risk-adjustment variables in recent one-year and combined three-year time periods
- Update measures' SAS analytic package
- Evaluate impact of SDS adjustment

ICD-10 Transition

- Currently incorporating ICD-10 codes for use in defining the cohorts, risk adjustment, and planned readmission algorithm
- Continuing to monitor hospital coding practices and update measure specifications using ICD-10 data

Future Measure Development for HRRP

- Socioeconomic status (SES)
- Hospital-wide readmissions

SES Analyses
Multi-variable Model (Heart Failure)

Variable	Univariate Model		Multivariable Model	
	Odds Ratio	P-Value	Odds Ratio	P-Value
Dual Eligibility	1.22	<.0001	1.08	<.0001
AHRQ Index	1.15	<.0001	1.08	<.0001
Race	1.17	<.0001	1.08	<.0001
Range of Odds Ratios for Clinical Factors in Multivariable Model (0.994,1.182)				

Analyses presented to NQF

Model Performance Unchanged with Addition of SES

C-Statistics for Each Model

Measure	Variables Included in the Model	C-Statistic
Heart Failure Readmission	Current*	0.608
	Current + Dual Eligibility	0.609
	Current + AHRQ Index	0.609

Analyses presented to NQF

Absolute Change in RSRRs with SES Adjustment (Heart Failure)

Percentile	Current Model Adjusted for Dual Eligibility	Current Model Adjusted for AHRQ SES Indicator
Maximum	0.21 %	0.30%
95%	0.11%	0.21%
75%	0.06%	0.11%
Median Percentage	**0.02%**	**0.04%**
25%	-0.01%	-0.05%
5%	-0.10%	-0.24%
Minimum	-0.41%	-0.97%

Analyses presented to NQF

Chartbook SES Analyses

FIGURE I. ***Distributions of AMI RSRRs (%) for hospitals with the lowest and highest proportions of Medicaid admissions, July 2012-June 2015.***

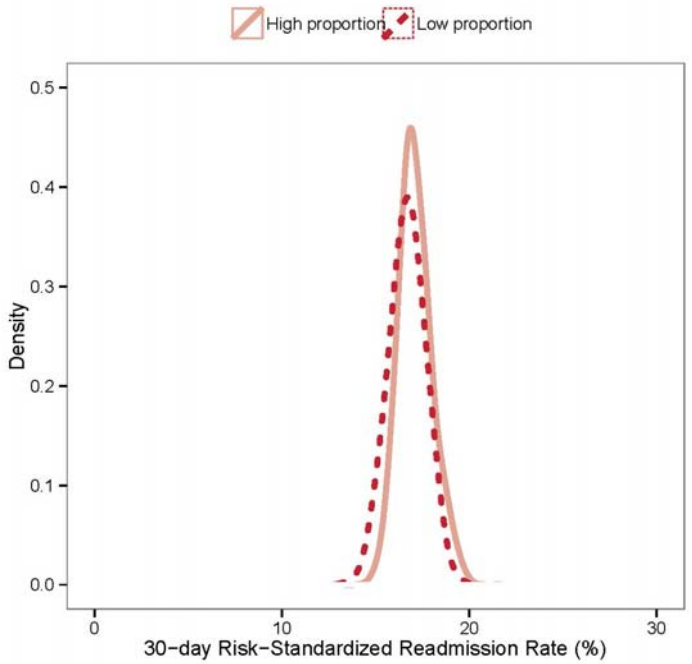
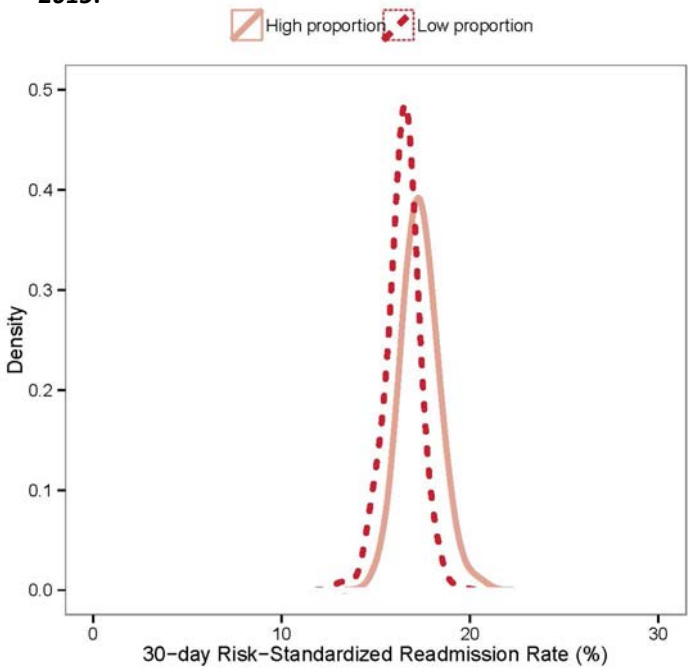


FIGURE 2. ***Distributions of AMI RSRRs (%) for hospitals with the lowest and highest proportions of African-American patients, July 2012-June 2015.***



CMS Chartbooks available at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/OutcomeMeasures.html

Chartbook SES Analyses cont.

FIGURE 3. ***Distributions of heart failure RSRRs (%) for hospitals with the lowest and highest proportions of Medicaid admissions, July 2012-June 2015***

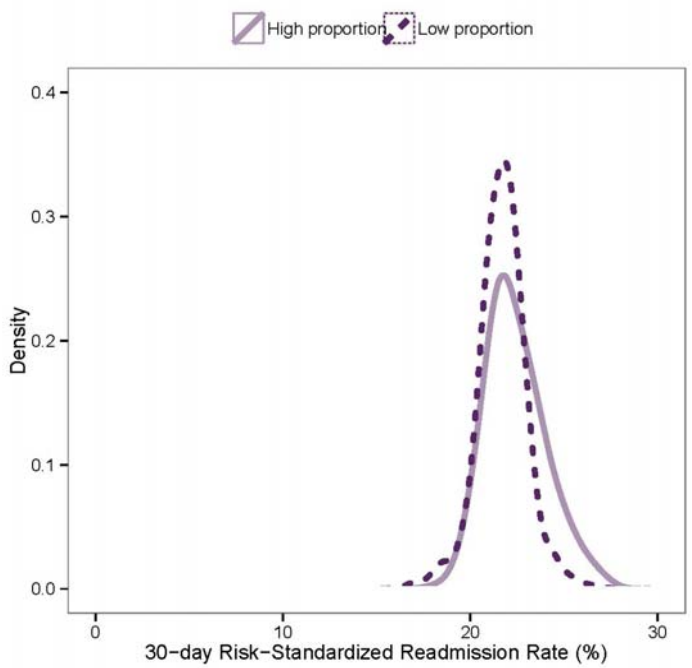
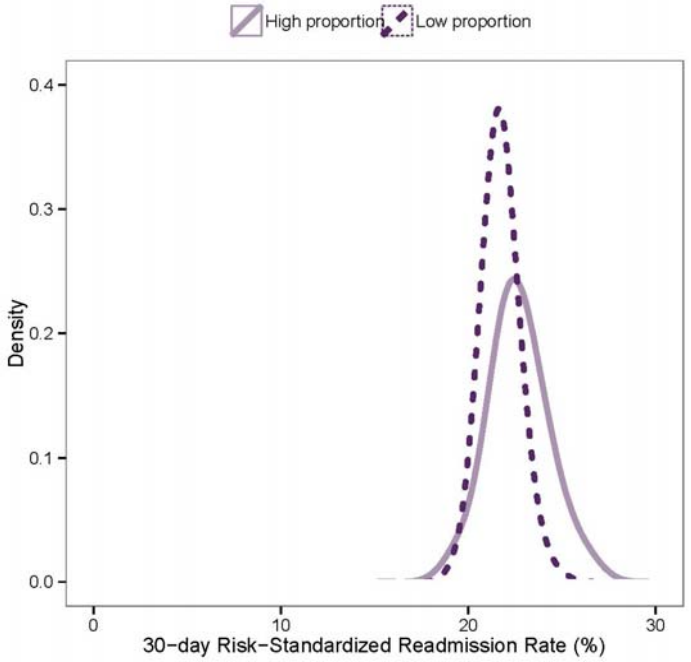
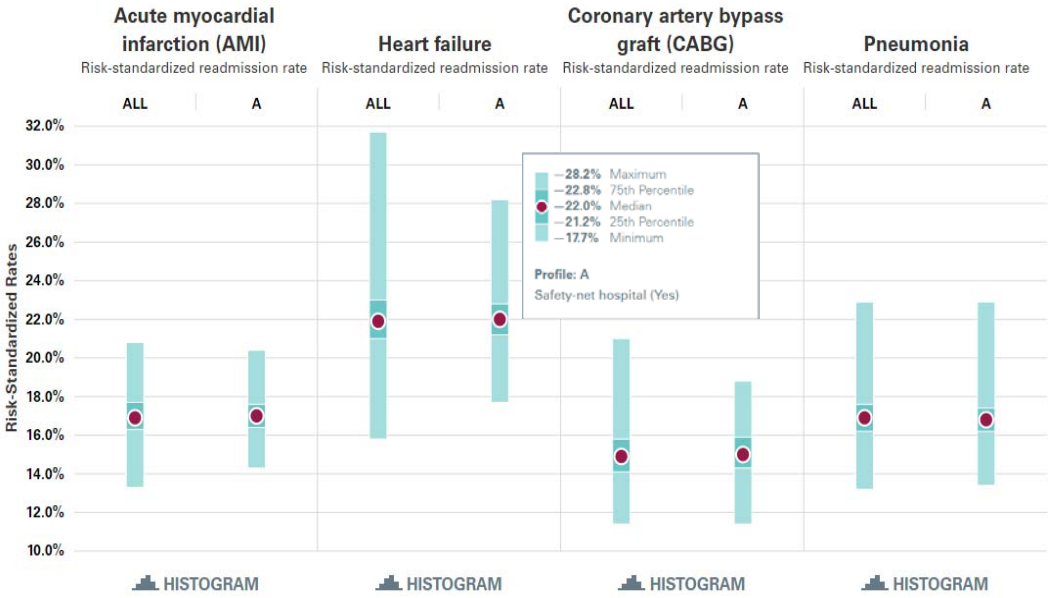


FIGURE 4. ***Distributions of heart failure RSRRs (%) for hospitals with the lowest and highest proportions of African-American patients, July 2012-June 2015***



Chartbook SES Analyses cont.



A = Safety-net hospitals

- Another data visualization can give side by side comparisons for different subsets of hospitals.
- In this example, we are able to look at four different readmission measures (AMI, heart failure, CABG, and pneumonia) and see the performance range for all hospitals and for safety-net hospitals.
- Here you can see that safety-net hospitals achieve similar ranges of performance compared with all hospitals.
- Additionally, we could also look at small volume, and non-safety-net hospitals at the same time.

Summary of SES Findings

- Modest relationship between patient-level SES and readmission in CMS readmission measures
- Addition of SES does not significantly change model performance or change hospital results
- More substantial hospital component of risk for SES and race variables, in contrast to clinical variables
- Safety net hospitals are able to achieve high performance rates (e.g., low readmissions) comparable to non-safety net hospitals

Design of the Hospital-Wide Readmission Measure

- Composite of five separate models (specialty cohorts)
  - Better discrimination and predictive ability
  - Accounts for differences in hospitals' case mix and service mix
  - Admissions are assigned to cohorts based on Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CCS) category (grouping of related ICD-9 diagnosis/procedure codes)
  - Readmissions are eligible to be considered new index admissions

Ongoing Work

- NQF
  - Conducting a 2 year pilot on risk adjustment for SES/SDS for quality measures
- IMPACT Act
  - Office of the Assistant Secretary of Planning and Evaluation at HHS charged with conducting research and issues recommendations on the use of SES/SDS factors in risk adjustment for quality measures

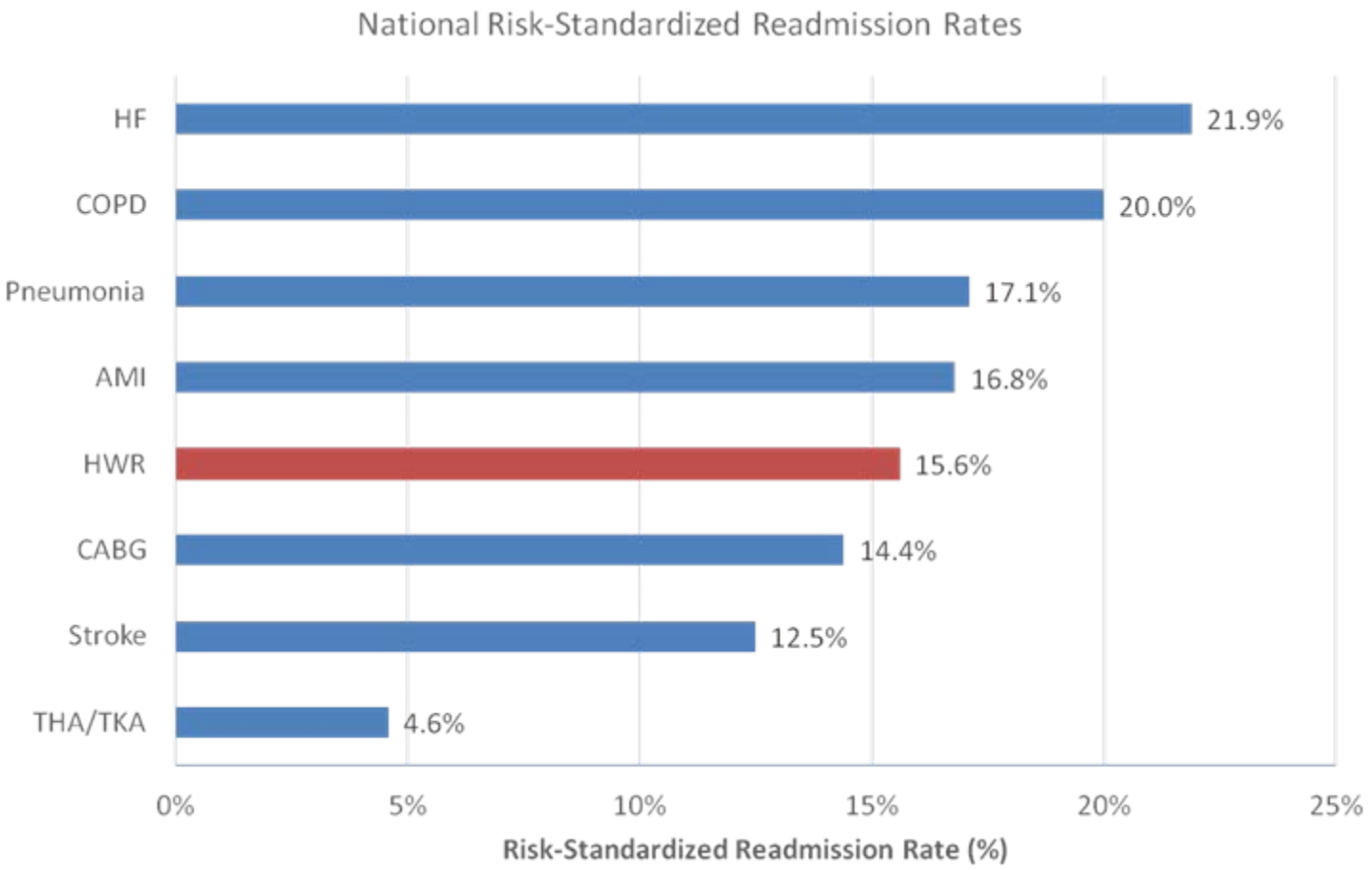
Design of the Hospital-Wide Readmission Measure cont.

- Specialty Cohort Assignment
  1) Surgery/Gynecology: Admissions for eligible surgical procedures
- If an admission does not have an eligible surgical procedure, then it is assigned to one of the following specialty cohorts:
  2) Cardiorespiratory: Pneumonia, COPD, heart failure, & related conditions
  3) Cardiovascular: AMI, atherosclerosis, & related conditions
  4) Neurology: Stroke, multiple sclerosis, & related conditions
  5) Medicine: Patients not included in any of the other four specialty cohorts

Design of the Hospital-Wide Readmission Measure cont.

- Exclusion Criteria
  - Admitted to Prospective Payment System (PPS)-exempt cancer hospitals
  - Without at least 30 days post-discharge enrollment in FFS Medicare
  - Discharged against medical advice (AMA)
  - Admitted for primary psychiatric diagnoses
  - Admitted for rehabilitation
  - Admitted for medical treatment of cancer

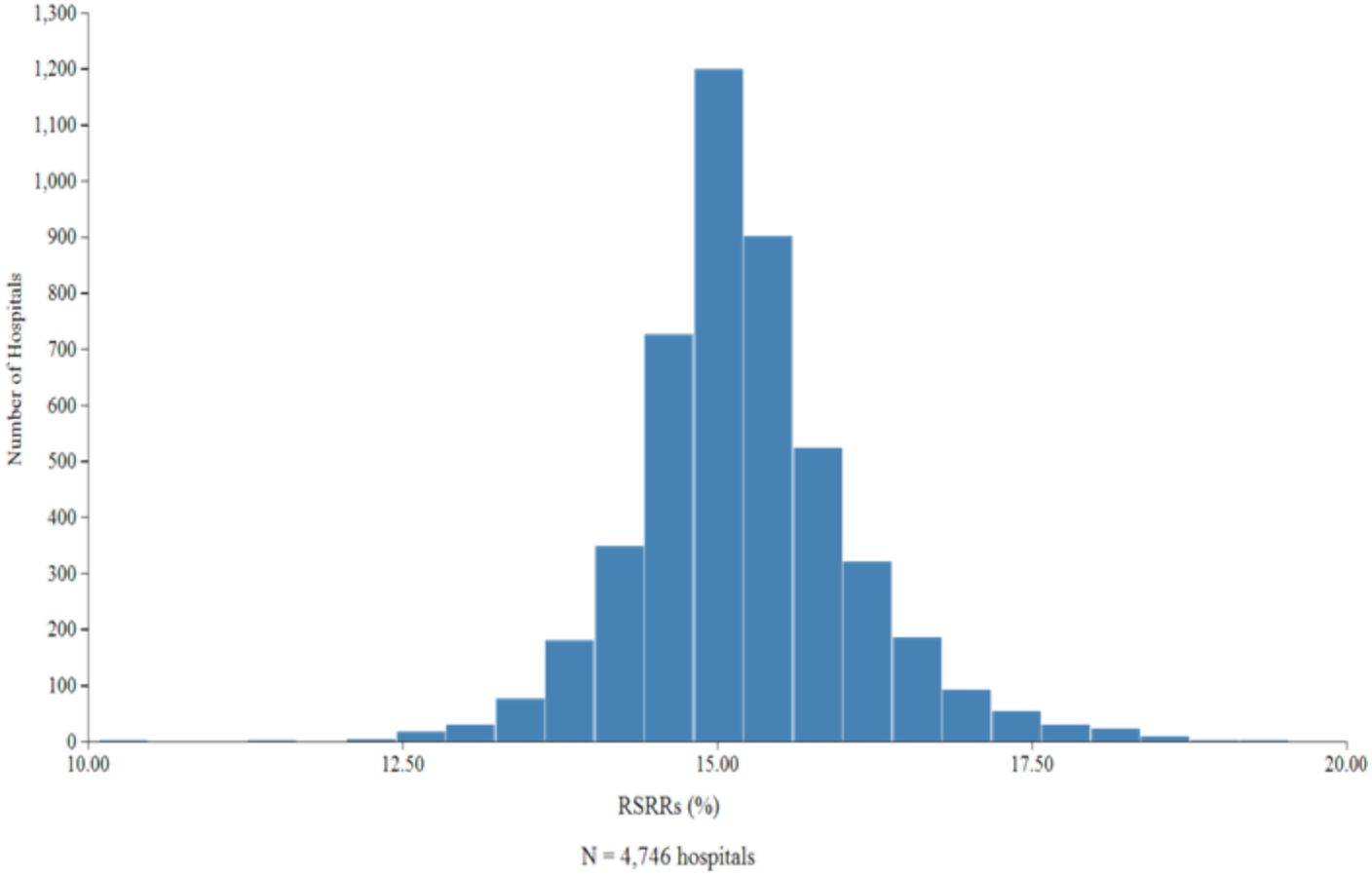
Results of the Hospital-Wide Readmission Measure



HWR Data Period: July 1, 2014 – June 30, 2015
All Other Measures: July 1, 2012 – June 30, 2015

Results of the Hospital-Wide Readmission Measure cont.

Distribution of Hospital 30-Day HWR RSRRs Between July 1, 2014 and June 30, 2015



HRRP Contacts

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cmsreadmissionmeasures@yale.edu

QualityNet Help Desk:
qnetsupport@hcqis.org

HRRP Program Resources

General Program Information:

- https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1228772412458

More Program and Payment Adjustment Information

- http://cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html/

Readmission Measures

- https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1219069855273

IPPS Final Rule (FY 2017)

- https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY2017-IPPS-Final-Rule-Home-Page.html

Initiatives to Reduce Readmissions

- https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228766331358

THANK YOU!