ACCOUNTING FOR SOCIAL RISK FACTORS IN PUBLIC REPORTING ON UNPLANNED HOSPITAL READMISSIONS IN MASSACHUSETTS

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CENTER FOR HEALTH INFORMATION AND ANALYSIS

CHIA.

Acknowledgements

- Workgroup on Social Risk Factors and Readmissions

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Agenda

- Background
- Objectives
- Methods
- Results
- Summary
- Next Steps

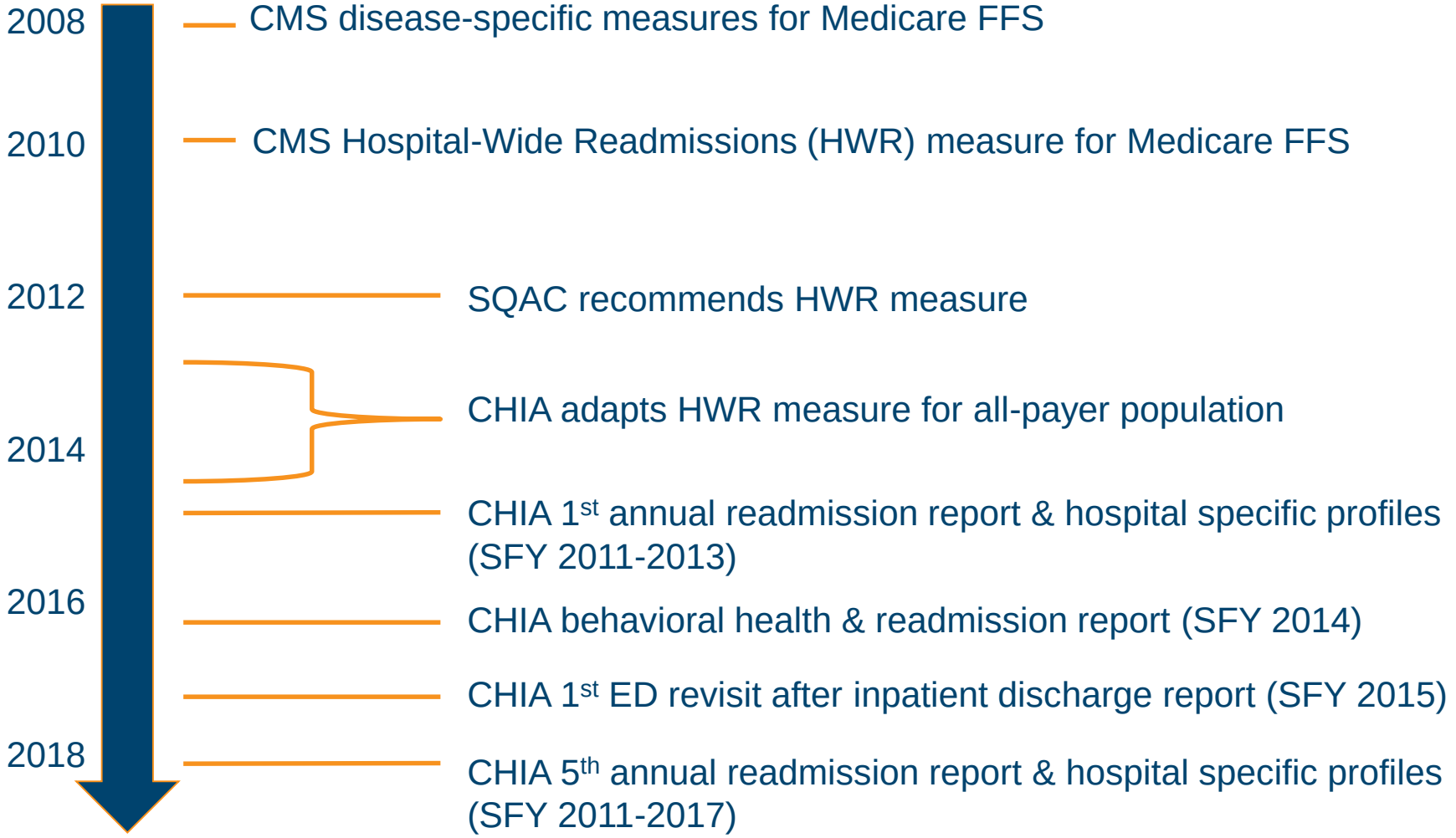
Background

- There is evidence that social risk factors are associated with access, utilization and quality of health care
- Unplanned hospital readmissions adversely impact patient health and are a significant financial burden on the healthcare system
- Appropriately accounting for social risk factors in quality and performance measures could have significant implications for improvements in health care delivery and population health

Objectives

- Identify available social risk factor data in the current systems
- Determine how to adequately account for social risk factors in hospital readmissions analysis
- Incorporate results from analysis in the public reporting on hospital readmissions in Massachusetts

CHIA's All-Payer Readmission Work



Hospital-Wide All-Cause Readmission Measure

	Original Yale/CMS Measure	CHIA's Adapted Version for All-payer
Population	• Medicare FFS population, 65+	• All-payer population, 18+
Data source	• Based on Medicare claims & enrollment data	• Based on MA acute care hospital casemix Hospital Inpatient Discharge Database (HIDD)
Exclusions for specialized care	• Obstetric • Cancer • Psychiatric • Rehabilitation	• Obstetric • Cancer • Psychiatric • Rehabilitation
Observed Rates	• Raw rates (unadjusted)	

Risk Standardized Readmission Rates (RSRRs)	• Derived from statistical model.
	• Adjust hospitals' observed rates for:
	  • Age
	  • Patient case mix (comorbidities)
	  • Hospital service mix (discharge condition)	

Counting “Eligible” Discharges

HIDD Adult Discharges
704,607*

Remove discharges that don’t make sense to include

- Missing/invalid SSN
- Transfers
- Deaths in hospital
- Against medical advice

Eligible Discharges (before exclusion)
614,566*

Remove discharges for certain specialized types of care

- Obstetric
- Cancer
- Psychiatric
- Rehabilitation

Analytic Cohort
498,493*

* Based on SFY 2017 data

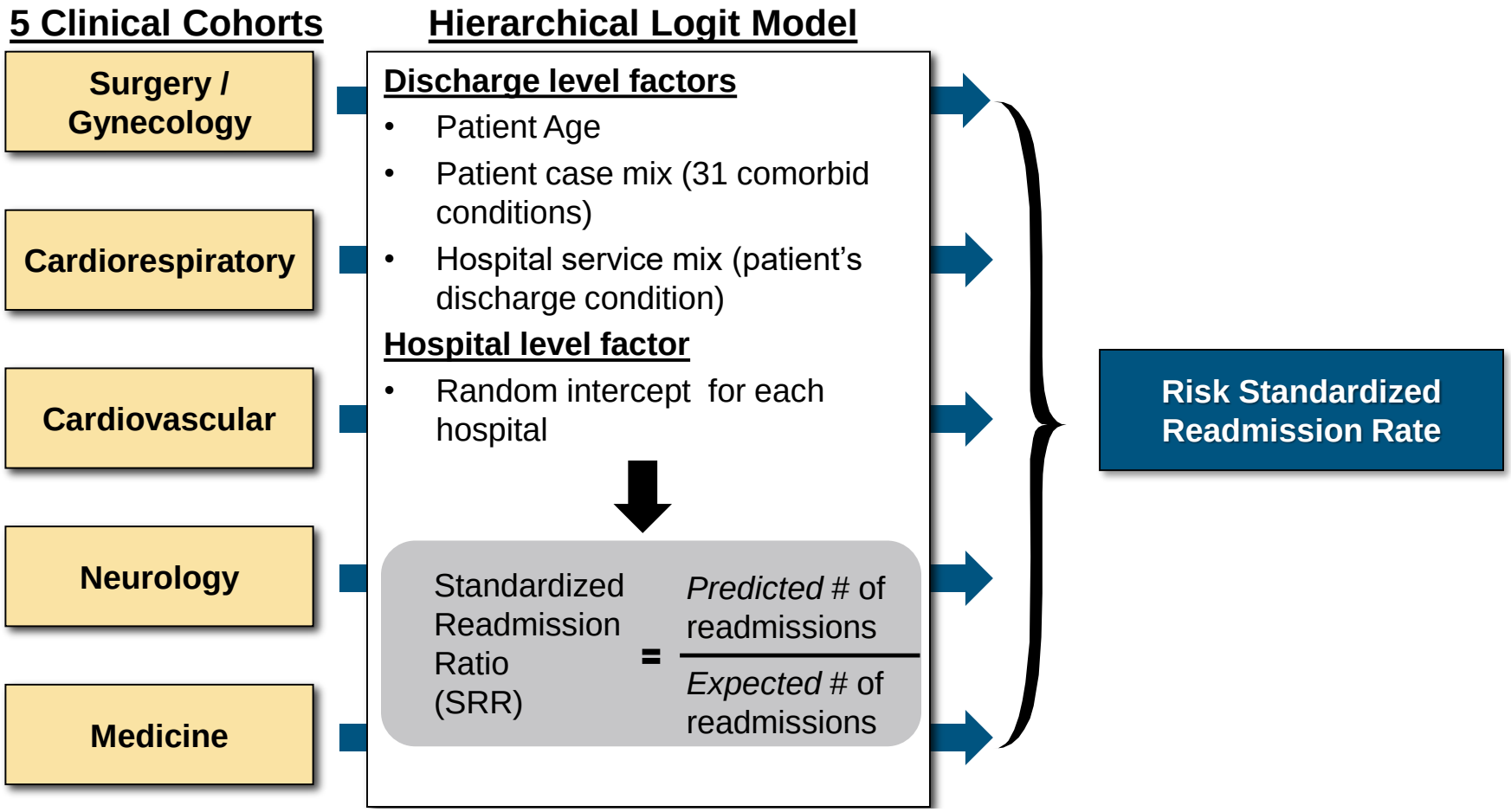
Calculating Readmission Rates

$$\text{Observed Readmission Rate} = \frac{\text{Number of Readmissions}}{\text{Number of Eligible Discharges}} \times 100$$

$$\text{Risk Standardized Readmission Rate} = \text{Observed Readmission Rate} \times \text{Hospital-wide Standardized Readmission Ratio}^{*}$$

* Standardized Readmission Ratio represents the extent to which a hospital has more or fewer readmissions than one would expect based on characteristics of the patients they treat. This ratio is derived by a series of calculations from the output of multiple statistical models. For more information, please see CHIA's Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2017: Technical Appendix.

Current Risk-Adjustment Model for Readmissions

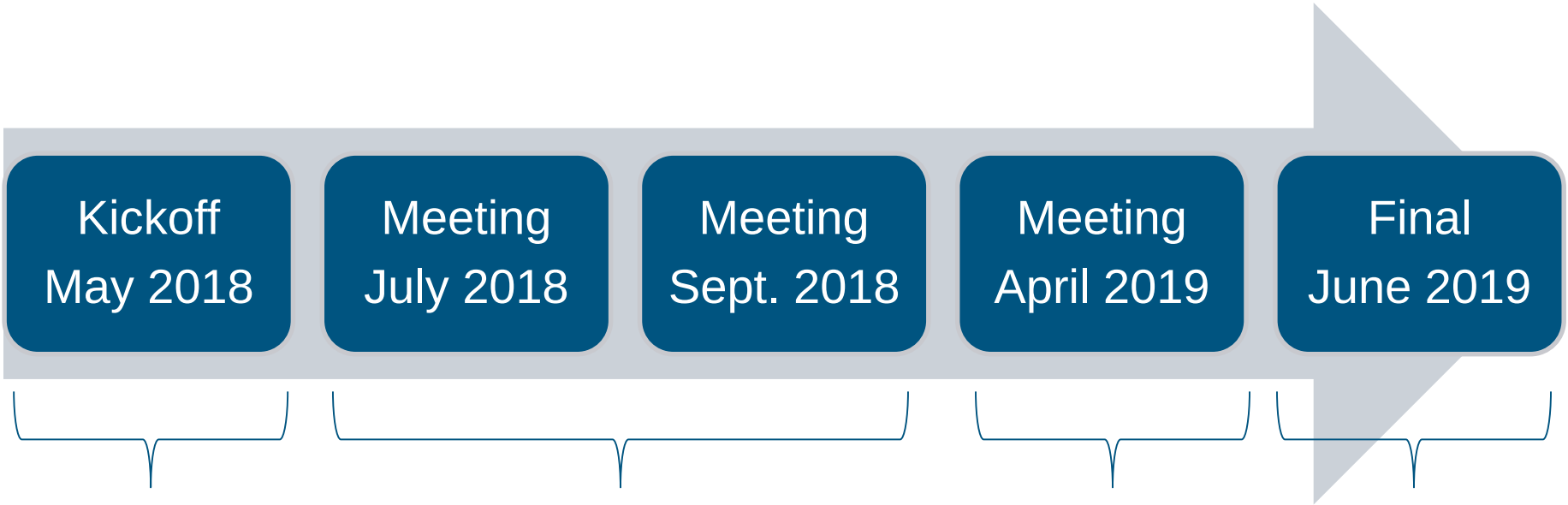


Note: Clinical cohorts and hospital service mix are based on the AHRQ Clinical Classification Software (CCS) grouper. Patient case mix is based on CMS Condition Categories grouper. For more information, please see CHIA's Hospital-Wide Adult All-Payer Readmissions in Massachusetts: SFY 2011-2017: Technical Appendix.

Workgroup on Social Risk Factors and Readmissions

- The workgroup was created to advise CHIA by gathering expert counsel and scientific research to examine the following areas:
  - How might individual and community-level social risk factors be conceptualized and defined?
  - What data is necessary and/or available to adequately measure social risk factors?
  - If applicable, how might social risk factors be appropriately accounted for in CHIA's public reporting of readmissions and revisits?

Workgroup on Social Risk Factors and Readmissions



Purpose
Introductions
Initial Exploration

Purpose
MA HIDD & Readmissions
Stratification vs. Adjustment
Discussion
Identify analytic tests

Review preliminary analysis

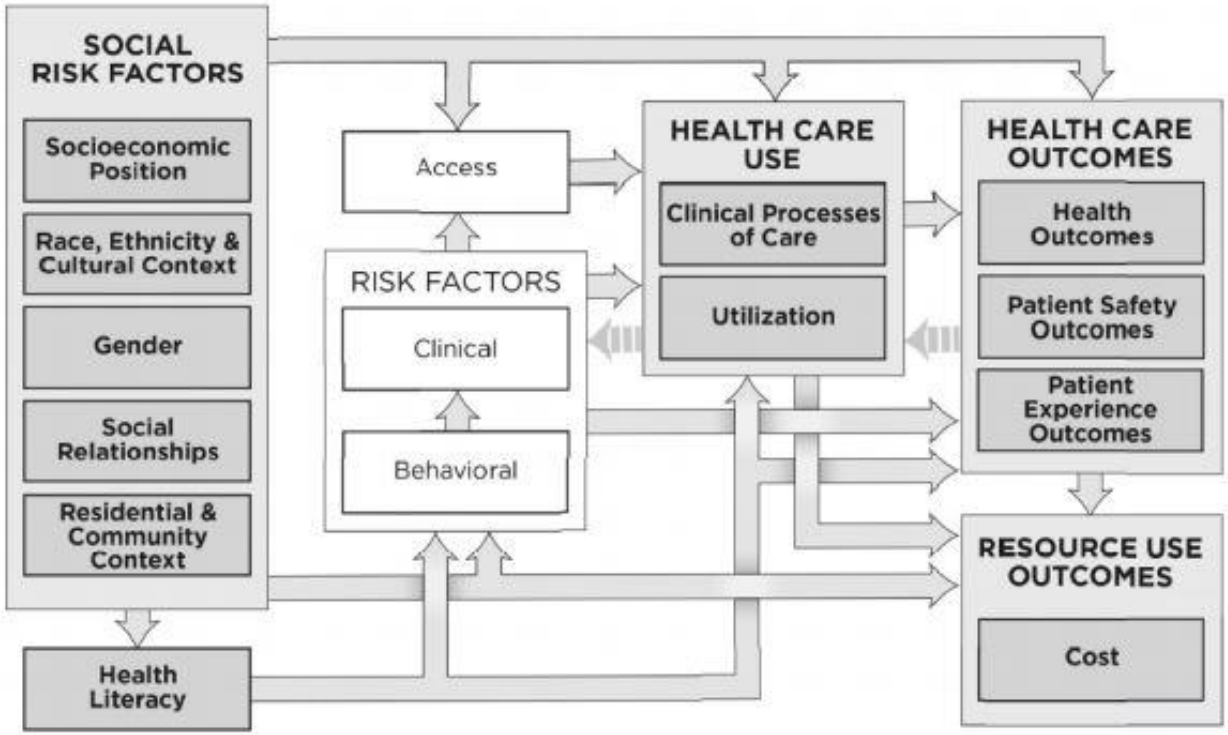
Discussions & Recommendations

Solution

- Adopt a social risk factor framework
- Identify available social risk factor data
- Enhance existing risk-adjustment model

Conceptual Framework of Social Risk Factors for Health Use, Outcomes, and Cost

Figure 2.1. National Academies of Sciences, Engineering, and Medicine's Conceptual Framework of Social Risk Factors for Healthcare Use, Outcomes, and Cost



Source: National Academies of Sciences, Engineering, and Medicine. Accounting for Social Risk Factors in Medicare Payment: Identifying Social Risk Factors. Washington, DC: National Academies of Sciences, Engineering, and Medicine; 2016.

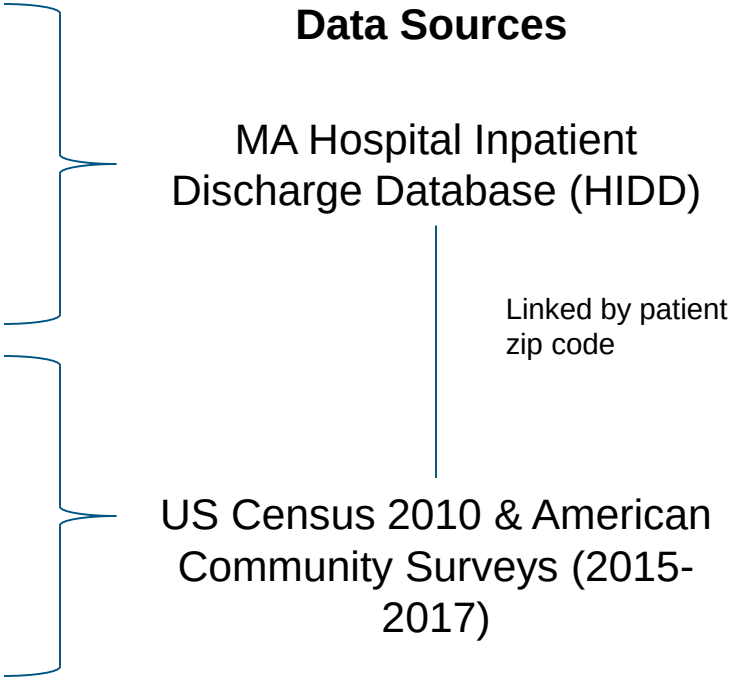
Data Sources for Available Social Risk Factors

Patient-level variables:

- Sex
- Race
- Homeless status
- Insurance type (incl. dual-eligibility proxy)

Community-level factors:

- Poverty
- Housing
- Employment
- Education



- A three-year aggregate dataset is created from these sources. Missing data is dropped. For example, if missing zip code, community-level factors are not included.

Original and Enhanced Risk-Adjustment Models

Original model (Yale/CMS): CHIA's current risk-adjustment model for readmissions adjusts for patient age, patient case-mix, and hospital service mix

Enhanced model: Original model plus the *additional* patient- and community-level factors

Patient-level factors:

- Sex
- Race
- Homeless status
- Insurance type (incl. dual-eligibility proxy)

Community-level factors:

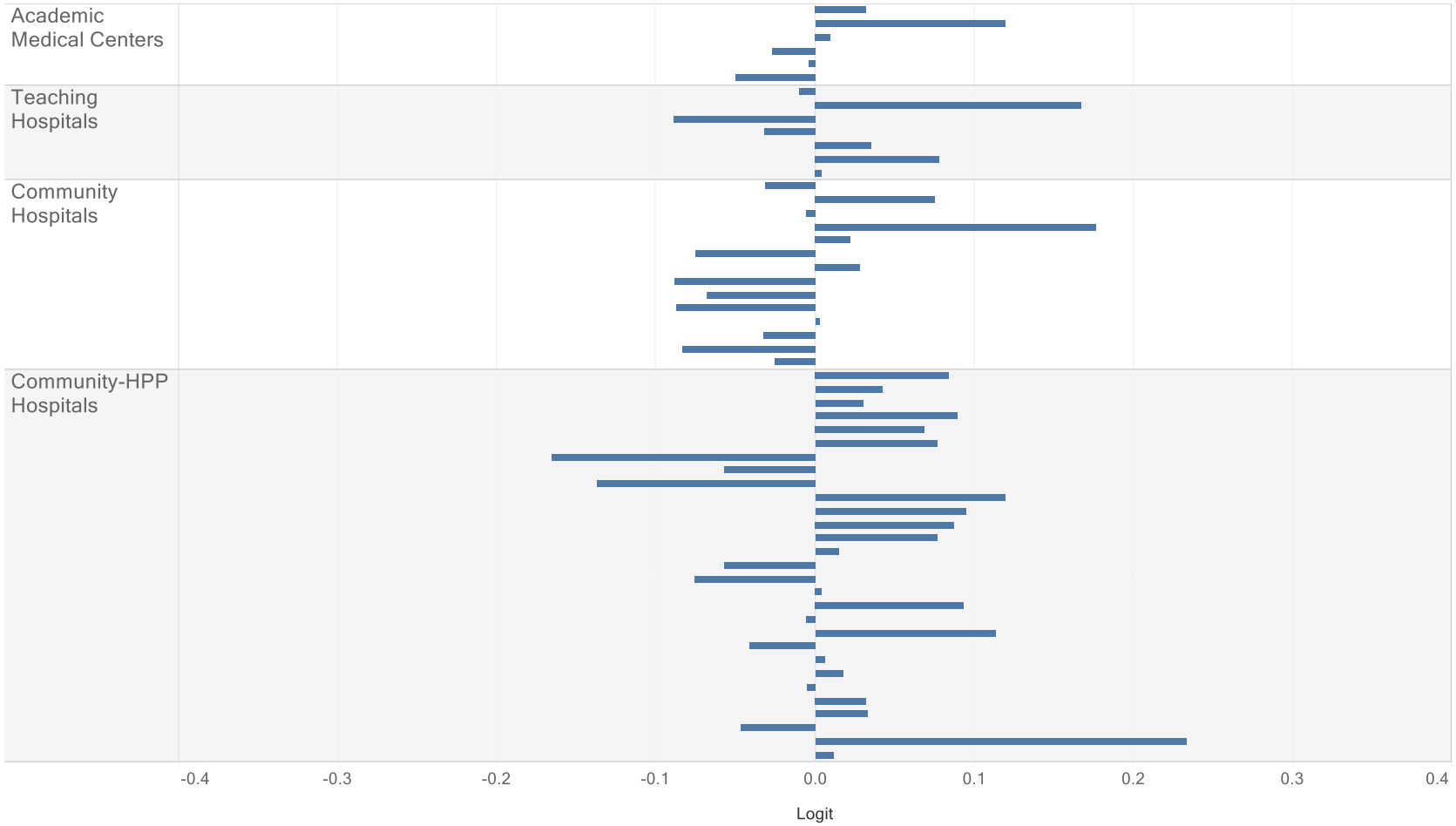
- Poverty
- Housing
- Employment
- Education

Original and Enhanced Risk-Adjustment Models

Variable Type	Description	Original	Enhanced
Variables in original model	Comorbidities*	X	X**
	Age	Age as continuous variable	Age groups for 18+
	Cohort-specific condition categories	X	X
Patient-level social risk factors	Sex		X
	Race		X
	Homeless status		X
	Insurance type (incl. dual-eligible proxy)		X
Community-level social risk factors	Median family income		X
	Median home value		X
	Percent of employed persons 16+ in white collar occupations		X
	Percent of single parent households with dependents under age 18		X
	Percent of population ages 25+ with at least a high school education		X
	Percent of population on food stamps/SNAP		X
	Percent of population who have lived in the same house in the past 12 months		X
	Percent of population ages 16+ who are unemployed		X

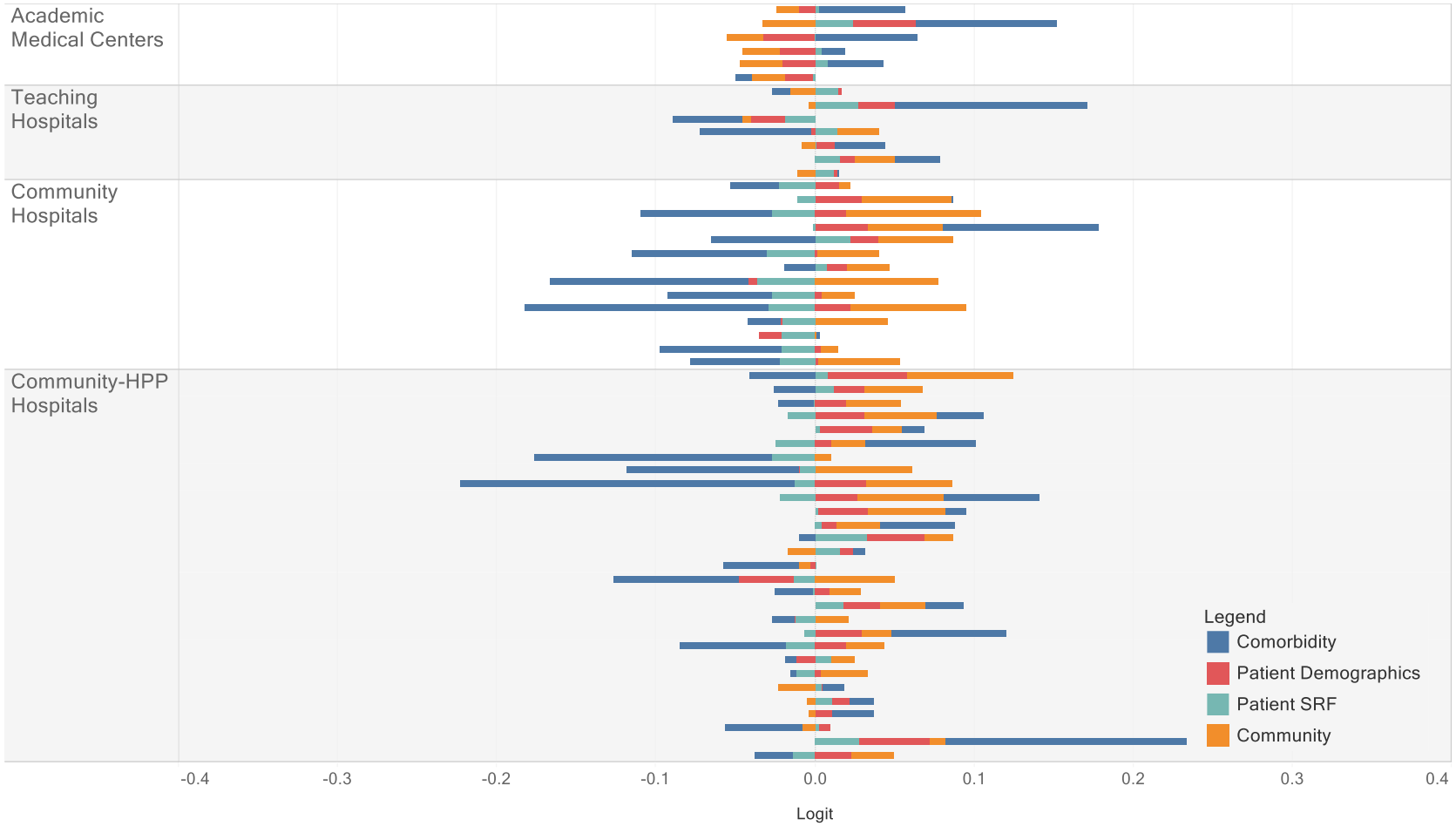
Results

Total Hospital-Level Adjustment: CV Cohort



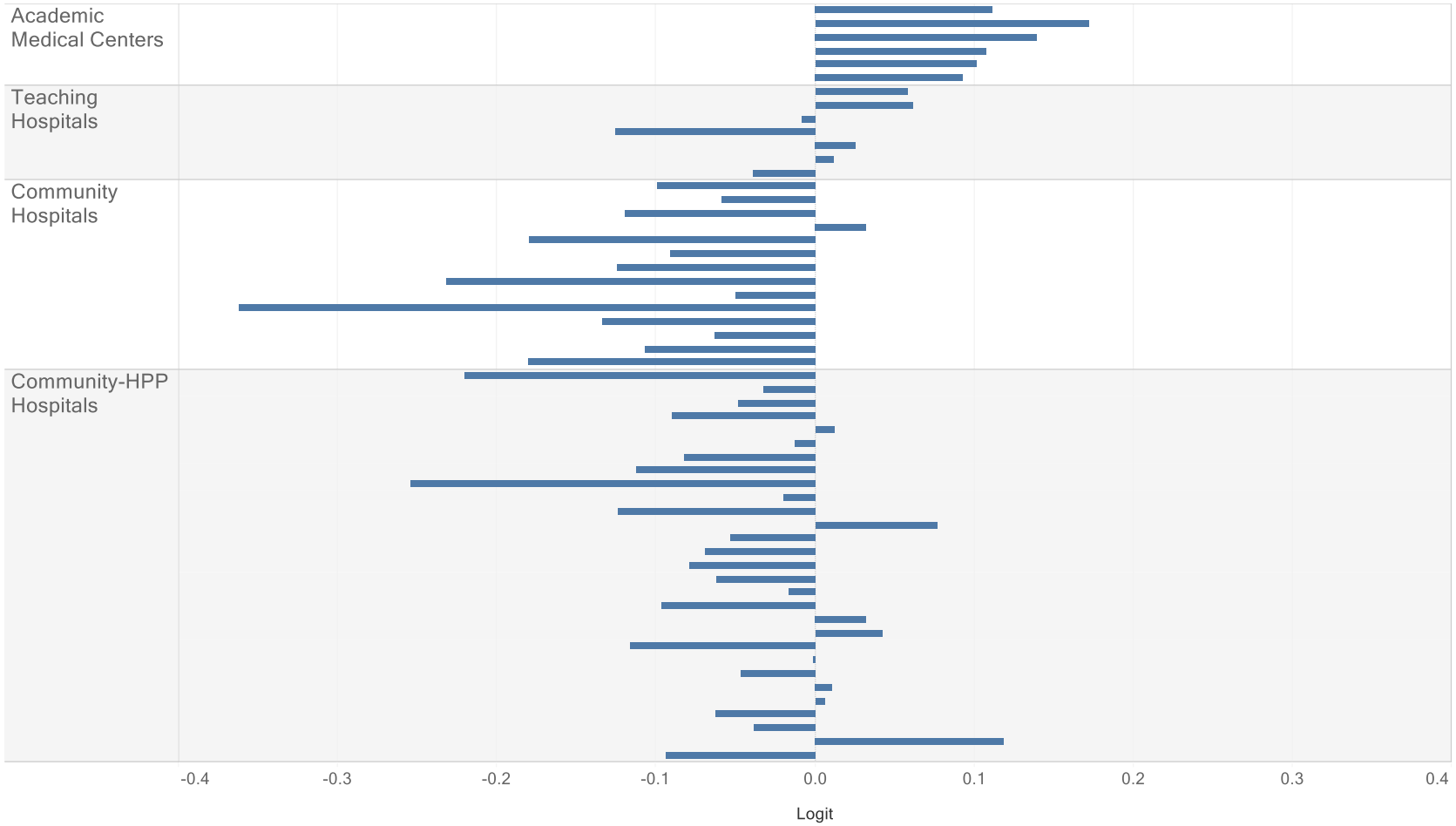
Results

Domain-Specific Hospital-Level Adjustment: CV Cohort



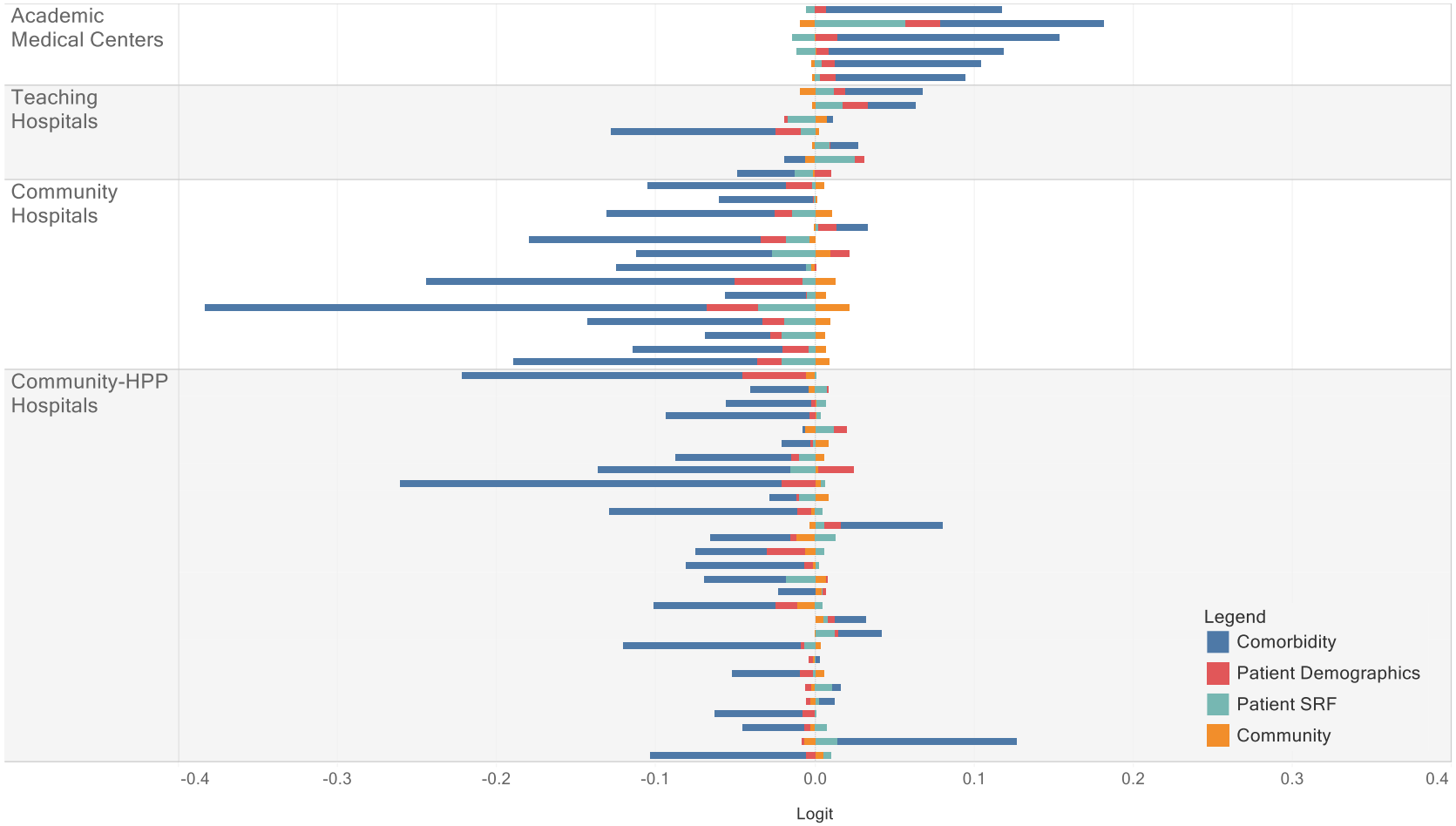
Results

Total Hospital-Level Adjustment: Medicine Cohort



Results

Domain-Specific Hospital-Level Adjustment: Medicine Cohort



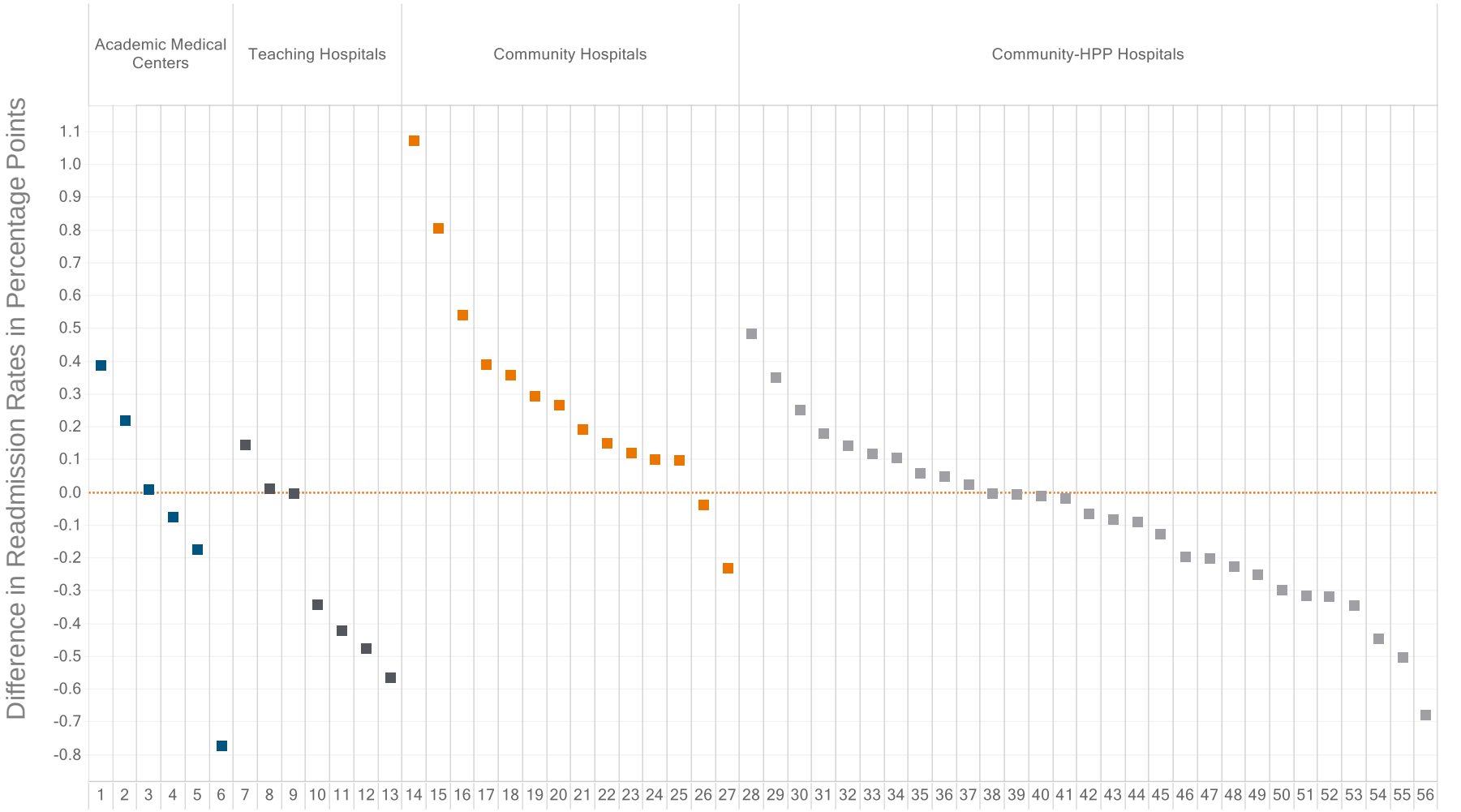
Results

Sample Hospital Domain-Specific Hospital-Level Adjustment: Medicine Cohort

	Regression coefficient (B)	Hospital-specific score (S)	Amount of adjustment in logit scale (B*S)	Adjustment in odds ratio (exp(B*S))
Comorbidity score	0.577	-0.151	-0.087	0.917
Patient demographic score	0.119	-0.137	-0.016	0.984
Patient social risk score	0.098	-0.019	-0.002	0.998
Community score	-0.011	-0.557	0.006	1.006
Total Net Adjustment			**-0.099**	**0.906**

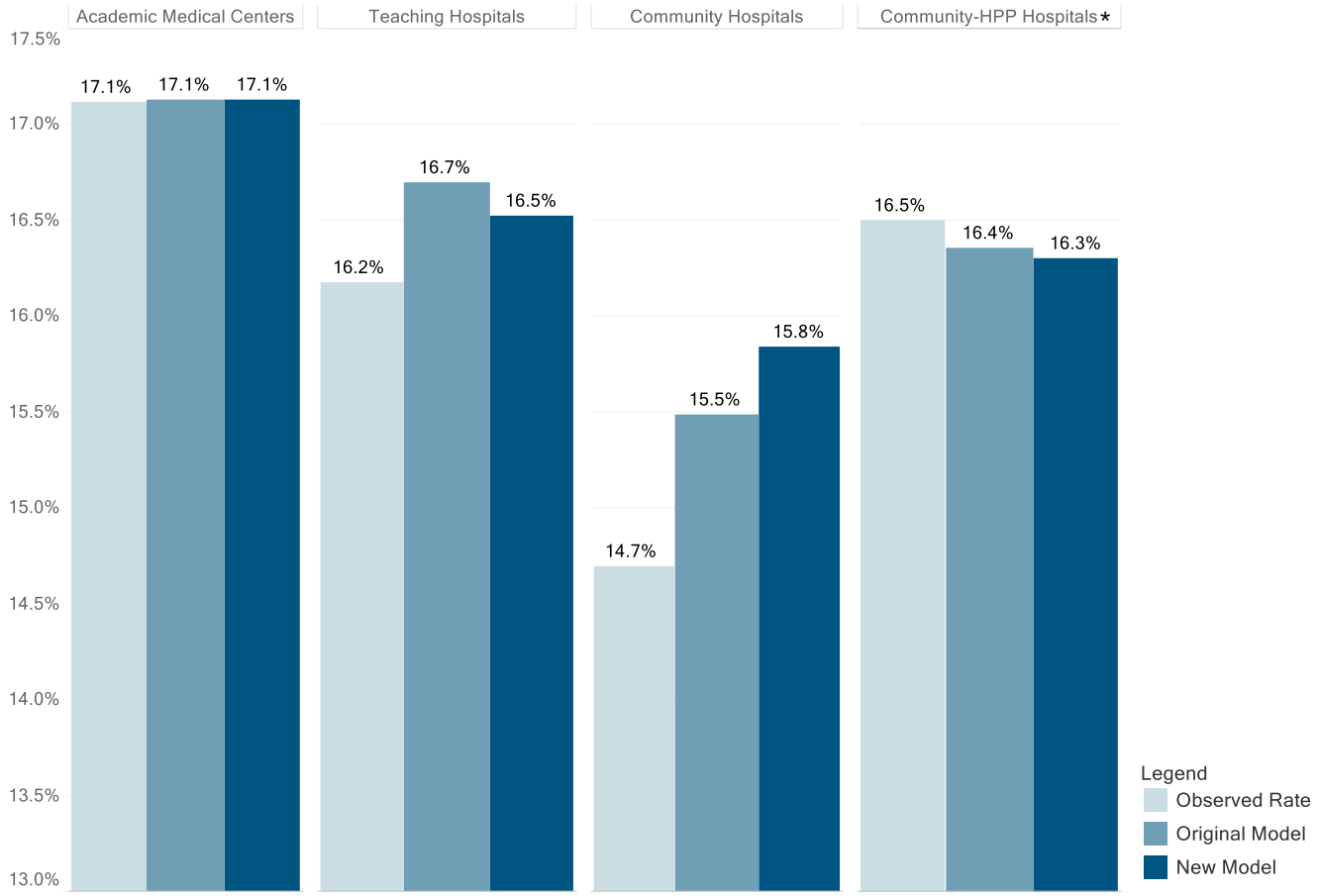
Results

Change in risk-standardized readmission rates by hospital



Results

Change in risk-standardized readmission rates by hospital cohort



*Community-High Public Payer (HPP) hospitals are community hospitals that have at least 63% of Gross Patient Service Revenue attributable to Medicare, MassHealth, and other government payers, including the Health Safety Net.

Summary

- Accounting for social risk factors is important for fair and accurate reporting of hospital quality and performance
- Social risk factors significantly influence risk for readmissions and should be considered routinely in risk adjustment
- Comorbid conditions are still the dominant risk factors for adjustment
- Incorporating social risk factors in risk-adjustment does not mask differences between hospitals (range of 4.8 percentage points)
- Proper adjustment for social risk factors works in favor of hospitals serving higher proportions of vulnerable patients

Next Steps

- Incorporate community-level data for patients from neighboring states
- Work with hospital stakeholders to standardize zip code on discharges flagged as homeless
- Linkage to member eligibility data for an enhanced indicator of dual-eligibility status

Questions?

Contact Information

- For questions, please contact:

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