HSCRC ED-Hospital Throughput Best Practice Subgroup

February 17, 2026

maryland health services cost review commission

Agenda

- ED LOS Measure Preliminary Results
- Discuss ED LOS Risk Adjustment Methodology
- Discuss Measure Options for CY 2027 (ECAT)
- Discuss Analysis of Best Practice Data

ED LOS Preliminary Data

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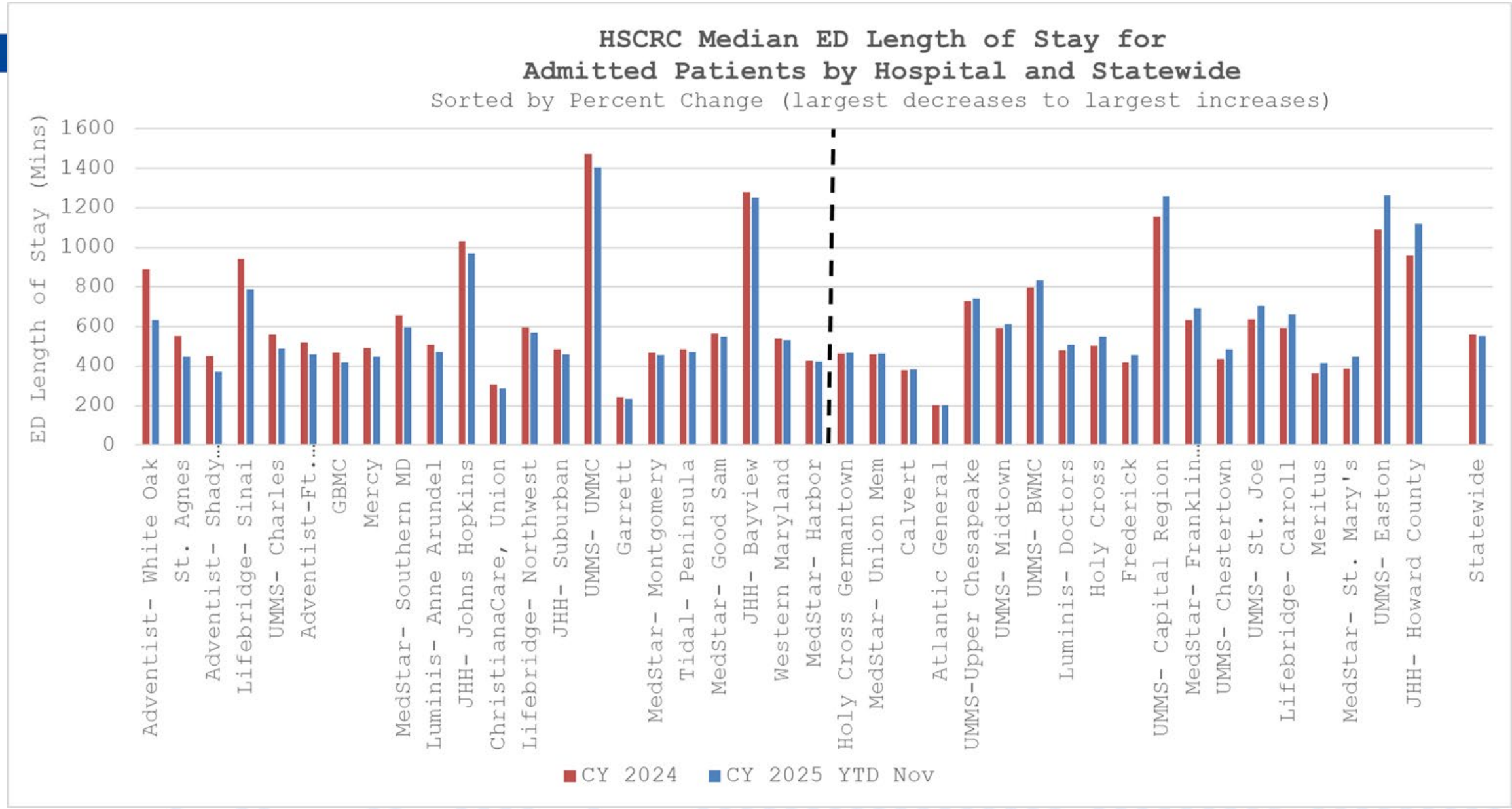

HSCRC Median ED Length of Stay for
Admitted Patients by Hospital and Statewide
Sorted by Percent Change (largest decreases to largest increases)
ED Length of Stay (Mins)
1600
1400
1200
1000
800
600
400
200
0
Adventist- White Oak
St. Agnes
Adventist- Shady...
Lifebridge- Sinai
UMMS- Charles
Adventist-Ft...
GBMC
Mercy
MedStar- Southern MD
Luminis- Anne Arundel
JHH- Johns Hopkins
ChristianaCare, Union
Lifebridge- Northwest
JHH- Suburban
UMMS- UMMC
Garrett
MedStar- Montgomery
Tidal- Peninsula
MedStar- Good Sam
JHH- Bayview
Western Maryland
MedStar- Harbor
Holy Cross Germantown
MedStar- Union Mem
Calvert
Atlantic General
UMMS-Upper Chesapeake
UMMS- Midtown
UMMS- BWMC
Luminis- Doctors
Holy Cross
Frederick
UMMS- Capital Region
MedStar- Franklin...
UMMS- Chestertown
UMMS- St. Joe
Lifebridge- Carroll
Meritus
MedStar- St. Mary's
UMMS- Easton
JHH- Howard County
Statewide
CY 2024
CY 2025 YTD Nov

Preliminary data through November 2025 indicates that **22 of 41 Maryland hospitals (54%)** have had some **improvements** compared to CY 2024.

Hospital	CY 2025 Median (min)	CY 2024 Median (min)	% Change CY2024 to CY2025
Adventist- White Oak	634.0	889	-28.68%
St. Agnes	446.0	553	-19.35%
Adventist- Shady Grove	373.0	454	-17.84%
Lifebridge- Sinai	791.0	941	-15.94%
UMMS- Charles	490.0	562	-12.81%
Adventist-Ft. Washington	461.0	519.5	-11.26%
GBMC	420.0	467	-10.06%
Mercy	447.0	492	-9.15%
MedStar- Southern MD	597.0	657	-9.13%
Luminis- Anne Arundel	472.0	509	-7.27%
JHH- Johns Hopkins	970.0	1032	-6.01%
ChristianaCare, Union	289.0	306	-5.56%
Lifebridge- Northwest	568.0	598	-5.02%
JHH- Suburban	461.0	484	-4.75%
UMMS- UMMC	1405.0	1474	-4.68%
Garrett	233.0	244	-4.51%
MedStar- Montgomery	456.5	470	-2.87%
Tidal- Peninsula	472.0	485	-2.68%
MedStar- Good Sam	550.0	565	-2.65%
JHH- Bayview	1252.0	1281	-2.26%
Western Maryland	532.0	539	-1.30%
MedStar- Harbor	423.0	427	-0.94%
Holy Cross Germantown	468.5	466	0.54%
MedStar- Union Mem	465.0	462	0.65%
Calvert	383.0	380	0.79%
Atlantic General	204.0	201	1.49%
UMMS-Upper Chesapeake	740.0	728	1.65%
UMMS- Midtown	613.5	594	3.28%
UMMS- BWMC	835.0	799	4.51%
Luminis- Doctors	507.0	481	5.41%
Holy Cross	548.0	505	8.51%
Frederick	457.0	421	8.55%
UMMS- Capital Region	1259.0	1156	8.91%
MedStar- Franklin Square	694.0	632	9.81%
UMMS- Chestertown	485.0	437	10.98%
UMMS- St. Joe	707.0	635	11.34%
Lifebridge- Carroll	663.0	592	11.99%
Meritus	416.0	365	13.97%
MedStar- St. Mary's	448.0	389	15.17%
UMMS- Easton	1265.0	1091.5	15.90%
JHH- Howard County	1121.0	958	17.01%
Statewide	553	562	-1.60%

ED LOS Risk Adjustment Methodology for QBR

Development of Risk-Adjusted ED LOS Measure

- Hospital stakeholders requested staff explore risk-adjustment for the ED LOS measure for measuring attainment.
- Mathematica has calculated risk-adjusted ED LOS measure for the Inpatient ED LOS payment measure using current specification (e.g., removal of pediatrics, primary psychiatric dx, etc.).
- Initial models presented focused on patient level factors (see Appendix)
  - With only 41 acute care Maryland hospitals in model, effects of hospital characteristics could not confidently be distinguished from variation in individual hospitals' performance; need national norms to measure effects of hospital-level risk factors.
- Based on results indicating low explanatory power of the models, staff recommended maintaining an improvement only incentive using the unadjusted median.
- Staff have examined additional factors based on feedback, however our recommendation remains the same.

Use of Risk-Adjusted ED LOS Variable in QBR

Attainment: Provide QBR credit for better performers

- ED Risk-Adjustment only accounts for small amount of the variation seen across hospital performance in both Clinical and Full Models. Raises concerns on being able to fairly compare across hospitals.

Improvement: Provide QBR credit for improvement

- Staff propose to maintain improvement goal that focuses on not getting worse (i.e., 0 to -5% and 0 to -10% based on median in base) and provide those with rates below national average the full points.
- Staff recommend maintaining this for newly approved RY 2028 goal.

ED visit resulting in inpatient stay

- Logged dependent variable
  - Avoids negative LOS prediction
  - Improves fit
  - Coefficients interpreted as percentages
  - Risk adjusted results reported as geometric mean*

*Geometric mean is exponential mean of logs-reduces influence of outliers and approximates median if lognormally distributed, however improvement results differ somewhat simply based on this change and explanation of the metric is less intuitive to all stakeholders

Inpatient model presented here

- Calendar Year 2024, 2025 YTD models fit
  - Coefficients for 2024 applied to 2025
- Admission APR-DRG, admission risk of mortality and secondary psych diagnosis are clinical risk adjusters
- Includes inpatient admissions with observation stays
- Measure uses currently developed IP ED LOS specifications but handles outliers differently
  - Excludes maternity, trauma, burns, psychiatric, pediatric, chronic conditions, rehab
  - Excludes stays over 30 days long
  - Excludes admission APR-DRG cells with less than 30 discharges statewide
  - Does not truncate outlier values (i.e., winsorize at 95th percentile)

Risk Factors Considered

Clinical characteristics

- Risk of mortality: On admission to inpatient stay
- APR-DRG: Admitting APR-DRG from inpatient stay, if at least 30 stays with this DRG
- Secondary psychiatric diagnosis: From code list

Patient demographics

- Sex: Male, female, unknown
- Age group: 5-year groupings, with 18 – 20, 85+

Visit characteristics

- Payer: Charity, Medicare, Medicaid, Commercial, Other, NA
- Arrived by ambulance: Y/N
- Admission source: Excludes newborns
- Hour of arrival: From ED arrival time
- Weekend arrival: From ED arrival date
- Census: number of ED at visit hour compared to two year average

Hospital choice

- Observation stay: start date not missing
- Observation stay: starts at or after ED discharge

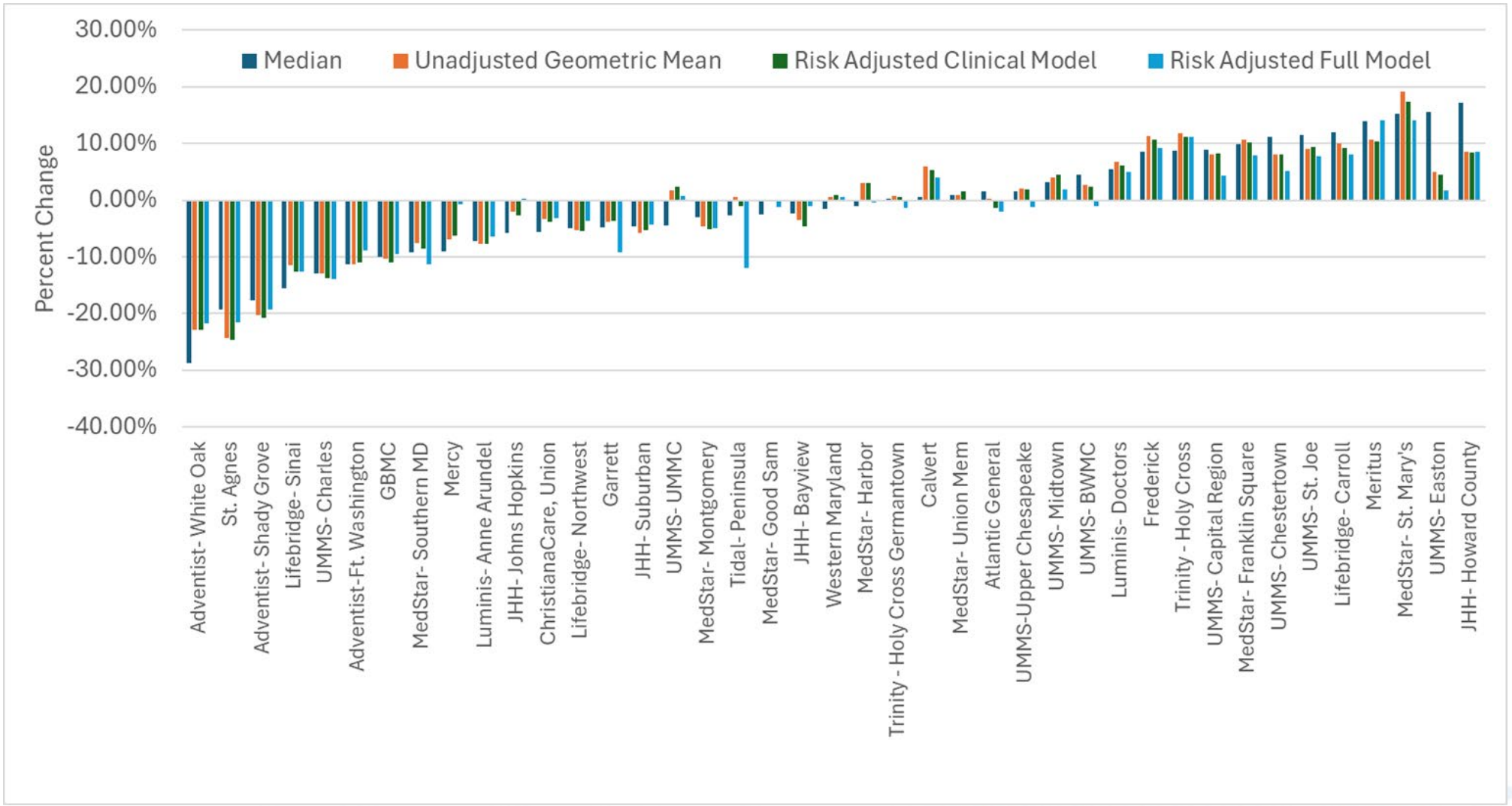
Testing an Inpatient Risk Adjusted Length of Stay Measure

- Risk adjustment models aim to control for factors affecting the outcome (ED LOS) that are outside the control of the hospital
  - Could include patient-level or hospital–level factors
  - Model geometric mean ED-LOS: closer than mean ED-LOS to median, models of geometric mean explain a higher proportion of ED-LOS variation
- Hospital-level factors could add explanatory power to the risk adjustment model (e.g., trauma level, community characteristics)
  - With only 41 acute care Maryland hospitals in model, effects of hospital characteristics could not confidently be distinguished from variation in individual hospitals' performance
  - Need national norms to measure effects of hospital-level risk factors
  - Elected to base candidate risk adjusted ED-LOS measure on patient characteristics alone
- Patient-level models
  - Tested models with all patient risk factors, all patient factors but observation stay occurrence, and models with only clinical factors
  - Also measured variation by quarter across years to capture seasonal effects

Evaluation of Risk Adjusted Measure

- Inpatient models, clinical risk factors and occurrence of observation stay are most powerful predictors
  - Observation stay occurrence as a risk factor is appropriate in some cases and not in others which are difficult to distinguish.
- Patient load and seasonal effects explain variation within hospital but have small effects on comparisons between hospitals
- Even models with all candidate patient risk factors explain only a small proportion of variation
- Recommend using ED-LOS improvement as performance measure
- Yearly changes in adjusted and unadjusted ED-LOS correlated at >0.99 for clinical risk factors, >0.95 for models with all candidate patient risk factors

Percent Change by Hospital CY 2024 - CY 2025

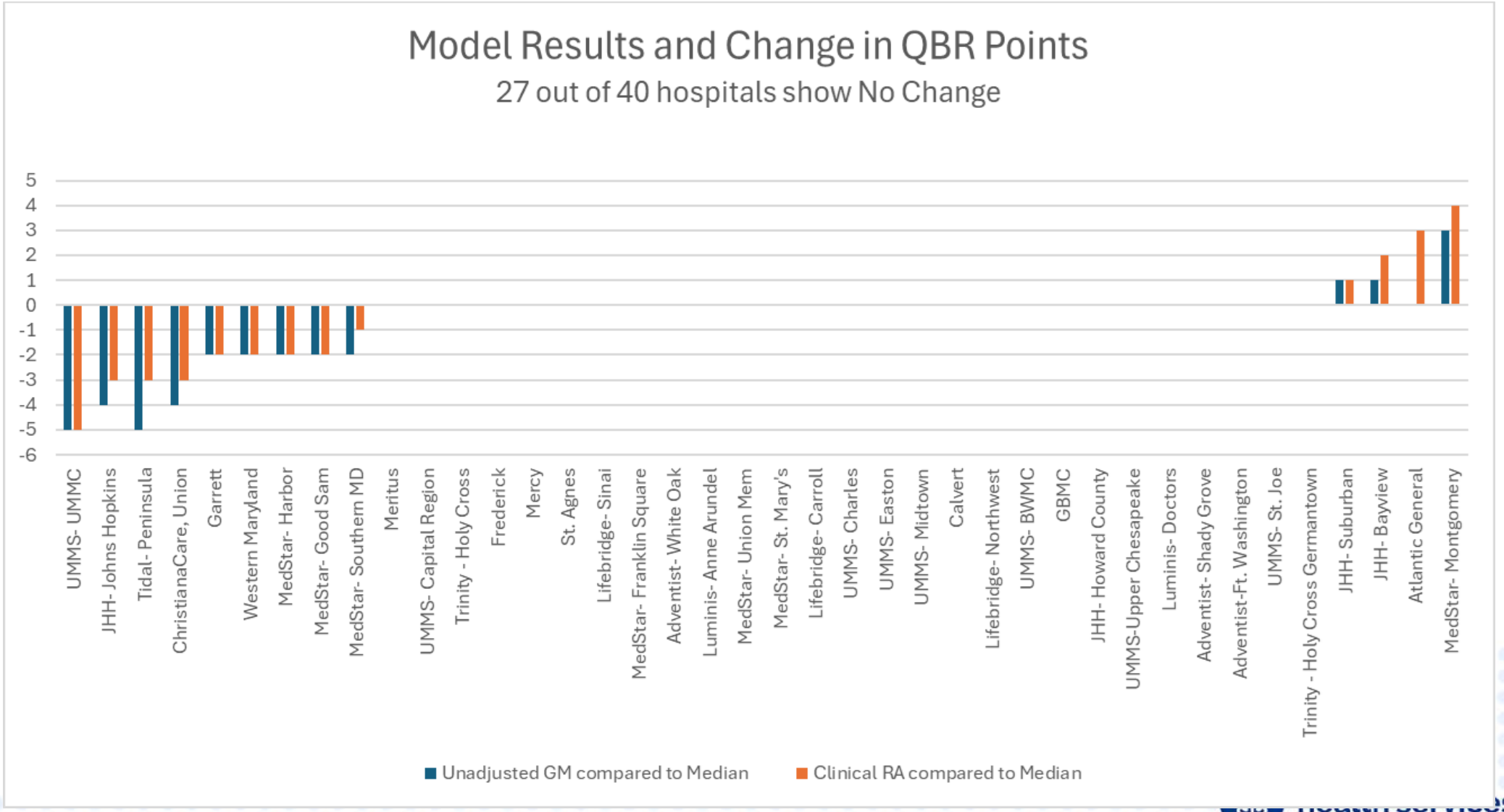


See Handout

Change to geometric mean contributes to the differences in results

Handout includes models with observation variables

YTD Ad Hoc Estimates



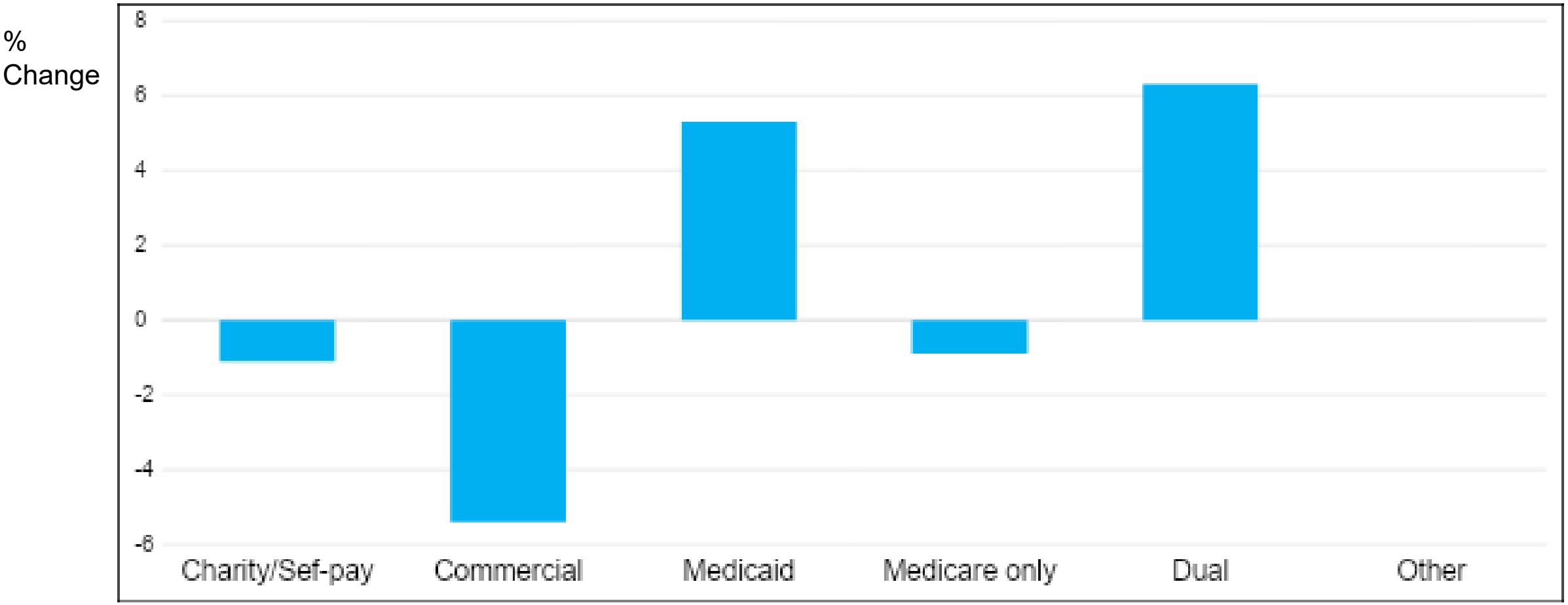
Risk adjustment changes: New risk factors

- Secondary Medicaid (Dual status)
- Inpatient Capacity
  - Based on occupied beds compared to staffed beds on arrival date
  - Compared staffed and total beds as denominator
  - Based on MIEMSS data from April 2024 to December 2025
- Surge
  - Based on daily arrivals to ED
  - Replaces hourly census
- Seasonal
  - Quarter of arrival

Methods

- Univariate analyses
  - Relation of capacity and surge variables to log ED LOS
- Multivariate modeling
  - Add variables to full risk adjustment model
- Analysis of changes
  - Correlation of hospital changes in median or geometric mean ED LOS

Payer impacts on ED LOS



Marginal impact in multivariate model, 2023 – 2025, Other is reference

Dual is similar to Medicaid and should be added if including a payer adjustment

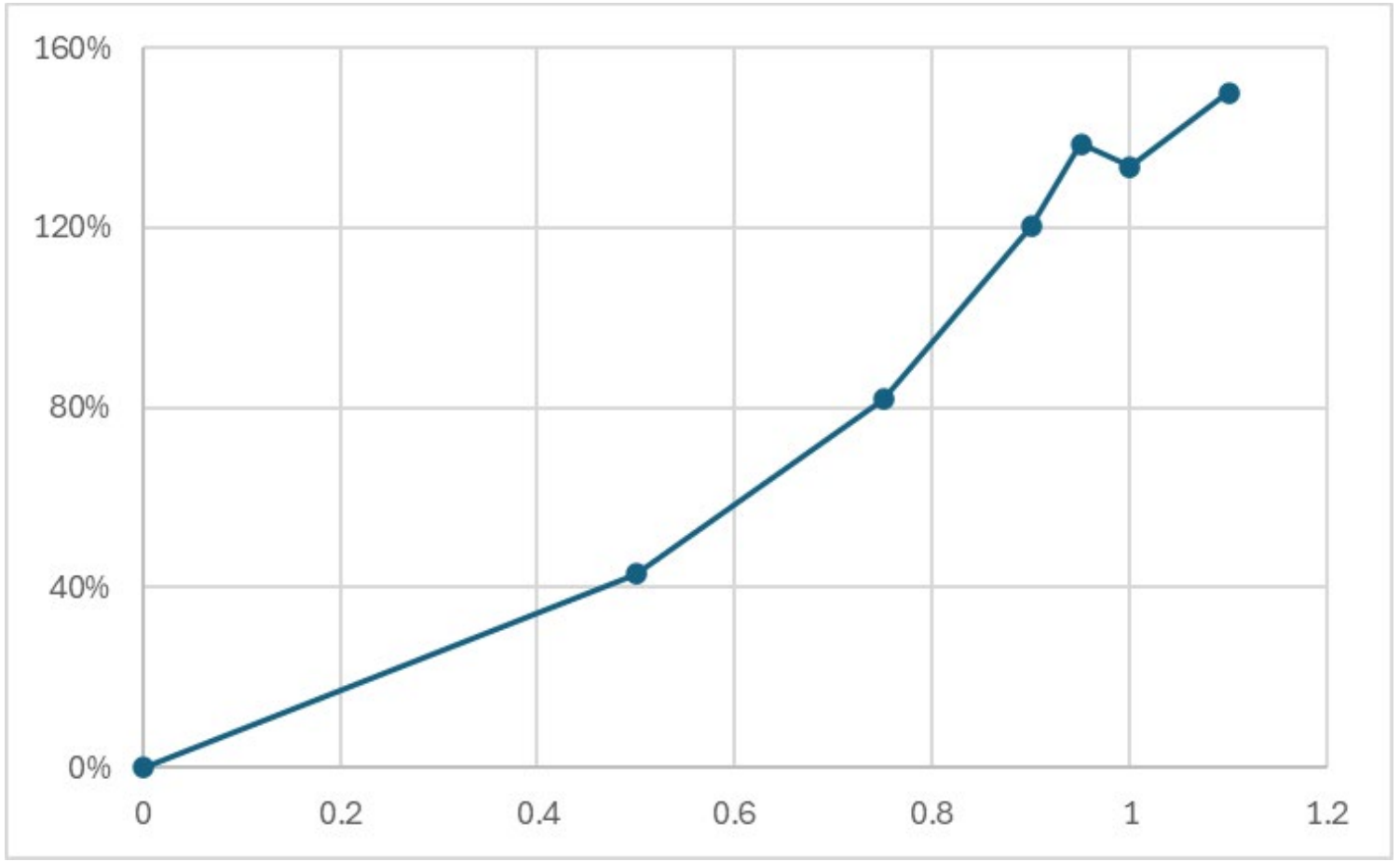
Relative contribution of bed occupancy and ED arrival volume

Variable	R-square
Occupied/Staffed Acute Beds*	.0423
Occupied/Total Acute Beds*	.0091
Staffed ratio piecewise linear*	.0481
ED arrival volume**	.0008
ED arrival volume piecewise linear**	.0013

* Univariate model 2024 - 2025

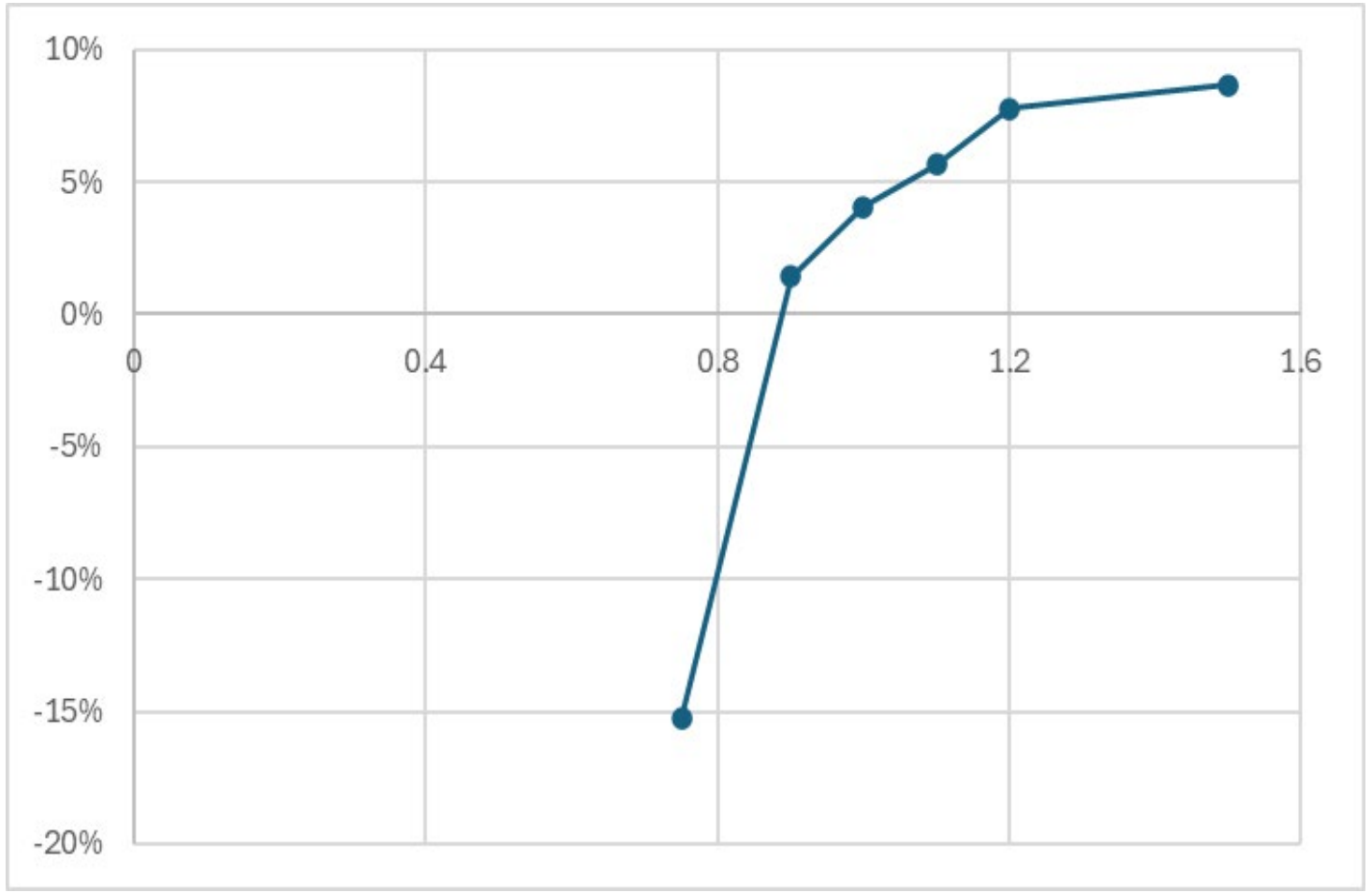
** Univariate model 2023 - 2025

Occupancy and ED-LOS impact



* Univariate model 2024 - 2025

Volume and ED-LOS impact

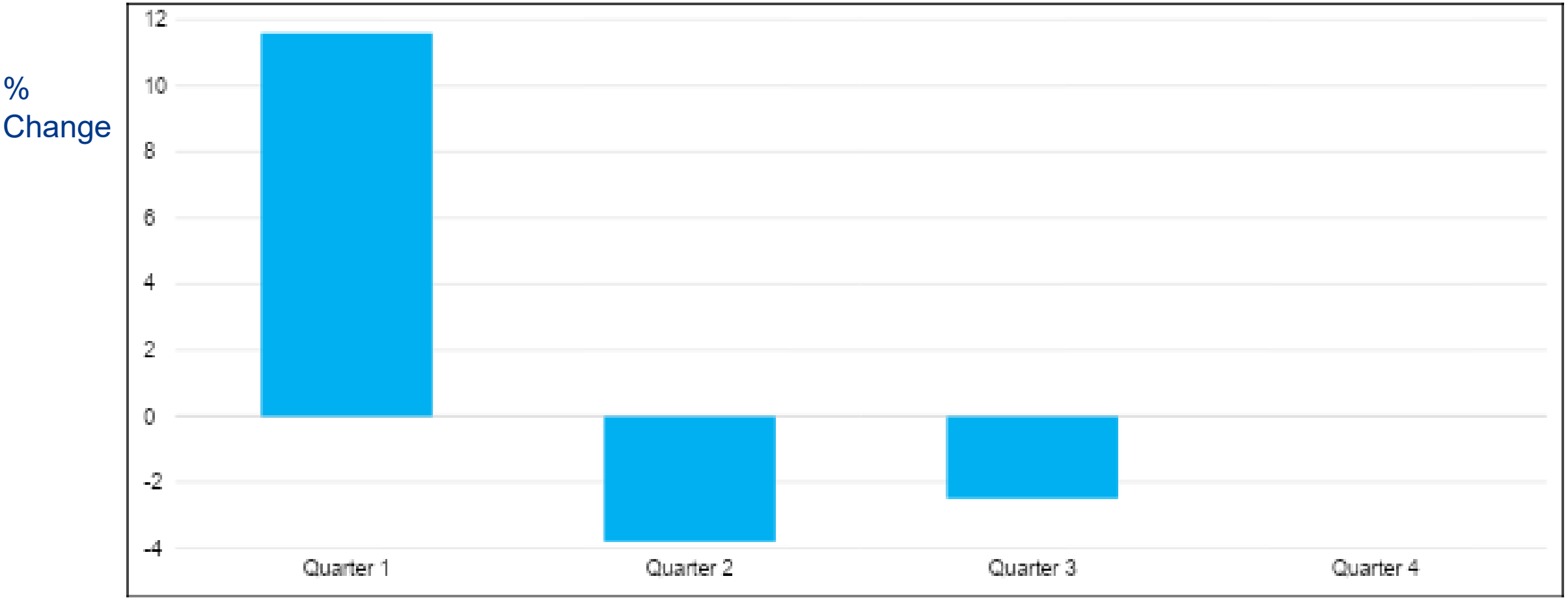


* Univariate model 2023 - 2025

ED arrivals and change in ED LOS: 2024 - 2025

Correlation	Correlation Coefficient
Change in median ED LOS with change in arrival volume	-0.27
Change in median ED LOS with arrival volume	0.21
Change in median ED LOS with change in flu volume	0.06
Median ED LOS with arrival volume	0.23

Seasonal Effects on ED-LOS: 2023 - 2025



Quarter dummy added to full log ED LOS model: Average marginal effect over 3 years

Conclusions

- Medicaid secondary payer is as strongly related to ED LOS as Medicaid primary payer
  - Medicaid primary payer predicts 5% longer LOS, secondary is 6% longer
- Inpatient bed use appears more strongly related to ED LOS than volume of ED arrivals
- Relation of both inpatient bed use and arrival volume to ED LOS are nonlinear
- High volume hospitals appear weakly more likely to experience increase in median ED LOS
- Winter (Q1) is associated with longer ED LOS even controlling for arrival volume
  - Using volume and clinical variables preferable to seasonality as risk adjuster
- Recommendation: Focus on improvement only with unadjusted ED LOS
  - Additional risk factor analysis does not seem to warrant risk-adjustment due to low explanatory value; attainment model is not recommended currently.
  - Inpatient occupancy rate is considered an opportunity for improvement.

Discussion

- **Overall goal: Improve ED LOS for patients in Maryland hospitals**
- **Should we use unadjusted median or risk-adjusted model?**
  - Differences between median and geometric mean are concern for capturing improvement
  - End of the day, patients experience actual and not risk-adjusted LOS
  - Current risk-adjustment model does not address hospital level factors
- **Reconsider attainment if ED LOS is maintained in payment after RY 2028 or use the new CMS digital measure for ED (i.e., ECAT)**
  - Explore whether elements of ECAT can be recreated using case-mix
  - Voluntary reporting in 2027, mandatory reporting in 2028

ECAT Measure Proposed for RY 2027 (voluntary) and RY 2028

The numerator is comprised of ED visits meeting the denominator criteria and where the patient experiences any of the following quality gaps in access:

1. The patient waited longer than 60 minutes (1 hour) after arrival to the ED to be placed in a treatment room or dedicated treatment area that allows for audiovisual privacy during history-taking and physical examination, or

2. The patient left the ED without being evaluated, or

3. The patient boarded (time from Decision to Admit order to ED departure for admitted patients) in the ED for longer than 240 minutes (4 hours), or

4. The patient had an ED length of stay (LOS) (time from ED arrival to ED departure as defined by the ED departure timestamp indicating when the patient physically left the ED) of longer than 480 minutes (8 hours).

ED encounters with ED observation stays are excluded from numerator criteria #3 (boarding) and #4 (ED LOS). To clarify, patients who have a 'decision to admit' after an ED observation stay remain excluded from numerator criteria #3 (boarded) calculations.

Next Steps

- Share feedback from this group with PMWG at tomorrow's (Feb 18) Meeting
  - Want to finalize decision for RY 2027 by end of February and make that default for RY 2028 ED LOS measure as starting point
  - Need input on whether stakeholders want to prioritize additional risk-adjustment for RY 2028 versus development of measure more in line with the new CMS measure (i.e., use case mix data to assess improvement in proportion of patients staying greater than 8 hours).

Best Practice Survey

Best Practice Survey Overview

All 41 hospitals submitted their best practices on time, before December 31, 2025

Best Practice Selection Overview
(Sorted by most selected Best Practice)

Best Practice	Hospitals Selected the Best Practice		Tier (1 = less □ 3 = more established)		
	#	%	Tier 1	**Tier 2**	**Tier 3**
BP 3 - Standardized Daily Shift Huddles	20	49%	1	1	18
BP 5 - Patient Flow Throughput Performance Council	19	46%	0	7	12
BP 4 - Expedited Care Interventions	16	39%	0	0	16
BP 1 - Interdisciplinary Rounds & Early Discharge	13	32%	1	7	5
BP 2 - Bed Capacity Alert System	10	24%	2	2	6
BP 6 - Clinical Pathways	4	10%	1	0	3

Best Practice Data Discussion

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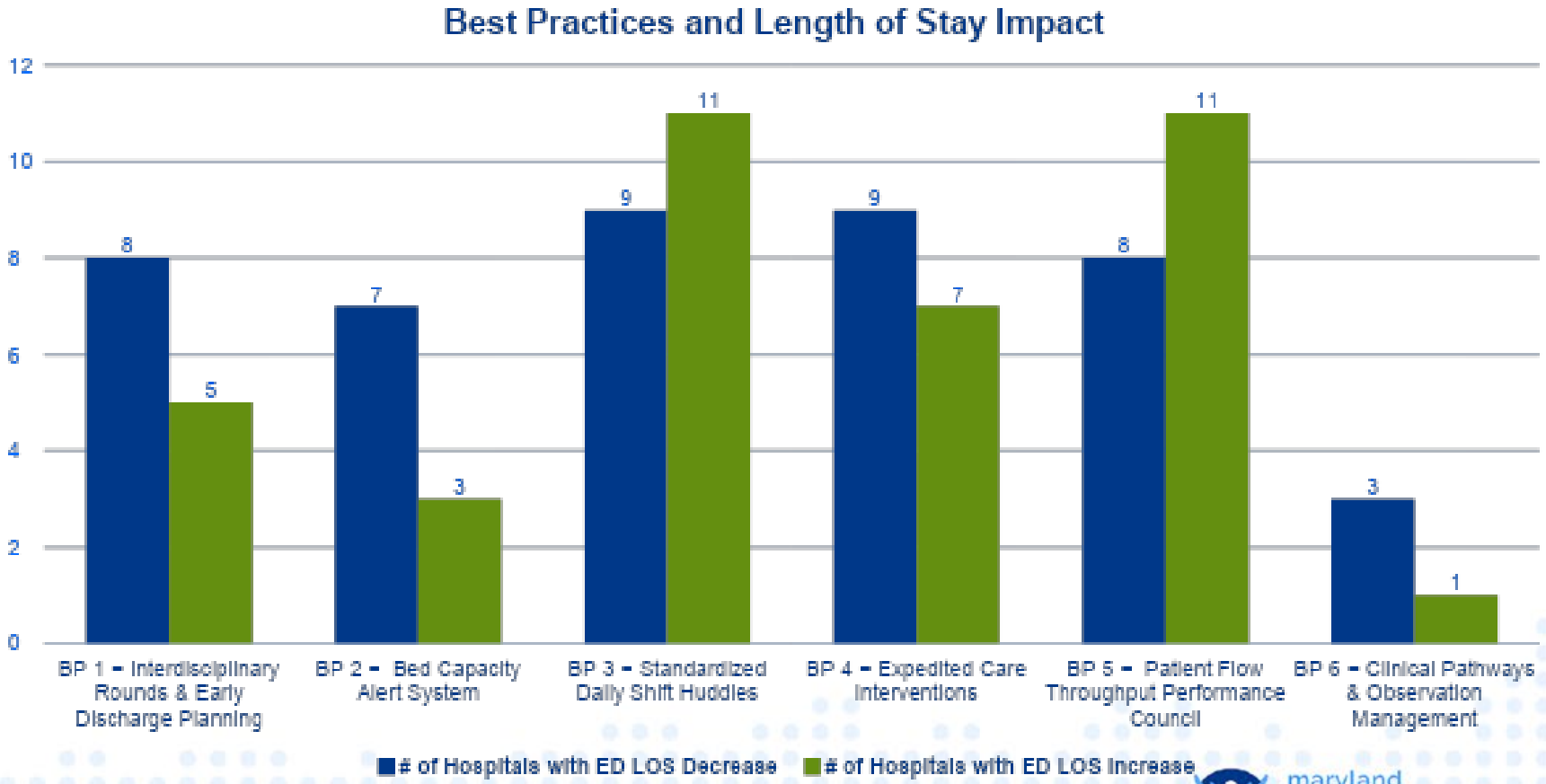
Best Practices and Impact to Length of Stay

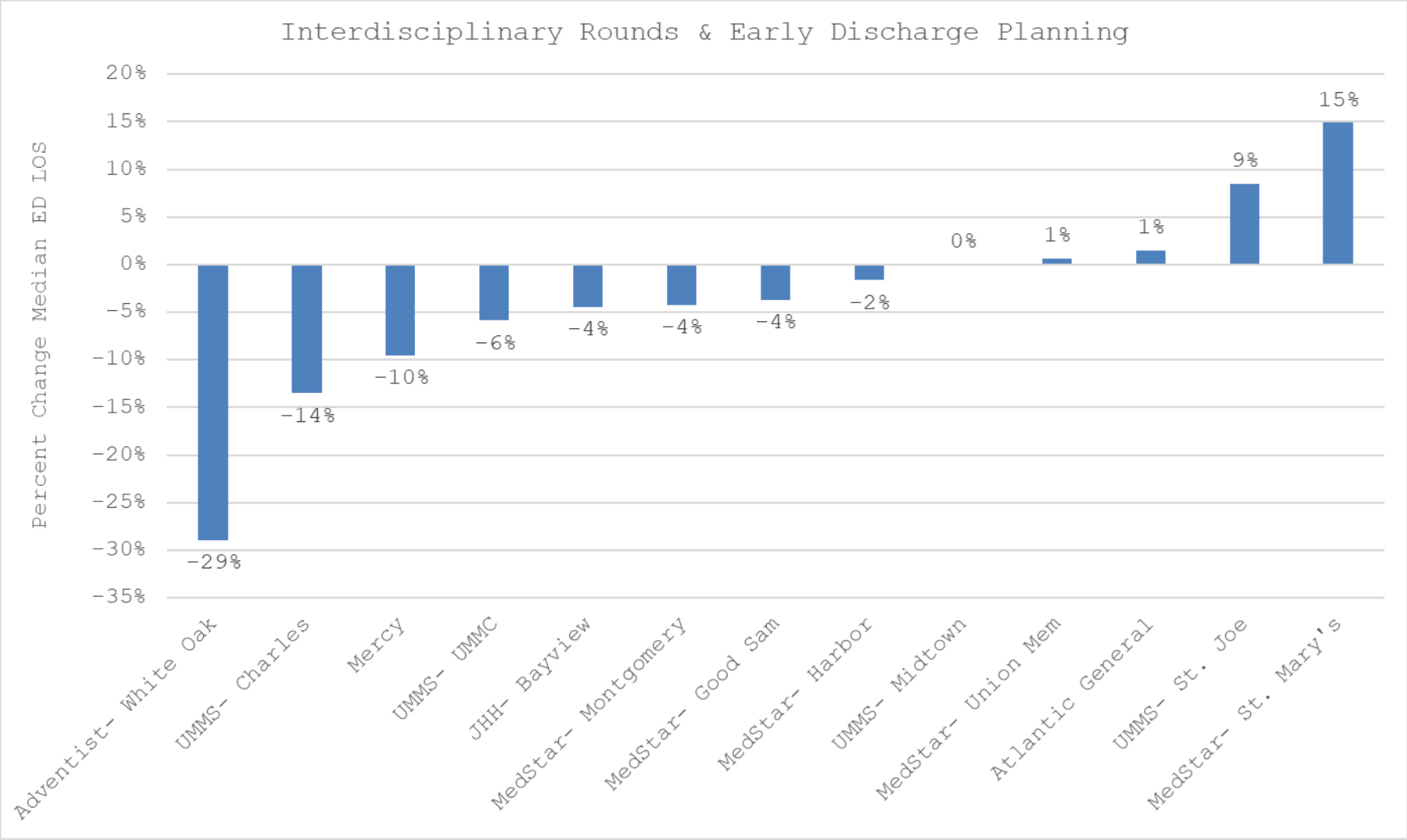
The Best Practice results were compared to the preliminary CY24 and CY25 YTD ED LOS median data set to evaluate overall change against the best practices selected.

22 Hospitals Reported ED LOS Decrease

19 Hospitals Reported ED LOS Increase

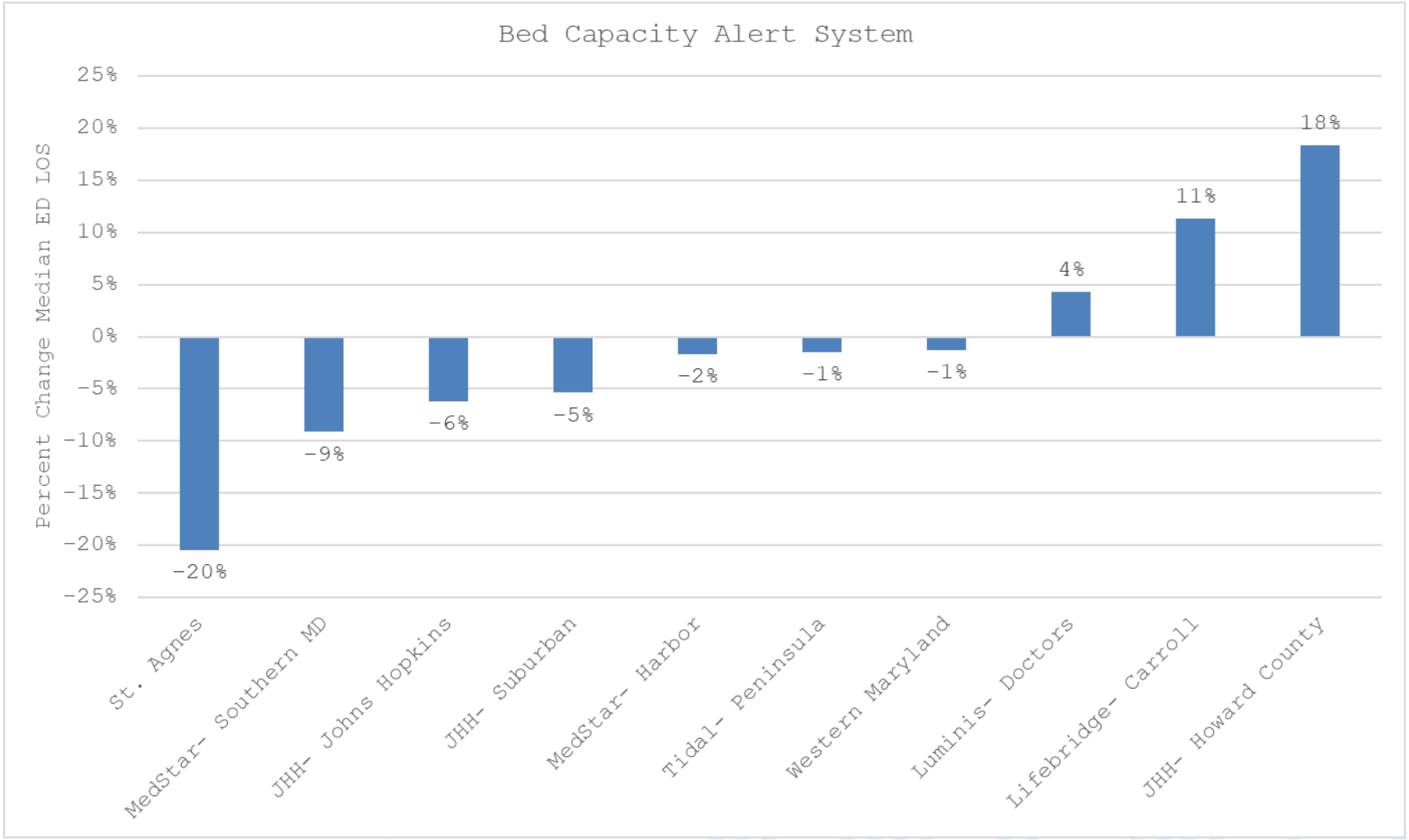


BP1: Interdisciplinary Rounds & Early Discharge Planning



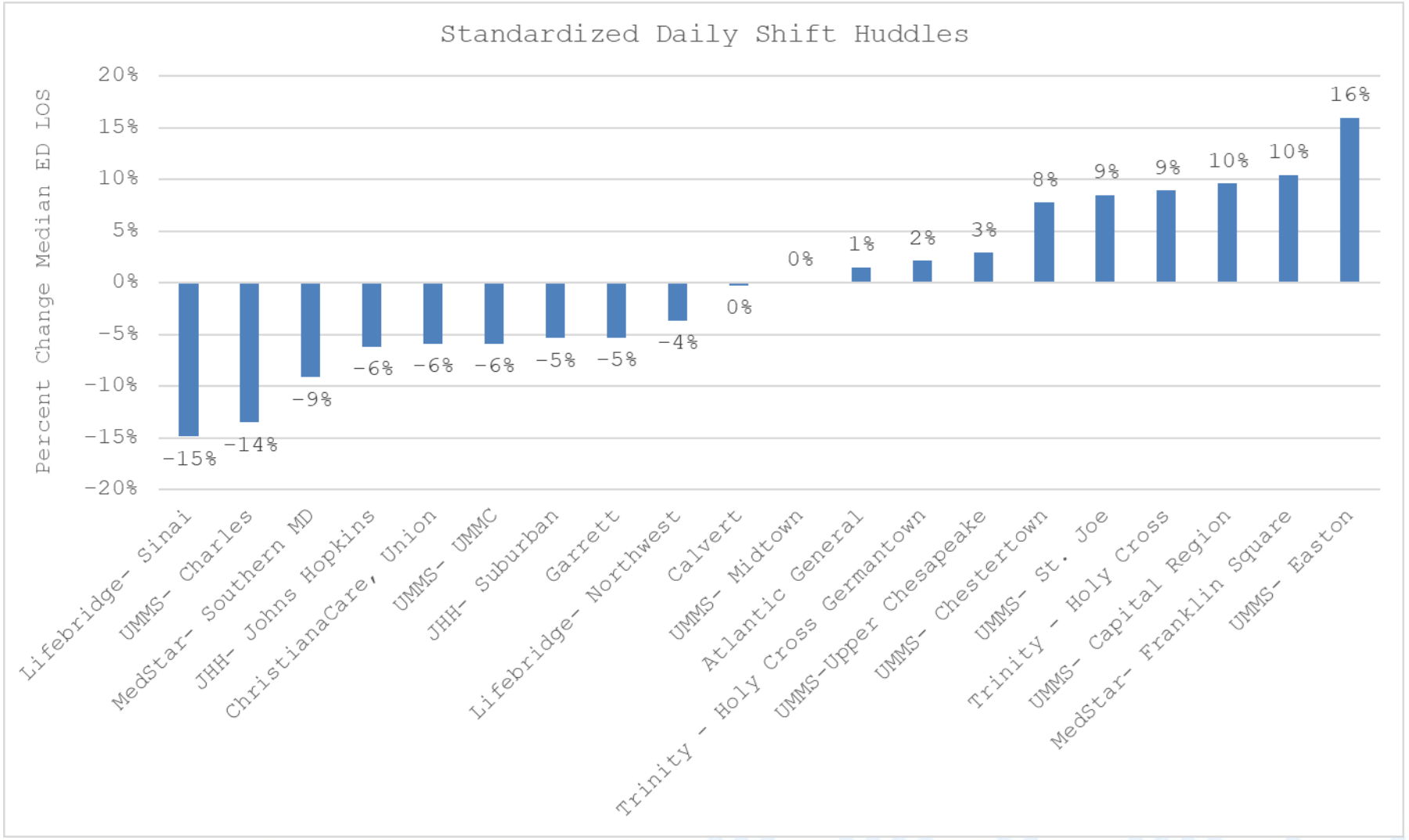
Median change in ED LOS for admitted patients from CY 2024 and CY 2025 (December Prelim)

BP2: Bed Capacity Alert System



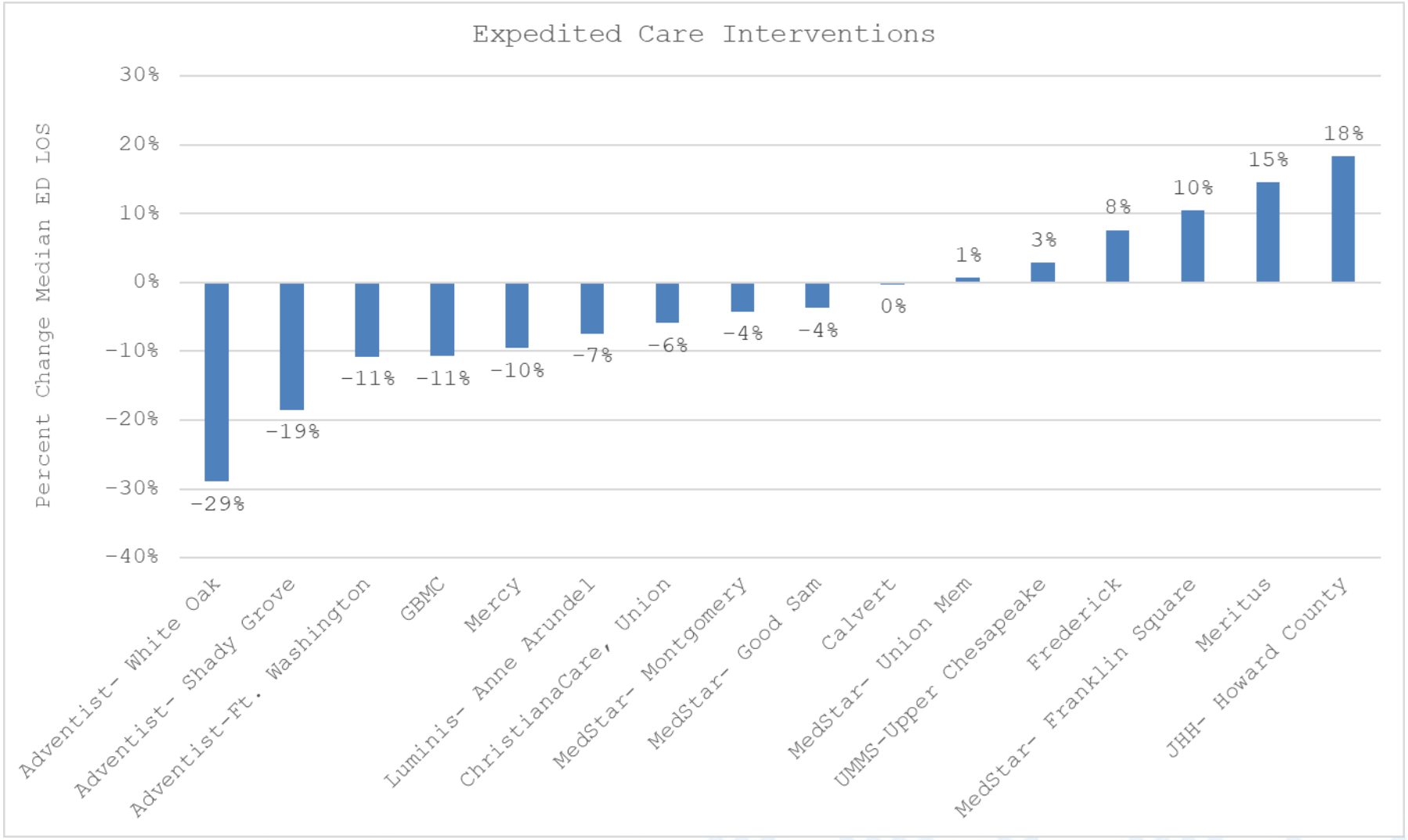
Median change in ED LOS for admitted patients from CY 2024 and CY 2025 (December Prelim)

BP3: Standardized Daily Shift Huddles



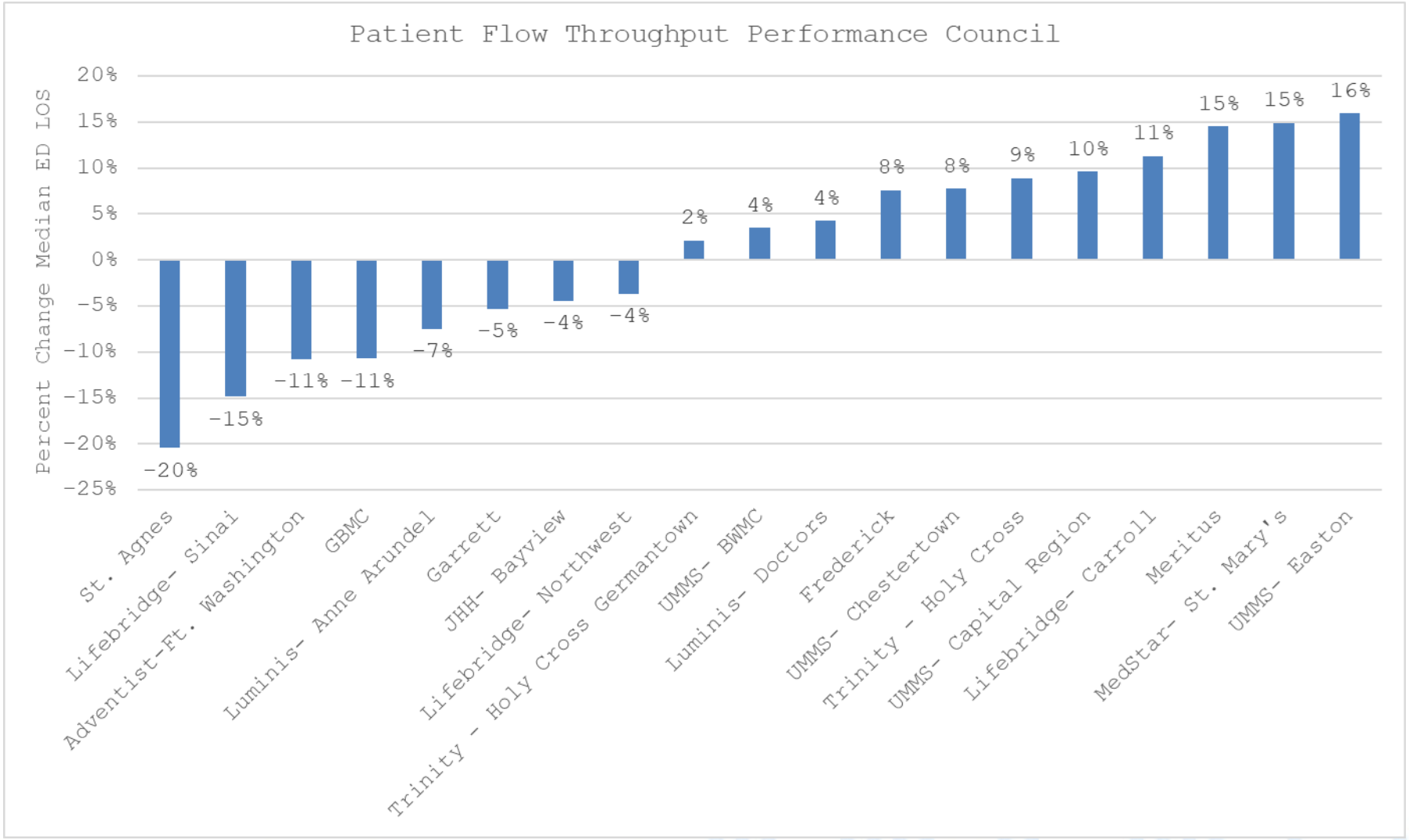
Median change in ED LOS for admitted patients from CY 2024 and CY 2025 (December Prelim)

BP4: Expedited Care Interventions



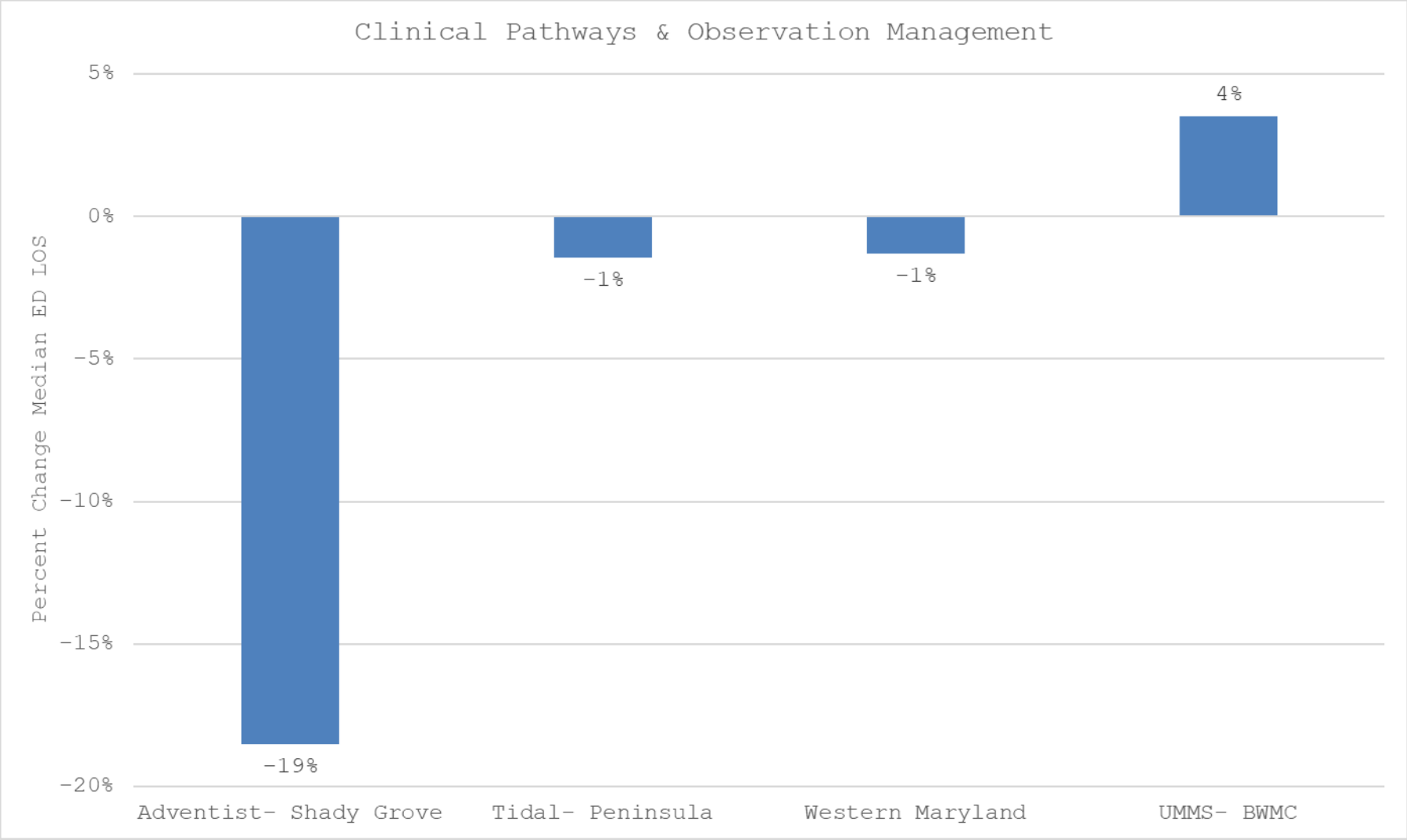
Median change in ED LOS for admitted patients from CY 2024 and CY 2025 (December Prelim)

BP5: Patient Flow and Throughput Performance Council



Median change in ED LOS for admitted patients from CY 2024 and CY 2025 (December Prelim)

BP6: Clinical Pathways and Observation Management



Median change in ED LOS for admitted patients from CY 2024 and CY 2025 (December Prelim)

Hospitals with Decreased ED LOS CY24 to CY25

Hospital Name	% percent change	Best Practice #1	Best Practice #2
Adventist- White Oak	-28.91%	Interdisciplinary Rounds & Early Discharge	Expedited Care Interventions
St. Agnes	-20.43%	Bed Capacity Alert System	Patient Flow Throughput Performance
Adventist- Shady Grove	-18.50%	Expedited Care Interventions	Clinical Pathways & Observation Management
Lifebridge- Sinai	-14.88%	Standardized Daily Shift Huddles	Patient Flow Throughput Performance
UMMS- Charles	-13.52%	Interdisciplinary Rounds & Early Discharge	Standardized Daily Shift Huddles
Adventist-Ft. Washington	-10.78%	Expedited Care Interventions	Patient Flow Throughput Performance
GBMC	-10.71%	Expedited Care Interventions	Patient Flow Throughput Performance
Mercy	-9.55%	Interdisciplinary Rounds & Early Discharge	Patient Flow Throughput Performance
MedStar- Southern MD	-9.13%	Bed Capacity Alert System	Standardized Daily Shift Huddles
Luminis- Anne Arundel	-7.47%	Expedited Care Interventions	Patient Flow Throughput Performance
JHH- Johns Hopkins	-6.20%	Bed Capacity Alert System	Standardized Daily Shift Huddles
ChristianaCare, Union	-5.88%	Standardized Daily Shift Huddles	Expedited Care Interventions
UMMS- UMMC	-5.87%	Interdisciplinary Rounds & Early Discharge	Standardized Daily Shift Huddles
JHH- Suburban	-5.37%	Bed Capacity Alert System	Standardized Daily Shift Huddles
Garrett	-5.33%	Standardized Daily Shift Huddles	Patient Flow Throughput Performance
JHH- Bayview	-4.45%	Interdisciplinary Rounds & Early Discharge	Patient Flow Throughput Performance
MedStar- Montgomery	-4.26%	Interdisciplinary Rounds & Early Discharge	Expedited Care Interventions
MedStar- Good Sam	-3.72%	Interdisciplinary Rounds & Early Discharge	Expedited Care Interventions
Lifebridge- Northwest	-3.68%	Standardized Daily Shift Huddles	Patient Flow Throughput Performance
MedStar- Harbor	-1.64%	Interdisciplinary Rounds & Early Discharge	Bed Capacity Alert System
Tidal- Peninsula	-1.44%	Bed Capacity Alert System	Clinical Pathways & Observation Management
Western Maryland	-1.30%	Bed Capacity Alert System	Clinical Pathways & Observation Management
Calvert	-0.26%	Standardized Daily Shift Huddles	Expedited Care Interventions

Best Practice Correlation with Improvement

Best Practice	# Hospitals Implemented	Count of Hospital with any ED LOS Improvement
1. Interdisciplinary Rounds & Early Discharge	13	8
2. Bed Capacity Alert System	10	7
3. Standardized Dail Shift Huddles	20	10
4. Expedited Care Interventions	16	9
5. Patient Flow Throughput Performance Council	19	9
6. Clinical Pathways & Observation Management	4	3