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Do Well-Publicized Risk-Adjusted Outcomes Reports Affect Hospital Volume?

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Background:

California Hospital Outcomes Project

- ◆ Legislatively mandated (AB524) program of the California Office of Statewide Health Planning and Development (OSHPD)
- ◆ Publish “annual” reports on risk-adjusted outcomes of medical, surgical, and obstetric conditions/procedures at acute care hospitals, based on the Patient Discharge Data Set
- ◆ Five public reports on hospital-specific, risk-adjusted AMI mortality since December 1993 (plus nonpublic reports)
- ◆ One public report on cervical & lumbar diskectomy complications
- ◆ Extensive validation of data and models, including recoding and clinical abstraction of randomly sampled records

Background:

New York Cardiac Surgery Reporting System

- ◆ “Voluntary” program of the New York Department of Health, with 100% participation
- ◆ Publish “annual” reports on risk-adjusted mortality after coronary artery bypass surgery at all acute care hospitals, based on a clinically detailed Cardiac Surgery Reporting System (CSRS)
- ◆ Cardiac Advisory Committee oversees data system and methods
- ◆ Surgeon-specific and hospital-specific performance
- ◆ Multiple public reports on risk-adjusted CABG mortality
- ◆ One public report on risk-adjusted PTCA mortality
- ◆ Prior evidence of impact on statewide patient outcomes

Overview: The Outcomes of Hospital Outcome Studies

- ◆ A set of interrelated studies on the impacts of disseminating risk-adjusted hospital outcomes data in CA and NY
- ◆ Funded by the US Agency for Healthcare Research and Quality
- ◆ Mail survey of hospital administrators (CA + NY)
- ◆ Mail/Telephone Survey of hospital CQI leaders (CA)
- ◆ Mail/Telephone Survey of health plan executives (CA)
- ◆ Content analysis of print media coverage (CA + NY)
- ◆ Analysis of patient flows/volumes (CA + NY)

Research questions/objectives:

- ◆ Do hospitals publicly recognized for good or poor performance experience volume changes in the year after publication of a report card?
 - Are these volume effects immediate or delayed?
 - Are these volume effects transient or persistent?
- ◆ Do favorable outliers attract more patients with related conditions ("spillover") and more patients from outside their usual catchment areas ("bypass")?
- ◆ Are socioeconomically disadvantaged persons less responsive to report cards?

Methods: Data, Study Period, Hospitals

- ◆ Data from the California Patient Discharge Data Set (PDDS) and the New York Statewide Planning and Research Cooperative System (SPARCS)
- ◆ Identified study period 24-36 months before and 12 months after publication of 3 CSRS and 3 OSHPD reports (2 AMI, 1 lumbar/cervical diskectomy) in 1992-96
- ◆ Excluded Kaiser and state hospitals, plus hospitals that had been excluded from a public report because of data irregularities
- ◆ Focused on designated outlier hospitals

Methods: Target, Related, Unrelated Conditions

- ◆ **Acute myocardial infarction (CA)**

 - Target – AMI

 - Related – CABG, PTCA, CHF

- ◆ **Diskectomy (CA)**

 - Target – Cervical, Lumbar

 - Related – Other back/neck procedures w/out diskectomy, medical back admissions, TKA, THA

- ◆ **Coronary artery bypass surgery (NY)**

 - Target – CABG

 - Related – AMI, PTCA, CHF

Methods: Subjects

- ◆ Excluded children (<18 yrs) and patients admitted with psychiatric, injury, poisoning, or rehabilitation principal dx
- ◆ Excluded patients transferred in from other acute care hospitals
- ◆ Defined unrelated admissions by exclusion, with obstetric admissions stratified separately
- ◆ Dependent variable: Total number of patients with a target or related condition admitted to a hospital in a specific month (NY) or quarter (CA)

Methods: Regression Models

- ◆ Estimated hospital-level time-series models based on months prior to each report; applied models to estimate expected volume for each subsequent month based on values of independent variables in those months
- ◆ Aggregated hospitals by outcome category in public report
- ◆ Used OLS models in NY; both OLS and autoregressive models in CA due to significant first order autocorrelation
- ◆ Stratified volume by age, race/ethnicity, insurance status, catchment area (2 definitions based on zip of residence)

Methods: Adjustors in Regression Models

- ◆ Statewide hospital volume in that month (prevalence)
- ◆ Hospital effects (mean monthly pre-report volume, reflecting invariant hospital characteristics)
- ◆ Interactions between statewide hospital volume and hospital effects (hospital share of statewide volume changes)
- ◆ Unrelated volume in that hospital-month (reflecting overall market and referral network characteristics)
- ◆ Hospital charges (marginal and inconsistent effects)

Mean difference between actual and OLS predicted monthly patient volume for outlier hospitals, CA

Condition	Quarter 1	Quarter 2	Quarter 3	Quarter 4
AMI (Better)	1.00	-0.74	1.66	2.84
AMI (Worse)	1.30	0.25	-0.55	0.15
AMI-related (Better)	-3.83	-0.60	-0.23	0.44
AMI-related (Worse)	2.36	0.29	0.52	0.98
Cervical (Better)	0.04	0.13	-0.55	-0.66
Cervical (Worse)	-1.14	-0.57	1.38	0.53
Lumbar (Better)	0.60	0.61	0.68	0.61
Lumbar (Worse)	-0.18	-0.22	-0.33	-0.52
Disk-related (Better)	0.47	-0.43	-1.13	-1.05
Disk-related (Worse)	-0.75	1.08	1.13	1.19

Mean difference between actual and ARIMA predicted monthly patient volume for outlier hospitals, CA

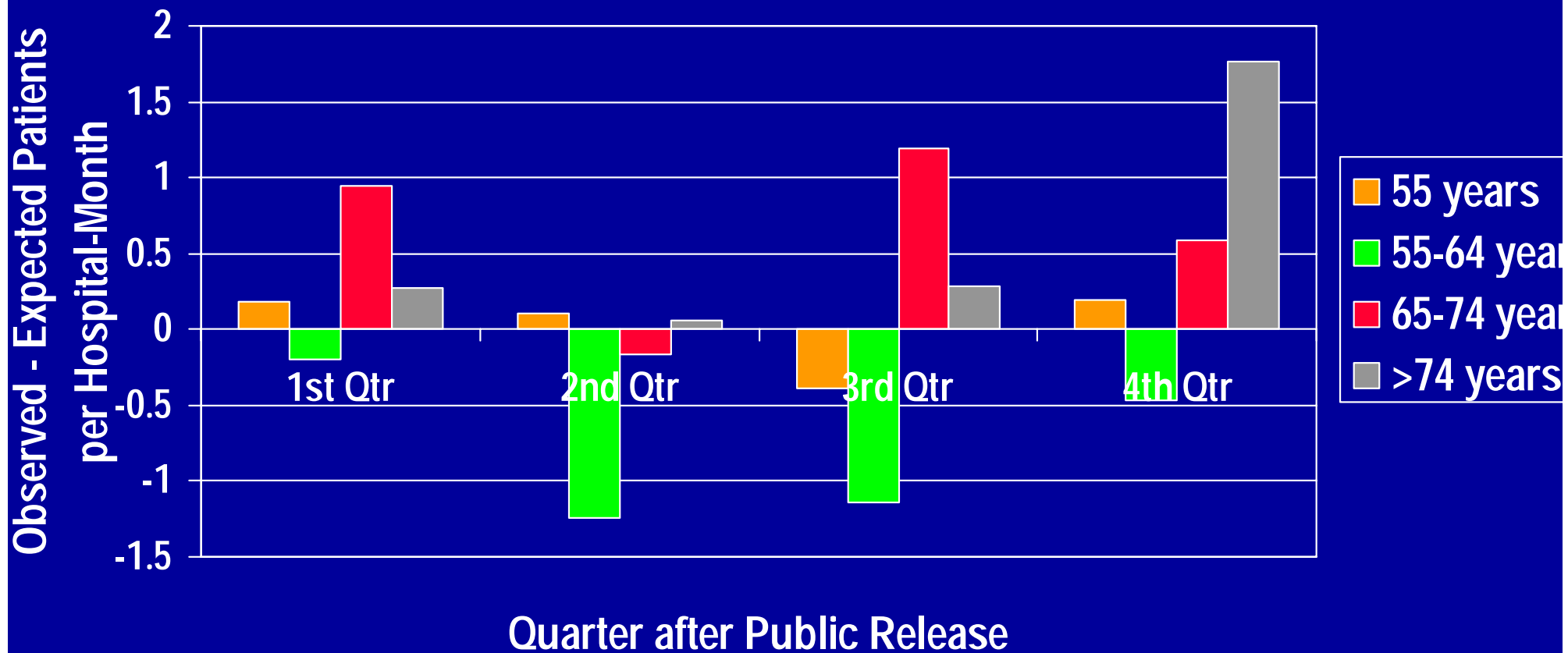
Condition	Quarter 1	Quarter 2	Quarter 3	Quarter 4
AMI (Better)	1.93	-1.14	-0.56	1.12
AMI (Worse)	0.67	1.04	0.03	0.65
AMI-related (Better)	-1.10	4.19	3.75	-0.07
AMI-related (Worse)	1.04	0.36	-0.38	-0.97
Cervical (Better)	0.22	-0.30	-1.61	-0.59
Cervical (Worse)	-0.97	0.34	1.07	0.86
Lumbar (Better)	0.58	0.30	0.52	0.78
Lumbar (Worse)	-0.13	-0.13	-0.31	-0.52
Disk-related (Better)	0.36	-0.87	-1.15	0.36
Disk-related (Worse)	-1.37	0.18	0.03	0.24

Summary of effects: CA

- ◆ Good AMI outliers: The average hospital admitted 90.4 AMI patients during the 3rd and 4th quarters after release, versus 76.9 expected by OLS (18% increase)
- ◆ Good AMI outliers: No effect by ARIMA
- ◆ Poor AMI outliers: No effect in any model
- ◆ No spillover effects
- ◆ Cervical diskectomy outliers: No effects
- ◆ Lumbar diskectomy outliers: Modest effects by ARIMA (0.5-1.0 additional patients per hospital per month)

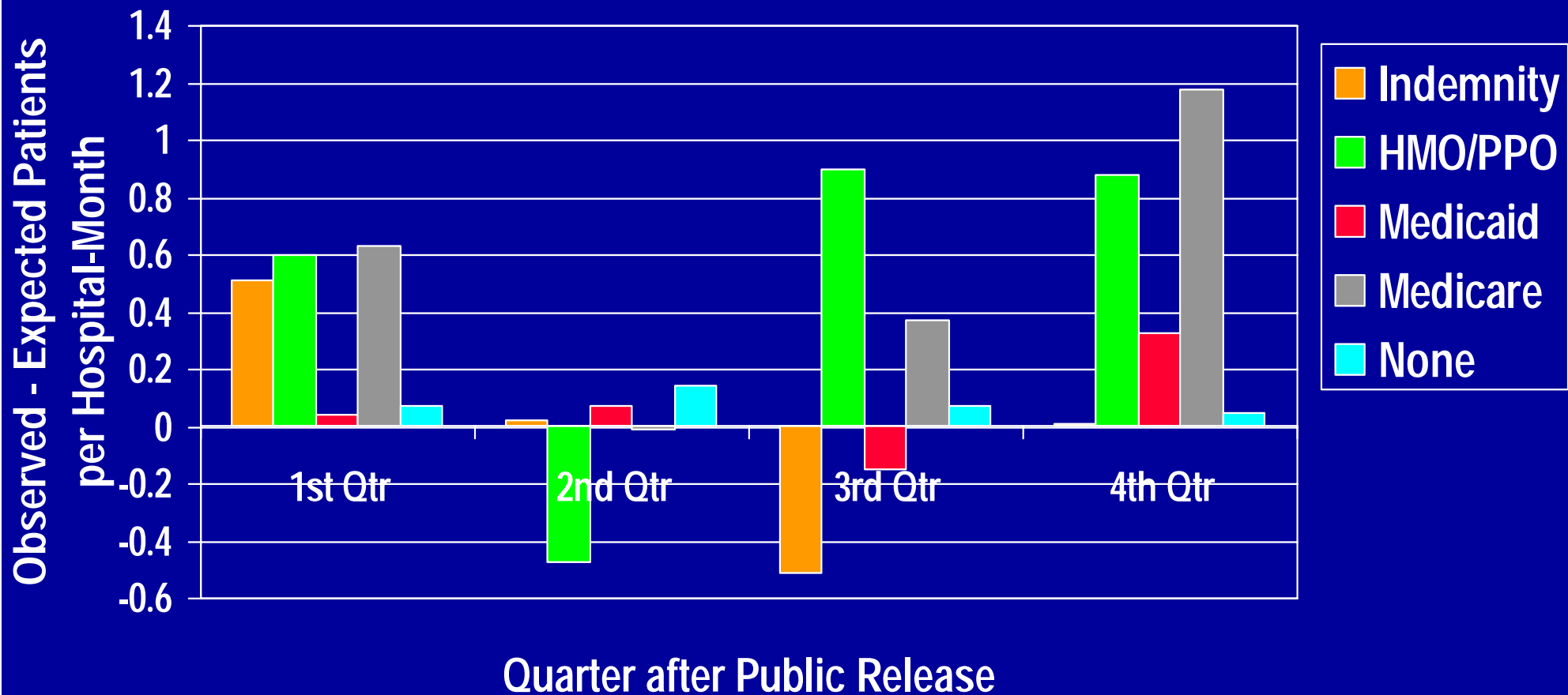
Volume effects by patient characteristics

CA, AMI volume, low-mortality hospitals, ARIMA model



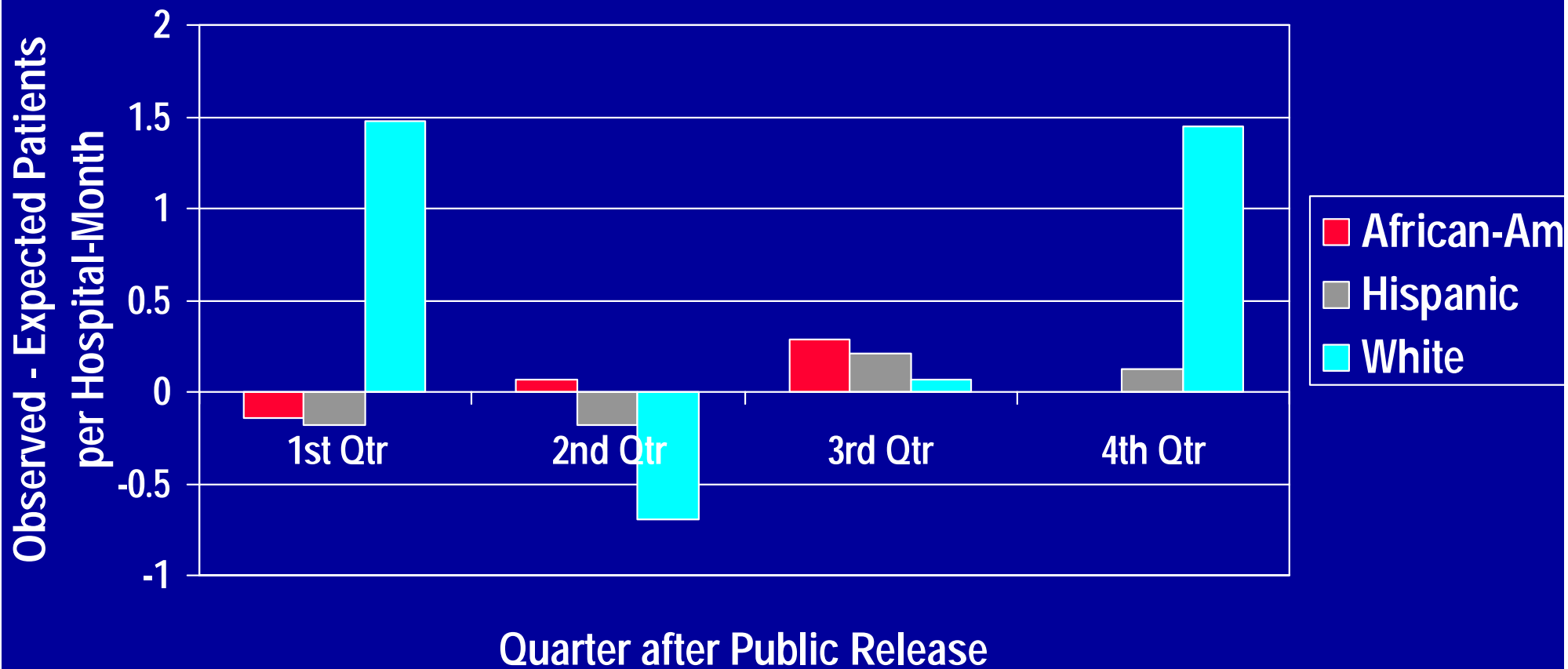
Volume effects by patient characteristics

CA, AMI volume, low-mortality hospitals, ARIMA model



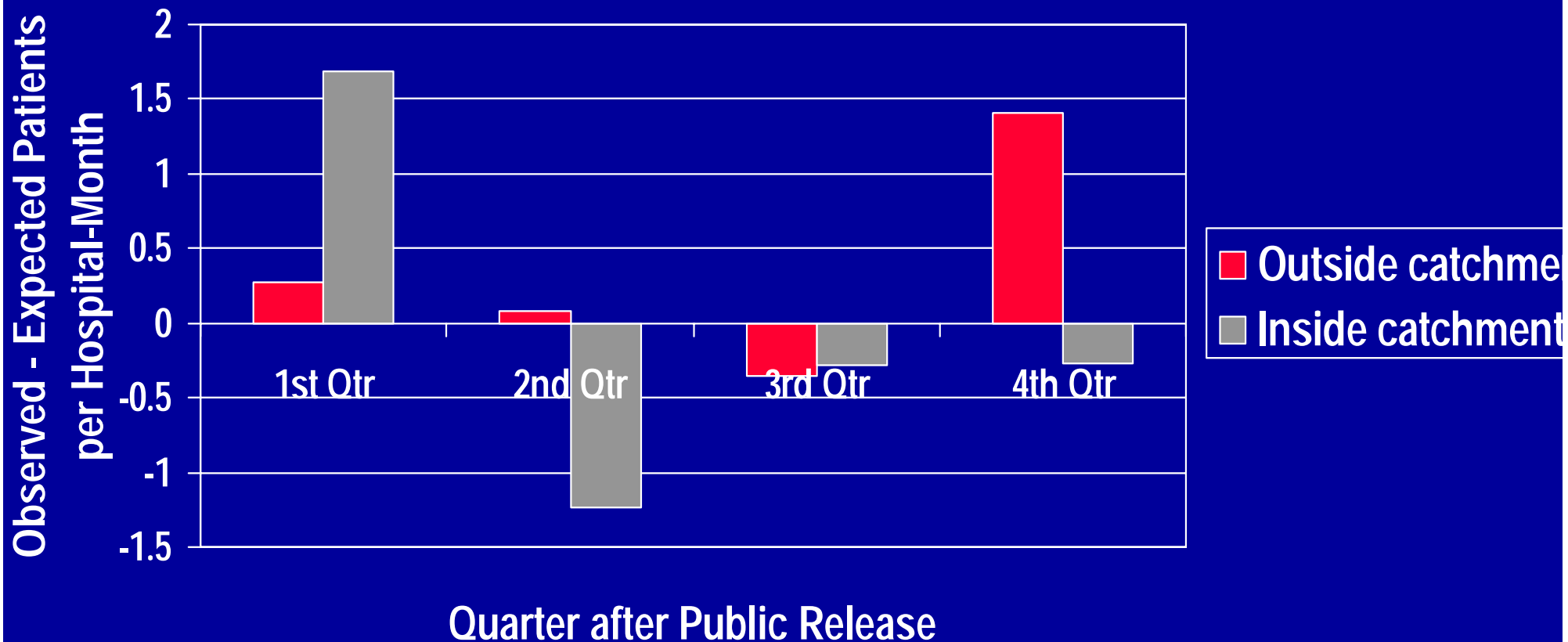
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Volume effects by patient characteristics

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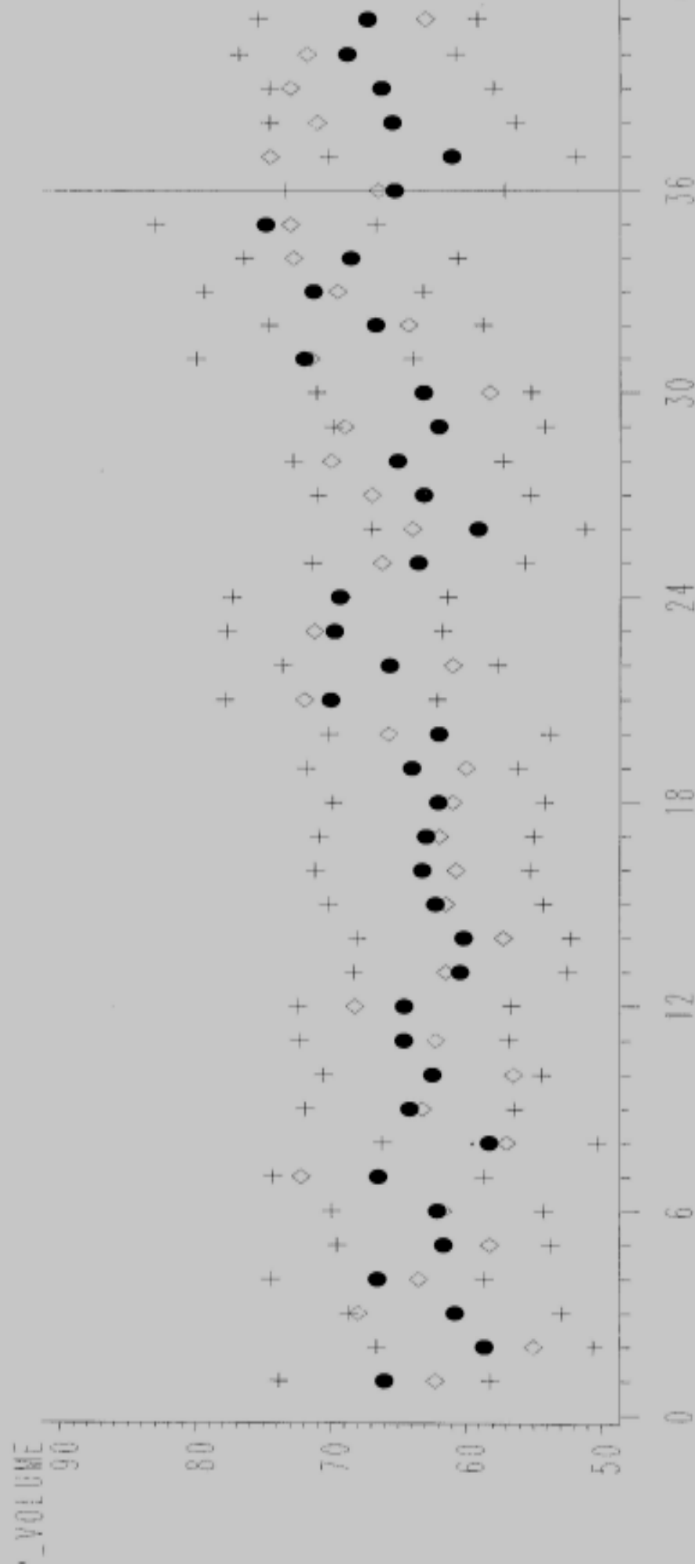


Mean difference between actual and OLS predicted monthly patient volume for outlier hospitals, NY

Condition	Month 1	Month 2	Month 3	Month 4
CABG (Better)	13.45	5.55	6.73	2.96
CABG (Worse)	-4.04	-7.11	-2.66	-0.93
AMI (Better)	-4.93	-1.44	-1.95	0.55
AMI (Worse)	-4.53	-1.24	-1.61	-6.00
PTCA (Better)	3.75	1.12	0.60	-1.15
PTCA (Worse)	-2.62	-1.43	0.36	-2.07
CHF (Better)	-2.81	-3.97	-0.52	-1.72
CHF (Worse)	-0.98	-1.97	-1.73	-0.07

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RATING=' favor'

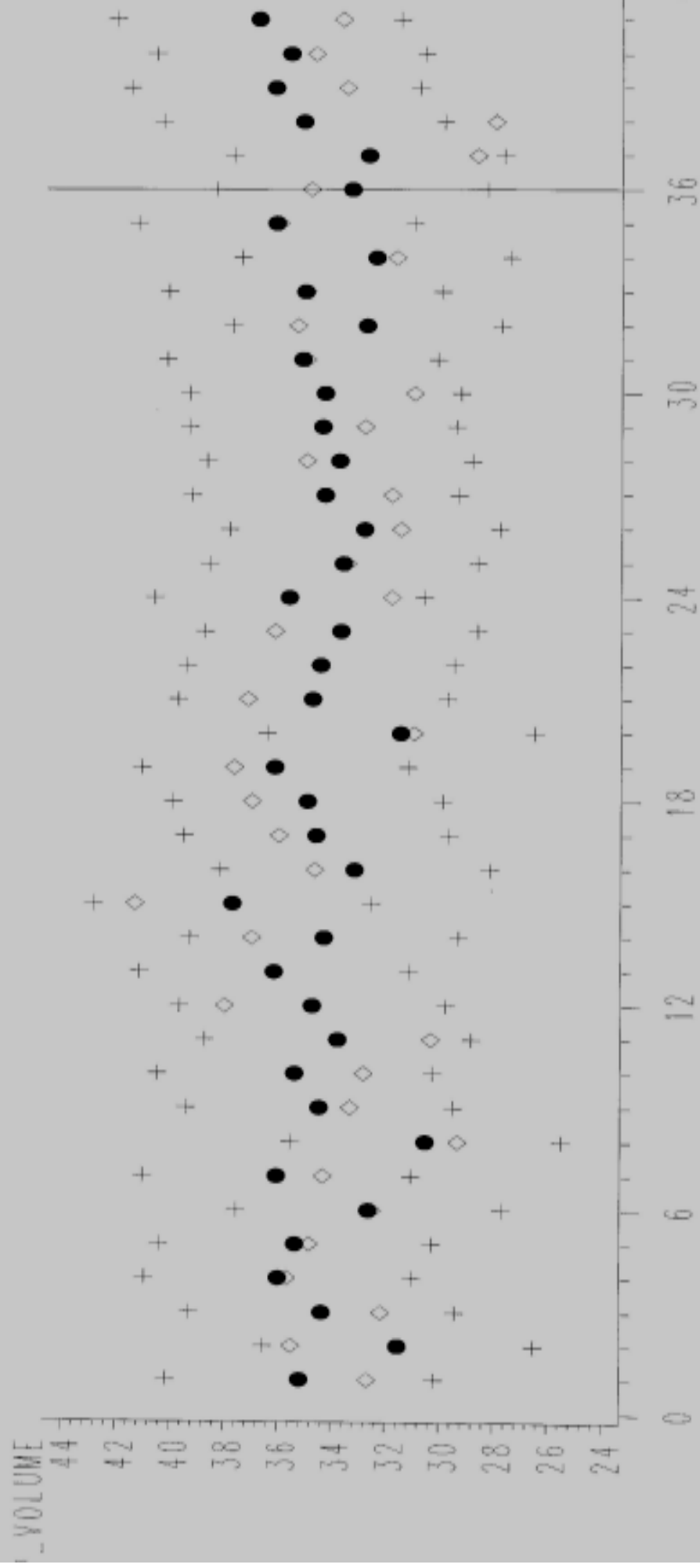


ALLMONTH

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dataset = Overall

RATING=unfavor



ALLMONTH

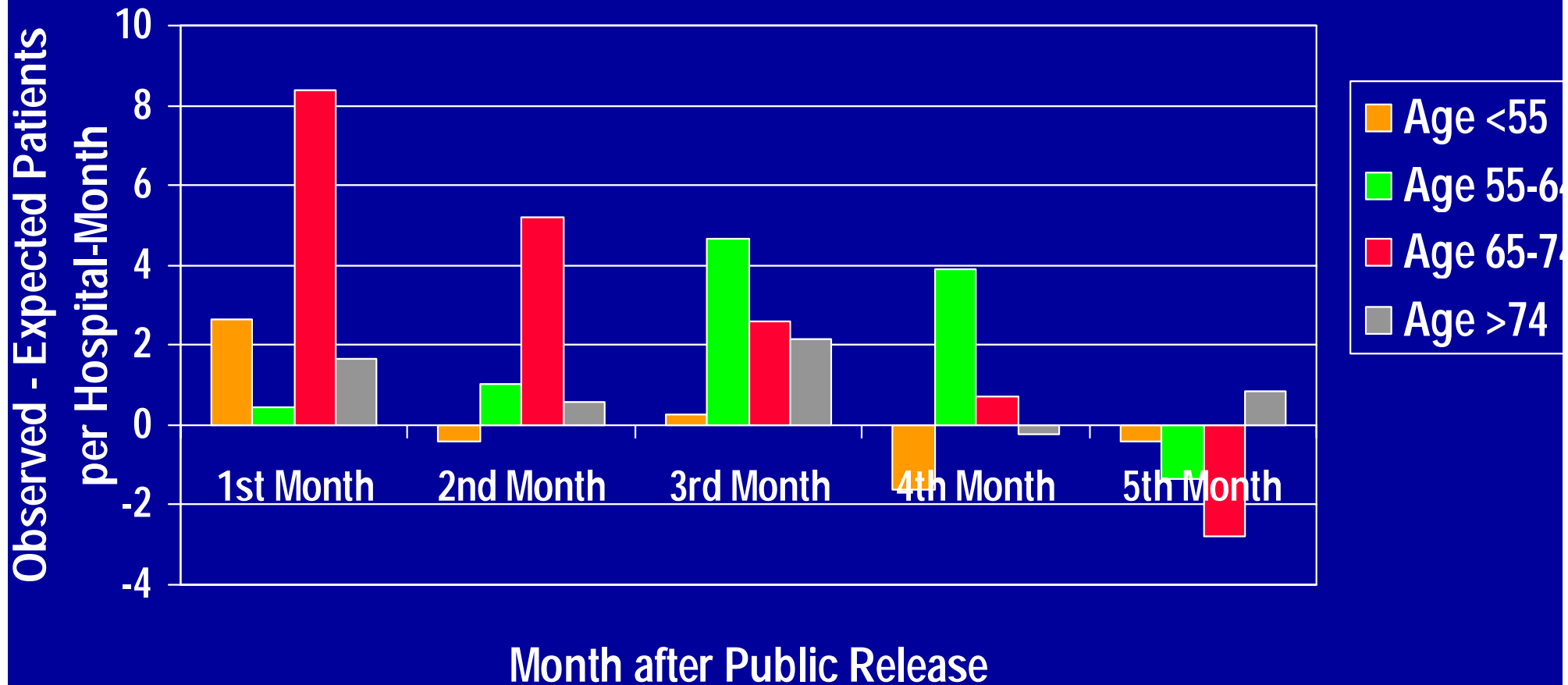
relcoba = 1

Summary of effects: NY

- ◆ Good CABG outliers: The average hospital admitted 74.5 CABG patients during the 1st month after release, versus 61.1 expected by OLS (22% increase; net effect +24 pts)
- ◆ Poor CABG outliers: The average hospital admitted 56.7 CABG patients during the 1st and 2nd month after release, versus 67.8 expected by OLS (16% decrease)
- ◆ Spillover effect only for AMI admissions at poor CABG outliers: The average hospital admitted 104.3 AMI patients during the first 6 months after release, versus 86.0 expected by OLS (18% decrease)

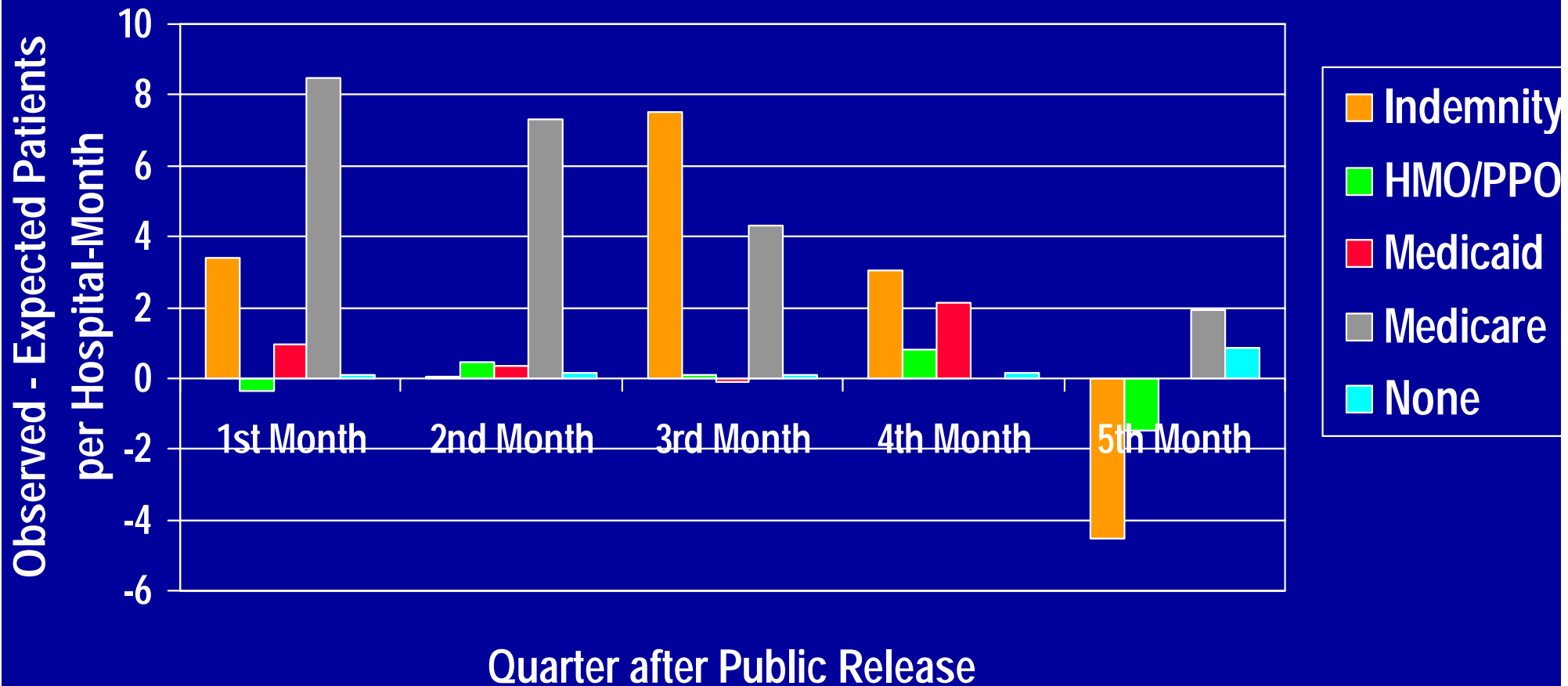
Volume effects by patient characteristics

NY, CABG volume, low-mortality hospitals, OLS model



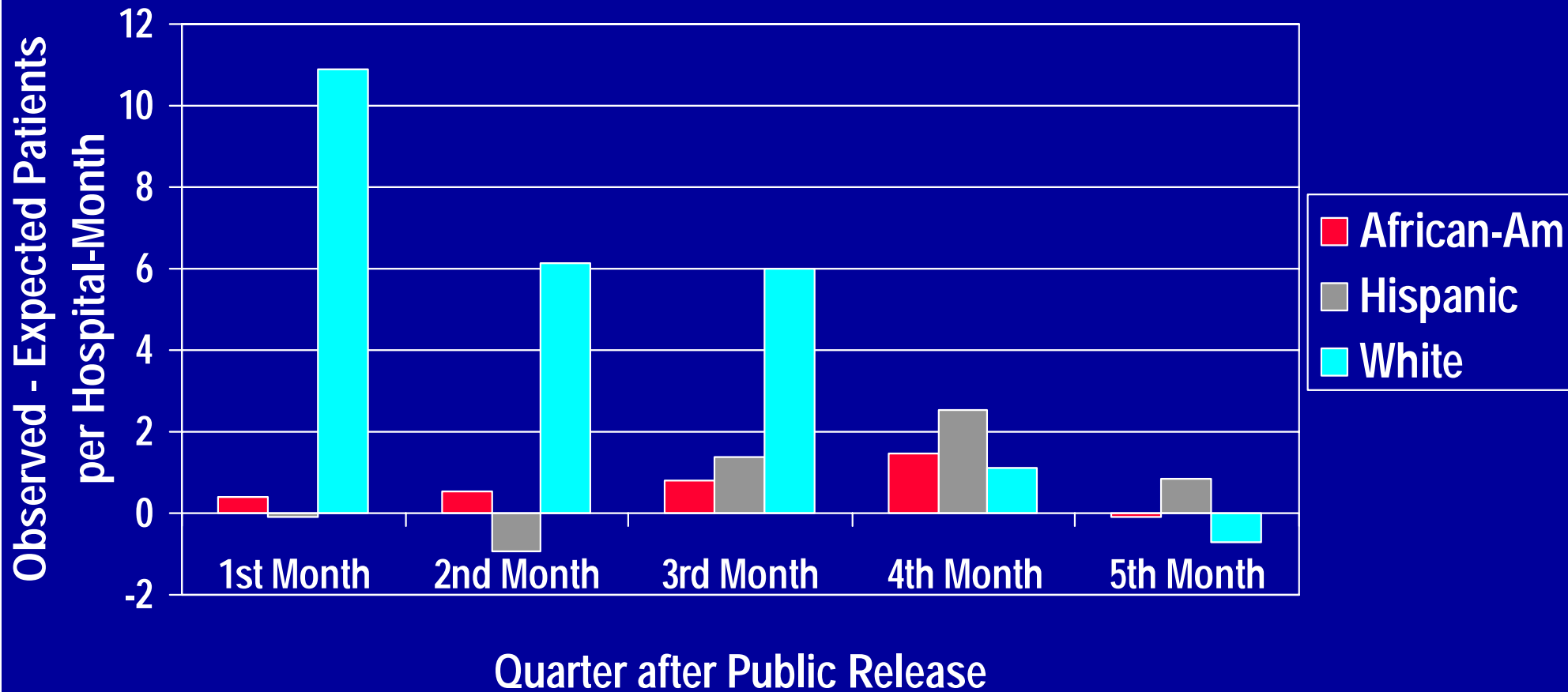
Volume effects by patient characteristics

NY, CABG volume, low-mortality hospitals, OLS model



Volume effects by patient characteristics

NY, CABG volume, low-mortality hospitals, OLS model



Conclusions

- ◆ In California, where time-series data showed significant autocorrelation, estimates of report card effects from ARIMA models were often smaller than estimates from OLS models, and were not statistically significant for AMI.
- ◆ In New York, estimates of report card effects were larger but lasted for only 1-2 months after public release.
- ◆ Observed volume shifts were largely limited to white patients in both CA and NY, tended to be greater among older patients in both CA and NY, and were greatest among HMO and Medicare patients in CA, and Medicare patients in NY.

Implications

- ◆ Report cards should not be expected to produce major shifts in volume, due to limited availability, conflicting advice, established referral patterns, lack of confidence in data, reliance on physicians, other market constraints, possible lack of new information.
- ◆ Any volume shifts that occur may be limited to the socio-demographic groups that are best able to understand and act upon such cognitively complex information.
- ◆ Behavior changes among a relatively small subset of consumers may still be sufficient to drive certain markets toward higher quality.
- ◆ Does public reporting make a difference?

Volume effects by patient characteristics

NY, CABG volume, low-mortality hospitals, OLS model

Characteristic	Month 0	Month 1	Month 2
Age <55	-0.11	2.62	-0.39
Age 55-64	-2.81	0.44	1.03
Age 65-74	1.91	8.40	5.22
Age >74	2.71	1.65	0.57
Race African-Am	0.48	0.38	0.53
Ethnicity Hispanic	-0.18	-0.08	-0.93
Race/ethnic White	0.61	10.91	6.14

Volume effects by patient characteristics

NY, CABG volume, low-mortality hospitals, OLS model

Characteristic	Month 0	Month 1	Month 2
Indemnity insurance	-1.06	3.38	0.02
HMO/PPO	1.21	-0.38	0.44
Medicaid	-0.24	0.97	0.37
Medicare	3.60	8.50	7.30
None	-0.06	0.50	0.62