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Enhancing Claims Data to Improve Risk Adjustment of Mortality and Patient Safety Indicators

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Outline



- Background
- Summary of study: Adding clinical data elements to administrative data
- Supporting the enhancement of administrative claims data: Next steps

Background

- Hospital administrative claims data
 - Statewide data readily available from most states
- AHRQ Quality Indicators
 - Prevention Quality Indicators
 - Inpatient Quality Indicators (mortality, utilization, volume)
 - Patient Safety Indicators
 - Pediatric Quality Indicators
- Administrative data currently used for public reporting on quality of care

Limitations of Current Data

- Lack clinically important information
 - Limited to ICD-9-CM diagnosis codes
- Do not distinguish between diagnoses present on admission (POA) and those that originate during the hospital stay
- Questions regarding use of only administrative data for hospital-specific reporting
 - Inadequate risk adjustment – additional data needed to predict individual patient's risk of mortality
 - Concern about penalizing providers with the sickest patients

Tension Between Value of Data and Cost of Obtaining the Data

- New York and California provide POA coding for diagnoses – more states adding this
- Pennsylvania hospitals provide chart-abstracted clinical detail
 - Hospital concern about costs of medical record abstraction
- Electronic medical records not yet poised to provide data efficiently
 - Exception: Lab data

Study Objective

- Assess impact of incrementally adding:
 - POA codes for diagnoses
 - Lab values on admission
 - Increased number of diagnosis fields
 - Improved documentation (ICD-9-CM codes)
 - Vital signs
 - More difficult to obtain clinical data
- Identify cost-effective enhancements to administrative data

Study Reported in ...

- Pine M, Jordan HS, Elixhauser A, et al. Enhancement of claims data to improve risk adjustment of hospital mortality. *JAMA* 2007; 267(1):71-76.
- Jordan HS, Pine M, Elixhauser A, et al. Cost-effective enhancement of claims data to improve comparisons of patient safety. *Journal of Patient Safety* 2007; 3(2) 82-90.
- Fry DR, Pine M, Jordan HS, et al. Combining administrative and clinical data to stratify surgical risk. *Annals of Surgery* (forthcoming).
- Pine M, Jordan HS, Elixhauser A, et al. Modifying claims data to improve risk-adjustment of inpatient mortality rates. (Submitted for publication)

Sources of Data

- 188 Pennsylvania hospitals
 - Claims data from July 2000 to June 2003
 - Corresponding Atlas clinical data
 - Hospital day recorded for each data element
- New York and California claims data
 - Distinguish which conditions were comorbidities versus complications
 - Identify potential risk factors

Indicators Studied



Mortality Indicators

- AAA repair
- CABG surgery
- Craniotomy
- AMI
- CHF
- Cerebrovascular accident
- GI hemorrhage
- Pneumonia

Post-operative patient safety events

- Pulmonary embolism/deep vein thrombosis
- Physiologic/metabolic abnormalities
- Respiratory failure
- Sepsis



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Data Used in Incrementally More Complex Models



H·CUP
HEALTHCARE COST AND UTILIZATION PROJECT

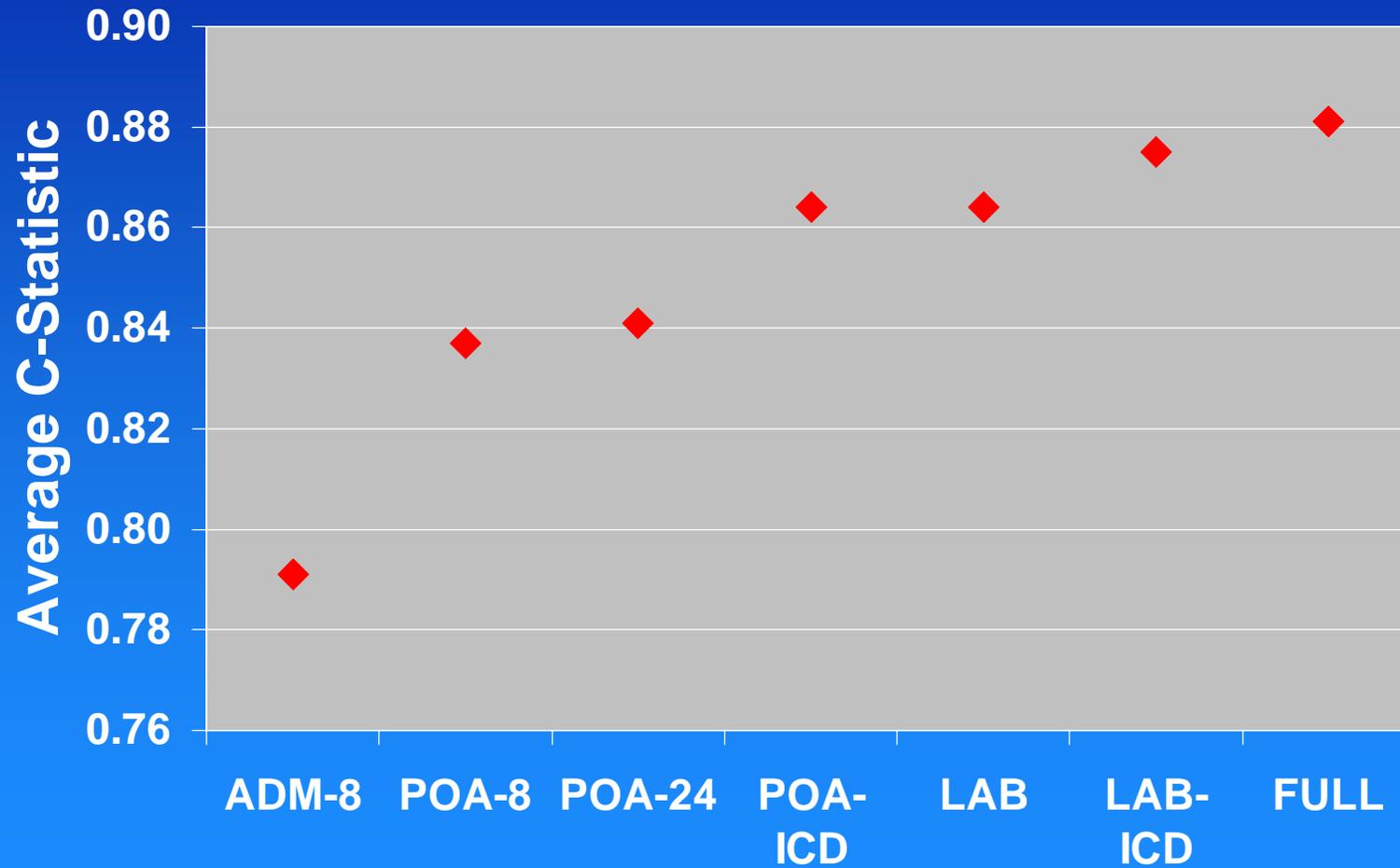
Model	Types of Data Elements
ADM-8	Age, sex, principal diagnosis, up to 8 secondary diagnoses only infrequently acquired during hospitalization, selected surgical procedures
POA-8	ADM-8 + secondary diagnoses not included in ADM-8, when clinical data establish that they were present on admission
POA-24	Same as POA-8 with up to 24 secondary diagnoses
POA-ICD	POA-24 + secondary diagnoses not included in POA-24 because they were underreported in administrative database but were established as present on admission in clinical database

Data Used in Incrementally More Complex Models



Model	Types of Data Elements
LAB	POA-24 + numerical laboratory data on admission (e.g., creatinine, white blood cell count) generally available in electronic form
LAB-ICD	LAB + secondary diagnoses not included in POA-24 because they were underreported in administrative database but were established as present on admission in clinical database
FULL	LAB + vital signs and lab data not in LAB (e.g., blood culture results) + key clinical findings abstracted from medical records (e.g., immunocompromised) + composite clinical scores (i.e., ASA Classification)

C-Statistics for Mortality Models



Bias Due to Suboptimal Data

Measured Performance

Good

Average

Poor

+ 2 Std Dev

- 2 Std Dev

Bias

Problematic

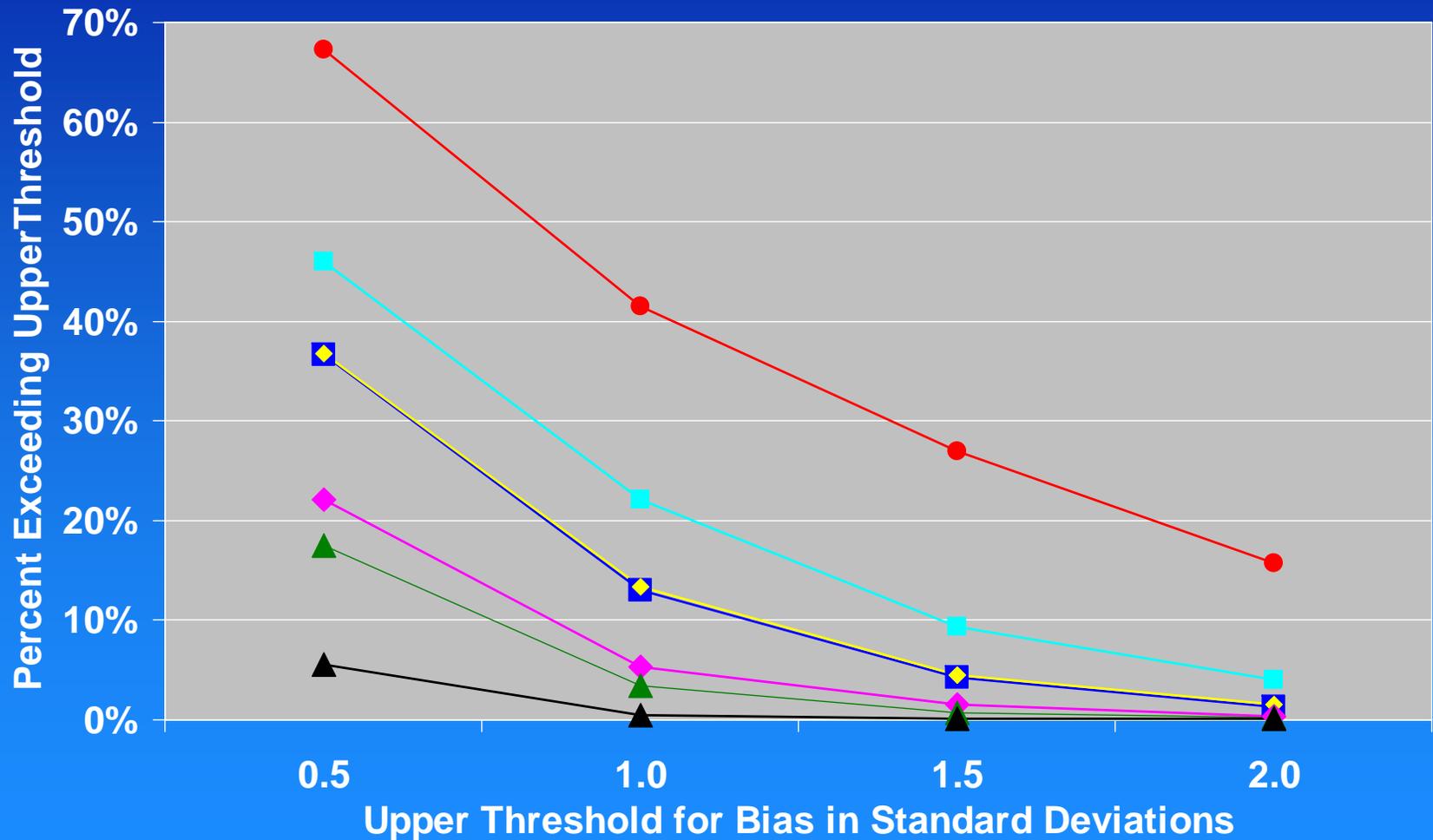
OK

Problematic

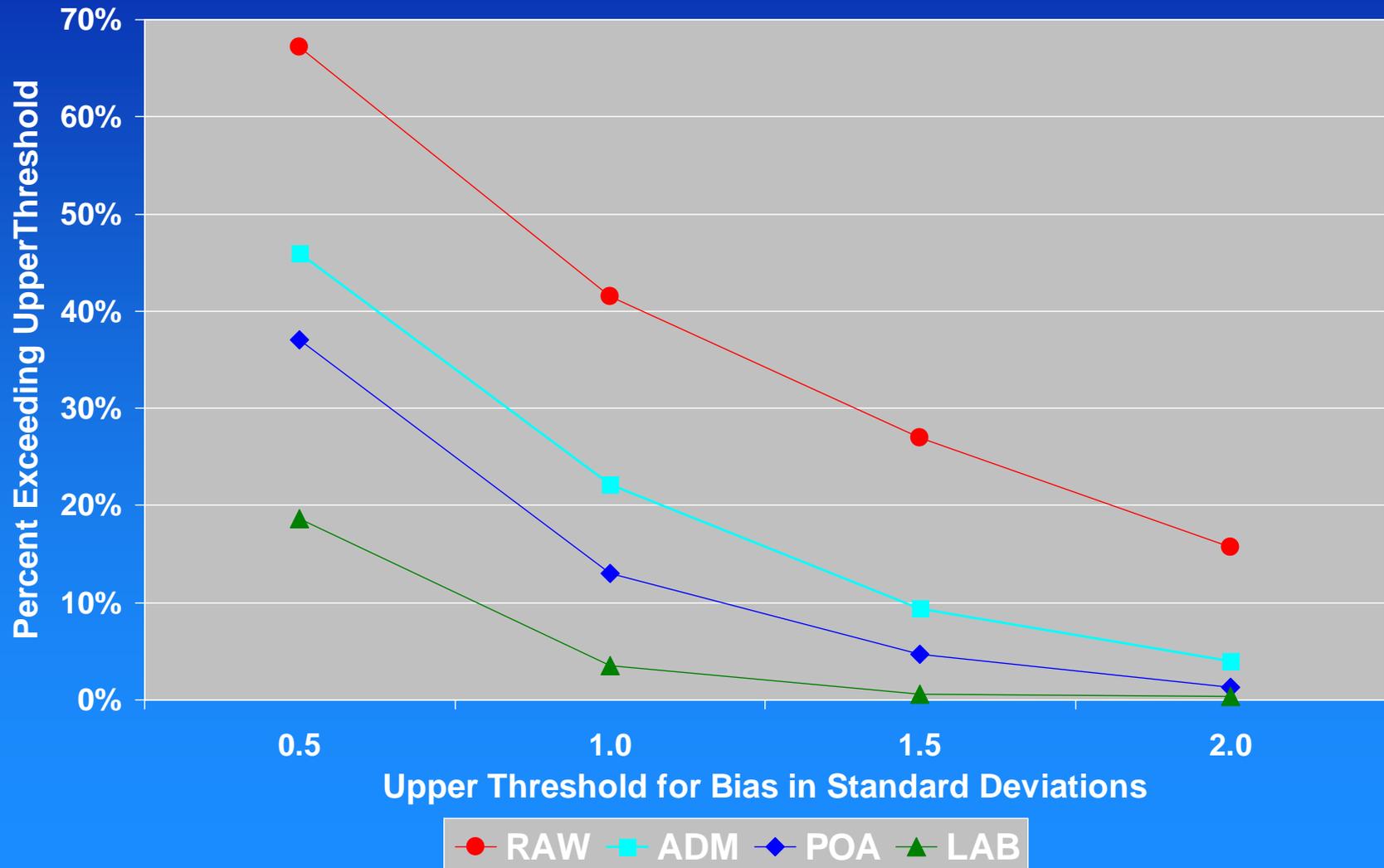
+ 0.5 Std Dev

- 0.5 Std Dev

Hospital Bias Due to Suboptimal Data – Mortality Models



Hospital Bias Due to Suboptimal Data – Patient Safety Models



Numerical Lab Data

- Results of 22 lab tests entered at least one model
- Results of 14 of these tests entered four or more models:
 - pH (11)
 - PTT (10)
 - Na (9)
 - WBC (9)
 - BUN (8)
 - pO₂ (8)
 - K (7)
 - SGOT (7)
 - Platelets (7)
 - Albumin (5)
 - pCO₂ (4)
 - Glucose (4)
 - Creatinine (4)
 - CPK-MB (4)

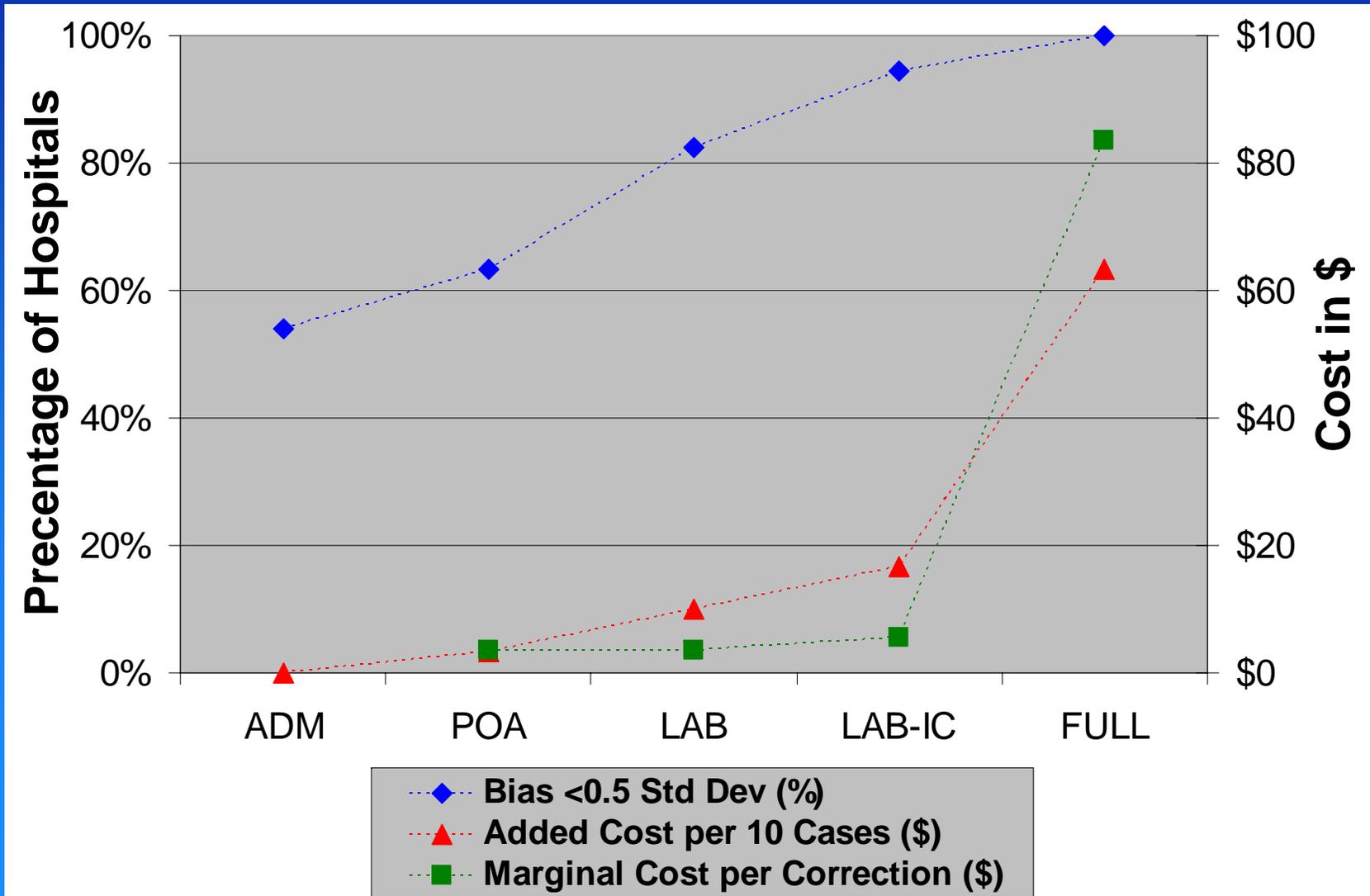
- All vital signs entered four or more models
 - Pulse (8)
 - Temp (6)
 - Blood pressure (6)
 - Respirations (5)
- Ejection fraction and culture results entered two models
- Composite scores entered four or more models
 - ASA classification (6)
 - Glasgow Coma Score (4)

Abstracted Key Clinical Findings



- 35 clinical findings entered at least one model
- Only three findings entered more than two models
 - Coma (6)
 - Severe malnutrition (4)
 - Immunosuppressed (4)
- 14 of these clinical findings have corresponding ICD-9-CM codes (e.g., coma, malnutrition)

Marginal Cost of Improved Risk Adjustment



Summary of Analyses

- Administrative data can be improved at relatively low cost by:
 - Adding POA modifiers
 - Adding numerical lab data on admission
 - Improved coding

Implementation of Study Results: Adding Clinical Data to Statewide Administrative Data

- Purpose:
 - Expand data capacities for statewide data organizations participating in HCUP
- Soliciting proposals for two types of contracts:
 1. In-depth pilots
 - To add or link hospital clinical information to administrative data
 2. Planning contracts
 - For organizations not yet ready to engage in pilots
 - But seek to enhance their administrative data

Objectives of Pilots

- Establish feasibility of linking clinical and administrative data
- Develop reproducible approach
- Set the stage for integrating clinical and administrative data streams in the future

Specific Activities

- Identify and select clinical data elements to add to administrative data
- Translate clinical data from electronic format
- Electronically transfer data from at least five hospitals to the data organization
- Process data into a multi-hospital database
- Collaborate with stakeholders, e.g.
 - Hospital representatives
 - State government agencies
 - Researchers, quality measurement professionals
 - Regional or state health care quality organizations
 - Regional health information exchange
- Engage in peer-to-peer learning, information sharing, dissemination

Conclusion

- Judicious addition of a few clinical data elements can significantly improve ability to do quality assessment using administrative data
 - POA
 - Labs on admission
 - (Potentially) vital signs
 - Improved ICD-9-CM coding
- Pilots and planning contracts will jumpstart the enhancement of administrative data by statewide data organizations