



Validity of Present on Admission Data and Implications for the AHRQ QIs

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Present on Admission

- Added to the UB-04 in March 2007
 - Earlier state-specific data elements in CA (1996) and NY (1994), as well as similar data elements in other countries (CA, AU) and individual hospital systems (Mayo)
- Applies to each reported diagnosis code
- Adopted by CMS for Medicare claims 10/1/2007, with full implementation 4/1/2008
- Defined as “present at the time the order for inpatient admission occurs” (so conditions that develop in the ED or outpatient surgery are POA)



POA: Current Status

- Reporting options include:
 - Y = “present at the time of inpatient admission”
 - N = “not present at the time...”
 - U = “documentation insufficient to determine if condition was present at the time...”
 - W = “clinically undetermined. Provider unable to clinically determine whether the condition was present at the time...”
 - 1 = “exempt” (see Official Coding Guidelines)
- MS-DRG-based hospital payment may be affected by N and U diagnoses

POA in HCUP

- 2007: 10 of 40 HCUP partners submitted POA for at least some inpatient (SID) records
 - 4 states submitted POA for at least some ED (SEDD) records
- 2008: 22 partners submitted POA for at least some SID records
 - 5 states submitted POA for at least some SEDD records
- 2009: 33 partners are collecting POA data



Historical approach in AHRQ QIs: Applying the concept of POA

- Dropped candidate PSIs for which the likelihood of POA was deemed to be unacceptably high
 - Post hoc hold-back from NQF review (Postoperative Hip Fracture, Pressure Ulcer)
- Excluded patients who were deemed likely to have a PSI condition at admission
- Excluded “comorbidities” that were deemed likely to have developed after admission
 - Fluid and Electrolyte Disorders
 - Coagulation Deficiency
 - Cardiac Arrhythmias



Historical approach in AHRQ QIs: Incorporating actual POA data

- The POA flag was incorporated as an option to be used in calculating AHRQ QIs:
 - Reduce PSI numerators (to a variable but substantial extent)
 - Reduce PSI denominators (to a variable but lesser extent)
 - “Exclude cases with preexisting <DIAGNOSIS> (principal diagnosis or secondary diagnosis present on admission, if known)”
 - Remove risk factors (to a minor extent) or reassign APR-DRGs

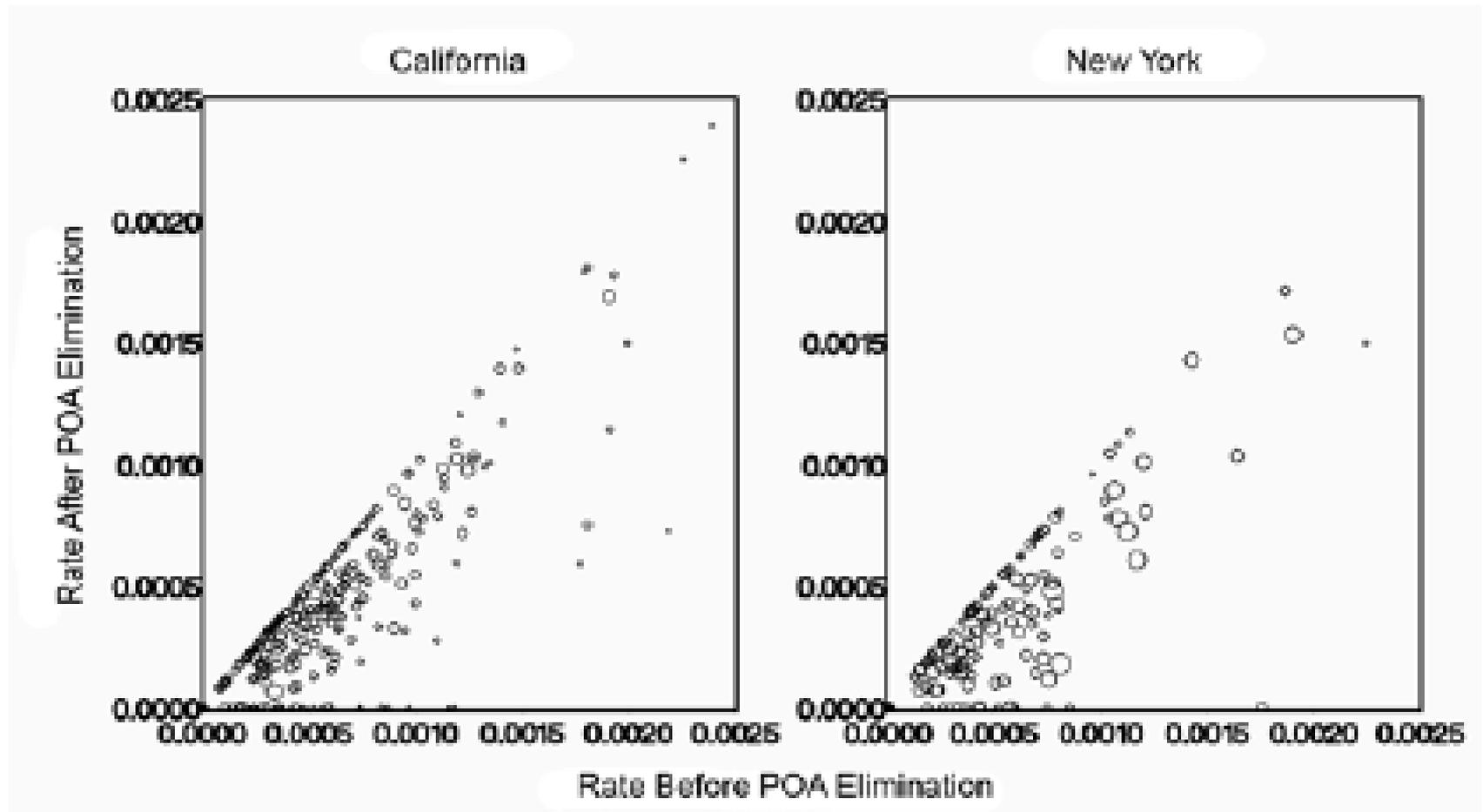
Table 4. Pearson Correlations (Weighted) Between Hospital-Level Patient Safety Indicator (PSI) Rates Before and After Dropping POA Diagnoses, 2003*

Patient Safety Indicator	California		New York	
	Observed	Risk Adjusted	Observed	Risk Adjusted
PSI 1: Complications of Anesthesia	1.00	1.00	1.00	1.00
PSI 3: Decubitus Ulcer	.29	.40	.47	.41
PSI 5: Foreign Body Left During Procedure	.89	NA	.94	NA
PSI 6: Iatrogenic Pneumothorax	.90	.86	.83	.78
PSI 7: Infection Due To Medical Care	.91	.90	.88	.85
PSI 8: Postoperative Hip Fracture	.47	.47	.34	.42
PSI 9: Postoperative Hemorrhage or Hematoma	.87	.85	.86	.86
PSI 10: Postoperative Physiologic and Metabolic Derangement	.94	.92	.78	.58
PSI 11: Postoperative Respiratory Failure	.99	.98	.99	.98
PSI 12: Postoperative PE or DVT	.80	.78	.41	.42
PSI 13: Postoperative Sepsis	.72	.71	.82	.80
PSI 15: Accidental Puncture/Laceration	.97	.95	.96	.95
PSI 16: Transfusion Reaction	.72	na	.92	NA

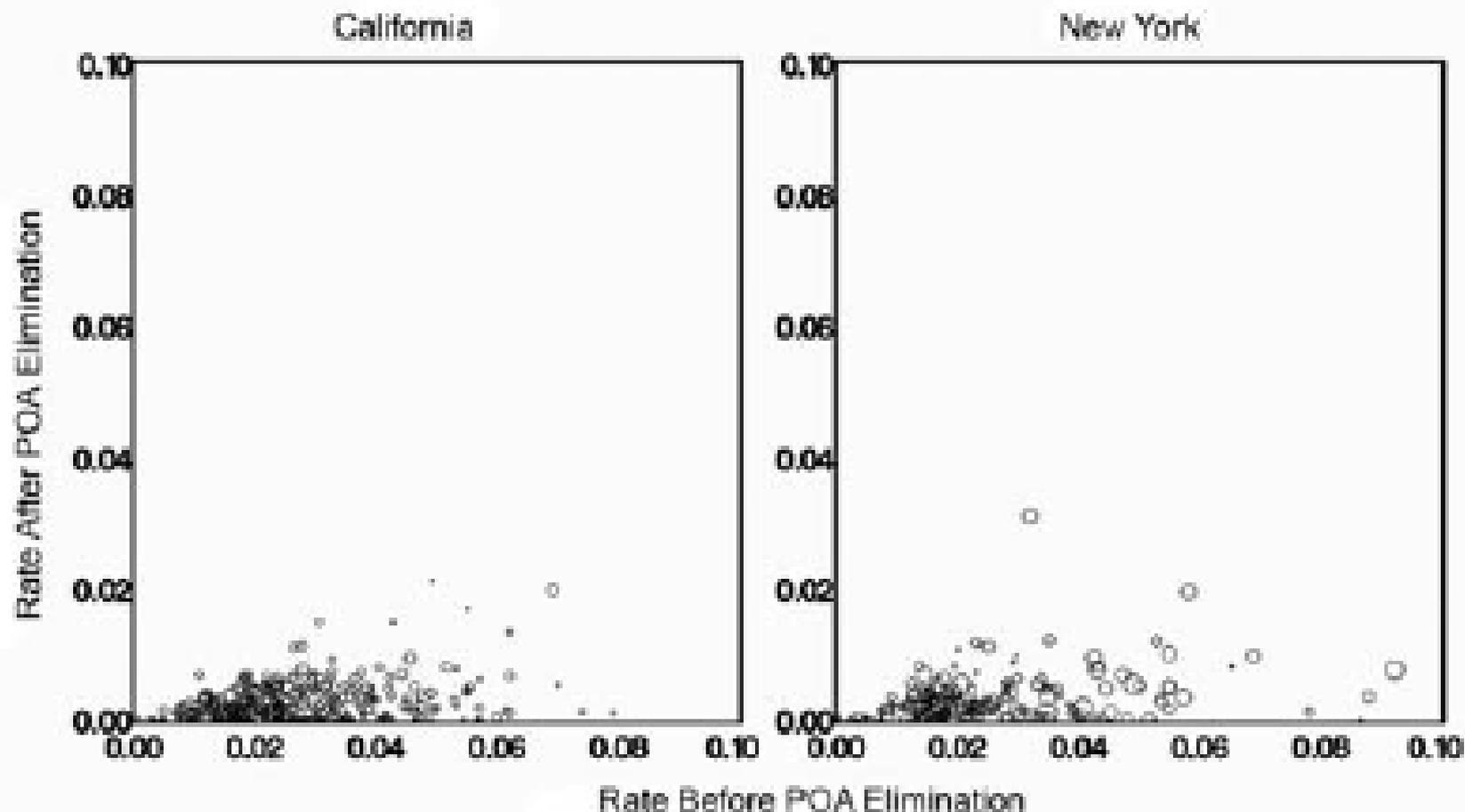
* POA, present on admission; NA, not available; PE, pulmonary embolism; DVT, deep vein thrombosis.

Houchens RL, Elixhauser A, Romano PS. How often are potential patient safety events present on admission? *Joint Comm J Qual Patient Safe*; 34(3):154-63

Plots of Hospital Rates Before and After POA Elimination for Postoperative Hemorrhage or Hematoma, 2003



Plots of Hospital Rates Before and After POA Elimination for Decubitus Ulcer, 2003





Similar findings for CABG in CA

Glance LG, et al. BMC Health Serv Res. 2008;8:176

Indicator	Hospital-level correlation		
	Houchens		Glance
	CA	NY	CA
PSI 1: Complications of Anesthesia	1.00	1.00	
PSI 3: Decubitus Ulcer	0.40	0.41	0.67
PSI 5: Foreign Body Left (no risk-adjustment)	0.89	0.94	
PSI 6: Iatrogenic Pneumothorax	0.86	0.78	
PSI 7: Infection Due To Medical Care	0.90	0.85	0.99
PSI 8: Postoperative Hip Fracture	0.47	0.42	
PSI 9: Postoperative Hemorrhage or Hematoma	0.85	0.86	0.93
PSI 10: Postoperative Physiologic or Metabolic	0.92	0.58	0.87
PSI 11: Postoperative Respiratory Failure	0.98	0.98	
PSI 12: Postoperative DVT or PE	0.78	0.42	0.63
PSI 13: Postoperative Sepsis	0.71	0.80	0.93
PSI 15: Accidental Puncture/Laceration	0.95	0.95	0.95
PSI 16: Transfusion Reaction (no risk-adjustment)	0.72	0.92	



Problem: “Not POA” rates for PSIs are not consistent: clinicians/coders

AHRQ Patient Safety Indicator	NACHRI	UMich	Mayo	CA	NY
PSI 3: Decubitus Ulcer	60%	42 (71)	18%	11%	14%
PSI 5: Foreign Body Left During Proc	80	80 (26)	54	64	76
PSI 6: Iatrogenic Pneumothorax	89	100 (33)	78	73	65
PSI 7: Infection Due To Medical Care	57	36 (77)	60	65	65
PSI 8: Postop Hip Fracture		0 (44)	22	21	26
PSI 9: Postop Hemorrhage or Hematoma	97	100 (86)	87	79	71
PSI 10: Postop Physiologic or Metabolic		91 (56)	46	77	64
PSI 11: Postop Respiratory Failure	83	100 (99)	74	94	93
PSI 12: Postop DVT or PE		67 (51)	40*	46	43
PSI 13: Postoperative Sepsis	60	60 (59)	76	73	70
PSI 14: Postop Wound Dehiscence	90		100		
PSI 15: Accidental Puncture/Laceration	93	84 (91)	85	87	87
PSI 16: Transfusion Reaction	71	N/A	50	58	78

* In a separate publication, Mayo reported that only 58 or 59 hospital-acquired VTE from 1996-1998 were ICD-9-CM coded, but only 29 (50%) were correctly reported as “not POA”.



California CAP Validation study (1996)

1,032 randomly sampled discharges from 86 hospitals

Table 12.3: Comparison of "Gold Standard" and OSHPD data on CPAA and CPAA plus presence of the condition for selected diagnoses.

Selected Conditions	% CPAA in OSHPD Data	% CPAA in GS Coders' Data	# in Both Datasets w/ Condition	% Agreement on CPAA-Both	KAPPA for CPAA*
<i>Staph. Species</i> Pneumonia	97.5	96.9	22	95.5	-
Viral Pneumonia	100.0	100.0	6	100.0	-
Gram negative pneumonia	93.2	93.4	47	89.4	0.23
Pneumonia NOS	97.8	97.3	558	96.2	0.20
Pneumococcal pneumonia	100.0	97.1	47	97.9	-
Aspiration Pneumonia	55.6	88.9	7	57.2	0.09
Acidosis	77.8	65.1	20	60.0	-0.07
Coagulopathy	76.5	70.7	25	84.0	0.57
Decubiti	90.3	80.0	21	85.7	0.32
Hyperosmolality	84.6	50.0	4	75.0	0.50
Stroke	72.2	81.5	14	85.7	0.69
Septicemia	92.9	87.0	100	92.0	0.39
Hyperpotassemia	72.7	61.5	27	66.7	0.18
Acute renal failure	62.0	55.2	41	56.1	0.12
Atrial fibrillation	90.6	84.6	160	85.0	0.32
Shock	83.7	74.5	27	85.2	0.26
Respiratory failure	80.7	69.1	147	79.6	0.47
Volume depletion	95.8	95.9	155	93.6	0.13
Rheumatic condition	94.6	100.0	36	94.4	-

* Among patients with the condition in both datasets.



California hip fracture validation study (1996)

1,007 randomly sampled discharges from 53 hospitals

Table 2.4: Agreement on “present at admission” coding between OSHPD data and independently recoded data from UCD, for risk factors included in the risk-adjustment model (omitting risk factors based on E codes, for which “present at admission” status was not reported)

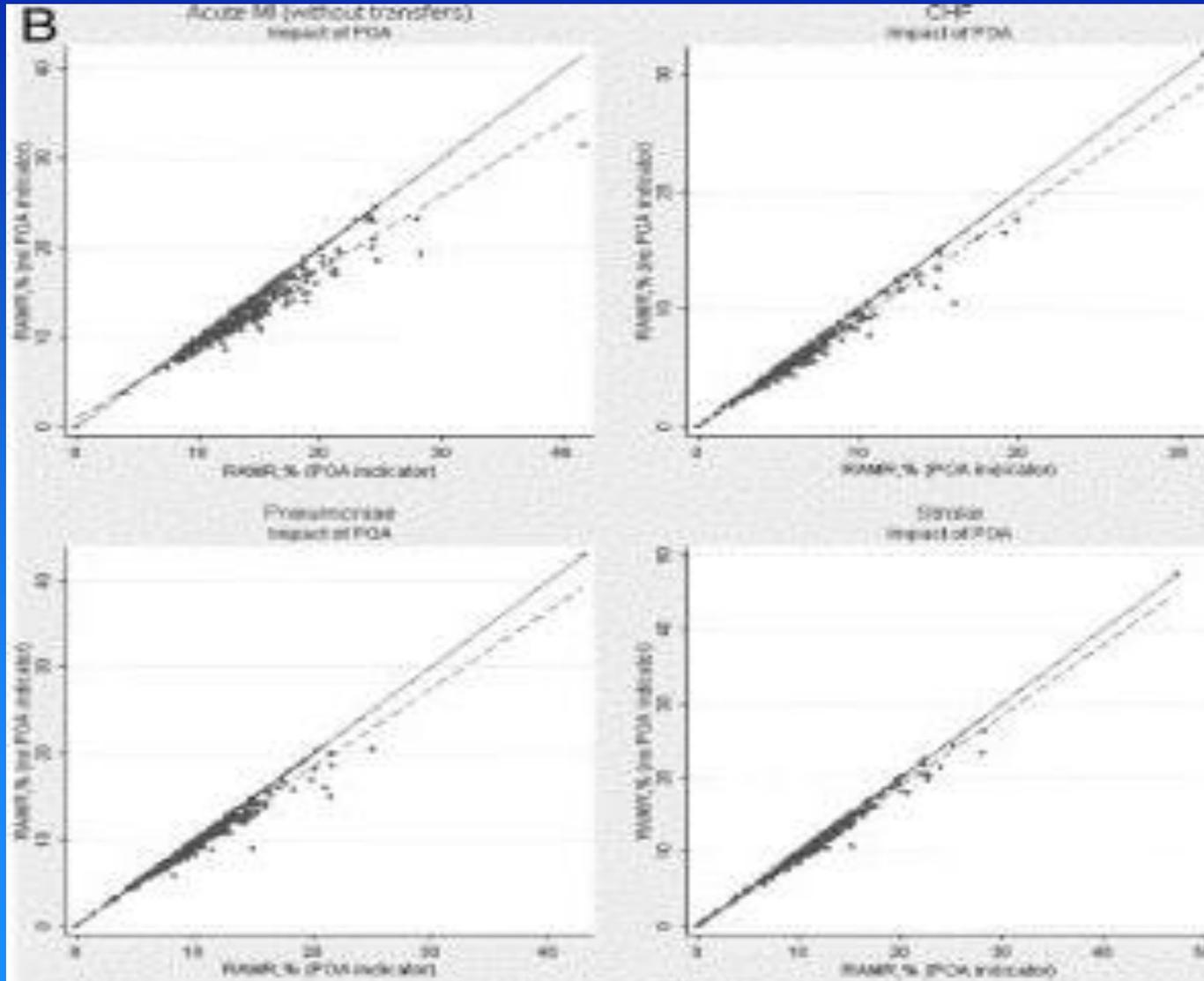
Risk Factor	Present at admission		Number with “present at admission” reported in both data	Agreement on “present at admission”	
	OSHPD data (%)	Recoded data (%)		%	Kappa
Atrial fibrillation	87%	82%	51	92%	0.67
Chronic renal failure	99%	100%	3	100%	
Congestive heart failure	88%	85%	58	93%	0.76
COPD/bronchitis/emphysema	98%	99%	58	100%	1.00
Dementia/delirium	99%	100%	85	98%	
Diabetes, complicated	96%	75%	3	67%	
Heart valve disease	99%	100%	21	100%	1.00
High risk cancer, not lung cancer	96%	100%	5	60%	
Other bone fracture	99%	93%	22	100%	1.00



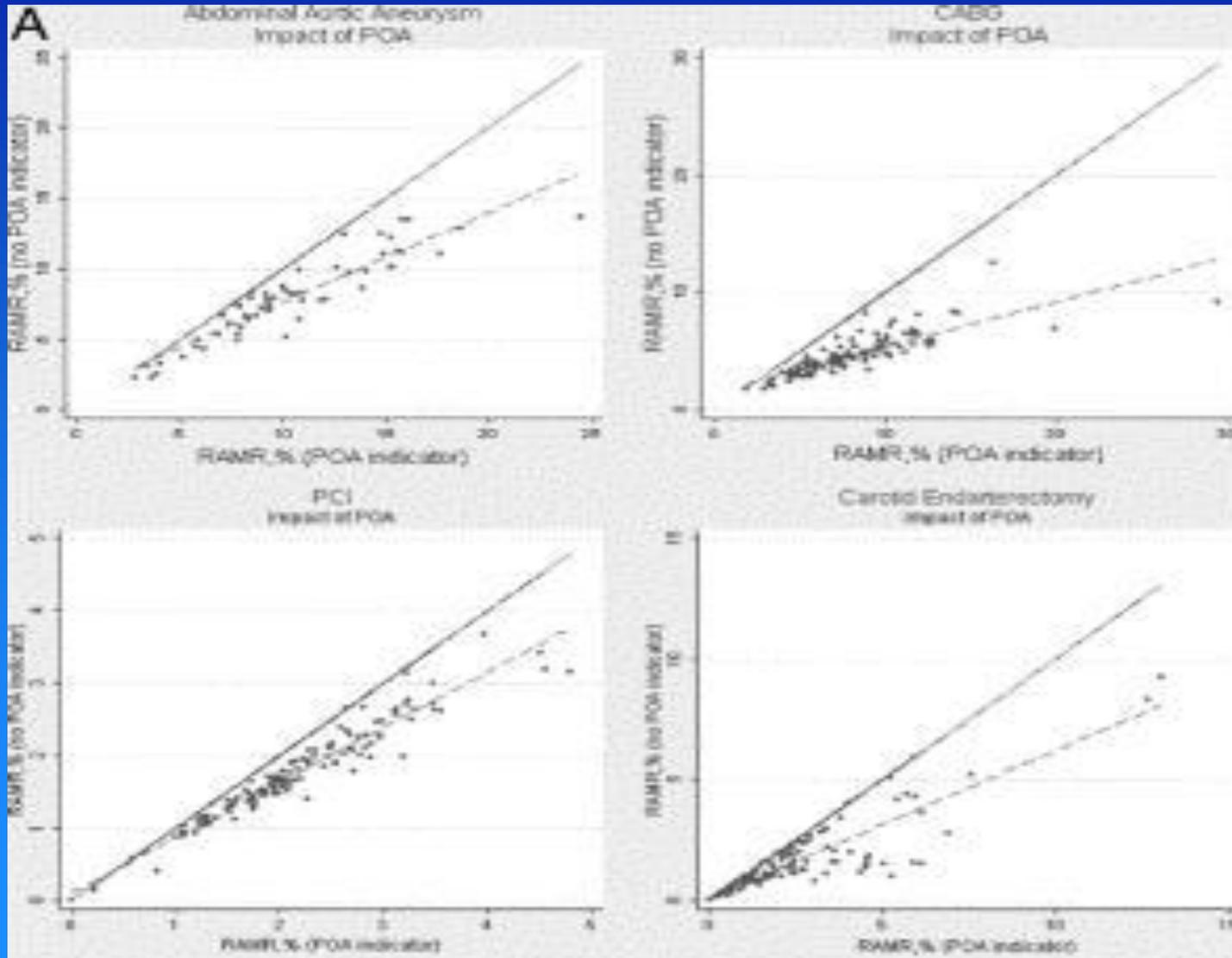
Problem: Some comorbidities are “not POA”

AHRQ Comorbidity	Mayo	Alberta
Hypertension	98.4%	99%
Valvular disease	98.8	100
Cardiac arrhythmia	85.4	95
Electrolyte disorder	67.0	81
Uncomplicated diabetes	98.3	100
Cancer (without metastasis) – 100% with metastases	98.5	100
Anemia, deficiency	90.0	89
Hypothyroidism	98.0	100
Heart failure	95.8	94
Chronic lung disease	98.6	100
Peripheral vascular disease	97.4	100
Neurologic disorder	94.2	94
Obesity	97.1	100
Complicated diabetes	98.2	100
Coagulation disorder	78.3	79
Alcoholism	97.8	100
Liver disorder	98.5	100
Psychoses	95.4	97

Impact of counting “comorbidities” that were “not POA”: Medical IQIs



Impact of counting “comorbidities” that were “not POA”: Surgical IQIs





Proposed approaches to excluding problematic hospitals

- Houchens et al. (2008) excluded hospitals at which every POA flag on every inpatient record was set to the same value (“no” or “yes”), and hospitals at which more than 10% of POA flags were missing for secondary diagnoses other than E codes.
 - Excluded 6 of 373 nonfederal acute care hospitals with 5,427 of 3,014,874 (0.2%) adult discharges in California
 - Excluded 40 of 233 nonfederal acute care hospitals with 351,418 of 2,100,413 (16.7%) adult discharges in New York.
- Glance et al. (2008) used Houchens’ rule but also excluded hospitals at which the percentage of ICD-9-CM codes flagged as POA was outside the 95% CI for all CA hospitals that perform CABG (i.e., 67% to 91%).
 - Excluded 13 of 124 hospitals that reported performing CABG in 1998-2000, and 2,593 of 84,656 eligible patients (3.1%).



Proposed approaches to excluding problematic hospitals (3M)

- % Not POA for secondary diagnosis on the Pre-Existing List
 - Red Zone: $\geq 7.5\%$ - 10 hospitals, 124,486 cases
 - Grey: $5\% \leq x < 7.5\%$ - 8 hospitals, 98,089 cases
- % Uncertain POA (secondary dx, excluding exempt and pre-existing codes).
 - Red Zone: $\geq 10\%$ - 1 hospital, 2,341 cases
 - Grey: $5\% \leq x < 10\%$ - 5 hospitals, 50,382 cases
- High % POA (secondary dx, excluding exempt, pre-existing, and OB).
 - Red Zone: $\geq 98\%$ - 33 hospitals (8.5%), 218,182 (3.0%) cases
 - Grey: $96\% \leq x < 98\%$ - 24 hosp (6.2%), 154,449 (2.1%) cases
- Low % POA (secondary dx, excluding exempt, pre-existing, and OB)
 - Red Zone: $\leq 75\%$ - 18 hospitals (4.6%), 228,265 (3.1%) cases
 - Grey: $75\% < x \leq 77\%$ - 8 hospitals (2.1%), 275,558 (3.7%) cases
- % POA for secondary diagnosis on the List 1 for elective surgical DRG cases.
 - Red Zone: $\geq 40\%$ - 68 hospitals (17.6%), 796,538 (10.8%) cases
 - Grey: $35\% \leq x < 40\%$ - 13 hospitals (3.4%), 253,385 (3.4%) cases



Proposed approaches to excluding problematic hospitals (3M)

- Overall impact:
 - 118 hospitals from CA 2005-2006 data failed “red zone” criteria.
 - 5 additional hospitals failed two or more “grey zone” criteria
 - 123 (31.8%) hospitals with 1,256,014 (17.0%) cases excluded for poor coding.

Table 3. Hospital-level performance on 12 proposed screens (from Pine et al., 2009) to assess the accuracy of POA information, based on New York SPARCS data from 2003-2005

⊕	Screen	Hospitals failing Screen (%)	Evaluated hospitals
	Secondary diagnosis codes for chronic conditions should be reported (a) as hospital-acquired $\leq 2\%$ of the time, and (b) as unknown POA status $\leq 10\%$ of the time (for high-risk admissions with principal diagnoses that account for 70% of inpatient deaths)	(a) 8.1% (b) 9.4%	222
	Screen 1 for elective surgical admissions performed within 2 days of admission	(a) 9.8% (b) 13.3%	143
	Screen 1 for inpatient childbirth admissions	(a) 42.6% (b) 21.3%	61
	Secondary diagnosis codes for acute exacerbations or complications of a chronic condition should be reported as hospital-acquired $\geq 2\%$ of the time in high-risk admissions, and at least twice as often as the corresponding uncomplicated chronic condition codes	28.3%	145
	Secondary diagnosis codes in set B (which are reported as hospital-acquired on 30-50% of records) should be reported as hospital-acquired $\geq 15\%$ of the time in high-risk admissions, and should be reported as hospital-acquired less often than codes in set A (which are reported as hospital-acquired on $>50\%$ of records), and more often than codes in set C (which are reported as hospital acquired on 20-30% of records)	16.6%	181
	Secondary diagnosis codes on a comprehensive list of conditions that are associated with higher inpatient mortality rates in high-risk admissions when hospital-acquired than when POA should be associated with an odds ratio of at least 1.30, and the codes on an abbreviated list of those conditions should be associated with an odds ratio of at least 1.60	17.4%	184
	Secondary diagnosis codes that are generally contraindications to performing scheduled procedures in elective surgical admissions should be reported as hospital-acquired $>65\%$ of the time	38.9%	175
	Secondary diagnosis codes for acute exacerbations or complications of a chronic condition should be reported as hospital-acquired $\geq 12\%$ of the time in elective surgical admissions, and at least three times as often as the corresponding uncomplicated chronic condition codes	3.2%	93
	Percentage of cases with prolonged postoperative length of stay (based on a linear regression model) should be less than the median of 5.4% among live discharges with no secondary diagnoses reported as POA	18.5%	178
	Obstetric diagnosis codes that are almost always POA in inpatient childbirth admissions should be reported as hospital-acquired $\leq 3\%$ of the time	36.6%	134
	Obstetric diagnosis codes with 5 th digits incompatible with inpatient delivery should be present in $<0.5\%$ of inpatient childbirth admissions	12.7%	134
	Records with obstetric secondary diagnosis codes indicative of a postpartum complication should have one or more secondary diagnoses reported as hospital-acquired $\geq 80\%$ of the time	58.5%	123



QI Workplan for FY2010 to better incorporate POA logic into PSIs

- Reconsider necessity and value of PSI denominator exclusions
 - Nursing home or hospital transfers for Pressure Ulcer
 - Patients with other infections for Postoperative Sepsis
 - Nonelective surgery patients for Postoperative Respiratory Failure, Postoperative Physiologic or Metabolic Derangement
- Modify existing PSI denominator exclusions that rely awkwardly on procedure criteria
 - Chronic renal disease requiring preop hemodialysis to exclude Postoperative Physiologic or Metabolic Derangements
 - Hip fracture requiring preop fracture repair to exclude Postoperative Hip Fracture



QI Workplan for FY2010 to better incorporate POA logic into PSIs

- Reconsider necessity and value of PSI numerator restrictions
 - Procedures in conjunction with diagnoses for drainage of Postoperative Hemorrhage or Hematoma, repair of Postoperative Wound Dehiscence
- Reconsider comorbidities that could be added to risk-adjustment models
 - Fluid and electrolyte disorders
 - Coagulopathy
 - Cardiac arrhythmias
 - Other candidates
- Consider adding hospital-level flag for worrisome POA data pattern



Questions and discussion

- Web site: <http://qualityindicators.ahrq.gov/>
- E-mail: support@qualityindicators.ahrq.gov
- Support Phone: (888) 512-6090 (voicemail)
- References:
 - Houchens RL et al., *Joint Comm J Qual Safe* 2008;34(3):154-63
 - Bahl V et al., *Medical Care* 2008;46(5):516-22
 - Glance LG et al., *Medical Care* 2008;46(2):112-9 and *BMC Health Serv Res* 2008;8:176
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 - Coffee R et al., *The Case for the Present-on-Admission Indicator*. At http://www.hcup-us.ahrq.gov/reports/2006_1.pdf