

Development of the Emergency Department Prevention Quality Indicators (ED PQI)

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Key terms

- Potentially preventable healthcare encounters
 - Hospitalizations or ED visits which may be preventable through high quality outpatient care.
- Ambulatory care sensitive conditions (ACSC)
 - Conditions for which hospitalizations are assumed to reflect poor access to high quality outpatient care.
- Prevention Quality Indicators (PQI)
 - A set of area level hospital discharge data based indicators of potentially avoidable hospitalizations.

Expanding the Concept to ED Visits

● Makes sense to expand to ED:

- Capture less severe, but significant events
- Account for practice pattern variation
- Examine different types of avoidable encounters

● Challenges

- ED data less developed
- ED takes all comers, no gatekeeper
- Fewer coding guidelines, potentially poorer documentation
- Currently split data for those treated and released and those admitted

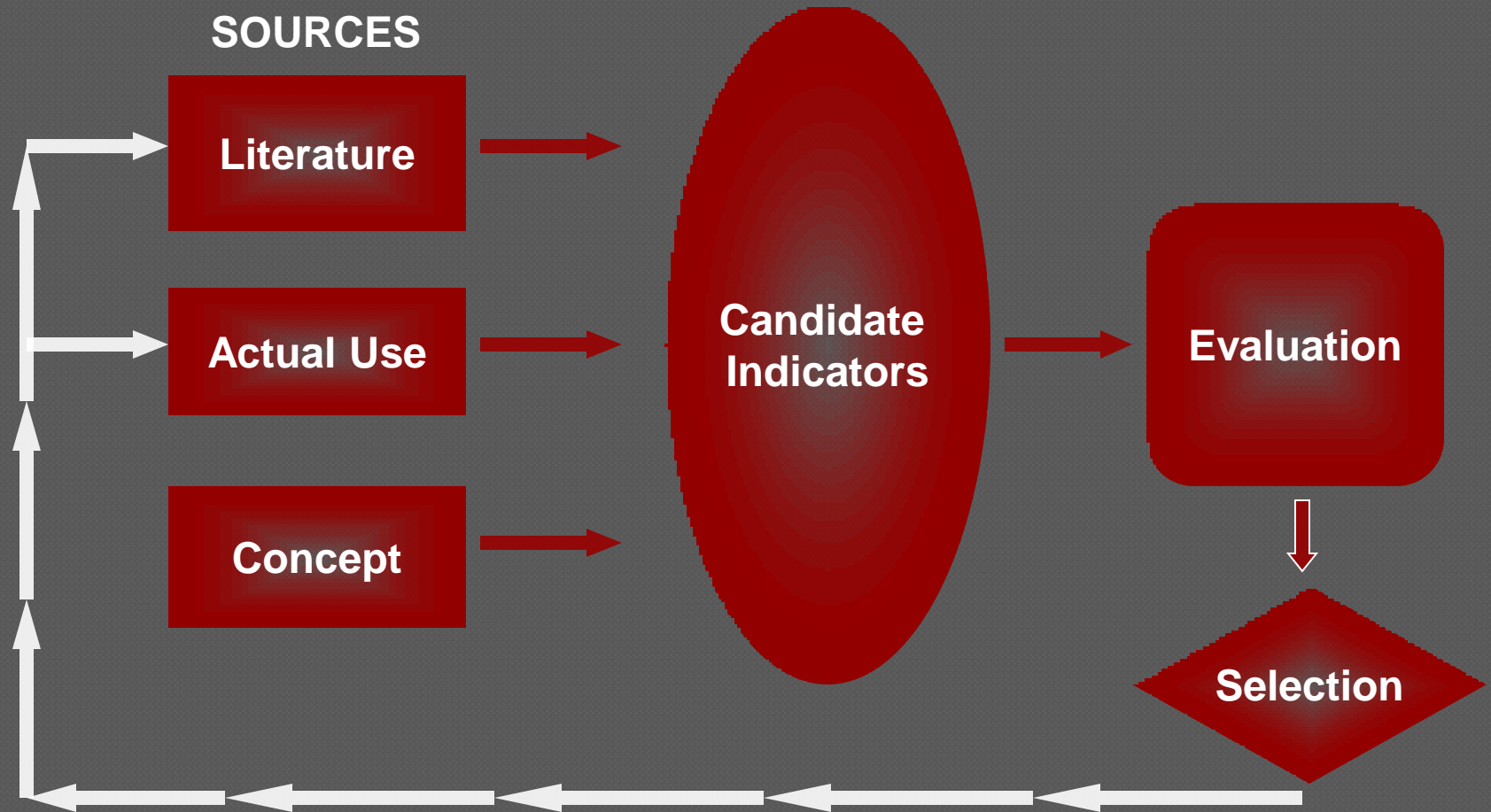
Conceptual Framework

- Clinical exacerbations that are typically treated and released from the ED but are clinically significant. These may also be treated in well-equipped outpatient facilities.
- Exacerbations that might be treated and released in some hospitals yet treat and admit in others.
- Utilization of the ED as a medical home for non-emergent conditions.
- Events requiring emergent care that may be preventable given public health intervention (e.g. trauma) or that reflect injuries or complications resulting from outpatient care (e.g. healthcare acquired infection).

Expanding PQIs to ED

- Adapt the PQIs to ED data
 - Consider alternative ways to specifying the data
- Understand what we are capturing (AKA: characterization)
- Evaluate based on National Quality Forum (NQF) framework and identify evidence gaps
- Understand the relationship with other indicators of access to care (AKA: validation)

Measure development and validation process



Literature review methods

- Reviewed literature of ED specific applications of ACSC based indicators
- Reviewed PubMed for past 10 years
- Re-abstracted literature cited in recent literature reviews for inpatient indicators.

Evidence from Literature Review

- Most frequent ACSC related visits: asthma (45%), COPD (26%), hypertension (13%)
- Quality of care or interventions associated with lower ED visits: Overall ACSC, asthma, COPD, pneumonia (vaccination)
- Inconsistent associations with quality of care and ED visits: Diabetes, CHF
- Racial disparities: Overall ACSC, CHF, asthma, UTI
- Potential biases: Asthma/COPD (air quality)
Pneumonia, UTI (residential care)
- Practice patterns can impact relationship with inpatient indicators: Asthma/COPD, Pneumonia, dehydration/gastroenteritis

Gaps in Literature Evidence

	Usability/ Feasibility	Face Validity	Reliability	Construct Validity	Criterion Validity	Bias	Relation to Inpatient	Type of ED visit
All ACSC	Orange	Orange	Orange	Grey	Orange	Orange	Orange	Yellow
Diabetes	Orange	Orange	Orange	Yellow	Orange	Orange	Orange	Yellow
CHF	Orange	Orange	Orange	Yellow	Orange	Orange	Orange	Yellow
Hypertension	Orange	Orange	Orange	Red	Orange	Orange	Orange	Yellow
Asthma	Orange	Orange	Orange	Grey	Red	Orange	Yellow	Yellow
COPD	Orange	Orange	Orange	Grey	Orange	Orange	Orange	Yellow
Pneumonia	Orange	Orange	Orange	Red	Red	Orange	Yellow	Yellow
Dehydration	Orange	Orange	Orange	Red	Red	Orange	Yellow	Yellow
Urinary Tract Infection	Orange	Orange	Orange	Red	Red	Orange	Yellow	Yellow

Orange = little evidence, Yellow = mixed evidence, red = no evidence

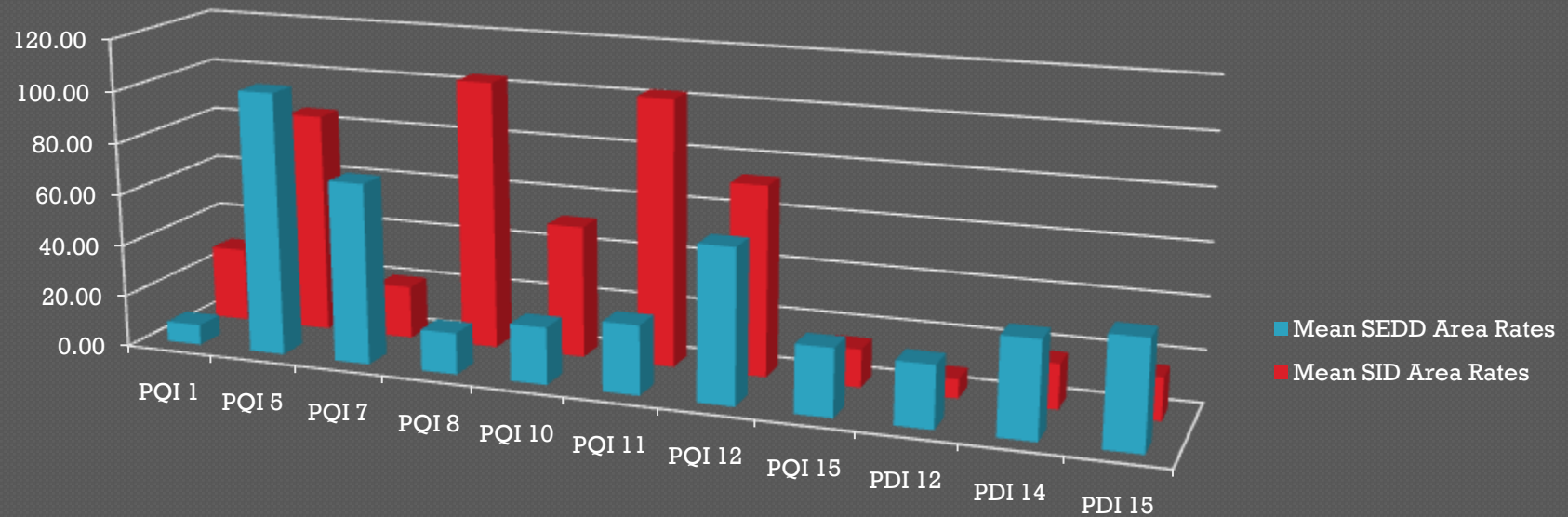
Indicators Not Considered Further

Indicator	Reasons
Diabetes long term complications	<ul style="list-style-type: none">• Most long term complications don't present to ED as the reason for visit.• Infections due to vascular complications are present in data.
Lower extremity amputations	<ul style="list-style-type: none">• Major procedures , not applicable to ED
Perforated appendix	<ul style="list-style-type: none">• Perforation is often seen as a reflection of ED care, not outpatient care (ED patient safety indicator)• Recent evidence suggests the delay in presentation may not be related to access to quality care
Angina	<ul style="list-style-type: none">• Recent evidence suggests that coding practices drive rate.• Initial empirical analyses support concern (low rates)

Data

- ◉ Data from 8 states: AZ, CA, FL, HI, IN, NE, SC, TN, UT
- ◉ SEDD: Treat and release cases
 - Removes all procedure, DRG and MDC based specifications
 - Most analyses use first listed diagnosis only
- ◉ SID: Treat and admit
 - ED listed as admission source
 - Uses principal diagnosis

ED treat and release (SEDD) and ED treat and admit rates (SID)



	PQI 1	PQI 5	PQI 7	PQI 8	PQI 10	PQI 11	PQI 12	PQI 15	PDI 12	PDI 14	PDI 15
Mean SEDD Area Rates	7.86	101.75	70.00	15.95	21.99	26.63	59.15	25.95	23.83	36.93	41.30
Mean SID Area Rates	28.69	85.53	20.43	103.82	50.99	102.72	73.13	14.61	7.34	17.20	16.25

Data Source: HCUP SEDD and SID (2005 and 2006) from selected states

What are these visits?

- Characterizing the indicators
 - NYU algorithm
 - Percent admitted as rough surrogate for severity of illness

NYU Emergency Department Profiling Algorithm

- Developed by Billings et al. (2000)
 - Panel of ED Physicians
 - Evaluated complete ED records
 - 1994: N = 3,500 records
 - 1999: N = 2,200 records
 - 6 Bronx, NY Hospitals
- 4 Categories for Classified Cases
 - Non-Emergent
 - Emergent, Primary Care Treatable
 - Emergency Department Care Needed, Preventable/Avoidable
 - Emergency Department Care Needed, Not Preventable/Avoidable
- 5 Categories for Unclassified Cases
 - Injury
 - Mental Health
 - Alcohol
 - Other Drug
 - “Unclassified”*

*Issue for comparison between current NYU ED Algorithm and ED-PQI definitions

Applying the NYU algorithm

○ Maintenance

- Coding that is reflected in PQI definitions are unclassified by NYU ED algorithm in some cases (most PQIs 8-14%)
- Dehydration 75% cases unclassified (5th digit codes added in 2006)

○ Application across all diagnosis codes

- First listed does not tell the whole story
- Second listed may not be the same severity as algorithm assumes

○ Does not take into account non-diagnosis based risk factors

- Age, comorbidities, socioeconomic status

○ Final diagnosis not always the chief complaint

○ Validated on urban setting, rural application unknown

Applying NYU algorithm

Mean probabilities for cases by indicator

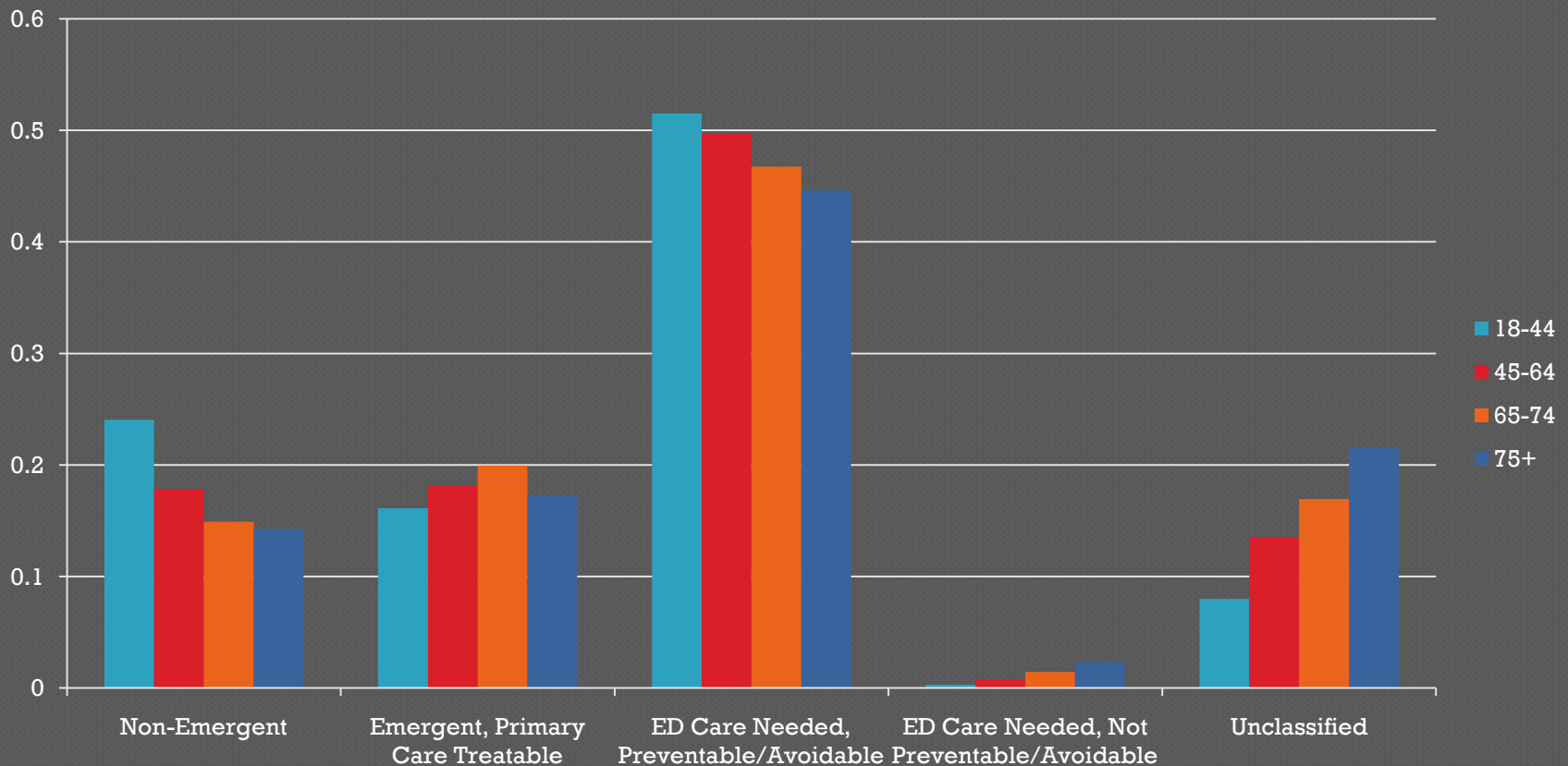
Indicator	Non-Emergent	Emergent, Primary Care Treatable	ED Care Needed, Preventable	ED Care Needed, Non-Preventable
Diabetes	0	0	1	0
COPD	.02	.28	.70	0
Hypertension	.61	.18	.21	0
CHF	.04	.05	.91	0
Dehydration	.45	.38	.13	.03
Pneumonia	.09	.24	.67	0
UTI	.40	.25	.30	.04
Asthma	0	.02	.98	0

Applying the NYU algorithm

- No differences in urban/rural settings
 - Exception: COPD
- No differences in payer, after adjusting for age
- In general, no differences in age categories
 - Diagnoses more common in older age groups aren't assigned higher risk
 - Exceptions: COPD, UTI

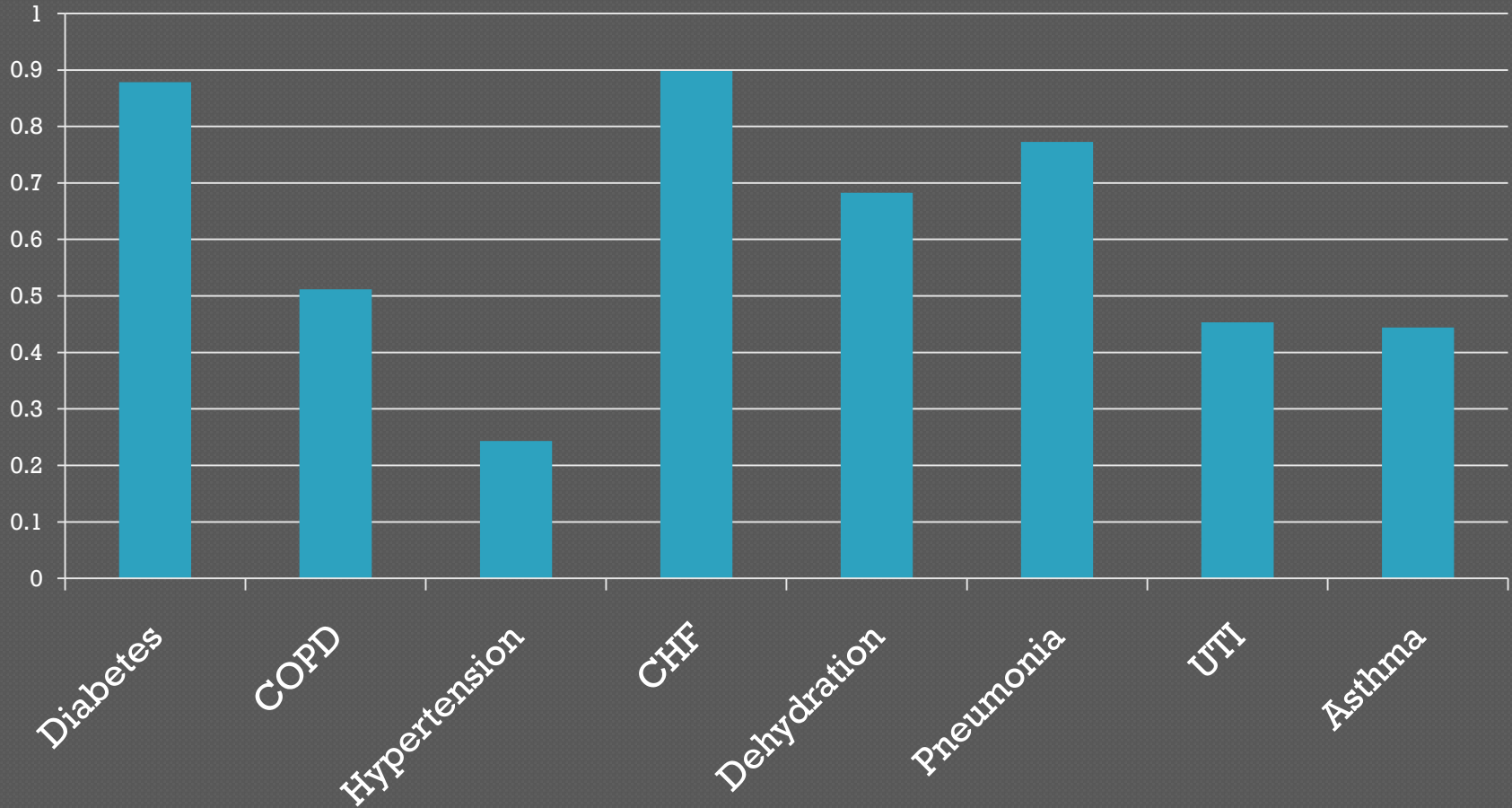
Average NYU probabilities by age

All ED-PQI Candidate Indicators by Age



Data Source: HCUP NEDD (2008) from selected states

Percent of ED encounters resulting in admission

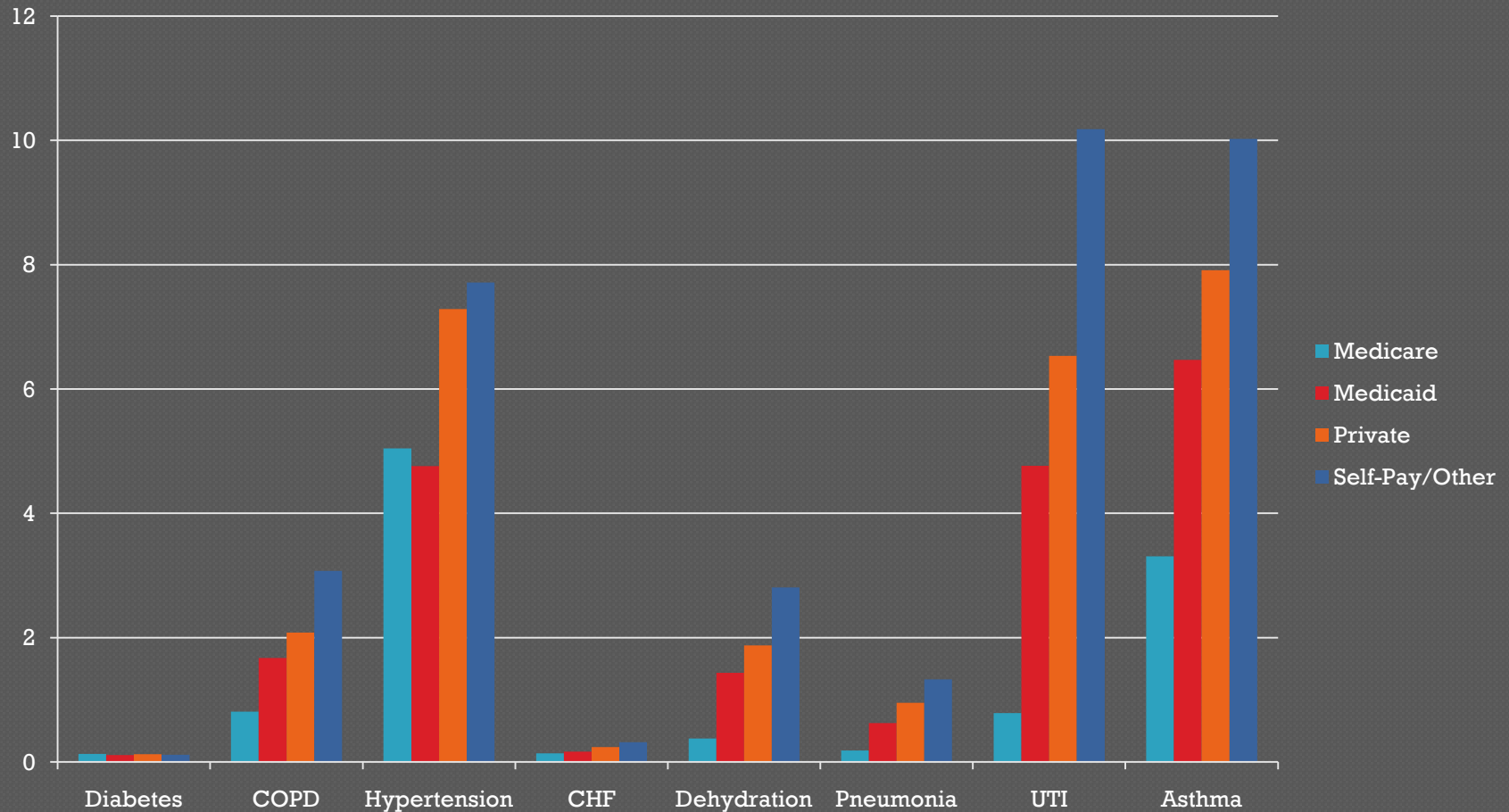


Data Source: HCUP SEDD and SID (2005 and 2006) from selected states

Does it matter what healthcare encounters you include?

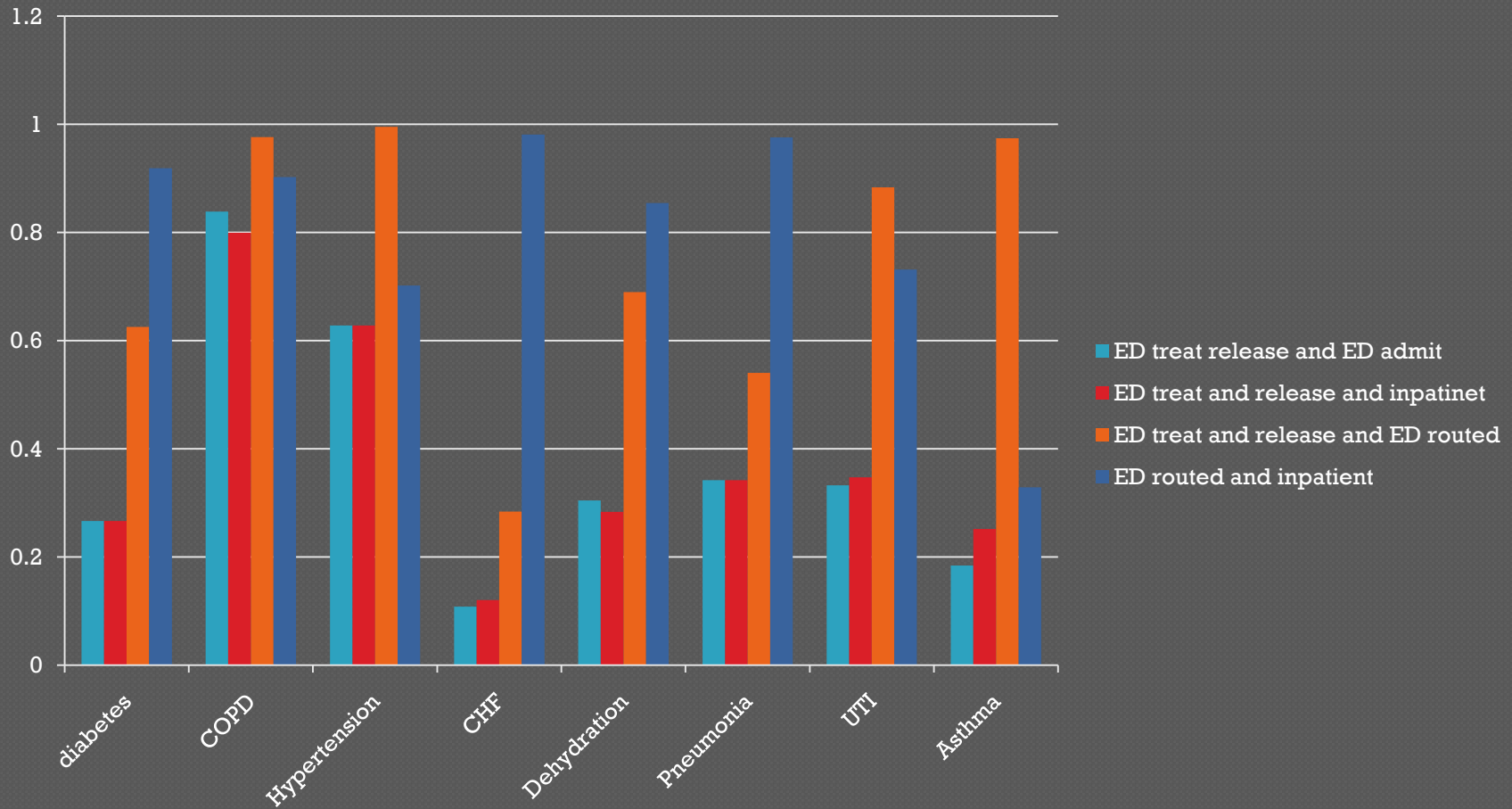
- If practice patterns vary systematically, then the picture will be skewed if using an incomplete set.
- Examine differences in admission by patient and area characteristics.
- Examine relationship between indicators.
- Examine relative area performance by indicator.

Ratio of ED treat and release to ED admitted by payor



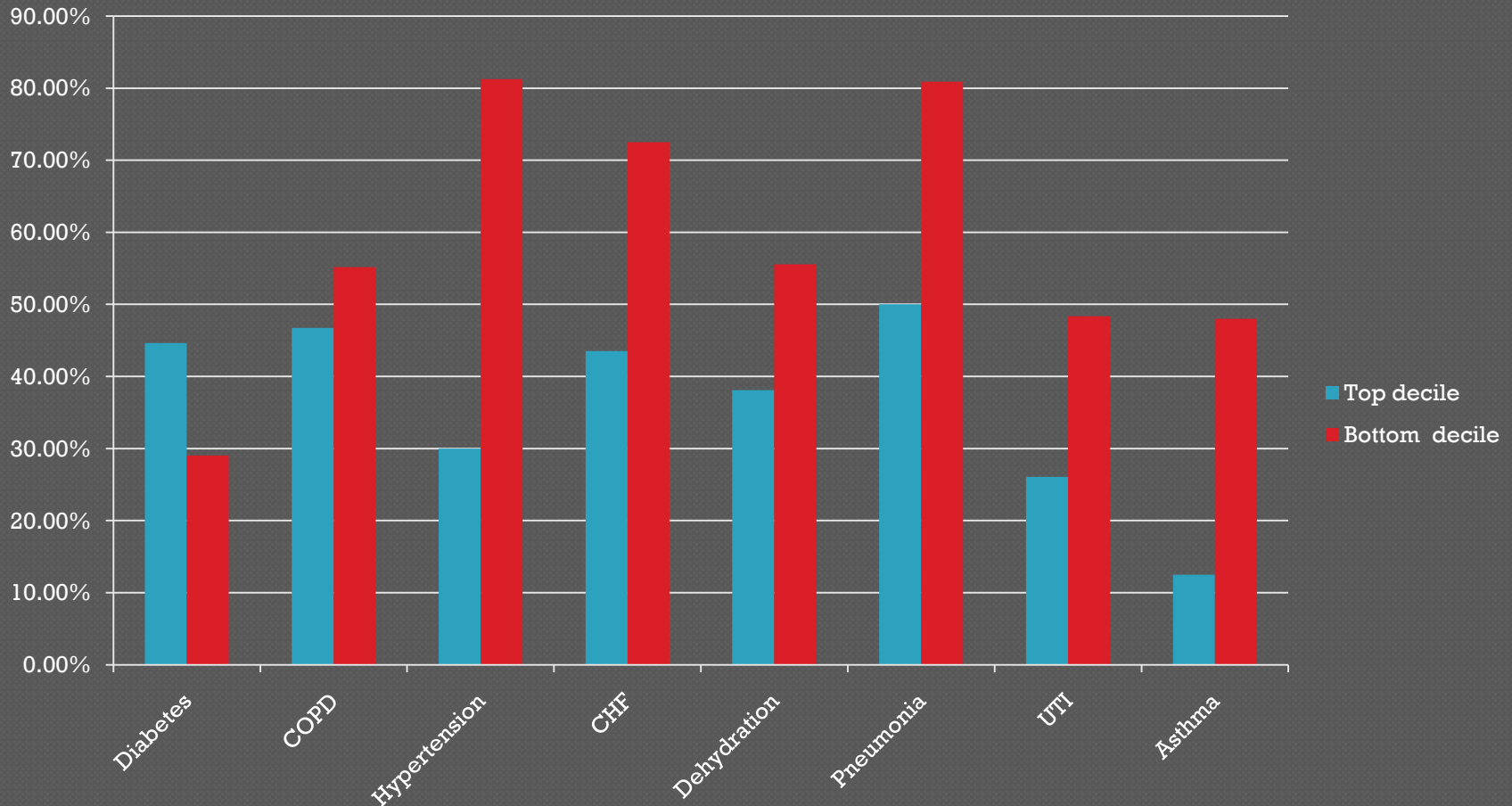
Data Source: HCUP SEDD and SID (2005 and 2006) from selected states

Correlation between healthcare encounter indicators



Data Source: HCUP SEDD and SID (2005 and 2006) from selected states

Percent areas remaining in extreme deciles: Inpatient and ED routed (SEDD+ED SID)



Data Source: HCUP SEDD and SID (2005 and 2006) from selected states

Further work

- ◉ Continue investigating which indicators should be defined with one vs. all listed diagnoses
- ◉ Continue to characterize indicators based on alternative methods
- ◉ Examine variation between areas
- ◉ Continue to understand relationship between indicators and impact on area level performance
- ◉ Validation analyses

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All ACSC conditions	Continuity of care associated with few ED visits Disparities for black race, women, Hispanic Payer relationship unclear	
Diabetes	Unclear relationship between ED visits and quality interventions	- Construct Validity
CHF	Disparities for black race and Hispanic. Unclear relationship between ED visits and quality interventions	

Hypertension	Little literature	
Asthma	High prevalence (45% of aCSC related visits, 2.3% of all pediatric visits) Disparities for black race, Hispanics Quality care such as care coordination, care plans, education and appropriate drug use associated with fewer ED visits	
COPD	Some evidence that quality interventions reduce ED visits	

Pneumonia	Residential care facilities have higher rates Evidence of practice pattern variation Vaccination rates associated with lower ED visit rates	
Dehydration	Young children at higher risk Evidence of practice pattern variation	
UTI	Residential care facilities have higher rates Disparities noted for race	