

## **UC Davis**

### **Reports for the Agency for Healthcare Research and Quality**

#### **Title**

Refinement of the HCUP Quality Indicators: Appendix 5 Inventory of Indicators

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#### **Authors**

Davies, Sheryl M.  
Geppert, Jeffrey  
McClellan, Mark  
et al.

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# APPENDIX 5

## Inventory of Indicators

This appendix includes a compilation of the indicators that we located during the Phase 1 literature review (Identifying indicators), and through interviews.

The indicators are organized by measure type (structural indicators; process indicators – utilization, length of stay; outcome indicators – ACSC/avoidable hospitalizations, complications, mortality) and by clinical domain (medical, surgical, chronic, obstetric, neonatal, pediatric, psychiatric). In some cases multiple definitions appear in the literature. Alternate definitions are noted.

The current users or developers include all the groups/individuals that we identified during our Phase 1 literature review and through phone interviews.

The literature and empirical columns refer to whether or not a detailed literature or empirical review was completed for the indicator. These reviews appear in the main text.

The reason for selection or exclusion refers to our selection process for determining which indicators to review extensively with the structured evaluation framework. The criteria and process are described in the methods section.

The indicator number is the number that has been assigned to each indicator as a unique identifier used throughout the report.

## Appendix 5. Inventory of Indicators

Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		

Structure measures:

Volume Outcome measures:

Examples:

Acute myocardial infarction (AMI)	Suggested uses in literature (Halm, Dudley)			Providers have limited control over frequency of AMI admissions, controversy over actual volume-outcome relationship	-
Amputation of lower limb				No recent studies	-
Abdominal Aortic Aneurysm (AAA) repair		x	x	Relatively frequent procedure, with strong established volume-outcome relationship	1
Carotid endarterectomy		x	x	Frequent, high complication, mortality rates	2
Cerebral aneurysm repair				Small number of recent studies.	-
Cholecystectomy				No recent studies. Conflicting evidence as to the volume-outcome relationship.	-
Coronary Artery Bypass Graft (CABG) surgery		x	x	Frequent, PTCA alternative, documented relationship, current HCUP QI utilization	3
Esophageal resection		x	x	Though infrequent, the volume outcome relationship is particularly strong.	4
Gastric surgery				No recent studies. Conflicting evidence as to the volume-outcome relationship.	-
Heart transplantation				Small number of recent studies.	-
Hepatic resection			Infrequent procedure, low provider variation	-	

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Hernia repair				Conflicting evidence as to the volume-outcome relationship.	-
	Hip fracture				Conflicting evidence as to the volume-outcome relationship.	-
	Human Immunodeficiency Virus (HIV)				Literature showing relationship is based on data over a decade old. Recent advances and changes in treatment call into question the validity of those results in the year 2000.	-
	Lower extremity arterial bypass surgery				Small number of recent studies, 2 out of 3 showed no volume effect.	-
	Pancreatic resection		x	x	Though infrequent, volume relationship to outcome is very strong.	5
	Pediatric heart surgery		x	x	Pediatrics is a focus area for new HCUP indicators, strong volume-outcome relationship	6
	Prostatectomy				Conflicting evidence as to the volume-outcome relationship.	-
	Percutaneous Transluminal Coronary Angioplasty (PTCA)		x	x	Frequent, CABG alternative, documented relationship with volume	7
	Total knee replacement				Few recent studies.	-
	Total hip replacement				Conflicting evidence as to the volume-outcome relationship.	-

Process Measures, provider level:

Potentially overused:

Cesarean sections:

Primary cesarean section	• National Center for Healthcare Statistics			Combined in all cesarean section	
Repeat cesarean section	• University Hospital Consortium				

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
Surgical:	All cesarean section	<ul style="list-style-type: none"> <li>• Cleveland Health Quality Choice</li> <li>• Colorado Health and Hospital, proposed</li> <li>• Florida Agency for Health Care Administration</li> <li>• Greater New York Hospital Association</li> <li>• HCUP</li> <li>• HealthGrades.com</li> <li>• IMSystem</li> <li>• Maryland Quality Indicator Project</li> <li>• Michigan Hospital Association</li> <li>• Pacific Business Group on Health</li> <li>• United Health Care</li> <li>• University Hospital Consortium</li> <li>• Virginia Health Information</li> <li>• Washington State Community Health Information Partnership</li> <li>• Submitted as ORYX measure</li> </ul>	x	x	Current HCUP indicator	8
	Incidental appendectomy	<ul style="list-style-type: none"> <li>• HCUP</li> </ul>	x	x	Current HCUP	9
	Bilateral cardiac catheterization	<ul style="list-style-type: none"> <li>• HCFA</li> </ul>	x	x	Common procedures with clear indications and overuse documentation.	10

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Radical mastectomy	<ul style="list-style-type: none"> <li>Literature, NIH consensus development conference</li> </ul>	p		Many mastectomy or lumpectomy procedures are performed on an outpatient basis.	-

Potentially underused:

Vaginal delivery after cesarean section (VBAC):

Vaginal Birth After C-section (VBAC)	<ul style="list-style-type: none"> <li>Cleveland Health Quality Choice</li> <li>HealthGrades.com</li> <li>HCUP</li> <li>IMSystem</li> <li>JCAHO core measure</li> <li>Maryland QI Project</li> <li>Michigan Hospital Association</li> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>	x	x	VBAC is a current HCUP measure	11
Laparoscopic cholecystectomy	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> </ul>	x	x	Current HCUP with extensive literature	12

Process Measures, area level:

Potentially overused:

Surgical:

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Carotid endarterectomy	<ul style="list-style-type: none"> <li>Literature (eg., Chassin, Leape, Wong)</li> </ul>	p		Common procedure, with evidence of potential overuse. Low precision using HCUP NIS data.	-
	Cataract surgery	<ul style="list-style-type: none"> <li>Literature (Tobacman)</li> </ul>			Potentially outpatient procedure	-
	Cholecystectomy	<ul style="list-style-type: none"> <li>Literature (Pilpel)</li> </ul>			Potentially outpatient procedure	-
	Colonoscopy	<ul style="list-style-type: none"> <li>Literature (Froehlich)</li> </ul>			Outpatient procedure	-
	Coronary angiography (includes diagnostic testing for coronary artery disease)	<ul style="list-style-type: none"> <li>Literature (eg., Bernstein, Carlisle Chassin, Gray, Leape)</li> </ul>			Outpatient procedure	-
	Coronary artery bypass graft (CABG)	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> <li>Literature (Gray, Leape, McGlynn)</li> </ul>	x	x	Current HCUP	13
	Hysterectomy	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> <li>Literature (Bernstein, Broder)</li> </ul>	x	x	Current HCUP	14
	Joint replacement (hip and knee)	<ul style="list-style-type: none"> <li>Literature (Quintana, Van Walraven)</li> </ul>			Though high variability of procedure makes indicator potentially precise, inappropriateness rates not studied extensively due to inherent subjectivity of indication for procedure.	-
	Laminectomy and/or spinal fusion	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> <li>Literature (Larequi-Lauber, Porchet)</li> </ul>	x	x	Current HCUP	15

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
Length of stay (LOS):	Transurethral resection of the prostate (TURP)	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> </ul>	p		Current HCUP, low precision	-
	Radical prostatectomy (all and over 75 years)	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> </ul>	p		Current HCUP, low precision	-
	PTCA	<ul style="list-style-type: none"> <li>Literature (Bernstein, Leape, Ziskind)</li> </ul>	x	x	Common procedure, high area variation, and evidence of misuse.	16
	Sinus surgery	<ul style="list-style-type: none"> <li>Literature (Piccirillo)</li> </ul>			Potentially outpatient procedure	-
	Upper GI tract endoscopy	<ul style="list-style-type: none"> <li>Literature (Chassin, Leape)</li> </ul>			Outpatient procedure	-

Length of stay (LOS):

Since LOS is usually used as a resource measure and not typically as a quality indicator, we did not include any of the LOS indicators in our recommendations.

Medical Examples:

Chemotherapy	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
GI Hemorrhage	<ul style="list-style-type: none"> <li>Used in literature as a resource measure</li> </ul>			Not typically a quality indicator	-
Heart failure and shock	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
HIV related admissions	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			Not typically a quality indicator	-
Pneumonia	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Rehabilitation	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
	Stroke	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-

Surgery  
Examples:

Bone and joint procedures	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
Coronary procedures				Not typically a quality indicator	-
Circulation disorders with catheterization				Not typically a quality indicator	-
Craniotomy				Not typically a quality indicator	-
Hip replacement surgery				Not typically a quality indicator	-
Percutaneous transluminal coronary angioplasty (PTCA)				Not typically a quality indicator	-

Obstetric:

Cesarean section with complications	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			Not typically a quality indicator	-
Cesarean section without complications	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
Vaginal delivery with complications	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			Not typically a quality indicator	-
Vaginal delivery without complications	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-

Neonatal:

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
Pediatric:	Normal neonatal	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
	Neonatal with complication	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			Not typically a quality indicator	-
	Pediatric asthma/bronchitis	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
Psychiatric:	Psychoses	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Not typically a quality indicator	-
Proxy-Outcome measures: Conditional length of stay:	All discharges, length of stay	<ul style="list-style-type: none"> <li>HQI ValiData</li> </ul>			A new indicator in development, will be considered in complications module.	-
Outcomes measures: Ambulatory care sensitive conditions/Avoidable hospitalizations: Medical:	AMI	<ul style="list-style-type: none"> <li>Literature (Begley)</li> </ul>			Not included in most commonly used ACSC indicator sets.	-
	Cellulitis (or abscess, or other soft tissue infection, or lymphadenitis)	<ul style="list-style-type: none"> <li>Billings (United Hospital Fund)</li> <li>Weissman</li> <li>Literature (Silver)</li> </ul>	p		Low precision using HCUP NIS data set	-
	Congenital syphilis	<ul style="list-style-type: none"> <li>Billings (UHF)</li> </ul>			Infrequent	-
	Dehydration/volume depletion	<ul style="list-style-type: none"> <li>Billings (UHF)</li> </ul>	x	x	Measured with adequate precision.	17

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Delivery, high risk/complicated	• Literature (Laditka, Parchman)			Possibly need detailed clinical data.	-
	Dental conditions	• Billings (UHF)			Infrequent	-
	Gangrene	• Weissman			Infrequent	-
	Gastroenteritis	• Billings (UHF) • Literature (Silver)	p		Low precision for adults. Evaluated as a pediatric measure.	-
	Hypoglycemia	• Billings	p		Low precision.	
	Hypokalemia	• Weissman			Infrequent, outside of eating disorder treatment centers	-
	Immunization preventable diseases (includes pneumonia and influenza in elderly)	• Billings (UHF) • HCUP • Weissman	p		Current HCUP Indicator. Low precision, combined with Pneumonia avoidable hospitalization indicator	-
	Malnutrition	• Billings (UHF)			Infrequent, outside of eating disorder treatment centers	-
	Pelvic inflammatory disease	• Billings (UHF)			Infrequent	-
	Pneumonia (defs may include bacterial pneumonia, pleurisy, bronchitis, bronchiolitis, pharyngitis, and sinusitis)	• Weissman	x	x	Common admission, measured with adequate precision.	18
	Pyelonephritis/ Urinary Tract Infection	• UK National Health Service High Level Performance Indicators • Weissman	x	x	Measured with adequate precision	19
	Ruptured/perforated appendix	• HCUP • Weissman	x	x	Current HCUP QI, measured with adequate precision.	20
	Severe ear, nose and throat infections	• Billings (UHF)	p		Low precision using HCUP NIS data set	-
	Skin graft with cellulitis	• Billings	p		Low precision using HCUP NIS data set	

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
Chronic:	Stroke (def may specify with hypertension)	<ul style="list-style-type: none"> <li>Literature (Begley, Djojonegoro)</li> </ul>			Not included in most commonly used ACSC indicator sets.	-
	Tuberculosis (may include other respiratory infections)	<ul style="list-style-type: none"> <li>Billings (UHF)</li> <li>Literature (Rohrer)</li> </ul>			Infrequent	-
	Angina	<ul style="list-style-type: none"> <li>Billings</li> <li>Literature (Rohrer)</li> </ul>	x	x	Common admission, measured with adequate precision.	21
	Anemia (includes iron deficiency anemia)	<ul style="list-style-type: none"> <li>Billings</li> <li>Literature (Silver)</li> </ul>				
	Asthma	<ul style="list-style-type: none"> <li>Billings (UHF)</li> <li>UK National Health Service High Level Performance Indicators</li> <li>HP 2010</li> <li>Weissman</li> </ul>	x	x	A current HCUP QI as a pediatric measure.	22
	Asthma and bronchitis	<ul style="list-style-type: none"> <li>Literature (Rohrer)</li> </ul>			Evaluated asthma without bronchitis.	-
	Cancer, breast (female)	<ul style="list-style-type: none"> <li>Literature (Shukla)</li> </ul>			Not included in most sets of ACSC indicators.	-
	Cancer, cervical (invasive)	<ul style="list-style-type: none"> <li>Literature (Shukla)</li> </ul>			Not included in most sets of ACSC indicators.	-
	Cerebrovascular disease among non-elderly adults	<ul style="list-style-type: none"> <li>HCUP</li> </ul>	p		Current HCUP QI, low precision using HCUP NIS data set.	-
	Chronic obstructive pulmonary disease (COPD)	<ul style="list-style-type: none"> <li>Billings (UHF)</li> <li>Colorado Health and Hospital, proposed</li> </ul>	x	x	Frequent cause of admission, guidelines for ambulatory management, differences in practice patterns.	23

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Congestive heart failure (CHF; may include CHF and pulmonary edema or shock)	<ul style="list-style-type: none"> <li>• Billings (UHF)</li> <li>• DEMPAQ (CHF complications)</li> <li>• UK National Health Service High Level Performance Indicators</li> <li>• Weissman</li> <li>• Literature (Rohrer)</li> </ul>	x	x	Common chronic condition with relatively frequent hospitalizations	24
	Diabetes, all	<ul style="list-style-type: none"> <li>• Literature (Connell)</li> </ul>				
	Diabetes (short-term complications or A,B,C)	<ul style="list-style-type: none"> <li>• Billings (UHF)</li> <li>• DEMPAQ</li> <li>• HCUP</li> <li>• UK National Health Service High Level Performance Indicators (single diabetes measure)</li> <li>• Weissman</li> </ul>	x	x	Current HCUP QI with complications	25
	Diabetes, uncontrolled	<ul style="list-style-type: none"> <li>• HP 2010</li> <li>• Literature (Bierman, Shukla)</li> </ul>	x	x	Addendum indicator for use with diabetes short-term complications to make definition consistent with HP2010.	26
	Diabetes (long-term complications)	<ul style="list-style-type: none"> <li>• HCUP</li> <li>• UK National Health Service High Level Performance Indicators (single diabetes measure)</li> <li>• Literature (Begley)</li> </ul>	x	x	Current HCUP QI with complications	27
	Diabetic ketoacidosis (DKA)	<ul style="list-style-type: none"> <li>• DEMPAQ</li> <li>• Sagamore Health</li> <li>• Weissman</li> </ul>			A current HCUP QI as a diabetes complication measure	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Hypertension (includes malignant)	<ul style="list-style-type: none"> <li>• Billings (UHF)</li> <li>• Weissman</li> </ul>	x	x	Measured with adequate precision.	28
	Lower extremity amputation	<ul style="list-style-type: none"> <li>• DEMPAQ</li> <li>• HP 2010</li> </ul>	x	x	Healthy People 2000 goal, low precision using HCUP NIS data set.	29
	Perforated/bleeding ulcer	<ul style="list-style-type: none"> <li>• Weissman</li> </ul>			Infrequent	-
	Rheumatic fever	<ul style="list-style-type: none"> <li>• Literature (Shukla)</li> </ul>				
	Seizures and convulsions (may include convulsions 'A' & 'B'; epilepsy or grand mal status)	<ul style="list-style-type: none"> <li>• Billings (UHF)</li> <li>• UK National Health Service High Level Performance Indicators</li> </ul>	p		Low precision	-

Pediatrics:

Failure to thrive	<ul style="list-style-type: none"> <li>• Billings (UHF)</li> </ul>			Infrequent	-
Immunization preventable diseases (measles, mumps, and/or polio)	<ul style="list-style-type: none"> <li>• Billings</li> <li>• South Carolina adaptation of Billings (UHF)</li> <li>• Weissman</li> <li>• Literature (Shukla)</li> </ul>			Infrequent	-
Iron deficiency anemia	<ul style="list-style-type: none"> <li>• Billings (UHF)</li> </ul>			Infrequent	-
Low birthweight	<ul style="list-style-type: none"> <li>• HCUP</li> <li>• HEDIS</li> <li>• United Health Care</li> <li>• University Hospital Consortium</li> <li>• Literature (Shukla)</li> </ul>	x	x	Current HCUP QI	30
Pediatric acute otitis media	<ul style="list-style-type: none"> <li>• South Carolina adaptation of Billings (UHF)</li> <li>• Literature (Rohrer)</li> </ul>			Infrequent (as a primary diagnosis excluding surgery patients)	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Pediatric Asthma (may include bronchitis & asthma)	<ul style="list-style-type: none"> <li>• Billings</li> <li>• Colorado Health and Hospital, proposed</li> <li>• HCUP</li> <li>• South Carolina adaptation of Billings (UHF)</li> <li>• United Health Care</li> <li>• Weissman</li> <li>• Literature (Rohrer)</li> </ul>	x	x	Frequent cause of admission, guidelines for ambulatory management, differences in practice patterns	31
	Pediatric burns	<ul style="list-style-type: none"> <li>• Literature (Gadomski et al.)</li> </ul>			A good potential injury indicator, which was not our primary focus.	-
	Pediatric diabetes	<ul style="list-style-type: none"> <li>• Literature (Gadomski et al.)</li> </ul>	p		Frequent cause of admission, very low precision	-
	Pediatric gastroenteritis	<ul style="list-style-type: none"> <li>• South Carolina adaptation of Billings (UHF)</li> </ul>	x	x	Frequent cause of admission, guidelines for ambulatory management, differences in practice patterns	32
	Pediatric mastoiditis	<ul style="list-style-type: none"> <li>• Literature</li> </ul>			Infrequent	-
	Pediatric nausea and vomiting	<ul style="list-style-type: none"> <li>• Literature (Gadomski et al.)</li> </ul>			Infrequent	-
	Pediatric urinary tract infection	<ul style="list-style-type: none"> <li>• South Carolina adaptation of Billings (UHF)</li> </ul>			Infrequent	-
	Pediatric viral meningitis	<ul style="list-style-type: none"> <li>• Literature (Gadomski et al.)</li> </ul>			Infrequent	
	Pediatric viral syndrome	<ul style="list-style-type: none"> <li>• Literature (Gadomski et al.)</li> </ul>			Frequent cause of admission	-
	Very low birthweight	<ul style="list-style-type: none"> <li>• HEDIS</li> <li>• IMSystem</li> <li>• HCUP</li> </ul>	p		Current HCUP, low precision using HCUP NIS data set.	-

Complications:

In-hospital Mortality:

REVIEW OF COMPLICATIONS  
IN SEPARATE REPORT

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Overall mortality	<ul style="list-style-type: none"> <li>• Collaborative Approach to Resource Effectiveness (CARE) Project</li> <li>• Maryland QI Project</li> <li>• Literature</li> <li>• Submitted as ORYX measure</li> </ul>			Potentially very biased due to heterogeneous patient population; difficult to determine an appropriate intervention	-

Medical:

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Acute myocardial infarction (AMI)	<ul style="list-style-type: none"> <li>• California Hospital Outcomes Project</li> <li>• Cleveland Health Quality Choice (grouped with cardiovascular measure)</li> <li>• Collaborative Approach to Resource Effectiveness (CARE) Project</li> <li>• Colorado Health and Hospital, proposed</li> <li>• Greater New York Hospital Association</li> <li>• HealthGrades.com</li> <li>• IMSystem</li> <li>• JCAHO core measure</li> <li>• Michigan Hospital Association (in aggregated measure)</li> <li>• Pennsylvania Health Care Cost Containment Council</li> <li>• University Hospital Consortium</li> <li>• UK National Health Service High Level Performance Indicators</li> <li>• Submitted as ORYX measure</li> </ul>	x	x	Already a substantial amount of information on hospital performance with AMI, including the Medicare Cooperative Cardiovascular project; other HCUP QI focus on procedures for the treatment of MI (PTCA, CABG).	33

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Angina	<ul style="list-style-type: none"> <li>Michigan Hospital Association (in aggregated measure)</li> </ul>			Have indicator for AMI mortality, one of the other conditions covered by the MHA aggregate measure	-
	Bone marrow transplant (BMT)	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			Limited number of providers, infrequent	-
	Chronic obstructive pulmonary disease	<ul style="list-style-type: none"> <li>Literature (Rosenthal et al.)</li> <li>Cleveland Health Quality Choice (grouped with respiratory measure)</li> <li>HealthGrades.com</li> <li>Maryland QI Project</li> <li>Michigan Hospital Association (in aggregated measure)</li> <li>Submitted as ORYX measure</li> </ul>			A progressive chronic disease ; more difficult to evaluate without longitudinal data	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Congestive heart failure (CHF)	<ul style="list-style-type: none"> <li>Literature (Rosenthal et al.)</li> <li>Cleveland Health Quality Choice (grouped with cardiovascular measure)</li> <li>HealthGrades.com</li> <li>Greater New York Hospital Association</li> <li>Maryland QI Project</li> <li>Michigan Hospital Association (in aggregated measure)</li> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>	x	x	Substantial literature, some use as quality indicator. Related to other indicators as overall cardiovascular care.	34
	Adult diabetes	<ul style="list-style-type: none"> <li>Pennsylvania Health Care Cost Containment Council</li> </ul>			Very rare cause of death ; other indicators (cardiovascular, infections) capture deaths in this population.	-
	GI hemorrhage	<ul style="list-style-type: none"> <li>Literature (Rosenthal et al.)</li> <li>Cleveland Health Quality Choice</li> <li>Maryland QI Project</li> <li>Michigan Hospital Association (in aggregated measure)</li> <li>Outcome measure in literature</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume).	35

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Heart failure and shock	<ul style="list-style-type: none"> <li>• Pennsylvania Health Care Cost Containment Council</li> <li>• University Hospital Consortium</li> <li>• Submitted as ORYX measure</li> </ul>	p		Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume), measured with low precision.	-
	Hip fracture	<ul style="list-style-type: none"> <li>• Literature</li> <li>• UK National Health Service High Level Performance Indicators</li> </ul>	x	x	Common admission in the elderly with relatively high mortality rates. Substantial literature regarding hip fracture mortality.	36
	HIV	<ul style="list-style-type: none"> <li>• Maryland QI Project</li> </ul>			Data unavailable. Confounds due to HAART, home IV antibiotics, etc.	-
	Lung cancer	<ul style="list-style-type: none"> <li>• Pennsylvania Health Care Cost Containment Council</li> </ul>			A progressive disease requiring clinical risk adjustment (PHC4 uses clinical risk adjustment)	

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Pneumonia	<ul style="list-style-type: none"> <li>Literature (Rosenthal et al.)</li> <li>California Hospital Outcomes Project</li> <li>Greater New York Hospital Association</li> <li>HealthGrades.com</li> <li>Maryland QI Project</li> <li>Michigan Hospital Association (in aggregated measure)</li> <li>Pennsylvania Health Care Cost Containment Council</li> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume).	37
	Pneumonia/hemo thorax mortality	<ul style="list-style-type: none"> <li>IMSystem</li> </ul>			Limited use	-
	Renal failure	<ul style="list-style-type: none"> <li>Maryland Hospital Association</li> <li>Pennsylvania Health Care Cost Containment Council</li> </ul>			Disease is rarely fatal by itself, associated with other serious complications or comorbidities.	-
	Respiratory failure	<ul style="list-style-type: none"> <li>Maryland Hospital Association</li> </ul>			Often coded based on physiological state, rather than as a treatable condition.	-
	Septicemia	<ul style="list-style-type: none"> <li>Maryland Hospital Association</li> <li>Pennsylvania Health Care Cost Containment Council</li> </ul>			Limited evidence located.	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
Surgical:	Stroke	<ul style="list-style-type: none"> <li>Literature (Rosenthal et al.)</li> <li>Cleveland Health Quality Choice</li> <li>Greater New York Hospital Association</li> <li>HealthGrades.com</li> <li>Maryland QI Project</li> <li>Michigan Hospital Association (in aggregated measure)</li> <li>Submitted as ORYX measure</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume).	38
	Trauma	<ul style="list-style-type: none"> <li>Literature, Rutledge, Hannan</li> </ul>			Potential need for emergency room data and/or clinical data on injury severity.	-
	Abdominal aortic aneurysm repair	<ul style="list-style-type: none"> <li>Literature (volume-outcome)</li> <li>HealthGrades.com</li> <li>Pennsylvania Health Care Cost Containment Council (with major vessel procedures)</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume).	39
Carotid endarterectomy	<ul style="list-style-type: none"> <li>Literature (volume-outcome)</li> <li>Greater New York Hospital Association</li> <li>Pennsylvania Health Care Cost Containment Council (with vascular operations)</li> </ul>	p		Preliminary exploration of indicator to focus on related aspects of particular condition (i.e., mortality, utilization, volume). Excluded due to low precision.	-	

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Circulation disorder with catheterization	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			In general, avoid non-complication related procedure based mortality measures due to problems of patient selection	-
	Cholecystectomy	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> </ul>	p		Current HCUP QI, low precision.	-
	Coronary artery bypass graft (CABG)	<ul style="list-style-type: none"> <li>California CABG Mortality Reporting Project</li> <li>Greater New York Hospital Association</li> <li>HealthGrades.com</li> <li>IMSystem</li> <li>Maryland QI Project</li> <li>New Jersey Dept. of Health and Senior Services</li> <li>New York Dept. of Health</li> <li>Pennsylvania Health Care Cost Containment Council</li> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>	x	x	Already widely reported in multiple states.	40
	Coronary Procedures	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			In general, avoid non-complication related procedure based mortality measures due to problems of patient selection	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Craniotomy	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume)	41
	Esophageal resection	<ul style="list-style-type: none"> <li>Literature (volume-outcome)</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume)	42
	Knee replacement	<ul style="list-style-type: none"> <li>HCUP</li> <li>Greater New York Hospital Association</li> <li>HealthGrades.com</li> <li>Medicare Quality of care Surveillance System</li> <li>University Hospital Consortium (aggregated with THA)</li> <li>Submitted as ORYX measure</li> </ul>	p		Current HCUP QI. Low precision.	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Hip replacement	<ul style="list-style-type: none"> <li>• HCUP</li> <li>• Greater New York Hospital Association</li> <li>• HealthGrades.com</li> <li>• Medicare Quality of care Surveillance System</li> <li>• Pennsylvania Health Care Cost Containment Council (with hip operations)</li> <li>• University Hospital Consortium (aggregated with TKA)</li> <li>• Submitted as ORYX measure</li> </ul>	x	x	Current HCUP QI	43
	Hysterectomy	<ul style="list-style-type: none"> <li>• HCUP</li> <li>• Medicare Quality of care Surveillance System</li> <li>• Submitted as ORYX measure</li> </ul>	p		Current HCUP QI. Low precision.	-
	Laminectomy/spinal fusion	<ul style="list-style-type: none"> <li>• HCUP</li> <li>• HealthGrades.com</li> <li>• Medicare Quality of care Surveillance System</li> <li>• Submitted as ORYX measure</li> </ul>	p		Current HCUP QI. Low precision.	-
	Orthopedic surgery	<ul style="list-style-type: none"> <li>• University Hospital Consortium</li> <li>• Submitted as ORYX measure</li> </ul>			In general, avoid non-complication related procedure based mortality measures due to problems of patient selection	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Pancreatic resection	<ul style="list-style-type: none"> <li>Literature (volume-outcome)</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume)	44
	Perioperative mortality	<ul style="list-style-type: none"> <li>Collaborative Approach to Resource Effectiveness (CARE) Project</li> <li>IMSystem</li> <li>Maryland QI Project</li> <li>University Hospital Consortium</li> <li>Michigan Hospital Association (with specified procedures)</li> <li>Submitted as ORYX measure</li> </ul>			Potentially very biased due to heterogeneous patient population; difficult to determine an appropriate intervention	-
	Percutaneous transluminal coronary angioplasty (PTCA)	<ul style="list-style-type: none"> <li>IM System</li> <li>Greater New York Hospital Association</li> <li>HealthGrades.com</li> <li>New York Dept. of Health</li> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>	p		Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume) Low precision.	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		
	Prostatectomy	<ul style="list-style-type: none"> <li>Literature (Klein et al.)</li> <li>Medicare Quality of care Surveillance System</li> <li>Submitted as ORYX measure</li> </ul>			In general, avoid non-complication related procedure based mortality measures due to problems of patient selection	-
	Transurethral resection of prostate (TURP)	<ul style="list-style-type: none"> <li>HCUP</li> <li>Submitted as ORYX measure</li> </ul>	p	x	Current HCUP QI. Low precision.	-
Pediatric:						
	Overall pediatric mortality	<ul style="list-style-type: none"> <li>University Hospital Consortium</li> </ul>			Potentially very biased due to heterogeneous patient population; difficult to determine an appropriate intervention	-
	Neonatal mortality	<ul style="list-style-type: none"> <li>Collaborative Approach to Resource Effectiveness (CARE) Project</li> <li>Maryland QI Project</li> <li>University Hospital Consortium</li> <li>Submitted as ORYX measure</li> </ul>			Potentially very biased due to heterogeneous patient population; difficult to determine an appropriate intervention	-
	Pediatric heart surgery	<ul style="list-style-type: none"> <li>Literature (volume-outcome)</li> </ul>	x	x	Indicator selected to focus on related aspects of particular condition (i.e., mortality, utilization, volume)	45
Psychiatric:						
	Depression	<ul style="list-style-type: none"> <li>RAND, JCAHO</li> </ul>			Infrequent in acute care setting	-
Other measures:						
	Newborn Outcomes	<ul style="list-style-type: none"> <li>IMSsystem</li> </ul>			Difficult to implement without longitudinal data	-

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Measure Type and Clinical Domain	Indicator Name	Current Users or Developers	Evidence Review*		Reason for selection or exclusion	Indicator # in text body
			Empirical	Literature		

Public Health Measures:

Admission for AMI	• Colorado Health and Hospital, proposed			Included in previously considered indicators	-
Adolescent mothers	• Colorado Health and Hospital, proposed			These indicators generally are underreported, and have less connection with the health care system	-
Child abuse	• Colorado Health and Hospital, proposed			These indicators generally are underreported, and have less connection with the health care system	-
External injury (firearms)	• Colorado Health and Hospital, proposed			These indicators generally are underreported, and have less connection with the health care system	-
Motor vehicle accident (MVA)	• Colorado Health and Hospital, proposed			These indicators generally are underreported, and have less connection with the health care system	-
Substance abuse	• Colorado Health and Hospital, proposed			Difficult to determine from discharge data true cases, infrequent in acute care setting	-
Stroke/TIA	• Colorado Health and Hospital, proposed			Included in previously considered indicators	-
Suicide attempt	• Colorado Health and Hospital, proposed			Concern about reporting bias.	-

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