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#### **Title**

Refinement of the HCUP Quality Indicators: Appendix 8B

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Table 2A. Studies of ACSC indicators.

Study	Payer	Level	Validating variables
Begley, 1994	all	area (city/state)	none
Bierman, 2000	all	person	income (area, all), Medicaid (asthma, diabetes), race (asthma, diabetes), race (asthma, diabetes)
Billings, 1993	all	area (zip code)	income, race (diagnosis-specific findings in Billings, 1992)
Billings, 1996	all and Canadian health system	area (zip code)	Income, national health insurance
Bindman, 1995	all	area (zip code cluster/MSSA)	self-rated access (all, but strongest for asthma, CHF, DM), income, education, uninsured, Medicaid
Blustein, 1998	Medicare	person	education, income, usual source of care, race, supplemental Medicaid or other insurance, prior physician visits
Casanova, 1995	Spanish national health system	person	illiteracy (area), unemployment (area), income (area), school enrollment (area), availability of health center, availability of pediatrician
Casanova, 1996	Spanish national health system	person	family income, paternal/maternal employment, social class, paternal/maternal education, prior physician visit, pediatrician
Claudio, 1999	all	area	income, % minority, % children under 18, lack of access to preventative health care, poor housing conditions, environmental exposures, genetic susceptibility
Connell, 1984	Medicare and Medicaid	hospitalization	reside in nursing home, payment source, quality of care (appropriate diagnostic tests, use of IV insulin)_
Culler, 1998	Medicare	person	race, education, living alone/with spouse, income, supplemental Medicaid or other insurance, problems obtaining care, health professional shortage area, core SMSA or rural county
Djojonegoro 2000	all	area (zip code)	income, race (person)
Gadomski, 1998	Medicaid	person/quarter	enrollment in Maryland Access to Care (Medicaid managed care with gatekeeper), SSI or AFDC recipients, urban residence, race
Gill, 1997	Medicaid	person	regular source of care, regular care from primary care physician
Gill, 1998	Medicaid	person	continuity index (function of number of ambulatory visits and unique providers)
Giuffrida, 1999	English Health Services Area	area	supply of secondary care (physicians, hosp beds), morbidity measures (limiting l.t. illness, permanently sick), socioeconomic characteristics (pop density, unemploy, no central heating, crowded accommodations, no car, new commonwealth, retired living alone, students, social class 1 & 2, pop mobility), year
Kaestner, 2000	all	hospital-income category –year	income
Krakauer, 1996	Medicare	area (HCSA)	race/ethnicity, supplemental Medicaid or HMO coverage, urban residence, income, unemployment, active, generalist, med spec, & surg spec MD/pop ratio, generalists/MD, med spec/MD, surg spec/MD
Laditka, 1999 (JWA)	Medicare	area (hospital market area)	income
Laditka, 1999 (JHSP)	Medicaid	area (hospital market area)	Medicaid proportion
McConnochie 1997	all	area (zip code)	inner city or “other urban” residence (person), late prenatal care, maternal education, uninsured, Medicaid, race, unemployment, lack of telephone/automobile, childhood poverty
Millman, 1993	all	area	income (all except congenital syphilis, immunization/preventable, dental; gastroenteritis O:E<2)
O’ Sullivan 1996	all	area	geographic region, insurance status
Pappas, 1997	all	person	race, income (area), uninsured, Medicaid)

<b>Parchman, 1994</b>	all	area, (HSA)	FP-GP/pop ratio, gen IM/pop ratio, gen ped/pop ratio, income
<b>Parchman, 1999</b>	Medicare	person	primary care shortage area, supplemental Medicaid, income, race, education, marital status
<b>Rohrer, 1997</b>	all	area	geographic region
<b>Schreiber, 1997</b>	all	area (zip code)	poverty, race, pop density, primary care MD/pop ratio, health professional shortage area, proximity to hospital
<b>Shi, 1999</b>	all	person	race, income (area), non-MSA, primary care MD, uninsured, Medicare/Medicaid
<b>Shukla, 1997</b>	all	person	race (all conditions), insurance type (diabetes, hypertension, asthma), localities
<b>Silver, 1997</b>	Medicare	area (county)	rural regions of Utah (0/4 anemia, 2/4 asthma, 4/4 cellulitis, 2/4 CHF, 1/4 DM, 3/4 gastric, 2/4 hypertension, 4/4 pneumonia)
<b>Solet, 2000</b>	all	area	income/ poverty status
<b>Taroni, 1997</b>	Italian health system	area (local health unit)	low overall hospital use
<b>Weissman, 1992</b>	all	person	uninsured (0/2 rupt appendix, 1/2 asthma, 2/2 cellulitis, 1/2 CHF, 2/2 DM, 2/2 gangrene, 1/2 hypokalemia, 1/2 immunizable, 2/2 malig. htn. 2/2 pneumonia, 1/2 pyelo, 2/2 ulcer), Medicaid, race

Table 3A. Studies of ACSC indicators.

Study		Acute Myocardial Infarction	Acute Poliomyelitis	Anemia, Iron deficiency	Anemia, any	Angina	Asthma	Asthma & bronchitis	Cellulitis or abscess	Cellulitis, or other soft tissue infection	Cellulitis, abscess, lymphadenitis	Cellulitis with skin graft	Chest pain	Congestive heart failure	CHF (plus pulmonary edema)	CHF and shock	Congenital syphilis	Convulsions 'A' & 'B'	COPD	Dehydration/ volume depletion	Dental conditions	
Begley, 1994	Adult Peds Adult & Peds	X					X								X			X	X			
Bierman, 2000	Adult Peds Adult & Peds						X															
Billings, 1993	Adult Peds Adult & Peds			X		X X	X X			X X	X X				X X		X	X X	X X	X X	X X	X X
Billings, 1996	Adult Peds Adult & Peds			X		X	X			X	X				X		X	X	X	X	X	X
Bindman, 1995	Adult Peds Adult & Peds						X								X				X			
Blustein, 1998	Adult Peds Adult & Peds					X	X			X	X				X				X	X	X	X
Casanova, 1995	Adult Peds Adult & Peds			X		X	X			X					X		X	X	X	X	X	X
Casanova, 1996	Adult Peds Adult & Peds			X		X	X			X					X		X	X	X	X	X	X
Claudio, 1999	Adult Peds Adult & Peds						X															
Connell, 1984	Adult Peds Adult & Peds																					
Culler, 1998	Adult Peds Adult & Peds					X	X			X	X				X			X	X	X		
Djojonegoro 2000	Adult Peds Adult & Peds			X		X	X								X		X	X	X	X	X	X
Gadomski, 1998	Adult Peds Adult & Peds			X			X			X							X	X		X		
Gill, 1997	Adult Peds Adult & Peds					X	X								X				X			
Gill, 1998	Adult Peds Adult & Peds						X			X	X				X			X	X	X	X	X
Guiffrida, 1999	Adult Peds Adult & Peds						X															
Kaestner, 2000	Adult Peds Adult & Peds																	X		X		

Study		Acute Myocardial Infarction	Acute Poliomyelitis	Anemia, Iron deficiency	Anemia, any	Angina	Asthma	Asthma & bronchitis	Cellulitis or abscess	Cellulitis, or other soft tissue infection	Cellulitis, abscess, lymphadenitis	Cellulitis with skin graft	Chest pain	Congestive heart failure	CHF (plus pulmonary edema)	CHF and shock	Congenital syphilis	Convulsions 'A' & 'B'	COPD	Dehydration/ volume depletion	Dental conditions
Krakauer, 1996	Adult Peds Adult & Peds					X	X				X	X			X				X	X	
Laditka, 1999 (JWA)	Adult Peds Adult & Peds					X	X				X	X			X			X	X	X	X
Laditka, 1999 (JHSP)	Adult Peds Adult & Peds			X		X X	X X				X X	X X			X X			X X	X X	X X	X X
McConnochie 1997	Adult Peds Adult & Peds																	X		X	
Millman, 1993	Adult Peds Adult & Peds					X	X				X	X			X		X	X	X	X	X
O'Sullivan, 1996	Adult Peds Adult & Peds			X		X	X				X	X			X			X	X	X	X
Pappas, 1997	Adult Peds Adult & Peds						X		X					X							
Parchman, 1994	Adult Peds Adult & Peds					X	X								X						
Parchman, 1999	Adult Peds Adult & Peds					X	X				X				X			X	X	X	
Rohrer, 1997	Adult Peds Adult & Peds					X		X	X				X			X				X	
Schreiber, 1997	Adult Peds Adult & Peds			X		X	X				X	X			X		X	X	X	X	X
Shi, 1999	Adult Peds Adult & Peds			X		X X	X X				X X	X X			X		X	X	X	X	X
Shukla, 1997	Adult Peds Adult & Peds		X				X														
Silver, 1997	Adult Peds Adult & Peds				X		X			X				X							
Solet, 2000	Adult Peds Adult & Peds						X														
Taroni, 1997	Adult Peds Adult & Peds																				
Weissman, 1992	Adult Peds Adult & Peds						X X		X X					X X							

\*Removed "diabetes mellitus without mention of complication, not stated as uncontrolled"

# Added benign hypertension and hypertensive renal failure

Table 3A, cont. Studies of ACSC indicators.

Study		Diabetes A	Diabetes B	Diabetes C	Diabetes w/ketoacidosis or coma	Diabetes, Uncontrolled	Diabetes with complications	Diabetes, all	Epilepsy or grand mal status	Failure to thrive	Gangrene	Gastroenteritis	Gastrointestinal hemorrhage, upper	High risk/complicated delivery	Hypertension	Hypertension, malignant	Hypoglycemia	Hypokalemia	Immunizable conditions	Immunization-related or preventable	Immunization-preventable pneumonia	Invasive cervical cancer	Kidney/UTI
<b>Begley, 1994</b>	Adult Peds Adult & Peds						X		X								X			X			
<b>Bierman, 2000</b>	Adult Peds Adult & Peds					X															X		
<b>Billings, 1993</b>	Adult Peds Adult & Peds	X X	X X	X X					X X	X		X X			X X		X X			X X			X X
<b>Billings, 1996</b>	Adult Peds Adult & Peds								X	X		X			X		X			X			X
<b>Bindman, 1995</b>	Adult Peds Adult & Peds	X	X	X											X								
<b>Blustein, 1998</b>	Adult Peds Adult & Peds	X	X	X					X			X			X		X			X			X
<b>Casanova, 1995</b>	Adult Peds Adult & Peds	X	X	X					X	X		X			X		X			X			X
<b>Casanova, 1996</b>	Adult Peds Adult & Peds	X	X	X					X	X		X			X		X			X			X
<b>Claudio, 1999</b>	Adult Peds Adult & Peds																						
<b>Connell, 1984</b>	Adult Peds Adult & Peds																						
<b>Culler, 1998</b>	Adult Peds Adult & Peds	X	X	X					X			X			X		X						X
<b>Djojonegoro 2000</b>	Adult Peds Adult & Peds	X	X	X					X			X			X		X			X			X
<b>Gadomski, 1998</b>	Adult Peds Adult & Peds	X	X	X					X	X		X					X			X			X
<b>Gill, 1997</b>	Adult Peds Adult & Peds	X X	X X	X X											X X								
<b>Gill, 1998</b>	Adult Peds Adult & Peds	X	X	X					X			X			X		X						
<b>Guiffrida, 1999</b>	Adult Peds Adult & Peds																						
<b>Kaestner, 2000</b>	Adult Peds Adult & Peds									X		X											

\*\* Separate indicators for pregnancy (646.6+590.1) and others (590.1); removed chronic or NOS pyelonephritis

Table 3A, cont. Studies of ACSC indicators.

Study		Diabetes A	Diabetes B	Diabetes C	Diabetes w/ketoacidosis or coma	Diabetes, Uncontrolled	Diabetes with complications	Diabetes, all	Epilepsy or grand mal status	Failure to thrive	Gangrene	Gastroenteritis	Gastrointestinal hemorrhage, upper	High risk/complicated delivery	Hypertension	Hypertension, malignant	Hypoglycemia	Hypokalemia	Immunizable conditions	Immunization-related or preventable	Immunization-preventable pneumonia	Invasive cervical cancer	Kidney/UTI
Krakauer, 1996	Adult Peds Adult & Peds	X	X	X								X			X		X						X
Laditka, 1999 (JWA)	Adult Peds Adult & Peds	X	X	X					X			X			X		X			X			X
Laditka, 1999 (JHSP)	Adult Peds Adult & Peds	X X	X X	X X					X X	X		X X		X	X X		X X			X X			X X
McConnochie 1997	Adult Peds Adult & Peds									X		X											
Millman, 1993	Adult Peds Adult & Peds	X	X	X					X			X			X		X			X			X
O'Sullivan, 1996	Adult Peds Adult & Peds	X	X	X					X			X			X		X			X			X
Pappas, 1997	Adult Peds Adult & Peds				X						X					X		X	X				
Parchman, 1994	Adult Peds Adult & Peds	X	X	X										X									
Parchman, 1999	Adult Peds Adult & Peds	X	X	X					X			X			X		X						X
Rohrer, 1997	Adult Peds Adult & Peds							X							X								
Schreiber, 1997	Adult Peds Adult & Peds	X	X	X					X	X		X			X		X			X			X
Shi, 1999	Adult Peds Adult & Peds	X X	X X	X X					X X	X		X X			X		X			X X X			X X X
Shukla, 1997	Adult Peds Adult & Peds					X									X							X	
Silver, 1997	Adult Peds Adult & Peds							X*					X		X#								
Solet, 2000	Adult Peds Adult & Peds																						
Taroni, 1997	Adult Peds Adult & Peds																						
Weissman, 1992	Adult Peds Adult & Peds				X X						X X					X X		X X	X X				

\*\* Includes other respiratory TB (012)

Table 3A, cont. Studies of ACSC indicators.

Study		Low infant birth weight	Malignant neoplasm of female breast	Measles	Mumps	Nutritional Deficiency	Otitis Media	Pelvic Inflammatory Disease	Perforated or Bleeding Ulcer	Pneumonia, bacterial (outpatient treatable)	Pneumonia, bacterial (any)	Pneumonia or pleurisy	Pneumonia, Bronchitis, Bronchiolitis, Pharyngitis	Pneumonia, sinusitis	Pyelonephritis	Respiratory infections (including pulmonary TB)	Rheumatic fever	Ruptured appendix	Severe ENT infection	Stroke with hypertension	TB, other	TB, pulmonary
<b>Begley, 1994</b>	Adult Peds Adult & Peds													X	X*					X		
<b>Bierman, 2000</b>	Adult Peds Adult & Peds																					
<b>Billings, 1993</b>	Adult Peds Adult & Peds					X		X		X									X		X	X
<b>Billings, 1996</b>	Adult Peds Adult & Peds					X		X		X									X		X	X
<b>Bindman, 1995</b>	Adult Peds Adult & Peds																					
<b>Blustein, 1998</b>	Adult Peds Adult & Peds					X		X											X		X	X
<b>Casanova, 1995</b>	Adult Peds Adult & Peds					X		X		X									X		X	X
<b>Casanova, 1996</b>	Adult Peds Adult & Peds					X				X									X		X	X
<b>Claudio, 1999</b>																						
<b>Connell, 1984</b>	Adult Peds Adult & Peds																					
<b>Culler, 1998</b>	Adult Peds Adult & Peds									X									X			
<b>Djojonegoro 2000</b>	Adult Peds Adult & Peds					X		X		X									X	X	X	X
<b>Gadomski, 1998</b>	Adult Peds Adult & Peds					X				X									X		X	X
<b>Gill, 1997</b>	Adult Peds Adult & Peds										X								X			
<b>Gill, 1998</b>	Adult Peds Adult & Peds										X								X			
<b>Guiffrida, 1999</b>	Adult Peds Adult & Peds																					
<b>Kaestner, 2000</b>	Adult Peds Adult & Peds																					

\*\* Separate indicators for pregnancy (646.6+590.1) and others (590.1); removed chronic or NOS pyelonephritis



Table 3A, cont. Studies of ACSC indicators.

Study		Low infant birth weight	Malignant neoplasm of female breast	Measles	Mumps	Nutritional Deficiency	Otitis Media	Pelvic Inflammatory Disease	Perforated or Bleeding Ulcer	Pneumonia, bacterial (outpatient treatable)	Pneumonia, bacterial (any)	Pneumonia, or pleurisy	Pneumonia, Bronchitis, Bronchiolitis, Pharyngitis	Pneumonia, sinusitis	Pyelonephritis	Respiratory infections (including pulmonary TB)	Rheumatic fever	Ruptured appendix	Severe ENT infection	Stroke with hypertension	TB, other	TB, pulmonary	
Krakauer, 1996	Adult Peds Adult & Peds									X													
Laditka, 1999 (JWA)	Adult Peds Adult & Peds					X		X		X									X		X	X	
Laditka, 1999 (JHSP)	Adult Peds Adult & Peds					X X		X X		X X									X X		X X	X X	
McConnochie 1997	Adult Peds Adult & Peds																						
Millman, 1993	Adult Peds Adult & Peds									X													
O'Sullivan, 1996	Adult Peds Adult & Peds					X		X		X									X				X
Pappas, 1997	Adult Peds Adult & Peds								X		X				X			X					
Parchman, 1994	Adult Peds Adult & Peds									X X													
Parchman, 1999	Adult Peds Adult & Peds									X									X				
Rohrer, 1997	Adult Peds Adult & Peds						X					X				X							
Schreiber, 1997	Adult Peds Adult & Peds					X		X		X									X		X	X	
Shi, 1999	Adult Peds Adult & Peds					X X		X		X X									X X		X X	X X	
Shukla, 1997	Adult Peds Adult & Peds	X	X														X						X
Silver, 1997	Adult Peds Adult & Peds			X	X								X										
Solet, 2000	Adult Peds Adult & Peds																						
Taroni, 1997	Adult Peds Adult & Peds																						
Weissman, 1992	Adult Peds Adult & Peds								X X		X X				X X			X X					

\* Includes other respiratory TB (01)

Table 4A. Studies of ACSC Indicators- Pediatric Avoidable Hospitalizations

Study	Acute Otitis Media	Acute pyelonephritis	Asthma	Bronchitis	Burns	Congenital Lower Bowel Obstruction***	Diabetic ketoacidosis	Gastroenteritis	Hypematremic***	Immunizable Diseases	Jaundice***	Mastoiditis	Nausea and Vomiting	Obstructive Cardiac Defects***	PID	Upper Respiratory Infection	UTI	Viral Meningitis	Viral Syndrome	Volume depletion***	
<b>Gadomski, 1998</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

\*\*\* Infant readmission within 2 weeks of DOB

Table 5A. Studies of ACSC Indicators- Discretionary Hospitalization of Infants

Study	Croup/Tracheitis	Failure to Thrive	Fever, acute unexplained	Gastroenteritis/ Dehydration	Gastrointestinal disorders, other	Lower Respiratory Illness	Nonspecific signs and symptoms	Seizure w/o intractable mentioned	UTI	Viral Meningitis
<b>Kaestner, 2000</b>	X	X	X	X	X	X	X	X	X	X
<b>McConnochie, 1997</b>	X	X	X	X	X	X	X	X	X	X

Table 6A. Studies of ACSC Indicators- Late Hospitalization

Study	Appendicitis	Diverticular disease	Hernia, External	Peptic Ulcer	Pneumonia, bacterial	Uterine Fibroma
<b>Taroni, 1997</b>	X	X	X	X	X	X

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