

Supplemental tables

Supplemental table 1: The ICD-9 codes for sickle cell disease case identification.

Inclusion Criteria	ICD-9	Comments
At least one inpatient admission with a qualifying diagnosis of sickle cell disease ICD-9CM codes made as discharge diagnosis OR two outpatient visits with a qualifying diagnosis of sickle cell disease ICD-9CM codes at least 30 days apart.	282.41	Sickle cell beta thalassemia without crisis
	282.42	Sickle cell beta thalassemia with crisis
	282.60	Sickle-cell disease, unspecified
	282.61	Hb-SS disease without crisis
	282.62	Hb-SS disease with crisis
	282.63	Sickle-cell/Hb-C disease without crisis
	282.64	Sickle-cell/Hb-C disease with crisis
	282.68	Other sickle-cell disease without crisis
	282.69	Other sickle-cell disease with crisis
Exclusion criteria		
If diagnoses for sickle cell trait presented at any diagnosis field	282.5	Sickle-cell trait
Additional exclusion criteria		
Cancer	140–209	
Solid organ transplantation	V420, V421, V427, V432, V438	
Hematopoietic stem cell transplantation	V42.81, V42.82	

Supplemental table 2: Codes used to identify medication history, medical condition and history of procedures resulting from an inpatient, outpatient or emergency room (ER) encounters. (RuSH Algorithm)

Diagnosis	Code type	Code
Sickle cell disease	ICD-9CM diagnosis	282.6, 282.60, 282.61, 282.62, 282.63, 282.63, 282.64, 282.68, 282.69
Sickle cell disease-related treatments		
Hydroxycarbamide	NDC codes	Redbook reference
Opioid analgesics	NDC codes	
Iron Chelators	NDC codes	
Erythropoietin	NDC codes	
Folic acid	NDC codes	
Sickle cell disease-related procedures		
Transfusion	UB-92 Revenue Code	0380-0391, 0399
	CPT-4 Procedure Code	36430, 36455
	HCPCS Code	P9010, P9011, P9016, P9021, P9022, P9038, P9039, P9040, P9051, P9054, P9057, P9058
	ICD-9CM Procedure Code	99.0, 99.01, 99.02
Splenectomy	ICD-9CM diagnosis	41.43, 41.5
	CPT-4 Procedure Code	38100, 38101, 38120
Cholecystectomy	ICD-9CM diagnosis	575.0
	CPT-4 Procedure Code	47562, 47600
Transcranial Doppler	ICD-9CM diagnosis	88.71
	CPT-4 Procedure Code	93886
Sickle cell disease-related complications		

Vaso-occlusive crisis	ICD-9CM diagnosis	282.42, 282.62, 282.64, 282.69
Chronic renal disease	ICD-9CM diagnosis	585.1, 585.2, 585.3, 791.0
Pneumonia	ICD-9CM diagnosis	480.0-508.9; 486.0
Acute chest syndrome	ICD-9CM diagnosis	517.3
Pulmonary hypertension	ICD-9CM diagnosis	415.0, 416.0; 416.8
Stroke	ICD-9CM diagnosis	430, 431, 432, 433.01, 433.11, 433.21, 433.31, 433.41, 433.51, 433.61, 433.71, 433.81, 433.91, 434, 436
Priapism	ICD-9CM diagnosis	607.3
Iron overload	ICD-9CM diagnosis	275.0
Gallstones/cholelithiasis	ICD-9CM diagnosis	574, 575.10
Avascular necrosis	ICD-9CM diagnosis	733.40-733.44, 733.49
Retinal disease	ICD-9CM diagnosis	362.9
Splenomegaly	ICD-9CM diagnosis	759.0, 789.2
Splenic sequestration	ICD-9CM diagnosis	289.52
Hypersplenism	ICD-9CM diagnosis	289.4
Leg ulcers	ICD-9CM diagnosis	707.10
Dactylitis	ICD-9CM diagnosis	730.1, 095.5, 015.5
Osteomyelitis	ICD-9CM diagnosis	730.0, 730.1, 730.2

UB-92, Uniform/Universal Billing form 92; CPT-4, current procedural terminology codes; HCPCS, Healthcare Common Procedure Coding System; ICD-9 CM, International Classification of Diseases, Ninth Revision, Clinical Modification;

Supplemental table 3: Codes used to identify healthcare utilization and sickle cell disease-related complications.

Diagnosis	Code type	Code
ER visit	Procedure Group Code	110, 111, 114
	Revenue Code	0450-0452, 0456, 0459, 0981
	Place of Service Code	23, 220, 428
	Service Sub-Category Code	10120, 10420, 10320, 10220, 12220, 20220, 10520, 20120, 21120, 21220, 22320, 22120, 30220, 30120, 30420, 30320, 30520, 30620, 31120, 31420, 31320, 31520, 31220, 31620
Whole blood transfusion	CPT-4/HCPCS Procedure Code	P9010, P9011, P9051, P9054, P9056
	ICD-9 CM Procedure	99.03
	ICD-9 CM Diagnosis	V58.2
Packed red blood cells transfusion	CPT-4/HCPCS Procedure Code	P9016, P9021, P9022, P9038-P9040, P9057, P9058
	ICD-9 CM Procedure	99.04
Asthma	ICD-9CM diagnosis	493
Pneumonia	ICD-9CM diagnosis	480-488
Vaso-occlusive crisis	ICD-9CM diagnosis	282.42, 282.62, 282.64, 282.69
Chronic renal disease	ICD-9CM diagnosis	585.1, 585.2, 585.3, 791.0
Pneumonia	ICD-9CM diagnosis	480.0-508.9; 486.0
Acute chest syndrome	ICD-9CM diagnosis	517.3
Pulmonary hypertension	ICD-9CM diagnosis	415.0, 416.0; 416.8

Stroke	ICD-9CM diagnosis	430, 431, 432, 433.01, 433.11, 433.21, 433.31, 433.41, 433.51, 433.61, 433.71, 433.81, 433.91, 434, 436
Priapism	ICD-9CM diagnosis	607.3
Iron overload	ICD-9CM diagnosis	275.0
Gallstones/ cholelithiasis	ICD-9CM diagnosis	574, 575.10
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Supplemental table 4: Multivariate analysis of the **whole adult cohort** on effects of any hydroxycarbamide exposure on all-cause 30-day readmission (subgroup analysis)

Characteristics	Hydroxycarbamide not-exposed in the past 6 months before hospitalization (n=11,247)	Hydroxycarbamide exposed in the past 6 months before hospitalization (n=3,643)	95% CI		p-value
			OR		
Hydroxycarbamide exposure		1.07	0.90	1.27	0.4362
Demographic characteristics					
Male vs. Female		1.00	0.83	1.22	0.962
Age		0.98	0.98	0.99	<.0001
Hospitalization-related variables					
Length of stay (Days)		1.01	1.00	1.02	0.0122
Concomitant ACS or pneumonia diagnosis		0.79	0.70	0.89	0.0002
Concomitant asthma diagnosis		1.06	0.88	1.27	0.5485
Received transfusion		0.82	0.72	0.95	0.0066
Year of admission					
2009		1.15	0.92	1.43	0.2187
2010		1.30	1.06	1.61	0.0139
2011		1.26	1.03	1.53	0.0232
2012		1.26	1.05	1.51	0.0142
2013		1.17	0.99	1.38	0.0589
2014		(Reference)			
Season of admission					
Fall (Sep-Nov)		1.02	0.91	1.14	0.7332
Spring (Mar-May)		0.90	0.81	1.01	0.0777
Summer (Jun-Aug)		0.97	0.87	1.08	0.5354
Winter (Dec-Feb)		(Reference)			
Weekend discharge		1.09	0.99	1.20	0.0843

Baseline concomitant medication exposure and acute care use					
NSAIDs		0.83	0.71	0.97	0.0187
Opioids (in OME)		1.00	1.00	1.00	0.1622
Admitted in the 6-month baseline period		1.67	1.47	1.90	<.0001
ER visits in the 6-month baseline period		1.58	1.39	1.80	<.0001

ACS, acute chest syndrome; OME, oral morphine equivalent; NSAIDs, Nonsteroidal anti-inflammatory drugs; ER, emergency room

Supplemental table 5:. Multivariate analysis of the effects of any hydroxycarbamide exposure on all-cause 30-day readmission

Characteristics	Hydroxycarbamide unexposed hospitalization (n=16,194)	Hydroxycarbamide exposed hospitalization (n=4,527)	95% CI		P-value
			OR		
		OR	95% CI		P-value
Hydroxycarbamide exposure		1.12	0.96	1.31	0.138
Demographic characteristics					
Male vs. Female		0.98	0.83	1.15	0.8175
Age		1.00	1.00	1.00	0.2712
Hospitalization-related variables					
Length of stay (Days)		1.01	1.01	1.02	0.0001
Concomitant ACS or pneumonia diagnosis		0.70	0.63	0.78	<.0001
Concomitant asthma diagnosis		1.03	0.88	1.19	0.731
Received transfusion		0.84	0.74	0.95	0.005
Year of admission					
2009		1.11	0.92	1.34	0.2806
2010		1.22	1.02	1.46	0.0262
2011		1.14	0.96	1.35	0.1348
2012		1.14	0.97	1.34	0.0994
2013		1.15	1.00	1.33	0.0512
2014	(Reference)	1.00	1.00	1.00	
Season of admission					
Fall (Sep-Nov)		1.07	0.97	1.18	0.1621
Spring (Mar-May)		0.97	0.87	1.07	0.5008
Summer (Jun-Aug)		1.01	0.91	1.11	0.9169
Winter (Dec-Feb)	(Reference)	1.00	1.00	1.00	
Weekend discharge		1.05	0.97	1.15	0.2475
NSAIDs		1.00	0.88	1.15	0.9747
Opioids (in OME)		1.00	1.00	1.00	0.1842
Admitted in the 6-month baseline period		1.70	1.52	1.90	<.0001
ER visits in the 6-month baseline period		1.52	1.36	1.70	<.0001

ACS, acute chest syndrome; NSAIDs, Nonsteroidal anti-inflammatory drugs; OME, oral morphine equivalent; ER, emergency room;