

Supplemental Material

Changes in Primary Non-Cardiac Diagnoses over Time Among Elderly Cardiac Intensive Care Unit Patients in the United States

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Supplementary Appendix Table A. Clinical Classification System Diagnoses Assigned to
Each Disease Category

Coronary Artery Disease

- 101 Coronary atherosclerosis and other heart disease
- 100 Acute myocardial infarction

Congestive Heart Failure

- 108 Congestive heart failure; nonhypertensive
- 249 Shock

Dysrhythmias

- 105 Conduction disorders
- 106 Cardiac dysrhythmias

Valvular Heart Disease

- 96 Heart valve disorders

Other Circulatory Diseases

- 114 Peripheral and visceral atherosclerosis
- 99 Hypertension with complications
- 117 Other circulatory disease
- 103 Pulmonary heart disease
- 115 Aortic; peripheral; and visceral artery aneurysms
- 98 Essential hypertension
- 97 Peri-; endo-; and myocarditis; cardiomyopathy
- 116 Aortic and peripheral arterial embolism or thrombosis
- 121 Other diseases of veins and lymphatics
- 107 Cardiac arrest and ventricular fibrillation
- 104 Other and ill-defined heart disease
- 119 Varicose veins of lower extremity
- 245 Syncope
- 213 Cardiac and circulatory congenital anomalies
- 102 Nonspecific chest pain

Respiratory Diseases

- 127 Chronic obstructive pulmonary disease and bronchiectasis
- 128 Asthma
- 131 Respiratory failure; insufficiency; arrest (adult)
- 129 Aspiration pneumonitis; food/vomitus
- 133 Other lower respiratory disease
- 130 Pleurisy; pneumothorax; pulmonary collapse

- 134 Other upper respiratory disease
- 132 Lung disease due to external agents
- 56 Cystic fibrosis

Gastrointestinal Diseases

- 153 Gastrointestinal hemorrhage
- 145 Intestinal obstruction without hernia
- 149 Biliary tract disease
- 155 Other gastrointestinal disorders
- 143 Abdominal hernia
- 152 Pancreatic disorders (not diabetes)
- 138 Esophageal disorders
- 154 Noninfectious gastroenteritis
- 151 Other liver diseases
- 141 Other disorders of stomach and duodenum
- 147 Anal and rectal conditions
- 139 Gastroduodenal ulcer (except hemorrhage)
- 144 Regional enteritis and ulcerative colitis
- 137 Diseases of mouth; excluding dental
- 136 Disorders of teeth and jaw
- 120 Hemorrhoids
- 250 Nausea and vomiting
- 214 Digestive congenital anomalies

Infectious Diseases

- 122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)
- 125 Acute bronchitis
- 126 Other upper respiratory infections
- 123 Influenza
 - 2 Septicemia (except in labor)
- 159 Urinary tract infections
 - 7 Viral infection
 - 4 Mycoses
 - 6 Hepatitis
 - 8 Other infections; including parasitic
 - 3 Bacterial infection; unspecified site
 - 5 HIV infection
 - 1 Tuberculosis
 - 9 Sexually transmitted infections (not HIV or hepatitis)
- 10 Immunizations and screening for infectious disease
- 76 Meningitis (except that caused by tuberculosis or sexually transmitted disease)
- Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)
- 90

- 77 Encephalitis (except that caused by tuberculosis or sexually transmitted disease)
- 78 Other CNS infection and poliomyelitis
- 92 Otitis media and related conditions
- 124 Acute and chronic tonsillitis
- 146 Diverticulosis and diverticulitis
- 135 Intestinal infection
- 140 Gastritis and duodenitis
- 142 Appendicitis and other appendiceal conditions
- 148 Peritonitis and intestinal abscess
- 197 Skin and subcutaneous tissue infections
- 248 Gangrene
- 246 Fever of unknown origin
- Infective arthritis and osteomyelitis (except that caused by tuberculosis or
- 201 sexually transmitted disease)
- 247 Lymphadenitis

Neurologic Conditions

- 109 Acute cerebrovascular disease
- 112 Transient cerebral ischemia
- 110 Occlusion or stenosis of precerebral arteries
- 111 Other and ill-defined cerebrovascular disease
- 113 Late effects of cerebrovascular disease
- 216 Nervous system congenital anomalies
- 89 Blindness and vision defects
- 91 Other eye disorders
- 94 Other ear and sense organ disorders
- 80 Multiple sclerosis
- 87 Retinal detachments; defects; vascular occlusion; and retinopathy
- 82 Paralysis
- 88 Glaucoma
- 86 Cataract
- 653 Delirium, dementia, and amnestic and other cognitive disorders
- 95 Other nervous system disorders
- 83 Epilepsy; convulsions
- 93 Conditions associated with dizziness or vertigo
- 81 Other hereditary and degenerative nervous system conditions
- 79 Parkinson`s disease
- 85 Coma; stupor; and brain damage
- 84 Headache; including migraine

Injuries and Musculoskeletal Diseases

- 226 Fracture of neck of femur (hip)
- 231 Other fractures

- 233 Intracranial injury
- 230 Fracture of lower limb
- 229 Fracture of upper limb
- 239 Superficial injury; contusion
- 244 Other injuries and conditions due to external causes
- 234 Crushing injury or internal injury
- 232 Sprains and strains
- 228 Skull and face fractures
- 225 Joint disorders and dislocations; trauma-related
- 235 Open wounds of head; neck; and trunk
- 236 Open wounds of extremities
- 240 Burns
- 227 Spinal cord injury

Hematologic and Oncologic Diseases

- 42 Secondary malignancies
- 19 Cancer of bronchus; lung
- 14 Cancer of colon
- 47 Other and unspecified benign neoplasm
- 45 Maintenance chemotherapy; radiotherapy
- 29 Cancer of prostate
- 24 Cancer of breast
- 32 Cancer of bladder
- 44 Neoplasms of unspecified nature or uncertain behavior
- 33 Cancer of kidney and renal pelvis
- 38 Non-Hodgkin`s lymphoma
- 17 Cancer of pancreas
- 15 Cancer of rectum and anus
- 25 Cancer of uterus
- 39 Leukemias
- 11 Cancer of head and neck
- 13 Cancer of stomach
- 18 Cancer of other GI organs; peritoneum
- 35 Cancer of brain and nervous system
- 27 Cancer of ovary
- 40 Multiple myeloma
- 16 Cancer of liver and intrahepatic bile duct
- 12 Cancer of esophagus
- 36 Cancer of thyroid
- 21 Cancer of bone and connective tissue
- 23 Other non-epithelial cancer of skin
- 43 Malignant neoplasm without specification of site
- 28 Cancer of other female genital organs

- 46 Benign neoplasm of uterus
- 34 Cancer of other urinary organs
- 41 Cancer; other and unspecified primary
- 26 Cancer of cervix
- 22 Melanomas of skin
- 20 Cancer; other respiratory and intrathoracic
- 37 Hodgkin`s disease
- 31 Cancer of other male genital organs
- 30 Cancer of testis
- 118 Phlebitis; thrombophlebitis and thromboembolism
- 59 Deficiency and other anemia
- 63 Diseases of white blood cells
- 60 Acute posthemorrhagic anemia
- 62 Coagulation and hemorrhagic disorders
- 64 Other hematologic conditions
- 61 Sickle cell anemia

Other Diagnoses

- 157 Acute and unspecified renal failure
- 164 Hyperplasia of prostate
- 170 Prolapse of female genital organs
- 160 Calculus of urinary tract
- 163 Genitourinary symptoms and ill-defined conditions
- 161 Other diseases of kidney and ureters
- 162 Other diseases of bladder and urethra
- 175 Other female genital disorders
- 158 Chronic kidney disease
- 165 Inflammatory conditions of male genital organs
- 166 Other male genital disorders
- 173 Menopausal disorders
- 167 Nonmalignant breast conditions
- 172 Ovarian cyst
- 168 Inflammatory diseases of female pelvic organs
- 156 Nephritis; nephrosis; renal sclerosis
- 169 Endometriosis
- 171 Menstrual disorders
- 215 Genitourinary congenital anomalies
 - 55 Fluid and electrolyte disorders
 - 50 Diabetes mellitus with complications
 - 58 Other nutritional; endocrine; and metabolic disorders
 - 51 Other endocrine disorders
 - 48 Thyroid disorders
 - 54 Gout and other crystal arthropathies

52 Nutritional deficiencies
49 Diabetes mellitus without complication
57 Immunity disorders
53 Disorders of lipid metabolism
259 Residual codes; unclassified
251 Abdominal pain
252 Malaise and fatigue
253 Allergic reactions
257 Other aftercare
243 Poisoning by nonmedicinal substances
254 Rehabilitation care; fitting of prostheses; and adjustment of devices
217 Other congenital anomalies
224 Other perinatal conditions
237 Complication of device; implant or graft
238 Complications of surgical procedures or medical care
660 Alcohol-related disorders
663 Screening and history of mental health and substance abuse codes
651 Anxiety disorders
650 Adjustment disorders
670 Miscellaneous disorders
652 Attention-deficit, conduct, and disruptive behavior disorders
654 Developmental disorders
656 Impulse control disorders, NEC
658 Personality disorders
662 Suicide and intentional self-inflicted injury
655 Disorders usually diagnosed in infancy, childhood, or adolescence
241 Poisoning by psychotropic agents
242 Poisoning by other medications and drugs

Supplementary Appendix Table B. Rankings of Primary Diagnosis Among Fee-for-Service Medicare Beneficiaries with a CICU Stay During Hospitalizations in 2003 and 2013.

Rank	Diagnosis	2003	Rank	Diagnosis	2013
1	Coronary atherosclerosis and other heart disease	16.3%	1	Acute myocardial infarction	12.0%
2	Acute myocardial infarction	16.0%	2	Septicemia (except in labor)	9.2%
3	Congestive heart failure; nonhypertensive	9.3%	3	Cardiac dysrhythmias	7.2%
4	Cardiac dysrhythmias	6.6%	4	Coronary atherosclerosis and other heart disease	7.0%
5	Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	3.3%	5	Congestive heart failure; nonhypertensive	6.9%
6	Complication of device; implant or graft	2.8%	6	Heart valve disorders	4.8%
7	Nonspecific chest pain	2.6%	7	Respiratory failure; insufficiency; arrest (adult)	3.7%
8	Acute cerebrovascular disease	2.5%	8	Acute cerebrovascular disease	3.4%
9	Respiratory failure; insufficiency; arrest (adult)	2.3%	9	Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	2.7%
10	Heart valve disorders	2.3%	10	Complication of device; implant or graft	2.7%
11	Septicemia (except in labor)	1.9%	11	Acute and unspecified renal failure	1.9%
12	Occlusion or stenosis of precerebral arteries	1.8%	12	Gastrointestinal hemorrhage	1.9%
13	Chronic obstructive pulmonary disease and bronchiectasis	1.6%	13	Occlusion or stenosis of precerebral arteries	1.8%
14	Gastrointestinal hemorrhage	1.4%	14	Chronic obstructive pulmonary disease and bronchiectasis	1.7%
15	Hypertension with complications and secondary hypertension	1.3%	15	Aortic; peripheral; and visceral artery aneurysms	1.4%
16	Conduction disorders	1.3%	16	Hypertension with complications and secondary hypertension	1.4%
17	Peripheral and visceral atherosclerosis	1.2%	17	Conduction disorders	1.4%
18	Aortic; peripheral; and visceral artery aneurysms	1.2%	18	Peripheral and visceral atherosclerosis	1.2%
19	Acute and unspecified renal failure	1.1%	19	Complications of surgical procedures or medical care	1.1%
20	Syncope	1.1%	20	Pulmonary heart disease	1.1%

% of all admissions due to the top 20 diagnoses in 2003 and 2013

Supplementary Appendix C. Data Visualization

We created an online data visualization that allows for comparisons of individual discharge diagnosis rankings among any of the study years, either among the entire cohort or stratified by a specific age (65-74, 75-84, 85 and older) and sex subgroup. We present the data in the form of interactive slope graphs and heat map, respectively. These supplements are accessible at:

https://s3-us-west-2.amazonaws.com/colinrcooke/visualization/slopegraph_Sinha.html

and

https://s3-us-west-2.amazonaws.com/colinrcooke/visualization/heatmap_Sinha.html

For each subgroup, we limited the results to primary diagnoses of greater than 100 admissions in each of the study years. Rankings were created by frequency of admissions in each year and relative changes between years are also reported.