Supplemental Table 1: Initial List of Diagnosis Codes Used for Data Cleaning

| Number | ICD-9 Code | Diagnosis Description |
|--------|------------|-----------------------|
| 1      | 194.6      | Malignant Neoplasm of Aortic Body and Other Paraganglia |
| 2      | 249.21     | Secondary Diabetes Mellitus with Hyperosmolarity, Uncontrolled |
| 3      | 250        | Diabetes Mellitus |
| 4      | 250.00     | Diabetes mellitus without mention of complication, type II or unspecified type, not stated as uncontrolled |
| 5      | 250.01     | Diabetes Mellitus without Mention of Complication, Type I [juvenile Type], Not Stated as Uncontrolled |
| 6      | 250.02     | Diabetes mellitus without mention of complication, type II or unspecified type, uncontrolled |
| 7      | 250.03     | Diabetes Mellitus without Mention of Complication, Type I [juvenile Type], Uncontrolled |
| 8      | 250.1      | Diabetes with Ketoacidosis |
| 9      | 250.10     | Diabetes Mellitus with Ketoacidosis, Type II or Unspecified Type, Not Stated as Uncontrolled |
| 10     | 250.11     | Diabetes Mellitus with Ketoacidosis, Type I [juvenile Type], Not Stated as Uncontrolled |
| 11     | 250.12     | Diabetes mellitus with ketoacidosis, type II or unspecified type, uncontrolled |
| 12     | 250.13     | Diabetes Mellitus with Ketoacidosis, Type I [juvenile Type], Uncontrolled |
| 13     | 250.2      | Diabetes Mellitus with Hyperosmolarity |
| 14     | 250.20     | Diabetes mellitus with hyperosmolarity, type II or unspecified type, not stated as uncontrolled |
| 15     | 250.21     | Diabetes Mellitus with Hyperosmolarity, Type I [juvenile Type], Not Stated as Uncontrolled |
| 16     | 250.22     | Diabetes mellitus with hyperosmolarity, type II or unspecified type, uncontrolled |
| 17     | 250.23     | Diabetes Mellitus with Hyperosmolarity, Type I [juvenile Type], Uncontrolled |
| 18     | 250.30     | Diabetes mellitus with other coma, type II or unspecified type, not stated as uncontrolled |
| 19     | 250.31     | Diabetes Mellitus with Other Coma, Type I [juvenile Type], Not Stated as Uncontrolled |
| 20     | 250.32     | Diabetes mellitus with other coma, type II or unspecified type, uncontrolled |
| 21     | 250.33     | Diabetes Mellitus with Other Coma, Type I [juvenile Type], Uncontrolled |
| 22     | 250.40     | Diabetes mellitus with renal manifestations, type II or unspecified type, not stated as uncontrolled |
| 23     | 250.41     | Diabetes Mellitus with Renal Manifestations, Type I [juvenile Type], Not Stated as Uncontrolled |
| 24     | 250.42     | Diabetes mellitus with renal manifestations, type II or unspecified type, uncontrolled |
| 25     | 250.50     | Diabetes mellitus with ophthalmic manifestations, type II or unspecified type, not stated as uncontrolled |
| 26     | 250.61     | Diabetes Mellitus with Neurological Manifestations, Type I [juvenile Type], Not Stated as Uncontrolled |
| 27     | 250.63     | Diabetes Mellitus with Neurological Manifestations, Type I [juvenile Type], Uncontrolled |
| 28     | 250.70     | Diabetes Mellitus with Peripheral Circulatory Disorders, Type II or Unspecified Type, Not Stated as Uncontrolled |
| 29     | 250.72     | Diabetes mellitus with peripheral circulatory disorders, type II or unspecified type, uncontrolled |
| 30     | 250.73     | Diabetes Mellitus with Peripheral Circulatory Disorders, Type I [juvenile Type], Uncontrolled |
| 31     | 250.80     | Diabetes mellitus with other specified manifestations, type II or unspecified type, not stated as uncontrolled |
| 32     | 250.81     | Diabetes Mellitus with Other Specified Manifestations, Type I [juvenile Type], Not Stated as Uncontrolled |
| 33     | 250.82     | Diabetes mellitus with other specified manifestations, type II or unspecified type, uncontrolled |
| 34     | 250.83     | Diabetes Mellitus with Other Specified Manifestations, Type I [juvenile Type], Uncontrolled |
| 35     | 250.90     | Diabetes mellitus with unspecified complication, type II or unspecified type, not stated as uncontrolled |
| 36     | 250.91     | Diabetes Mellitus with Unspecified Complication, Type I [juvenile Type], Not Stated as Uncontrolled |
| 37     | 250.92     | Diabetes mellitus with unspecified complication, type II or unspecified type, uncontrolled |
| 38     | 276.50     | Volume Depletion, Unspecified |
| 39     | 276.52     | Hypovolemia |
| 40     | 285.1      | Acute Posthemorrhagic Anemia |
| 41     | 303        | Alcohol Dependence Syndrome |
| 42     | 303.00     | Acute Alcoholic Intoxication in Alcoholism, Unspecified Drinking Behavior |
| Code  | Description                                                                 |
|-------|-----------------------------------------------------------------------------|
| 43    | 305.00 Alcohol Abuse, Unspecified Drinking Behavior                          |
| 44    | 305.1 Tobacco Use Disorder                                                  |
| 45    | 337.29 Reflex Sympathetic Dystrophy of Other Specified Site                |
| 46    | 362.11 Hypertensive Retinopathy                                            |
| 47    | 401 Essential Hypertension                                                 |
| 48    | 401.1 Benign Essential Hypertension                                         |
| 49    | 401.9 Unspecified Essential Hypertension                                    |
| 50    | 403.10 Hypertensive Chronic Kidney Disease, Benign, with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified |
| 51    | 403.11 Hypertensive Chronic Kidney Disease, Benign, with Chronic Kidney Disease Stage V or End Stage Renal Disease |
| 52    | 405.91 Unspecified Renovascular Hypertension                               |
| 53    | 405.99 Other Unspecified Secondary Hypertension                            |
| 54    | 415.1 Pulmonary Embolism and Infarction                                    |
| 55    | 415.11 Iatrogenic Pulmonary Embolism and Infarction                         |
| 56    | 415.13 Saddle Embolus of Pulmonary Artery                                  |
| 57    | 415.19 Other Pulmonary Embolism and Infarction                             |
| 58    | 416.2 Chronic Pulmonary Embolism                                           |
| 59    | 417.8 Other Specified Diseases of Pulmonary Circulation                     |
| 60    | 430 Subarachnoid Hemorrhage                                                |
| 61    | 431 Intracerebral Hemorrhage                                               |
| 62    | 432.0 Nontraumatic Extracranial Hemorrhage                                 |
| 63    | 432.9 Unspecified Intracranial Hemorrhage                                 |
| 64    | 433.00 Occlusion and Stenosis of Basilar Artery, without Mention of Cerebral Infarction |
| 65    | 433.01 Occlusion and Stenosis of Basilar Artery, with Cerebral Infarction  |
| 66    | 433.10 Occlusion and Stenosis of Carotid Artery, without Mention of Cerebral Infarction |
| 67    | 433.11 Occlusion and Stenosis of Carotid Artery, with Cerebral Infarction  |
| 68    | 433.20 Occlusion and Stenosis of Vertebral Artery, without Mention of Cerebral Infarction |
| 69    | 433.21 Occlusion and Stenosis of Vertebral Artery, with Cerebral Infarction |
| 70    | 433.30 Occlusion and Stenosis of Multiple and Bilateral Precerebral Arteries, without Mention of Cerebral Infarction |
| 71    | 433.31 Occlusion and Stenosis of Multiple and Bilateral Precerebral Arteries, with Cerebral Infarction |
| 72    | 433.80 Occlusion and Stenosis of Other Specified Precerebral Artery, without Mention of Cerebral Infarction |
| 73    | 433.81 Occlusion and Stenosis of Other Specified Precerebral Artery, with Cerebral Infarction |
| 74    | 434.00 Cerebral Thrombosis, without Mention of Cerebral Infarction         |
| 75    | 434.01 Cerebral Thrombosis, with Cerebral Infarction                       |
| 76    | 434.10 Cerebral Embolism, without Mention of Cerebral Infarction           |
| 77    | 434.11 Cerebral Embolism, with Cerebral Infarction                         |
| 78    | 434.90 Cerebral Artery Occlusion, Unspecified, without Mention of Cerebral Infarction |
| 79    | 434.91 Cerebral Artery Occlusion, Unspecified, with Cerebral Infarction    |
| 80    | 435.8 Other Specified Transient Cerebral Ischemias                         |
| 81    | 435.9 Unspecified Transient Cerebral Ischemia                              |
| 82    | 436 Acute, but Ill-Defined, Cerebrovascular Disease                        |
| 83    | 437.0 Cerebral Atherosclerosis                                              |
| 84    | 437.2 Hypertensive Encephalopathy                                          |
| 85    | 437.8 Other Ill-Defined Cerebrovascular Disease                            |
| 86    | 437.9 Unspecified Cerebrovascular Disease                                  |
| 87    | 438.9 Unspecified Late Effects of Cerebrovascular Disease                  |
| Code | Description |
|------|-------------|
| 453.40 | Acute Venous Embolism and Thrombosis of Unspecified Deep Vessels of Lower Extremity |
| 453.41 | Acute Venous Embolism and Thrombosis of Deep Vessels of Proximal Lower Extremity |
| 453.51 | Chronic Venous Embolism and Thrombosis of Deep Vessels of Proximal Lower Extremity |
| 453.77 | Chronic Venous Embolism and Thrombosis of Other Thoracic Veins |
| 453.9 | Embolism and Thrombosis of Unspecified Site |
| 557.9 | Unspecified Vascular Insufficiency of Intestine |
| 642.01 | Benign Essential Hypertension Complicating Pregnancy, Childbirth, and the Puerperium, Delivered, with or without Mention of Antepartum Condition |
| 642.03 | Benign Essential Hypertension Complicating Pregnancy, Childbirth, and the Puerperium, Antepartum Condition or Complication |
| 642.04 | Benign Essential Hypertension Complicating Pregnancy, Childbirth, and the Puerperium, Postpartum Condition or Complication |
| 642.13 | Hypertension Secondary to Renal Disease, Complicating Pregnancy, Childbirth, and the Puerperium, Antepartum Condition or Complication |
| 642.14 | Hypertension Secondary to Renal Disease, Complicating Pregnancy, Childbirth, and the Puerperium, Postpartum Condition or Complication |
| 642.21 | Other Pre-Existing Hypertension Complicating Pregnancy, Childbirth, and the Puerperium, Delivered, with or without Mention of Antepartum Condition |
| 642.23 | Other Pre-Existing Hypertension Complicating Pregnancy, Childbirth, and the Puerperium, Antepartum Condition or Complication |
| 642.24 | Other Pre-Existing Hypertension Complicating Pregnancy, Childbirth, and the Puerperium, Postpartum Condition or Complication |
| 642.31 | Transient Hypertension of Pregnancy, Delivered, with or without Mention of Antepartum Condition |
| 642.73 | Pre-Eclampsia or Eclampsia Superimposed on Pre-Existing Hypertension, Antepartum Condition or Complication |
| 642.74 | Pre-Eclampsia or Eclampsia Superimposed on Pre-Existing Hypertension, Postpartum Condition or Complication |
| 642.91 | Unspecified Hypertension Complicating Pregnancy, Childbirth, or the Puerperium, Delivered, with or without Mention of Antepartum Condition |
| 642.93 | Unspecified Hypertension Complicating Pregnancy, Childbirth, or the Puerperium, Antepartum Condition or Complication |
| 642.94 | Unspecified Hypertension Complicating Pregnancy, Childbirth, or the Puerperium, Postpartum Condition or Complication |
| 648.03 | Diabetes Mellitus Complicating Pregnancy, Childbirth, or the Puerperium, Antepartum Condition or Complication |
| 796.2 | Elevated Blood Pressure Reading without Diagnosis of Hypertension |
| 861.02 | Laceration of Heart without Penetration of Heart Chambers or Open Wound Into Thorax |
| 861.10 | Unspecified Injury of Heart with Open Wound Into Thorax |
| 861.12 | Laceration of Heart without Penetration of Heart Chambers, with Open Wound Into Thorax |
| 861.13 | Laceration of Heart with Penetration of Heart Chambers and Open Wound Into Thorax |
| 901.0 | Injury to Thoracic Aorta |
| 901.40 | Injury to Pulmonary Vessel(s), Unspecified |
| 901.81 | Injury to Intercostal Artery or Vein |
| 965.01 | Poisoning by Heroin |
| 965.09 | Poisoning by Other Opiates and Related Narcotics |
| 965.4 | Poisoning by Aromatic Analgesics, Not Elsewhere Classified |
| 969.4 | Poisoning by Benzo diazepine-Based Tranquilizers |
| 996.82 | Complications of Transplanted Liver |
| 996.84 | Complications of Transplanted Lung |
| 996.85 | Complications of Bone Marrow Transplant |
| 996.86 | Complications of Transplanted Pancreas |
| 996.89 | Complications of Other Transplanted Organ |
| 997.91 | Hypertension |
| V11.3 | Personal History of Alcoholism |
| V15.82 | Personal History of Tobacco Use |
| V42.7 | Liver Replaced by Transplant |
| V42.83 | Pancreas Replaced by Transplant |
| 074.21 | Coxsackie Pericarditis |
| 112.81 | Candidal Endocarditis |
133 164.1 Malignant Neoplasm of Heart
134 212.7 Benign Neoplasm of Heart
135 272.0 Pure Hypercholesterolemia
136 272.2 Mixed Hyperlipidemia
137 272.4 Other and Unspecified Hyperlipidemia
138 272.6 Lipodystrophy
139 272.7 Lipidoses
140 272.9 Unspecified Disorder of Lipoid Metabolism
141 276.6 Fluid Overload
142 337.01 Carotid Sinus Syndrome
143 391.0 Acute Rheumatic Pericarditis
144 391.1 Acute Rheumatic Endocarditis
145 391.8 Other Acute Rheumatic Heart Disease
146 394 Diseases of Mitral Valve
147 394.0 Mitral Stenosis
148 394.1 Rheumatic Mitral Insufficiency
149 394.2 Mitral Stenosis with Insufficiency
150 394.9 Other and Unspecified Mitral Valve Diseases
151 395.0 Rheumatic Aortic Stenosis
152 395.1 Rheumatic Aortic Insufficiency
153 395.2 Rheumatic Aortic Stenosis with Insufficiency
154 396.0 Mitral Valve Stenosis and Aortic Valve Stenosis
155 396.1 Mitral Valve Stenosis and Aortic Valve Insufficiency
156 396.2 Mitral Valve Insufficiency and Aortic Valve Stenosis
157 396.3 Mitral Valve Insufficiency and Aortic Valve Insufficiency
158 396.8 Multiple Involvement of Mitral and Aortic Valves
159 396.9 Mitral and Aortic Valve Diseases, Unspecified
160 397.0 Diseases of Tricuspid Valve
161 398.90 Rheumatic Heart Disease, Unspecified
162 398.91 Rheumatic Heart Failure (Congestive)
163 401.0 Malignant Essential Hypertension
164 402.00 Hypertensive Heart Disease, Malignant, without Heart Failure
165 402.01 Hypertensive Heart Disease, Malignant, with Heart Failure
166 402.10 Hypertensive Heart Disease, Benign, without Heart Failure
167 402.11 Hypertensive Heart Disease, Benign, with Heart Failure
168 402.90 Hypertensive Heart Disease, Unspecified, without Heart Failure
169 402.91 Hypertensive Heart Disease, Unspecified, with Heart Failure
170 404.00 Hypertensive Heart and Chronic Kidney Disease, Malignant, without Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified
171 404.02 Hypertensive Heart and Chronic Kidney Disease, Malignant, without Heart Failure and with Chronic Kidney Disease Stage V or End Stage Renal Disease
172 404.11 Hypertensive Heart and Chronic Kidney Disease, Benign, with Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified
173 404.12 Hypertensive Heart and Chronic Kidney Disease, Benign, without Heart Failure and with Chronic Kidney Disease Stage V or End Stage Renal Disease
174 404.13 Hypertensive Heart and Chronic Kidney Disease, Benign, with Heart Failure and Chronic Kidney Disease Stage V or End Stage Renal Disease
175 404.90 Hypertensive Heart and Chronic Kidney Disease, Unspecified, without Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified
176 404.92 Hypertensive Heart and Chronic Kidney Disease, Unspecified, without Heart Failure and with Chronic Kidney Disease Stage V or End Stage Renal Disease
177 405.01 Malignant Renovascular Hypertension
Acute Myocardial Infarction

Acute Myocardial Infarction, of Anterolateral Wall

Acute Myocardial Infarction, of Anterolateral Wall, Episode of Care Unspecified

Acute Myocardial Infarction, of Anterolateral Wall, Initial Episode of Care

Acute Myocardial Infarction, of Anterolateral Wall, Subsequent Episode of Care

Acute Myocardial Infarction, of Other Anterior Wall, Episode of Care Unspecified

Acute Myocardial Infarction, of Other Anterior Wall, Initial Episode of Care

Acute Myocardial Infarction, of Other Anterior Wall, Subsequent Episode of Care

Acute Myocardial Infarction, of Inferolateral Wall, Episode of Care Unspecified

Acute Myocardial Infarction, of Inferolateral Wall, Initial Episode of Care

Acute Myocardial Infarction, of Inferolateral Wall, Subsequent Episode of Care

Acute Myocardial Infarction, of Inferoposterior Wall

Acute Myocardial Infarction, of Inferoposterior Wall, Episode of Care Unspecified

Acute Myocardial Infarction, of Inferoposterior Wall, Initial Episode of Care

Acute Myocardial Infarction, of Inferoposterior Wall, Subsequent Episode of Care

Acute Myocardial Infarction, of Other Inferior Wall

Acute Myocardial Infarction, of Other Inferior Wall, Episode of Care Unspecified

Acute Myocardial Infarction, of Other Inferior Wall, Initial Episode of Care

Acute Myocardial Infarction, of Other Inferior Wall, Subsequent Episode of Care

Acute Myocardial Infarction, True Posterior Wall Infarction, Initial Episode of Care

Acute Myocardial Infarction, True Posterior Wall Infarction, Initial Episode of Care

Acute Myocardial Infarction, Subendocardial Infarction

Acute Myocardial Infarction, Subendocardial Infarction, Episode of Care Unspecified

Acute Myocardial Infarction, Subendocardial Infarction, Initial Episode of Care

Acute Myocardial Infarction, Subendocardial Infarction, Subsequent Episode of Care

Acute Myocardial Infarction, of Other Specified Sites, Episode of Care Unspecified

Acute Myocardial Infarction, of Other Specified Sites, Initial Episode of Care

Acute Myocardial Infarction, of Other Specified Sites, Subsequent Episode of Care

Acute Myocardial Infarction, Unspecified Site

Acute Myocardial Infarction, Unspecified Site, Episode of Care Unspecified

Acute Myocardial Infarction, Unspecified Site, Initial Episode of Care

Acute Myocardial Infarction, Unspecified Site, Subsequent Episode of Care

Postmyocardial Infarction Syndrome

Intermediate Coronary Syndrome

Acute Coronary Occlusion without Myocardial Infarction

Other Acute and Subacute Forms of Ischemic Heart Disease

Old Myocardial Infarction

Angina Pectoris

Angina Decubitus

Prinzmetal Angina

Other and Unspecified Angina Pectoris

Coronary Atherosclerosis

Coronary Atherosclerosis of Unspecified Type of Vessel, Native or Graft

Coronary Atherosclerosis of Native Coronary Artery
Coronary Atherosclerosis of Autologous Vein Bypass Graft
Coronary Atherosclerosis of Artery Bypass Graft
Coronary Atherosclerosis of Unspecified Type of Bypass Graft
Coronary Atherosclerosis of Native Coronary Artery of Transplanted Heart
Aneurysm of Heart (Wall)
Aneurysm of Coronary Vessels
Dissection of Coronary Artery
Other Aneurysm of Heart
Chronic Total Occlusion of Coronary Artery
Coronary Atherosclerosis Due to Calcified Coronary Lesion
Other Specified Forms of Chronic Ischemic Heart Disease
Chronic Ischemic Heart Disease, Unspecified
Aneurysm of Pulmonary Artery
Acute Pericarditis
Acute Pericarditis, Unspecified
Acute and Subacute Bacterial Endocarditis
Acute Endocarditis, Unspecified
Acute Myocarditis, Unspecified
Idiopathic Myocarditis
Other Acute Myocarditis
Hemopericardium
Adhesive Pericarditis
Constrictive Pericarditis
Cardiac Tamponade
Other Specified Diseases of Pericardium
Unspecified Disease of Pericardium
Mitrail Valve Disorders
Aortic Valve Disorders
Tricuspid Valve Disorders, Specified as Nonrheumatic
Pulmonary Valve Disorders
Endocarditis, Valve Unspecified, Unspecified Cause
Endocarditis in Diseases Classified Elsewhere
Cardiomyopathy
Hypertrophic Cardiomyopathy
Hypertrophic Obstructive Cardiomyopathy
Other Hypertrophic Cardiomyopathy
Endocardial Fibroelastosis
Other Primary Cardiomyopathies
Alcoholic Cardiomyopathy
Cardiomyopathy in Other Diseases Classified Elsewhere
Secondary Cardiomyopathy, Unspecified
Atrioventricular Block, Complete
| Code  | Description                                                |
|-------|------------------------------------------------------------|
| 268   | Atrioventricular Block, Unspecified                        |
| 269   | First Degree Atrioventricular Block                        |
| 270   | Mobitz (Type) II Atrioventricular Block                    |
| 271   | Other Second Degree Atrioventricular Block                 |
| 272   | Left Bundle Branch Hemiblock                              |
| 273   | Other Left Bundle Branch Block                             |
| 274   | Right Bundle Branch Block                                 |
| 275   | Bundle Branch Block, Unspecified                          |
| 276   | Right Bundle Branch Block and Left Posterior Fascicular Block |
| 277   | Right Bundle Branch Block and Left Anterior Fascicular Block |
| 278   | Other Bilateral Bundle Branch Block                        |
| 279   | Trifascicular Block                                        |
| 280   | Other Heart Block                                          |
| 281   | Anomalous Atrioventricular Excitation                      |
| 282   | Long QT Syndrome                                           |
| 283   | Other Specified Conduction Disorders                       |
| 284   | Conduction Disorder, Unspecified                          |
| 285   | Paroxysmal Supraventricular Tachycardia                    |
| 286   | Paroxysmal Ventricular Tachycardia                         |
| 287   | Paroxysmal Tachycardia, Unspecified                       |
| 288   | Atrial Fibrillation and Flutter                            |
| 289   | Atrial Fibrillation                                        |
| 290   | Atrial Flutter                                             |
| 291   | Ventricular Fibrillation                                   |
| 292   | Ventricular Flutter                                        |
| 293   | Cardiac Arrest                                             |
| 294   | Premature Beats, Unspecified                               |
| 295   | Supraventricular Premature Beats                           |
| 296   | Other Premature Beats                                      |
| 297   | Sinoatrial Node Dysfunction                                |
| 298   | Other Specified Cardiac Dysrhythmias                       |
| 299   | Cardiac Dysrhythmia, Unspecified                          |
| 300   | Heart Failure                                              |
| 301   | Congestive Heart Failure, Unspecified                      |
| 302   | Left Heart Failure                                         |
| 303   | Systolic Heart Failure                                     |
| 304   | Unspecified Systolic Heart Failure                         |
| 305   | Acute Systolic Heart Failure                               |
| 306   | Chronic Systolic Heart Failure                             |
| 307   | Acute on Chronic Systolic Heart Failure                    |
| 308   | Diastolic Heart Failure                                    |
| 309   | Unspecified Diastolic Heart Failure                        |
| 310   | Acute Diastolic Heart Failure                              |
| 311   | Chronic Diastolic Heart Failure                            |
| 312   | Acute on Chronic Diastolic Heart Failure                   |
| Code  | Description                                                                                           |
|-------|-------------------------------------------------------------------------------------------------------|
| 313   | Unspecified Combined Systolic and Diastolic Heart Failure                                           |
| 314   | Acute Combined Systolic and Diastolic Heart Failure                                                 |
| 315   | Chronic Combined Systolic and Diastolic Heart Failure                                                |
| 316   | Acute on Chronic Combined Systolic and Diastolic Heart Failure                                      |
| 317   | Heart Failure, Unspecified                                                                          |
| 318   | Myocarditis, Unspecified                                                                             |
| 319   | Myocardial Degeneration                                                                             |
| 320   | Cardiovascular Disease, Unspecified                                                                  |
| 321   | Cardiomegaly                                                                                         |
| 322   | Functional Disturbances Following Cardiac Surgery                                                    |
| 323   | Rupture of Chordae Tendineae                                                                       |
| 324   | Rupture of Papillary Muscle                                                                         |
| 325   | Cardiac Septal Defect, Sequela of Myocardial Infarction                                             |
| 326   | Other Sequelae of Myocardial Infarction, Not Elsewhere Classified                                   |
| 327   | Takotsubo Syndrome                                                                                  |
| 328   | Other Ill-Defined Heart Diseases                                                                    |
| 329   | Heart Failure, Unspecified                                                                          |
| 330   | Atherosclerosis                                                                                      |
| 331   | Atherosclerosis of Aorta                                                                            |
| 332   | Atherosclerosis of Native Arteries of the Extremities, Unspecified                                  |
| 333   | Atherosclerosis of Native Arteries of the Extremities with Intermittent Claudication                 |
| 334   | Atherosclerosis of the Extremities with Rest Pain                                                    |
| 335   | Atherosclerosis of Native Arteries of the Extremities with Ulceration                                |
| 336   | Atherosclerosis of Native Arteries of the Extremities with Gangrene                                 |
| 337   | Atherosclerosis of Bypass Graft of the Extremities, Unspecified Graft                                |
| 338   | Atherosclerosis of Autologous Vein Bypass Graft of the Extremities                                  |
| 339   | Atherosclerosis of Nonautologous Biological Bypass Graft of the Extremities                         |
| 340   | Atherosclerosis of Other Specified Arteries                                                         |
| 341   | Dissecting Aneurysm of Aorta, Unspecified Site                                                       |
| 342   | Dissecting Aneurysm of Thoracic Aorta                                                                |
| 343   | Dissecting Aneurysm of Thoracoabdominal Aorta                                                       |
| 344   | Thoracic Aortic Aneurysm, Ruptured                                                                  |
| 345   | Thoracic Aortic Aneurysm without Mention of Rupture                                                  |
| 346   | Abdominal Aortic Aneurysm, Ruptured                                                                 |
| 347   | Abdominal Aortic Aneurysm without Mention of Rupture                                                 |
| 348   | Aortic Aneurysm of Unspecified Site, Ruptured                                                       |
| 349   | Thoracoabdominal Aortic Aneurysm, Ruptured                                                          |
| 350   | Thoracoabdominal Aortic Aneurysm, without Mention of Rupture                                        |
| 351   | Aortic Aneurysm of Unspecified Site without Mention of Rupture                                       |
| 352   | Aneurysm of Unspecified Artery Site                                                                  |
| 353   | Dissection of Other Artery                                                                          |
| 354   | Peripheral Vascular Disease, Unspecified                                                            |
| 355   | Embolism and Thrombosis of Thoracic Aorta                                                           |
| 356   | Arterial Embolism and Thrombosis of Lower Extremity                                                  |
| 357   | Rupture of Artery                                                                                   |
| Code    | Description                                                                 |
|---------|-----------------------------------------------------------------------------|
| 358 447.71 | Thoracic Aortic Ectasia                                                     |
| 359 447.8  | Other Specified Disorders of Arteries and Arterioles                        |
| 360 458   | Hypotension                                                                 |
| 361 458.0 | Orthostatic Hypotension                                                    |
| 362 458.1 | Chronic Hypotension                                                        |
| 363 458.29| Other Iatrogenic Hypotension                                               |
| 364 458.8 | Other Specified Hypotension                                                |
| 365 458.9 | Hypotension, Unspecified                                                  |
| 366 459.89| Other Specified Circulatory System Disorders                               |
| 367 459.9 | Unspecified Circulatory System Disorder                                    |
| 368 557.0 | Acute Vascular Insufficiency of Intestine                                  |
| 369 648.51| Congenital Cardiovascular Disorders Complicating Pregnancy, Childbirth, or Puerperium, Delivered, with or without Mention of Antepartum Condition |
| 370 648.61| Other Cardiovascular Diseases Complicating Pregnancy, Childbirth, or the Puerperium, Delivered, with or without Mention of Antepartum Condition |
| 371 648.63| Other Cardiovascular Diseases Complicating Pregnancy, Childbirth, or the Puerperium, Antepartum Condition or Complication |
| 372 674.51| Peripartum Cardiomyopathy, Delivered, with or without Mention of Antepartum Condition |
| 373 674.54| Peripartum Cardiomyopathy, Postpartum Condition or Complication            |
| 374 745.0 | Common Truncus                                                             |
| 375 745.10| Complete Transposition of Great Vessels                                    |
| 376 745.11| Double Outlet Right Ventricle                                              |
| 377 745.2 | Tetralogy of Fallot                                                        |
| 378 745.3 | Common Ventricle                                                           |
| 379 745.4 | Ventricular Septal Defect                                                  |
| 380 745.5 | Ostium Secundum Type Atrial Septal Defect                                  |
| 381 745.69| Other Endocardial Cushion Defects                                          |
| 382 746.01| Atresia of Pulmonary Valve, Congenital                                     |
| 383 746.09| Other Congenital Anomalies of Pulmonary Valve                              |
| 384 746.3 | Congenital Stenosis of Aortic Valve                                        |
| 385 746.4 | Congenital Insufficiency of Aortic Valve                                   |
| 386 746.81| Subaortic Stenosis, Congenital                                             |
| 387 746.82| Cor Triatriatum                                                            |
| 388 746.83| Infundibular Pulmonic Stenosis, Congenital                                 |
| 389 746.85| Coronary Artery Anomaly, Congenital                                        |
| 390 746.86| Congenital Heart Block                                                     |
| 391 746.87| Malposition of Heart and Cardiac Apex                                      |
| 392 746.89| Other Specified Congenital Anomalies of Heart                              |
| 393 746.9 | Unspecified Congenital Anomaly of Heart                                    |
| 394 747.0 | Patent Ductus Arteriosus                                                   |
| 395 747.10| Coarctation of Aorta (Preactual) (Postdactal)                               |
| 396 747.20| Congenital Anomaly of Aorta, Unspecified                                  |
| 397 747.21| Congenital Anomalies of Aortic Arch                                       |
| 398 747.22| Congenital Atresia and Stenosis of Aorta                                  |
| 399 747.29| Other Congenital Anomalies of Aorta                                        |
| 400 747.3 | Anomalies of Pulmonary Artery, Congenital                                  |
| 401 747.31| Pulmonary Artery Coarctation and Atresia                                  |
| 402 747.32| Pulmonary Arteriovenous Malformation                                      |
| Code | Description |
|------|-------------|
| 403  | Other Anomalies of Pulmonary Artery and Pulmonary Circulation |
| 404  | Partial Anomalous Pulmonary Venous Connection |
| 405  | Other Anomalies of Great Veins |
| 406  | Congenital Anomaly of the Peripheral Vascular System, Unspecified Site |
| 407  | Congenital Anomaly of Upper Limb Vessel |
| 408  | Congenital Anomalies of Other Specified Sites of Peripheral Vascular System |
| 409  | Anomalies of Cerebrovascular System, Congenital |
| 410  | Congenital Anomaly of Spinal Vessel |
| 411  | Other Specific Congenital Anomalies of Circulatory System |
| 412  | Unspecified Congenital Anomaly of Circulatory System |
| 413  | Edema |
| 414  | Tachycardia, Unspecified |
| 415  | Palpitations |
| 416  | Undiagnosed Cardiac Murmurs |
| 417  | Other Abnormal Heart Sounds |
| 418  | Shock without Mention of Trauma |
| 419  | Shock, Unspecified |
| 420  | Cardiogenic Shock |
| 421  | Other Shock without Mention of Trauma |
| 422  | Other Symptoms Involving Cardiovascular System |
| 423  | Chest Pain |
| 424  | Unspecified Chest Pain |
| 425  | Precordial Pain |
| 426  | Other Chest Pain |
| 427  | Nonspecific Abnormal Function Study, Cardiovascular, Unspecified |
| 428  | Nonspecific Abnormal Electrocardiogram [ECG] [ekg] |
| 429  | Other Nonspecific Abnormal Function Study of Cardiovascular System |
| 430  | Nonspecific Low Blood Pressure Reading |
| 431  | Contusion of Heart without Mention of Open Wound Into Thorax |
| 432  | Poisoning by Cocaine |
| 433  | Poisoning by Cardiac Rhythm Regulators |
| 434  | Poisoning by Coronary Vasodilators |
| 435  | Poisoning by Other Antihypertensive Agents |
| 436  | Poisoning by Other and Unspecified Agents Primarily Affecting the Cardiovascular System |
| 437  | Poisoning by Other Diuretics |
| 438  | Shock Due to Anesthesia, Not Elsewhere Classified |
| 439  | Mechanical Complications of Unspecified Cardiac Device, Implant, and Graft |
| 440  | Mechanical Complication Due to Cardiac Pacemaker (Electrode) |
| 441  | Mechanical Complication Due to Heart Valve Prosthesis |
| 442  | Mechanical Complication Due to Coronary Bypass Graft |
| 443  | Mechanical Complication Due to Automatic Implantable Cardiac Defibrillator |
| 444  | Other Mechanical Complication of Cardiac Device, Implant, and Graft |
| 445  | Mechanical Complication of Other Vascular Device, Implant, and Graft |
| 446  | Infection and Inflammatory Reaction Due to Cardiac Device, Implant, and Graft |
| 447  | Other Complications Due to Heart Valve Prosthesis |
| Code | Description |
|------|-------------|
| 996.72 | Other Complications Due to Other Cardiac Device, Implant, and Graft |
| 996.74 | Other Complications Due to Other Vascular Device, Implant, and Graft |
| 996.83 | Complications of Transplanted Heart |
| 997.1 | Cardiac Complications, Not Elsewhere Classified |
| 998.00 | Postoperative Shock, Unspecified |
| 998.01 | Postoperative Shock, Cardiogenic |
| 998.09 | Postoperative Shock, Other |
| 998.11 | Hemorrhage Complicating a Procedure |
| V12.53 | Personal History of Sudden Cardiac Arrest |
| V12.59 | Other Personal History of Diseases of Circulatory System |
| V13.65 | Personal History of (Corrected) Congenital Malformations of Heart and Circulatory System |
| V15.1 | Personal History of Surgery to Heart and Great Vessels, Presenting Hazards to Health |
| V17.49 | Family History of Other Cardiovascular Diseases |
| V42.1 | Heart Transplant |
| V43.3 | Heart Valve Replaced by Other Means |
| V45.01 | Cardiac Pacemaker in Situ |
| V45.02 | Automatic Implantable Cardiac Defibrillator in Situ |
| V45.81 | Postsurgical Aortocoronary Bypass Status |
| V45.82 | Percutaneous Transluminal Coronary Angioplasty, Postsurgical Status |
| V53.31 | Fitting and Adjustment of Cardiac Pacemaker |
| V53.32 | Fitting and Adjustment of Automatic Implantable Cardiac Defibrillator |
| V53.39 | Fitting and Adjustment of Other Cardiac Device |
| V58.81 | Encounter for Fitting and Adjustment of Vascular Catheter |
| V71.7 | Observation for Suspected Cardiovascular Disease |
| V72.81 | Preoperative Cardiovascular Examination |
| V81.2 | Screening for Other and Unspecified Cardiovascular Conditions |

Abbreviations: ICD-9, International Classification of Diseases, Ninth Edition
| Number | ICD-9 Code | Diagnosis Description |
|--------|------------|-----------------------|
| 1       | 074.21     | Coxsackie Pericarditis |
| 2       | 112.81     | Candidal Endocarditis  |
| 3       | 164.1      | Malignant Neoplasm of Heart |
| 4       | 212.7      | Benign Neoplasm of Heart |
| 5       | 272.0      | Pure Hypercholesterolemia |
| 6       | 272.2      | Mixed Hyperlipidemia    |
| 7       | 272.4      | Other and Unspecified Hyperlipidemia |
| 8       | 272.6      | Lipodystrophy           |
| 9       | 272.7      | Lipidoses               |
| 10      | 272.9      | Unspecified Disorder of Lipoid Metabolism |
| 11      | 276.6      | Fluid Overload          |
| 12      | 337.01     | Carotid Sinus Syndrome |
| 13      | 391.0      | Acute Rheumatic Pericarditis |
| 14      | 391.1      | Acute Rheumatic Endocarditis |
| 15      | 391.8      | Other Acute Rheumatic Heart Disease |
| 16      | 394.0      | Diseases of Mitral Valve |
| 17      | 394.1      | Mitral Stenosis         |
| 18      | 394.2      | Mitral Stenosis with Insufficiency |
| 19      | 394.9      | Other and Unspecified Mitral Valve Diseases |
| 20      | 395.0      | Rheumatic Aortic Stenosis |
| 21      | 395.1      | Rheumatic Aortic Insufficiency |
| 22      | 395.2      | Rheumatic Aortic Stenosis with Insufficiency |
| 23      | 395.3      | Rheumatic Heart Disease, Unspecified |
| 24      | 396.0      | Mitral Valve Stenosis and Aortic Valve Stenosis |
| 25      | 396.1      | Mitral Valve Stenosis and Aortic Valve Insufficiency |
| 26      | 396.2      | Mitral Valve Insufficiency and Aortic Valve Stenosis |
| 27      | 396.3      | Mitral Valve Insufficiency and Aortic Valve Insufficiency |
| 28      | 396.4      | Multiple Involvement of Mitral and Aortic Valves |
| 29      | 396.5      | Mitral and Aortic Valve Diseases, Unspecified |
| 30      | 397.0      | Diseases of Tricuspid Valve |
| 31      | 398.90     | Rheumatic Heart Disease, Unspecified |
| 32      | 398.91     | Rheumatic Heart Failure (Congenital) |
| 33      | 401.0      | Malignant Essential Hypertension |
| 34      | 402.00     | Hypertensive Heart Disease, Malignant, without Heart Failure |
| 35      | 402.01     | Hypertensive Heart Disease, Malignant, with Heart Failure |
| 36      | 402.10     | Hypertensive Heart Disease, Benign, without Heart Failure |
| 37      | 402.11     | Hypertensive Heart Disease, Benign, with Heart Failure |
| 38      | 402.90     | Hypertensive Heart Disease, Unspecified, without Heart Failure |
| 39      | 402.91     | Hypertensive Heart Disease, Unspecified, with Heart Failure |
| 40      | 404.00     | Hypertensive Heart and Chronic Kidney Disease, Malignant, without Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified |
| 41      | 404.01     | Hypertensive Heart and Chronic Kidney Disease, Benign, without Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified |
| 42      | 404.10     | Hypertensive Heart and Chronic Kidney Disease, Benign, with Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified |
| 43      | 404.11     | Hypertensive Heart and Chronic Kidney Disease, Benign, with Heart Failure and with Chronic Kidney Disease Stage V or End Stage Renal Disease |
| 44      | 404.12     | Hypertensive Heart and Chronic Kidney Disease, Benign, with Heart Failure and with Chronic Kidney Disease Stage V or End Stage Renal Disease |
| 45      | 404.13     | Hypertensive Heart and Chronic Kidney Disease, Benign, with Heart Failure and Chronic Kidney Disease Stage V or End Stage Renal Disease |
| 46      | 404.14     | Hypertensive Heart and Chronic Kidney Disease, Unspecified, without Heart Failure and with Chronic Kidney Disease Stage I Through Stage IV, or Unspecified |
| 47      | 405.01     | Malignant Renovascular Hypertension |
| 48      | 410.00     | Acute Myocardial Infarction |
| 49      | 410.01     | Acute Myocardial Infarction, of Anterolateral Wall |
| 50      | 410.00     | Acute Myocardial Infarction, of Anterolateral Wall, Episode of Care Unspecified |
| 51      | 410.01     | Acute Myocardial Infarction, of Anterolateral Wall, Episode of Care |
| 52      | 410.02     | Acute Myocardial Infarction, of Anterolateral Wall, Subsequent Episode of Care |
| 53      | 410.10     | Acute Myocardial Infarction, of Other Anterior Wall, Episode of Care Unspecified |
| 54      | 410.11     | Acute Myocardial Infarction, of Other Anterior Wall, Episode of Care |
| 55      | 410.12     | Acute Myocardial Infarction, of Other Anterior Wall, Subsequent Episode of Care |
| 56      | 410.20     | Acute Myocardial Infarction, of Inferolateral Wall, Episode of Care Unspecified |
| 57      | 410.21     | Acute Myocardial Infarction, of Inferolateral Wall, Initial Episode of Care |
| 58      | 410.22     | Acute Myocardial Infarction, of Inferolateral Wall, Subsequent Episode of Care |
| 59      | 410.3      | Acute Myocardial Infarction, of Interposterior Wall |
| 60      | 410.30     | Acute Myocardial Infarction, of Interposterior Wall, Episode of Care Unspecified |
| 61      | 410.31     | Acute Myocardial Infarction, of Interposterior Wall, Initial Episode of Care |
| 62      | 410.32     | Acute Myocardial Infarction, of Interposterior Wall, Subsequent Episode of Care |
| 63      | 412.04     | Acute Myocardial Infarction, of Other Inferior Wall |
| 64      | 412.40     | Acute Myocardial Infarction, of Other Inferior Wall, Episode of Care Unspecified |
| 65      | 412.41     | Acute Myocardial Infarction, of Other Inferior Wall, Initial Episode of Care |
| 66      | 412.42     | Acute Myocardial Infarction, of Other Inferior Wall, Subsequent Episode of Care |
| 67      | 412.50     | Acute Myocardial Infarction, of Other Lateral Wall, Episode of Care Unspecified |
| 68      | 412.51     | Acute Myocardial Infarction, of Other Lateral Wall, Initial Episode of Care |
| 69      | 412.61     | Acute Myocardial Infarction, True Posterolateral Wall Infarction, Initial Episode of Care |

AC/HD: ACS/CAD, MI/SH, Arrest/Arrhythmia, Valve disease, Aorta/PAD, Other, Peri-Procedural, No acute CV
| Code | Description                                                                 | X |
|------|-----------------------------------------------------------------------------|---|
| 142  | Left Bundle Branch Block                                                   |   |
| 143  | Other Left Bundle Branch Block                                            |   |
| 144  | Right Bundle Branch Block                                                  |   |
| 145  | Bundle Branch Block, Unspecified                                          |   |
| 146  | Right Bundle Branch Block and Left Posterior Fascicular Block             |   |
| 147  | Right Bundle Branch Block and Left Anterior Fascicular Block              |   |
| 148  | Other Bilateral Bundle Branch Block                                        |   |
| 149  | Trifascicular Block                                                        |   |
| 150  | Other Heart Block                                                          |   |
| 151  | Anomalous Atrioventricular Excitation                                      |   |
| 152  | Long QT Syndrome                                                          |   |
| 153  | Other Specified Conduction Disorders                                       |   |
| 154  | Conduction Disorder, Unspecified                                          |   |
| 155  | Paroxysmal Supraventricular Tachycardia                                   |   |
| 156  | Paroxysmal Ventricular Tachycardia                                        |   |
| 157  | Paroxysmal Tachycardia, Unspecified                                      |   |
| 158  | Atrial Fibrillation and Flutter                                            |   |
| 159  | Atrial Fibrillation                                                        |   |
| 160  | Atrial Flutter                                                             |   |
| 161  | Ventricular Fibrillation                                                   |   |
| 162  | Ventricular Flutter                                                        |   |
| 163  | Cardiac Arrest                                                             |   |
| 164  | Premature Beats, Unspecified                                              |   |
| 165  | Supraventricular Premature Beats                                           |   |
| 166  | Other Premature Beats                                                      |   |
| 167  | Sinoatrial Node Dysfunction                                                |   |
| 168  | Other Specified Cardiac Dysrhythmias                                      |   |
| 169  | Cardiac Dysrhythmia, Unspecified                                          |   |
| 170  | Heart Failure                                                              |   |
| 171  | Congenital Heart Failure, Unspecified                                     |   |
| 172  | Left Heart Failure                                                         |   |
| 173  | Systolic Heart Failure                                                     |   |
| 174  | Unspecified Systolic Heart Failure                                        |   |
| 175  | Acute Systolic Heart Failure                                               |   |
| 176  | Chronic Systolic Heart Failure                                            |   |
| 177  | Acute on Chronic Systolic Heart Failure                                    |   |
| 178  | Diastolic Heart Failure                                                    |   |
| 179  | Unspecified Diastolic Heart Failure                                        |   |
| 180  | Acute Diastolic Heart Failure                                              |   |
| 181  | Chronic Diastolic Heart Failure                                            |   |
| 182  | Acute on Chronic Diastolic Heart Failure                                   |   |
| 183  | Unspecified Combined Systolic and Diastolic Heart Failure                  |   |
| 184  | Acute Combined Systolic and Diastolic Heart Failure                        |   |
| 185  | Chronic Combined Systolic and Diastolic Heart Failure                      |   |
| 186  | Acute on Chronic Combined Systolic and Diastolic Heart Failure             |   |
| 187  | Heart Failure, Unspecified                                                |   |
| 188  | Myocarditis, Unspecified                                                  |   |
| 189  | Myocardial Degeneration                                                    |   |
| 190  | Cardiovascular Disease, Unspecified                                       |   |
| 191  | Cardiomegaly                                                               |   |
| 192  | Functional Disturbances Following Cardiac Surgery                          |   |
| 193  | Rupture of Chordae Tendineae                                              |   |
| 194  | Rupture of Papillary Muscle                                                |   |
| 195  | Cardiac Septal Defect, Sequela of Myocardial Infarction                    |   |
| 196  | Other Sequela of Myocardial Infarction, Not Elsewhere Classified           |   |
| 197  | Takotsubo Syndrome                                                        |   |
| 198  | Other Ill-Defined Heart Diseases                                          |   |
| 199  | Heart Disease, Unspecified                                                |   |
| 200  | Atherosclerosis                                                            |   |
| 201  | Atherosclerosis of Aorta                                                   |   |
| 202  | Atherosclerosis of Native Arteries of the Extremities, Unspecified         |   |
| 203  | Atherosclerosis of Native Arteries of the Extremities with Intermittent Claudication |   |
| 204  | Atherosclerosis of the Extremities with Red Pain                          |   |
| 205  | Atherosclerosis of Native Arteries of the Extremities with Ulceration      |   |
| 206  | Atherosclerosis of Native Arteries of the Extremities with Gangrene        |   |
| 207  | Atherosclerosis of Bypass Graft of the Extremities, Unspecified Graft      |   |
| 208  | Atherosclerosis of Autologous Vein Bypass Graft of the Extremities         |   |
| 209  | Atherosclerosis of Nonautologous Biological Bypass Graft of the Extremities|   |
| 210  | Atherosclerosis of Other Specified Arteries                                |   |
| 211  | Dissecting Aneurysm of Aorta, Unspecified Site                            |   |
| 212  | Dissecting Aneurysm of Thoracic Aorta                                     |   |
| 213  | Dissecting Aneurysm of Thoracoabdominal Aorta                             |   |
| Code | Description                                                                                     | X |
|------|--------------------------------------------------------------------------------------------------|---|
| 214  | Thoracic Aortic Aneurysm, Ruptured                                                               |   |
| 215  | Thoracic Aortic Aneurysm without Mention of Rupture                                              |   |
| 216  | Abdominal Aortic Aneurysm, Ruptured                                                              |   |
| 217  | Abdominal Aortic Aneurysm without Mention of Rupture                                             |   |
| 218  | Aortic Aneurysm of Unspecified Site, Ruptured                                                   |   |
| 219  | Thoracoabdominal Aortic Aneurysm, Ruptured                                                      |   |
| 220  | Thoracoabdominal Aortic Aneurysm, without Mention of Rupture                                    |   |
| 221  | Aortic Aneurysm of Unspecified Site without Mention of Rupture                                  |   |
| 222  | Aneurysm of Unspecified Artery Site                                                             |   |
| 223  | Dissection of Other Artery                                                                     |   |
| 224  | Thoracoabdominal Aortic Aneurysm, Unspecified                                                   |   |
| 225  | Thoracic Aortic Ectasia                                                                          |   |
| 226  | Other Specified Disorders of Arteries and Arterioles                                             |   |
| 227  | Hypotension                                                                                      |   |
| 228  | Orthostatic Hypotension                                                                          |   |
| 229  | Chronic Hypotension                                                                             |   |
| 230  | Other Hypotension                                                                                 |   |
| 231  | Other Hypotension                                                                                 |   |
| 232  | Other Hypotension                                                                                 |   |
| 233  | Other Hypotension                                                                                 |   |
| 234  | Other Hypotension                                                                                 |   |
| 235  | Other Hypotension                                                                                 |   |
| 236  | Other Hypotension                                                                                 |   |
| 237  | Other Hypotension                                                                                 |   |
| 238  | Acute Vascular Insufficiency of Intestine                                                        |   |
| 239  | Congenital Cardiovascular Disorders Complicating Pregnancy, Childbirth, or the Puerperium, Delivered, with or without Mention of Antepartum Condition |   |
| 240  | Other Cardiovascular Diseases Complicating Pregnancy, Childbirth, or the Puerperum, Delivered, with or without Mention of Antepartum Condition |   |
| 241  | Other Cardiovascular Diseases Complicating Pregnancy, Childbirth, or the Puerperum, Antepartum Condition or Complication |   |
| 242  | Peripartum Cardiomyopathy, Delivered, with or without Mention of Antepartum Condition           |   |
| 243  | Peripartum Cardiomyopathy, Postpartum Condition or Complication                                |   |
| 244  | Common Truncus                                                                                   |   |
| 245  | Complete Transposition of Great Vessels                                                         |   |
| 246  | Double Outlet Right Ventricle                                                                   |   |
| 247  | Tetralogy of Fallot                                                                             |   |
| 248  | Common Ventricle                                                                                 |   |
| 249  | Ventricular Septal Defect                                                                        |   |
| 250  | Ostium Secundum Type Atrial Septal Defect                                                       |   |
| 251  | Other Endocardial Cushion Defect                                                                |   |
| 252  | Atresia of Pulmonary Valve, Congenital                                                          |   |
| 253  | Other Congenital Anomalies of Pulmonary Valve                                                   |   |
| 254  | Congenital Stenosis of Aortic Valve                                                             |   |
| 255  | Congenital Insufficiency of Aortic Valve                                                         |   |
| 256  | Subaortic Stenosis, Congenital                                                                   |   |
| 257  | Congenital Heart Block                                                                           |   |
| 258  | Infundibular Pulmonic Stenosis, Congenital                                                       |   |
| 259  | Coronary Artery Anomaly, Congenital                                                              |   |
| 260  | Congenital Heart Block                                                                           |   |
| 261  | Malposition of Heart and Cardiac Apex                                                             |   |
| 262  | Other Specified Congenital Anomalies of Heart                                                    |   |
| 263  | Unspecified Congenital Anomaly of Heart                                                          |   |
| 264  | Patent Ductus Arteriosus                                                                         |   |
| 265  | Coarctation of Aorta (Preadult) (Postdult)                                                       |   |
| 266  | Congenital Anomaly of Aorta, Unspecified                                                         |   |
| 267  | Congenital Anomalies of Aortic Arch                                                              |   |
| 268  | Congenital Atresia and Stenosis of Aorta                                                           |   |
| 269  | Other Congenital Anomalies of Aorta                                                               |   |
| 270  | Anomalies of Pulmonary Artery, Congenital                                                       |   |
| 271  | Pulmonary Artery Coarctation and Atresia                                                         |   |
| 272  | Pulmonary Arteriovenous Malformation                                                             |   |
| 273  | Other Anomalies of Pulmonary Artery and Pulmonary Circulation                                   |   |
| 274  | Partial Anomalous Pulmonary Venous Connection                                                    |   |
| 275  | Other Anomalies of Great Veins                                                                    |   |
| 276  | Congenital Anomaly of the Peripheral Vascular System, Unspecified Site                          |   |
| 277  | Congenital Anomaly of Upper Limb Vessel                                                          |   |
| 278  | Congenital Anomalies of Other Specified Sites of Peripheral Vascular System                      |   |
| 279  | Anomalies of Carotid Vascular System, Congenital                                                 |   |
| 280  | Congenital Anomaly of Spinal Vessel                                                              |   |
| 281  | Other Specified Congenital Anomalies of Circulatory System                                       |   |
| 282  | Unspecified Congenital Anomaly of Circulatory System                                             |   |
| 283  | Edema                                                                                           |   |
| 284  | Tachycardia, Unspecified                                                                        |   |
| 285  | Palpitations                                                                                    |   |
| Code | Description                                                                 |
|------|----------------------------------------------------------------------------|
| 286  | 785.2 Undiagnosed Cardiac Murmurs                                          |
| 287  | 785.3 Other Abnormal Heart Sounds                                          |
| 288  | 785.5 Shock without Mention of Trauma                                      |
| 289  | 785.50 Shock, Unspecified                                                  |
| 290  | 785.51 Cardiogenic Shock                                                   |
| 291  | 785.59 Other Shock without Mention of Trauma                               |
| 292  | 785.9 Other Symptoms Involving Cardiovascular System                       |
| 293  | 786.5 Chest Pain                                                           |
| 294  | 786.50 Unspecified Chest Pain                                             |
| 295  | 786.51 Precardial Pain                                                    |
| 296  | 786.59 Other Chest Pain                                                    |
| 297  | 794.30 Nonspecific Abnormal Function Study, Cardiovascular, Unspecified   |
| 298  | 794.31 Nonspecific Abnormal Electrocardiogram [ECG] [EKG]                  |
| 299  | 794.39 Other Nonspecific Abnormal Function Study of Cardiovascular System  |
| 300  | 796.5 Nonspecific Low Blood Pressure Reading                               |
| 301  | 861.01 Contusion of Heart without Mention of Open Wound Into Thorax        |
| 302  | 970.81 Poisoning by Cocaine                                               |
| 303  | 972.0 Poisoning by Cardiac Rhythm Regulators                              |
| 304  | 972.4 Poisoning by Coronary Vasodilators                                  |
| 305  | 972.6 Poisoning by Other Antiinflammatory Agents                          |
| 306  | 972.9 Poisoning by Other and Unspecified Agents Affecting the Cardiovascular System |
| 307  | 974.4 Poisoning by Other Diuretics                                         |
| 308  | 995.4 Shock Due to Anesthesia, Not Elsewhere Classified                    |
| 309  | 996.00 Mechanical Complications of Unspecified Cardiac Device, Implant, and Graft |
| 310  | 996.01 Mechanical Complication Due to Cardiac Pacemaker (Electrode)         |
| 311  | 996.02 Mechanical Complication Due to Heart Valve Prosthesis              |
| 312  | 996.03 Mechanical Complication Due to Coronary Bypass Graft                |
| 313  | 996.04 Mechanical Complication Due to Automatic Implantable Cardiac Defibrillator |
| 314  | 996.09 Other Mechanical Complication of Cardiac Device, Implant, and Graft |
| 315  | 996.1 Mechanical Complication of Other Vascular Device, Implant, and Graft|
| 316  | 996.61 Infection and Inflammatory Reaction Due to Cardiac Device, Implant, and Graft |
| 317  | 996.71 Other Complications Due to Heart Valve Prosthesis                  |
| 318  | 996.72 Other Complications Due to Other Cardiac Device, Implant, and Graft |
| 319  | 996.74 Other Complications Due to Other Vascular Device, Implant, and Graft|
| 320  | 996.83 Complications of Transplanted Heart                                 |
| 321  | 997.1 Cardiac Complications, Not Elsewhere Classified                      |
| 322  | 998.00 Postoperative Shock, Unspecified                                   |
| 323  | 998.01 Postoperative Shock, Cardiogenic                                    |
| 324  | 998.09 Postoperative Shock, Other                                          |
| 325  | 998.11 Hemorrhage Complicating a Procedure                                |
| 326  | D12.53 Personal History of Sudden Cardiac Arrest                          |
| 327  | D12.59 Other Personal History of Diseases of Circulatory System           |
| 328  | V13.65 Personal History of [Corrected] Congenital Malformations of Heart and Circulatory System |
| 329  | V15.1 Personal History of Surgery to Heart and Great Vessels, Presenting Hazards to Health |
| 330  | V17.49 Family History of Other Cardiovascular Diseases                    |
| 331  | V42.1 Heart Transplant                                                    |
| 332  | V43.3 Heart Valve Replaced by Other Means                                  |
| 333  | V45.01 Cardiac Pacemaker in Situ                                          |
| 334  | V45.02 Automatic Implantable Cardiac Defibrillator in Situ                 |
| 335  | V45.81 Postoperative Aortocoronary Bypass Status                          |
| 336  | V45.82 Percutaneous Transluminal Coronary Angioplasty, Posturgical Status  |
| 337  | V53.31 Fitting and Adjustment of Cardiac Pacemaker                         |
| 338  | V53.32 Fitting and Adjustment of Automatic Implantable Cardiac Defibrillator |
| 339  | V53.39 Fitting and Adjustment of Other Cardiac Device                      |
| 340  | V58.81 Encounter for Fitting and Adjustment of Vascular Catheter          |
| 341  | V71.7 Observation for Suspected Cardiovascular Disease                    |
| 342  | V72.81 Preoperative Cardiovascular Examination                            |
| 343  | V81.2 Screening for Other and Unspecified Cardiovascular Conditions       |

Abbreviations: ICD-9, International Classification of Diseases, Ninth Edition; ACS, acute coronary syndrome; CAD, coronary artery disease; HF, heart failure; PAD, peripheral arterial disease; CV, cardiovascular.
### Supplemental Table 3: ICU care indication suggested by principal diagnosis codes

| Principal diagnosis codes                          | Category                                    | ICD9-codes |
|--------------------------------------------------|---------------------------------------------|------------|
| Pulmonary disease                                | Pulmonary                                   | 460-519    |
| Diseases of pulmonary circulation                | Pulmonary                                   | 415-417    |
| Infectious diseases                              | Infectious Diseases/sepsis                  | 001-139    |
| Metabolic disorder                               | Renal/Metabolic/Toxic                       | 240-279    |
| Renal insufficiency                              | Renal/Metabolic/Toxic                       | 580-629    |
| Poisoning                                        | Renal/Metabolic/Toxic                       | 960-989    |
| Digestive disease                                | Digestive system                            | 520-579    |
| Diseases of the musculoskeletal system & connective tissue | Skin/Soft tissue/Musculoskeletal          | 710-739    |
| Diseases of the skin and subcutaneous tissue     | Skin/Soft tissue/Musculoskeletal            | 680-709    |
| Other forms of heart disease                     | Cardiovascular                              | 420-429    |
| Cerebrovascular disease                          | Neurologic                                  | 430-438    |
| Neurologic disease                               | Neurologic                                  | 320-389    |
| Mental disorders                                 | Neurologic                                  | 290-319    |
| Ischemic heart disease                           | Cardiovascular                              | 410-414    |
| Arteries and veins                               | Cardiovascular                              | 440-459    |
| Hypertensive disease                             | Cardiovascular                              | 401-405    |
| Chronic rheumatic heart disease                  | Cardiovascular                              | 393-398    |
| Acute Rheumatic fever                            | Cardiovascular                              | 390-392    |
| Trauma                                           | Trauma/Procedural complication              | 800-959    |
| Complications peculiar to certain specified procedures | Trauma/Procedural complication              | 996        |
| Neoplasms                                        | Heme-oncology                               | 140-239    |
| Diseases of the blood and blood-forming organs   | Heme-oncology                               | 280-289    |
| Supplementary classification of factors influencing health status and contact with health services | Other/unspecified                          | V01-V86    |
| Congenital anomalies                             | Other/unspecified                           | 740-759    |
| Symptoms, signs, and ill-defined conditions      | Other/unspecified                           | 780-799    |
| Other complications of procedures, NEC           | Other/unspecified                           | 998        |
| Complications affecting specified body systems, not elsewhere classified | Other/unspecified                          | 997        |
| Complications of pregnancy, childbirth, and the puerperium | Other/unspecified                          | 630-677    |
| Complications of medical care, not elsewhere classified | Other/unspecified                          | 999        |
| Other and unspecified effects of external causes | Other/unspecified                           | 990-995    |
| Heart failure                                    | Cardiovascular                              | 428        |

Source: Frequency of all ICD-9 codes for adult ICU-related hospital admissions [Internet]. Available from: https://physionet.org/mimic2/UserGuide/node86.html
### Supplemental Table 4: Odds Ratio Estimates For Model 3

| Variable Comparisons or Unit Increase                                      | OR  | 95% Confidence Limits | P value |
|---------------------------------------------------------------------------|-----|-----------------------|---------|
| Admission to Non-CICU vs CICU                                             | 0.863 | 0.757 - 0.984 | 0.0276 |
| Unit increase in age (years)*                                            | 1.034 | 1.029 - 1.040 | <0.0001 |
| Unit increase in SOFA score*                                             | 1.265 | 1.244 - 1.287 | <0.0001 |
| Unit increase in packs-per-day tobacco (packs)*                          | 0.903 | 0.759 - 1.074 | 0.2493 |
| Unit increase in Elixhauser score*                                       | 1.010 | 0.982 - 1.040 | 0.4851 |
| Male vs female                                                            | 0.841 | 0.747 - 0.947 | 0.0041 |
| Payer: Medicaid vs Medicare                                               | 1.467 | 1.094 - 1.969 |         |
| Payer: Other insurance vs Medicare                                       | 1.107 | 0.906 - 1.353 | 0.0086 |
| Payer: Self-insured vs Medicare                                          | 1.683 | 1.128 - 2.511 |         |
| Payer: Unknown vs Medicare                                               | 1.289 | 1.026 - 1.619 |         |
| Race: Caucasian vs African American                                      | 0.907 | 0.752 - 1.093 | 0.1310 |
| Race: Other/Specified vs African American                                | 1.440 | 0.935 - 2.218 |         |
| Race: Unknown/Unspecified vs African American                            | 0.945 | 0.733 - 1.218 |         |
| Admit year 2010 vs 2009                                                   | 1.074 | 0.834 - 1.382 | 0.0062 |
| Admit year 2011 vs 2009                                                   | 0.763 | 0.590 - 0.986 |         |
| Admit year 2012 vs 2009                                                   | 0.765 | 0.592 - 0.989 |         |
| Admit year 2013 vs 2009                                                   | 0.717 | 0.557 - 0.922 |         |
| Admit year 2014 vs 2009                                                   | 0.864 | 0.650 - 1.149 |         |
| ACS/CAD vs "other" cardiac diagnoses                                     | 0.467 | 0.368 - 0.592 |         |
| Aortic and PAD vs "other" cardiac diagnoses                              | 0.476 | 0.352 - 0.646 |         |
| Cardiac arrest/Arrhythmia vs "other" cardiac diagnoses                   | 1.154 | 0.906 - 1.472 | <0.0001 |
| Heart failure/Shock vs "other" cardiac diagnoses                         | 0.851 | 0.657 - 1.103 |         |
| Multiple cardiac diagnoses vs "other" cardiac diagnoses                  | 0.753 | 0.571 - 0.992 |         |
| No acute cardiac diagnosis vs "other" cardiac diagnoses                  | 0.628 | 0.404 - 0.978 |         |
| Peri-procedural monitoring vs "other" cardiac diagnoses                  | 0.553 | 0.356 - 0.858 |         |
| Valvular heart disease vs "other" cardiac diagnoses                      | 0.224 | 0.157 - 0.318 |         |
| Category                                    | Odd Ratio (95% CI) | p-value |
|---------------------------------------------|--------------------|---------|
| CICU level 1 vs 2                          | 1.438 (0.509, 4.063) | 0.4930  |
| Hospital bed size 200 - 499 vs ≥500         | 1.784 (0.721, 4.412) | 0.2101  |
| Hospital setting Urban vs Rural             | 0.262 (0.108, 0.636) | 0.0031  |
| Teaching hospital Yes vs No                 | 1.061 (0.380, 2.962) | 0.9102  |
| Annual admissions 10001-20000 vs <10000    | 1.466 (0.613, 3.507) | 0.1137  |
| Annual admissions >20000 vs <10000          | 0.564 (0.201, 1.583) |         |
| Respiratory disease Yes vs No               | 2.834 (2.461, 3.263) | <0.0001 |
| Infectious disease Yes vs No                | 2.082 (1.822, 2.379) | <0.0001 |
| Renal/Metabolic disease Yes vs No           | 1.111 (0.868, 1.423) | 0.4017  |
| Gastrointestinal disease Yes vs No          | 1.254 (1.109, 1.417) | 0.0003  |
| Skin/Soft tissue/Muscle disease Yes vs No   | 0.876 (0.766, 1.001) | 0.0523  |
| Neurologic disease Yes vs No                | 1.290 (1.137, 1.462) | <0.0001 |
| Traumatic disease/Procedural complication Yes vs No | 1.044 (0.878, 1.242) | 0.6234  |
| Hematologic/Oncologic disease Yes vs No     | 0.908 (0.801, 1.029) | 0.1315  |
| Other/Unspecified disease Yes vs No         | 0.958 (0.674, 1.363) | 0.8129  |

*Effects of continuous variables are assessed as one unit change from the mean

P values displayed are for Type III Tests of Fixed Effects for each variable category

Abreviations: CICU, cardiac intensive care unit; SOFA, sequential organ failure assessment; ACS, acute coronary syndrome; CAD, coronary artery disease; PAD, peripheral arterial disease.
Supplemental Table 5: Mortality in Non-CICU vs CICU

| Subgroup                        | N          | Model 2 OR (95% CI) | Model 3 OR (95% CI) |
|---------------------------------|------------|---------------------|---------------------|
| No MCV                          | 15346      | 1.12 (0.98-1.28)    | 0.89 (0.78-1.03)    |
| No Pressors                     | 12412      | 1.36 (1.16-1.58)    | 1.08 (0.92-1.26)    |
| No MCV or Pressors              | 12141      | 1.40 (1.20-1.64)    | 1.10 (0.94-1.30)    |
| Heart Failure/Shock             | 1370       | 1.37 (0.99-1.90)    | 1.16 (0.83-1.62)    |
| Heart Failure/Shock without MCV | 1057       | 1.67 (1.13-2.48)    | 1.36 (0.90-2.06)    |
| pressors                        |            |                     |                     |
| ACS/CAD                         | 7259       | 0.92 (0.71-1.19)    | 0.71 (0.54-0.93)    |
| ACS/CAD without MCV or pressors | 5959       | 1.35 (1.0-1.83)     | 1.07 (0.77-1.48)    |
| Arrythmia/Arrest                | 2088       | 1.34 (1.02-1.77)    | 1.11 (0.83-1.49)    |
| Arrythmia/Arrest without MCV    | 1473       | 1.92 (1.30-2.83)    | 1.41 (0.93-2.14)    |
| pressors                        |            |                     |                     |

Abbreviations: CICU, cardiac intensive care unit; OR, odds ratio; CI, confidence interval; MCV, mechanical ventilation; ACS, acute coronary syndrome; CAD, coronary artery disease