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PREDICTORS ASSOCIATED WITH 30-DAY READMISSION AMONG A COHORT

OF ADULT CONGENITAL HEART DISEASE PATIENTS, MEDICAID CLAIMS DATA

2010-2013

By

Giancarlo Licitra

Master of Public Health

Epidemiology

_____ [Chair's Signature]

Carol Hogue, Ph.D., MPH

Committee Chair

_____ [Member's Signature]

Cheryl Raskind-Hood, MPH, MS

Committee Member

_____ [Member's Signature]

Trenton C. Hoffman, MS

Committee Member

PREDICTORS ASSOCIATED WITH 30-DAY READMISSION AMONG A COHORT OF ADULT CONGENITAL HEART DISEASE PATIENTS, MEDICAID CLAIMS DATA 2010-2013

By

Giancarlo Licitra

Bachelor of Science - Biology

Florida State University

2015

An abstract of

A thesis submitted to the Faculty of the

School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of

Master of Public Health in Epidemiology

2018

Abstract

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2010-2013

By Giancarlo Licitra

Purpose:
Advancements in medical technology and treatment of CHD has led to improved survival. Adults with CHD (ACHD) have been largely understudied, especially with respect to hospital readmissions - a quality indicator commonly used to assess healthcare utilization. This study aims to identify common diagnoses at index admission associated with readmissions within 30-days of a cardiac-related hospital admission among ACHD patients. We also analyze socio-contextual factors associated with 30-day readmission including race, sex, and distance from patient zip code to a facility providing specialized cardiology care.

Methods:
This study is a retrospective cohort design analyzing Georgia Medicaid claims data, 2010-2013. The sample consists of ACHD patients aged 20-64 years, covered under Medicaid and with at least one of 55 ICD-9-CM CHD diagnostic codes on their encounter claim (n=1,697). To assess travel distance to specialized healthcare facilities, we conducted adjusted Cox-proportional models and reported hazard ratios with corresponding 95% CI's.

Results:
Of the 1,697 patients included in the analysis, about 22% had a 30-day hospital readmission. The remaining 78% had no recorded hospital readmissions within 30 days. Readmission was higher for those at initial admission with comorbid congestive heart failure (CHF) non-hypertensive (13% higher in readmitted patients compared to non-readmitted patients), fluid and electrolyte disease (15% higher), and diabetes mellitus (DM) with complications (~7% higher). Readmission was also higher for black patients compared to white (~6% higher). After adjustment for potential confounding variables, there was no significant increase in hazard found for greater distance between patient's resident zip code and healthcare facilities providing cardiology care.

Conclusion:
Specific comorbid diagnoses at index admission and black race identify subpopulations at increased risk for 30-day hospital readmission. Increased attention to comorbid diagnoses during initial hospital stay may reduce 30-day hospital readmission rates and improve health outcomes for the ACHD population.

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Acknowledgements

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List of Abbreviations

ACA   Affordable Care Act

ACHD   Adults with Congenital Heart Defects

AMI   Acute Myocardial Infarction

ASD   Atrial Septal Defect

BMI   Body Mass Index

AVCD   Atrioventricular Canal Defect

CCI   Charleston Comorbidity Index

CCS   Clinical Classification Software

CHD   Congenital Heart Defect

CHF   Congestive Heart Failure

CKD   Chronic Kidney Disease

CMS   Centers for Medicare & Medicaid Services

COPD   Chronic Obstructive Pulmonary Disease

DM   Diabetes Mellitus

DRG   Diagnostic Related Groups

eMR   Electronic Medical Records

HF   Heart Failure

HLHS   Hypoplastic Left Heart Syndrome

HRRP   Hospital Readmissions Reduction Program

IHD   Ischemic Heart Disease

ICD   International Classification of Diseases

NSTEMI   Non-ST segment Elevated Myocardial Infarction

PNA   Pneumonia

TOF   Tetralogy of Fallot

VSD   Ventricular Septal Defect

CHAPTER I: BACKGROUND

Congenital Heart Defect (CHD)

A congenital heart defect (CHD) is a structural anomaly of the heart presenting at birth differing in severity and defect type. CHDs are the most common type of birth defect. About one in four babies born with a heart defect has a critical CHD resulting in surgery or other procedures early in life [1]. The etiology of a CHD varies and is largely unknown. Approximately 15% of CHD cases are linked to a known cause, and it is currently understood that chromosomal aneuploidies are associated with malformation syndromes that compromise heart structure leading to a CHD diagnosis [2]. Around 2% of all congenital cases are associated with environmental factors and exposures such as maternal diabetes, phenylketonuria, maternal obesity, alcohol use, rubella infection, febrile illness and maternal exposure to certain drugs including thalidomide and retinoic acid [2]. Existing literature also suggests possible interaction between genetic aneuploidies and environmental exposures contributing to the presentation of CHDs [2].

Each year, around 40,000 babies in the United States are born with a CHD [3]. More than 90% of infants born with a CHD survive into adulthood, and the number of adults now living with CHD is greater than the number of children with a CHD [3]. It is estimated that 8 to 10 per 1000 live births in the United States have a diagnosis of a heart defect [4]. Diagnoses typically occur before or at the time of birth; however, some diagnoses occur much later in life. It is not uncommon for cases to go undiagnosed for some time, giving rise to the possibility that the prevalence of CHD in the population is underestimated [2].

Across the existing scientific literature, a CHD varies in definition and categorization. Mitchell and colleagues (1971) define a CHD as, "a gross structural abnormality of the heart or

intrathoracic great vessels that is actually or potentially of functional significance"; arrhythmias unrelated to heart structure and abnormalities of systemic veins are not included using this definition [5]. Variations in definitions and interpretations of CHDs highlight an issue with consistency not only with epidemiological studies, but also with clinical diagnoses in the healthcare setting. Typically, CHDs are classified by severity. For instance, a severe CHD classified by the Marelli scheme reflects patients with the highest probability for cyanosis or surgical intervention early in life [6]. Severe defects include atrioventricular canal defect (AVCD), tetralogy of Fallot (TOF), univentricular heart, transposition complex (complete or congenitally corrected transposition), truncus arteriosus and hypoplastic left heart syndrome (HLHS) [6]. Using a modified version of the Marelli scheme, non-severe CHDs can be further classified as shunt, valve, shunt + valve, and other (Appendix A). The scheme developed by Connelly and colleagues (1998) also classifies CHDs by severity; this scheme is based on how often patients should be seen at specialized CHD healthcare centers [7].

Advancements in medical technology and treatment have led to an overall improvement in survival of patients with CHDs. The median age at death for patients with a CHD has increased more than 20 years since 1987 [4]. From 1985-2000, the median age of those alive with a severe CHD increased from 11 to 17 years and is expected to continue to increase between 2000 and 2020 [4]. Despite progresses in survival, CHD remains the most common cause of infant death associated with birth defects [8]. Individuals living with a CHD, especially adults, require continuous, specialized healthcare and surveillance over their lifespan.

30-Day Hospital Readmission

A 30-day readmission is defined as a hospital admission within 30-days after discharge corresponding to the index hospitalization. Scheduled procedures, planned admissions and

emergency room visits without a resulting hospitalization are typically excluded [9]. Typically, patients must be alive during the follow-up time after the index admission discharge. If patients are transferred to other acute care facilities such as rehab and other long-term care facilities, they are typically excluded [10]. Hospital readmission is a quality indicator commonly used to assess healthcare utilization [11]. About 20% of Medicare patients are readmitted within 30-days of discharge [9]. Costs of these unplanned admissions are estimated to be more than $17 billion per year [9]. In response, the Affordable Care Act (ACA) established the Hospital Readmissions Reduction Program (HRRP) providing financial incentives for hospitals to reduce preventable readmissions. The HRRP program targets Medicare beneficiaries and took effect in 2013. Targeted readmission diagnoses for the HRRP include acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia (PNA) [12]. In 2015, chronic obstructive pulmonary disease (COPD) and hip/knee replacements were added to the list of targeted readmission diagnoses [12].

Implementation of the HRRP has spurred research interest in risk factors for hospital readmission. Fingar and colleagues (2006) investigated conditions at index admission associated with higher rates of readmission among the Medicare population. The diagnosis associated with the highest rate of readmission was CHF, non-hypertensive, followed by schizophrenia and other psychotic disorders, respiratory failure/insufficiency/arrest, diabetes mellitus (DM) with complications, acute renal failure, and COPD [12]. Social risk factors for increased 30-day readmission include older age, non-white, low socio-economic status, lack of social support, being unmarried, and risk behaviors such as illicit drug use, alcoholism, and poor medical adherence [13]. Numerous epidemiological studies have found that lack of early 7-day physician follow-up post-index admission discharge is associated with increased readmission rates

compared to no physician follow-up. This association is primarily seen for patients with an index diagnosis of either CHF [14] [15] and/or a non-ST segment elevated myocardial infarction (NSTEMI) [16]. Mixed evidence for this association exists analyzing 30-day readmission for all index diagnoses [17].

In response to the HRRP, hospitals have created initiatives designed to decrease readmission rates. These initiatives have targeted the transition from inpatient care to outpatient care following index admission discharge with the understanding that the lack of a 7-day physician follow-up is a key risk factor for hospital readmission. Initiatives involving home-visiting programs, multidisciplinary heart failure (HF) clinic interventions, and structured telephone support have shown success in decreasing hospital readmission rates and overall mortality for patients with a CHF diagnosis [18]. The Alberta Cardiac Access initiative was created to improve access to specialized HF clinics and has resulted in a substantial decrease in readmission and mortality within 30-days of discharge [19]. Kamermayer and colleagues (2017) summarize these findings in their review stating, "even though not all readmissions are preventable, multicomponent discharge interventions and a team-based approach are more likely to reduce readmissions and improve outcomes in recently discharged medical and surgical patients" [20].

Congenital Heart Defects (CHD) and 30-Day Readmission

Cedars and colleagues (2016) analyzed one-year readmission rates in an ACHD population (n=64,420) using state inpatient data from Arkansas, California, Florida, Hawaii, Nebraska and New York [21]. They found 39% of CHD patients experienced a one-year readmission and reported that predictors for readmission were lesion specific. Lesions associated with higher readmission included Eisenmenger syndrome or cyanosis, single ventricle

physiology, and conotruncal abnormality. Diagnoses at index admission associated with increased readmission rates, ranked highest to lowest, were CHF, arrhythmia, congenital heart disease, sepsis and nonspecific chest pain. Comorbidities associated with increased readmissions include chronic kidney disease (CKD) and DM with complications [21]. Patients with readmissions were more likely to be women, slightly older, had longer index admission stays, and were less likely to have had a major operation at index admission [21].

In another study by Islam and colleagues (2016), of hospital readmission in a Canadian CHD population (n=65,252, all ages), investigators found that regardless of age, 7.6% of patients were readmitted within one month [22]. Older, male patients with higher Charleston Comorbidity Index (CCI) scores were more likely to have higher rates of one-month readmission. Among adults, CHF, atrial fibrillation and flutter, non-rheumatic aortic valve disorder, and ischemic heart disease (IHD) were the most common non-CHD diagnoses at the time of readmission among patients with a 30-day readmission [22]. At the time of index admission, the most common diagnoses were CHF, infective endocarditis, and IHD. The most common primary CHD diagnoses at index admissions for adults were grouped by severity. The group including TOF, transposition of the great arteries, truncus arteriosus, and total anomalous pulmonary venous connection had the highest percentage of one-month readmission (7.4%) followed by a group containing hypoplastic left heart syndrome, univentricular heart, and tricuspid atresia (6.9%) [22]. The last grouping with the lowest percentage of 30-day readmissions included atrioventricular septal defect, ventricular septal defect (VSD) and atrial septal defect (ASD) (6.4%) [22].

A study in a Swiss university hospital of 996 non-adult CHD patients (ages 0-18) analyzed 30-day readmission focusing on demographic and existing conditions [23]. Patients

living farther from the hospital of admission had a higher readmission risk; however, the study

indicates this finding may be confounded by CHD severity. Patients living farther from the

hospital are more likely to have a severe CHD, motivating travel to a specialized clinic. Patients

with severe CHDs are also likely to have higher readmission rates due to their existing condition

suggesting a potential confounding bias. Patients hospitalized for surgery had lower readmission

rates, similar to the finding for adults in the previously mentioned 2016 study by Cedars and

colleagues. Contrary to existing literature however, longer length of stay at index admission was

associated with a lower readmission risk. Authors believe pediatricians may have been reluctant

to discharge a child with a CHD, thereby artificially increasing the length of stay [23].

Travel Distance

Social determinants and barriers to health have an influence on hospital readmission risk

in both adult and pediatric populations [24]. According to Lax and colleagues (2017), "Social

determinants of health include the conditions in which people are born, live and work and how

they are influenced by the distribution of money, power and resources" [25]. Geographic barriers

to healthcare access are of interest for research, especially for rural populations. Patients with

CHDs living in rural areas may have to travel long distances to receive specialized cardiology or

hospital care. If patients have a farther distance to travel for follow-up post admission, they may

be less likely to follow-up, thus increasing their risk of readmission [20, 26].

In the previously described Swiss study of pediatric CHD patients, Chave and colleagues

(2017) analyzed the association between patient distance from the admitting Swiss university

hospital and readmission [23]. Distance from the hospital was categorized in three categories:

patients from the same canton as the hospital, patients from the four neighboring cantons, and

other cantons. Pediatric patients living farther from the hospital (other cantons) of admission had

a significantly higher readmission risk [23]. To our knowledge, no study other than the one just described with a pediatric population assesses travel distance and readmission risk among CHD patients [23]. A study in Virginia conducted by Turrentine and colleagues (2017) of 5,425 patients, ages 18 and above, admitted for general surgery found each increase of 10 minutes in the time a patient must travel in a car to the nearest hospital was associated with a 9% increase in the probability of readmission status post-surgery [26]. Variable adjustments included patient demographic characteristics, pre-operative comorbidities, laboratory values, and post- and pre-surgical complications [26]. In a study conducted by Piette and Moos (1996) analyzing the association between travel distance and patient mortality within a year after discharge, investigators studied 4,637 male patients admitted for myocardial infarction, ages 18 and up. They found that patients living more than 20 miles from their admitting hospital were significantly more likely to die within the first-year post-discharge [27].

Medicaid Claims

Insurance claims provide a rich source of data for analyzing healthcare utilization. While claims data, specifically Medicaid, has a high congruence with electronic medical records (eMR) especially for screening measures and medical procedures, poor agreement has been revealed for some measures including body mass index (BMI) [28]. Medicaid claims data however, are dependent on the quality of information received by the providing healthcare source. Quality is also dependent on the accuracy of the compiled claims records created by Medicaid. Diagnosis codes on Medicaid claims may include diagnoses and procedures associated with higher cost billing conditions and may not accurately reflect the patient's actual health condition [29]. For example, applying higher rate cost billing procedures to CHD claims tends to overestimate the severity of the patient's condition [21]. It is important also to note that the population eligible for

Medicaid is often dependent on fixed income and does not accurately represent patients without insurance coverage or patients using other public or private insurers. Studies utilizing Medicaid claims data may lack generalizability to the entirety of the adult CHD population [30].

Converting medical claims data into a research database is difficult and requires a methodical approach. Tyree and colleagues (2006) identified four major challenges with using Medicaid data: conversion of claims into unique visits, identification of incomplete claims data, categorization of providers and locations of service, and selecting the most useful measures of utilization and expenditures [30]. Conversion of claims into unique visits is difficult without the use of chart review. Multiple lines of duplicate data on or around the date of the initial claim could represent a repeat visit or an adjustment to the original claim. One study analyzing readmission among Medicare beneficiaries decided to exclude all same-day claims and defined a readmission as any inpatient hospital-related claim within a 30-day period of the index discharge [31]. Multiple visits to the same provider on the same day are thought to be rare events, so these records are always treated as claim adjustments and typically are excluded from readmission analysis [30].

Jencks and colleagues (2009) utilized diagnosis related groups (DRG) to categorize types of inpatient visits in order to analyze 30-day readmission in a Medicare population [10]. Also found in Medicaid, DRGs categorize inpatient admissions based on diagnosis, complications and comorbidities [32]. DRGs are helpful for identifying non-hospital inpatient admissions such as transfers to long-term care facilities, rehabilitation, or other planned admissions. The Jencks et al. (2009) paper examined the DRGs most frequently used in all potential readmission claims. They individually examined each DRG to determine whether it was likely a planned admission or not. For example, a HF re-hospitalization was likely not planned compared to a hospitalization

for a stent placement. They found only about 10% of total readmissions (19 out of 100 DRG's) were thought to be planned [10].

To our knowledge, few studies have analyzed 30-day readmission in a Medicaid population compared to the popular and accessible Medicare populations. This is most likely because the HRRP is specific to Medicare populations, and thus, attracts research interest. Studies have shown readmission rates for the Medicare populations have decreased since the implementation of the HRRP [12]. The same cannot be said for the Medicaid population. Thirty-day readmission rates decreased for all payers between 2009 and 2013, except for Medicaid [12]. Medicare had higher readmission rates compared to all other payers, except for Medicaid in the years 2009-2013 [12]. This suggest trends in 30-day readmission rates differ by payer type. Assumptions about the effect of the HRRP on Medicare cannot be used when analyzing Medicaid data.

Georgia Medicaid

The Medicaid population in Georgia reflects the eligibility criteria for enrollment. Georgia Medicaid receives federal and state funding to provide care for children under 19 years of age, pregnant women, families with dependent children under 19 years of age, and people who are aged, blind and/or disabled and whose income is insufficient to meet the cost of necessary medical services [33]. U.S citizens or qualified immigrants are eligible, however; "non-qualified immigrants or undocumented immigrants may only be eligible for coverage of emergency medical services" [33]. To qualify for Medicaid as a disabled adult (ages 21 to 64), the person must receive benefits in the form of Supplemental Security Income (SSI). In addition, disabled persons living in a nursing home facility and having both limited assets and a low income qualify for Medicaid. Also, those who can stay at home with community care services to utilize regular

nursing care and personal services can apply for Medicaid benefits [34]. These criteria are more stringent than those in place to determine Medicaid eligibility for persons younger than 21. Further, there is a substantial waiting list for Medicaid coverage of blind and/or disabled individuals who do not also qualify for Medicare [35] [36].

Otherwise qualified individuals and families are eligible if their household income does not exceed $653 per month [33]. Pregnant women can apply for Medicaid through their local county health department and receive Presumptive Eligibility (PE) Medicaid. This coverage begins immediately, but is temporary and does not cover inpatient hospital services and labor and delivery [33]. Complete eligibility determination may take up to 10 days. Women under the age of 65 diagnosed and in treatment for breast or cervical cancer are eligible for Medicaid if they have a low income, are uninsured, and are a qualifying Georgia resident [33]. Individuals who are aged 65 years or older, blind, or disabled are eligible for Georgia Medicaid coverage [33]. These individuals are not limited to Medicaid for health insurance coverage and may utilize private insurance or Medicare for insurance coverage [33].

CHAPTER II: METHODS

Hypotheses-

For Georgia Medicaid beneficiaries with a CHD diagnosis and at least one index cardiac hospital admission on a claim between 2010-2013, it is hypothesized that:

1.   congestive heart failure (CHF) and arrhythmia are likely associated with higher rates of 30-day hospital readmission.

2.   patients with a severe CHD classification will have higher rates of 30-day hospital readmission.

3.   patients who live farther from facilities for cardiology follow-up will have higher rates of 30-day hospital readmission.

Study Design

This study is a retrospective cohort study analyzing secondary data obtained from Georgia Medicaid claims between 2010-2013. In collaboration with the CDC, this study is part of a larger pilot project conducted with Emory University whose aim is to develop a population-based surveillance system of Georgia adolescents and adults with CHD and to estimate the prevalence of disease with primary focus on those living within a five metro-Atlanta county area during 2008-2010 [21]. In addition, data used in the current study are also part of an expanded collaboration between Emory University and the CDC to look at CHDs across the life span, ages 1 to death, as well as extending the study timeframe to 2013. This thesis contributes to these larger projects by evaluating the 30-day hospital readmission rate among GA Medicaid beneficiaries during 2010-2013. All individuals in the sample were covered by Medicaid at some time during the 4-year period between 2010-2013.

Data used for the current thesis were obtained from Emory's population-based surveillance data repository that include Georgia Medicaid administrative claims from January 1, 2010 through December 31, 2013 for individuals with a CHD diagnosis. Inpatient Medicaid claims are used for this project, and these data were obtained from the Centers for Medicare and Medicaid Services (CMS) via Research Data Assistance Center (ResDAC), a CMS contractor that assists academic, government, non-profits and for-profits organizations acquire Medicaid and/or Medicare datasets [45].

Population

The study population consists of adult congenital heart defect (ACHD) patients, age 20-64 years. All ACHD patients have at least one of 55 ICD-9-CM CHD diagnostic codes on a Medicaid encounter claim (See Appendix A).

Data Management and IRB

The parent studies had approval from Emory University's Institutional Review Board (IRB#0000064051). To ensure data confidentiality, data were stored on a secure, private, Federal Information Security Management Act (FISMA)-compliant network storage drive at the Emory University, Rollins School of Public Health, IT Department server system, maintained only by authorized IT personnel and study researchers. Protected Health Information (PHI) was excluded from this dataset to maintain confidentiality and replaced with a unique identifier for each patient. Prior to analysis, all data were cleaned and de-duplicated.

Inclusion and Exclusion Criteria

Individuals included for analyses are ACHD patients aged 20-64 years. Index hospitalizations after November 30, 2013 are excluded from the study. Claims with a cardiac-related index admission are included for analyses, regardless of their diagnoses on subsequent

admissions. Non-cardiac index admissions are excluded. A cardiac admission is defined as having at least one ICD-9-CM Clinical Classification System (CCS) multi-level 1 code '7' of "diseases of the circulatory system" (Appendix D). For a patient to be eligible for inclusion, he/she must have continuous Medicaid coverage following a cardiac index admission until an outcome occurred, and so, an indicator was created for Medicaid eligibility during the same month of the claim and the next consecutive month. If a patient is not covered during this two-month period, the claim is excluded. The only possible caveat to this rule is for patients admitted on January 31st (30th during the 2012 leap year), who were then subsequently readmitted at the beginning of March within 30-days. Approximately 0.5% of patients were admitted on January 30th and 31st, and the percentage of those patients readmitted in March is considerably lower. Thus, controlling for this possibility is not necessary. Patients with a date of death listed before the end of the 30-days post-index admission are excluded (n=10).

Outcome Variables

The primary outcome is a hospital readmission within 30-days of an index hospital admission. A 30-day hospital readmission is defined as a hospital admission within 30-days after the discharge date corresponding to the index hospitalization. The other outcome is a patient who reaches 30-days after index admission without subsequent rehospitalization, thus is defined as being "not-readmitted." A 30-day readmission is calculated using the date of discharge of the index hospitalization claim and the following hospital admission date. Upon examination of Medicaid claims, there were instances of multiple claims on the same day or consecutive days indicating multiple claims filed for a single admission or possible billing adjustments. To avoid overestimation of readmissions, we combined encounter claims with overlapping or consecutive (abutting) date ranges. This was done for all encounters. Each patient contributed one period of

follow-up, and thus, could have a maximum of one readmission. If an included patient had any incidence of readmission during the follow-up period, the follow-up corresponding to the readmission is counted. Otherwise, for patients without a readmission, the first cardiac index admission is used to indicate start of follow-up, and follow-up time is counted up to 30-days as long as Medicaid coverage is continuous for this period.

Predictor Variables

Predictor variables assessed are severity of CHD diagnosis, age at index admission, sex, race, diagnoses at index admission, diagnoses at readmission, and travel distance from patient zip code to nearest ACHD provider (Appendix B), travel distance to Emory Clinic, and travel distance to the claim's listed NPI address. Severity of CHD at index admission is classified using a modified Marelli classification scheme (Appendix A). This scheme classifies disease as severe, shunt, valve, shunt + valve, and other. For our purposes, all non-severe diagnoses (shunt, valve, shunt + valve, and other) are collapsed into a "non-severe" category coded as '0' and dichotomized with severe diagnoses, coded as '1'. Age is calculated using integer values at the start of follow-up (index admission) and categorized into tertiles. These tertiles are ages 20-34 coded as '1', 35-54 coded as '2', and 55-64 coded as '3'. Sex is categorized as male coded as '1' or female coded as '0'. Race is reported using the same categorizations provided in the Medicaid dataset; white coded as '1', black coded as '2', and missing coded as 'missing'. Patients categorized as Asian are excluded from analysis due to low cell counts (n=13).

Diagnoses at index admission and diagnoses at readmission are categorized using the corresponding ICD-9-CM CCS multilevel 3 classifications (Appendix E). The top most frequent 13 comorbid diagnoses are identified and included in the analysis. If a patient has multiple occurrences of the same level 3 diagnosis classification used in a single claim, those duplicates

are grouped together and counted as one diagnosis. After initial analyses, three diagnosis categories were considered to assess confounding: CHF non-hypertensive, DM with and without complications, and fluid & electrolyte disease. Those with CHF non-hypertensive listed as a diagnosis are coded as '1' with those without CHF non-hypertensive are coded as '0'. Similarly, a dichotomous variable for those with fluid and electrolyte disease is coded as '1' for those with fluid and electrolyte disease and '0' for those without. There are two diagnosis categories listed for DM, DM with complications and without. Reference cell coding with dummy variables are created for diabetes, no diabetes as the referent group coded as '0', those with DM without complications coded as '1' for one dummy variable and another dummy variable coded for those with DM with complications coded as '1'.

Straight-line distances in miles are calculated using latitude-longitude coordinates. Distances from patient zip to Emory clinic, the nearest ACHD provider, and the listed NPI address are not distributed normally, thus they are log transformed. Reference cell dummy categories are created based on quartile cut-points along the log transformed distribution (min, 25th percentile, median, 75th percentile, and max). For distance to Emory clinic, the referent cut-point coded as '0' was <3.39 (29.7 miles), ≥3.39-4.17 (64.7 miles) was coded as '1' for the first dummy variable, ≥4.17-4.88 (131.6 miles) coded as '1' for the second dummy variable, and lastly ≥4.88 for the third. Distance to the nearest ACHD provider used the referent category <2.75 (15.6 miles) coded as '0', ≥2.75-3.37(29.1 miles) is coded as '1' for the first dummy variable, ≥3.37-3.97 (53.0 miles) coded as '1' for the second dummy variable, and lastly ≥3.97 for the third. Lastly, distance to the listed NPI address used the referent category <1.81 (6.1 miles) coded as '0', ≥1.81-2.64 (14.0 miles) is coded as '1' for the first dummy variable, ≥2.64-3.37 (29.1 miles) coded as '1' for the second dummy variable, and lastly ≥3.37 for the third.

Patients' resident zip codes are classified using the National Center for Health Statistics (NCHS) 2013 urban-rural classification scheme for counties. This scheme classifies counties as '1-Large central metro', '2-Large fringe metro', '3-Medium metro, '4-Small metro', '5-Micropolitan', and '6-Non-core'. Urban-rural levels 1-4 are collapsed into a 'Urban' classification coded as '0' [37]. Urban-rural levels 5 and 6 are collapsed into a 'Not-Urban' classification coded as '1'.

Directed Acyclic Graph (DAG)

A DAG was built to determine the potential associations between exposures and outcome, 30-day readmission. Diagnosis at index admission is used as the exposure and covariates considered for possible confounding in the DAG are CHD severity, age, race, distance to cardiology provider, smoking, comorbidities, and sex. Smoking is not included in the data set, thus, a possible source of unmeasured confounding (Supplementary Figure 7).

Statistical Analysis

All analyses were conducted using SAS 9.4 for Windows (Cary, NC). Frequencies and percentages are reported for categorical independent variables. Characteristics of the selected ACHD population are stratified by outcome of 30-day readmission. Bivariate analysis comparing race, sex, age at index admission, and severity of CHD diagnosis for the outcome measure were performed using a chi-square test of association at an alpha level of 0.05. Missing data on race are indicated as missing.

The association between CHD severity and 30-day hospital readmission is estimated using hazard ratios (HR) and 95% confidence intervals (95% CI) from a Cox-proportional hazards model. A similar model was run for the association between travel distance from patient zip code to nearest ACHD provider, Emory Clinic, and listed NPI address and 30-day

readmission. Another Cox-proportional model is used to test the association between selected diagnoses at index admission (CHF non-hypertensive, DM with no complications, and fluid & electrolyte disease) and 30-day readmission. The proportional hazards assumption is assessed for each predictor using log(-log(survival)) survival curves, goodness-of-fit testing, and time-dependent covariates. Assessment of confounding reviews all possible subsets of a gold standard model that includes adjustment for all covariates. Confounding is considered present if the corresponding subset's HR is greater than 10% of the gold standard model. Covariates considered for confounding include race, age, sex, CHD severity, and diagnoses at index admission including fluid & electrolyte disease, CHF non-hypertensive, and DM with and without complications. Models with race as a predictor are run without the observations containing missing race values. Kaplan-Meier curves are used to assess time until outcome stratified on CHD severity, race, age at index admission, sex, and travel distance from patient zip code to nearest CHD provider. Receiver-operator curves (ROC) are generated for specific diagnoses at index admission predicting 30-day readmission risk. These diagnoses are CHF non-hypertensive, fluid & electrolyte disease, and DM with and without complications.

CHAPTER III: MANUSCRIPT

PREDICTORS ASSOCIATED WITH 30-DAY READMISSION AMONG A COHORT

OF ADULT CONGENITAL HEART DISEASE PATIENTS, MEDICAID CLAIMS DATA

2010-2013

By Giancarlo Licitra

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Advancements in medical technology and treatment of CHD has led to improved survival.
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code to a facility providing specialized cardiology care.

Methods:
This study is a retrospective cohort design analyzing Georgia Medicaid claims data, 2010-2013.
The sample consists of ACHD patients aged 20-64 years, covered under Medicaid and with at
least one of 55 ICD-9-CM CHD diagnostic codes on their encounter claim (n=1,697). To assess
travel distance to specialized healthcare facilities, we conduct adjusted Cox-proportional models
and report hazard ratios with corresponding 95% CI's.

Results:
Of the 1,697 patients included in the analysis, about 22% had a 30-day hospital readmission. The
remaining 78% had no recorded hospital readmissions within 30 days. Readmission is higher for
those with comorbid congestive heart failure (CHF) non-hypertensive (13% higher in readmitted
patients compared to non-readmitted patients), fluid and electrolyte disease (15% higher), and
diabetes mellitus (DM) with complications (~7% higher) at initial admission. Readmission is
also higher for black patients compared to white (~6% higher). After adjusting for potential
confounding variables, there is no significant increase in hazard found for greater distance
between patient's resident zip code and healthcare facilities providing cardiology care.

Conclusion:
Specific comorbid diagnoses at index admission and black race identify subpopulations at
increased risk for 30-day hospital readmission.   Increased attention to comorbid diagnoses
during initial hospital stay may reduce 30-day hospital readmission rates and improve health
outcomes for the ACHD population.

Introduction

A congenital heart defect (CHD) is a structural anomaly of the heart presenting at birth differing in severity and defect type [1]. Each year, around 40,000 babies in the United States are born with a CHD [2]. More than 90% of infants born with a CHD survive into adulthood, and more adults than children now live with CHD [3]. Individuals living with a CHD require continuous and specialized healthcare and surveillance over their lifespan [1].

Hospital readmission is a quality indicator commonly used to assess healthcare utilization [4]. Adults with a CHD (ACHD) have been largely understudied, especially with respect to hospital readmissions. Previous literature describes the most common diagnoses associated with one-month readmission rates among Canadian ACHD patients. These include congestive heart failure (CHF), infective endocarditis, and ischemic heart disease (IHD) [5]. There is an association between decreased outpatient follow-up after a cardiac-related index hospital admission and increased 30-day hospital readmission rates [6], possibly related to the distance patients must travel after index admission to receive cardiology follow-up for their CHD [7]. To our knowledge, few studies have investigated 30-day hospital readmissions among the ACHD population in the United States.

This retrospective cohort study aims to identify common cardiac-related diagnoses at index admission associated with 30-day hospital readmissions among ACHD patients. We also analyze socio-contextual factors associated with higher hospital readmission rates including race, gender, and distance from patient zip code to Emory Clinic, the nearest ACHD provider and the listed NPI address. To our knowledge, this study is the first to investigate the association between 30-day hospital readmission and distance to facilities providing specialized cardiology care for an ACHD population in the United States.

Methods

Study Design

We conducted a retrospective cohort analysis of secondary data obtained from Georgia

Medicaid claims between 2010-2013. In collaboration with the CDC, this study is part of a larger

pilot project conducted with Emory University whose aim is to develop a population-based

surveillance system of Georgia adolescents and adults with CHD and to estimate the prevalence

of disease with primary focus on those living within a five metro-Atlanta county area during

2008-2010 [21]. In addition, data used in the current study are also part of an expanded

collaboration between Emory University and the CDC to look at CHDs across the life span, ages

1 to death, and extending the study timeframe to 2013. This thesis contributes to these larger

projects by evaluating the 30-day hospital readmission rate among GA Medicaid beneficiaries

during 2010-2013. All individuals in the sample were covered by Medicaid at some time during

the 4-year period between 2010-2013.

Data used for the current thesis are obtained from Emory's population-based surveillance

data repository that include Georgia Medicaid administrative claims from January 1, 2010

through December 31, 2013 for individuals with a CHD diagnosis. Inpatient Medicaid claims

are used for this project, and these data are obtained from the Centers for Medicare and Medicaid

Services (CMS) via Research Data Assistance Center (ResDAC), a CMS contractor that assists

academic, government, non-profits and for-profits organizations acquire Medicaid and/or

Medicare datasets [45].

Population

ACHD patients, age 20-64 years, with at least one of 55 ICD-9-CM CHD diagnostic

codes on a Medicaid encounter claim in Georgia (See Appendix A).

We define a cardiac admission as having at least one ICD-9-CM Clinical Classification System (CCS) multi-level 1 code '7' of "diseases of the circulatory system" (Appendix D). We created an indicator for Medicaid eligibility during the same month of the claim and the next consecutive month to assure that the patient had continuous Medicaid coverage following a cardiac index admission for at least 30-days. We include claims with a cardiac-related index admission, regardless of their diagnoses on subsequent admissions.

Exclusion Criteria

We exclude index hospitalizations after November 30, 2013, non-cardiac index admissions, and patients not continuously covered for the requisite two-month period. We also exclude patients who died before the end of the 30-days post-index admission (n=10). There are not enough Asians (n=13) to be included for analyses, thus, only whites and blacks are included in the dataset.

Predictor Variables

Predictors assessed are severity of CHD diagnosis, age, sex, race, diagnoses at index admission, diagnoses at readmission, and travel distance from patient's resident zip code to a cardiology provider. We classify severity of CHD severity at index admission using a modified Marelli classification scheme (Appendix A). We collapsed all non-severe diagnoses (shunt, valve, shunt + valve, and other) into a "non-severe" category. We categorized integer age values at the index admission into tertiles.

Diagnoses at index admission and diagnoses at readmission are categorized using the corresponding ICD-9-CM CCS multi-level 3 classifications (Appendix E). The top 13 most frequent comorbid diagnoses are identified and included in the analysis. If a patient has multiple occurrences of the same level 3 diagnosis classification used in a single claim, those duplicates

are grouped together and counted as one diagnosis. After initial analyses, three diagnosis categories were considered for confounding assessment; CHF non-hypertensive, DM with and without complications, and fluid & electrolyte disease.

Straight-line distances in miles are calculated using latitude-longitude coordinates. Distances from patient zip to Emory clinic, the nearest ACHD provider, and the listed NPI address were not distributed normally, thus they are log transformed. Reference cell dummy categories are created based off quartile cut points (25th percentile, median, 75th percentile) along the log transformed distribution. Patients zip codes are also classified using the National Center for Health Statistics (NCHS) 2013 urban-rural classification scheme for counties.

Statistical Analysis

All analyses are conducted using SAS 9.4 for Windows (Cary, NC). Frequencies and percentages are reported for categorical independent variables. Characteristics of the selected ACHD population are stratified by outcome of 30-day readmission. Bivariate analysis comparing race, sex, age at index admission, and severity of CHD diagnosis for the outcome measure were performed using a chi-square test of association at an alpha level of 0.05. Claims with missing data on diagnoses were excluded. Missing data on race, gender and patient zip codes were indicated as missing.

The association between CHD severity and 30-day hospital readmission is estimated using hazard ratios (HR) and 95% confidence intervals (95% CI) from a Cox-proportional hazards model. A similar model is used for assessing the association between travel distances from patient zip code to cardiology healthcare facilities. Another Cox-proportional model is used to test the association between selected diagnoses at index admission (CHF non-hypertensive, DM with no complications, and fluid & electrolyte disease) and 30-day readmission. The

proportional hazards assumption is tested for each predictor using log(-log(survival)) survival

curves, goodness-of-fit testing, and time-dependent covariates. Confounding assessment is

reviewed by all possible subsets of a gold standard model and considered present if the

corresponding subset's HR was greater than 10% of the gold standard model. All covariates

listed above are considered for confounding. Models with race as a predictor were run without

the observations containing missing race values. Kaplan-Meier curves assess time until outcome

stratifying on CHD severity, race, age at index admission, sex, and travel distance from patient

zip code to nearest CHD provider. Receiver-operator curves (ROC) are generated for specific

diagnoses at index admission predicting 30-day readmission risk. These diagnoses include CHF

non-hypertensive, fluid & electrolyte disease, and DM with and without complications.

Results

Of the 1,697 patients in the analysis, most are female and white with about 22% missing

data on race (Table 1). Overall, about 23% have a severe CHD, and about 22% had a 30-day

hospital readmission. The remaining 78% had no recorded 30-day hospital readmission.

Cardiac-related index admission diagnosis categories associated with 30-day hospital

readmission include CHF non-hypertensive, fluid & electrolyte disease, and DM with

complications. Readmission is higher for those at initial admission with comorbid CHF non-

hypertensive (13% higher in readmitted patients compared to non-readmitted patients), fluid and

electrolyte disease (15% higher), and DM with complications (about 7% higher). The most

common diagnosis categories are hypertension (n=704) and hyperlipidemia (n=421). Remaining

diagnosis categories of interest did not display an increased incidence among those readmitted

(see Table 2).

Assessment of confounding by the 10% gold standard method reveals confounding only by race for models with urban-rural classification, and distance to Emory clinic as predictors. Given race is also significantly different in the chi-squared analysis (Table 1), it was decided that race should be treated as a confounder and adjusted for in all final models. The hazard of 30-day readmission among those with a severe CHD diagnosis is not significantly different from those with a non-severe CHD diagnosis. This result is consistent across all three models (Table 3). There is also no difference found for rates of 30-day readmission between those living in an area classified as 'urban' vs. 'rural' across all three models (Table 3).

Patients with CHF non-hypertensive at the time of index admission have a higher hazard for 30-day readmission, evident in all three models. This association is also found for patients with fluid & electrolyte disease. There is no evidence of an increased hazard for patients with DM with and without complications. The ROCs reveal that a model including all three diagnoses have an area under the curve of 0.58, indicative of moderate prediction of 30-day readmission (see Figure 1). CHF non-hypertensive and fluid & electrolyte disease contribute to a higher predictive value, while DM with and without complications display no increased prediction (Supplementary Figures 1, 2, and 3). There is no difference in the hazard of 30-day readmission for the log transformed distance between a patient zip code and Emory Clinic, the listed NPI address, and the nearest ACHD provider.

Kaplan-Meier curves displayed the three DM categories (DM with complications, DM without complications, and no DM), DM with complications have slightly lower survival probability, meaning the patients in this category experience more readmissions over time than the other two categories. Survival probabilities remain similar for the three DM categories until around day 25 where those with DM with complications have a greater drop in survival

probability than the other two categories. The Kaplan-Meier curve for CHF non-hypertensive displays survival probabilities that diverge between 7-10 days into follow-up time and continue to diverge to the end of follow-up. Similarly, for the Kaplan-Meier curve analyzing fluid & electrolyte disease, the survival probabilities diverge around 7-10 days and continues through the end of follow-up. Race also displays divergence in the Kaplan-Meier curve from around 12 days onwards.

Discussion

We found several factors associated with 30-day hospital readmission rates among ACHD patients with Medicaid coverage in Georgia. Those include diagnoses at index admission of CHF non-hypertensive, fluid & electrolyte disease, DM with complications and black race. We found no significant associations with 30-day hospital readmission rates by CHD severity, age, or distances from patient zip code to Emory Clinic, a nearest ACHD provider.

CHF is the leading cause of hospitalization and healthcare costs in the United States [18]. Patients with CHF non-hypertensive are likely to be readmitted at higher rates due to CHF's complex medical pathology. Various factors contribute to the acute exacerbation of chronic CHF including poor medication and diet compliance [22]. Poor diet or medication compliance also contribute to uncontrolled DM, typically due to lack of glycemic control.

CHF leads to decreased cardiac output which can then decrease renal perfusion resulting in renal dysfunction and electrolyte imbalance [40]. Diuretic medications, a treatment for congestive heart failure, also can trigger electrolyte imbalance [41]. While other studies have reported an increase in 30-day hospital readmissions among ACHD patients with CHF at index admission [21] [22], they did not report increased readmissions for patients with DM or fluid &

electrolyte disease at index admission. Physicians and hospital systems currently target CHF patients for reducing readmission rates. Examples include: hospital initiatives using home-visiting programs, multidisciplinary heart failure clinic interventions, and structured telephone support [18]. Our study helps with identifying risk groups, within the broader ACHD population, that can possibly be targeted for reducing readmission.

We did not find CHD severity to be associated with increased readmissions, unlike other investigators [21]. The discrepant findings are possibly due to the severity classification schemes used. The Marelli scheme classifies severe CHD as lesions with the highest probability for cyanosis or surgical intervention early in life [6]. There may be better way to classify these lesions based on patient outcomes.

To our knowledge, no other study assesses travel distances in association with 30-day readmissions among an ACHD population. Other travel distance studies analyzing the general population have found longer travel distances are associated with increased 30-day readmission rates, attributing findings to poor healthcare access, especially for follow-up [26]. If patients were found not to follow-up within 7 days after index hospitalization discharge, their likelihood for being readmitted increased [26]. This was evident in our Kaplan-Meier curves analyzing CHF, fluid & electrolyte disease, and race (supplemental Figures 4, 5, and 6). Curves representing patients with these exposures diverged from those without about 7-12 days post-index admission discharge. These findings indicate that about 7-10 days may be an optimal time to follow-up in the outpatient setting after discharge.

Strengths and Limitations

Strengths of the study include having a large sample size. However, Medicaid claims data quality limit our analysis, with substantial underreporting of race and possible inaccurate

diagnosis codes. The diagnoses codes used may include more diagnoses and procedures associated with potential higher billing and may not accurately reflecting the patients' condition. The population eligible for Medicaid is also dependent on income and does not represent Medicare and private insurance patients. Therefore, results may lack generalizability to the entirety of the ACHD population. The distance calculated for patients' travel distance to specialized cardiology facilities was created using zip codes, not exact addresses; thus, distances were rough estimates. The listed NPI addresses may also not be accurately reflecting the address from where the service was provided. Lack of information on smoking status and other potential confounding factors may have introduced unmeasured bias.

Conclusion

Specific comorbid diagnoses at index admission and black race identify subpopulations at increased risk for more likely 30-day hospital readmission. Increased attention to comorbid diagnoses during initial hospital stay may reduce 30-day hospital readmission rates and improve health outcomes for the ACHD population.

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TABLES

Table 1. Selected Characteristics for ACHD Patients Based on 2010-2013 Georgia CMS Medicaid Claims Data by Whether Readmitted within 30 Days of Initial Admission Discharge, Retrospective Cohort Design

	Readmitted		Not Readmitted		Total		Chi-Square	P-value
	n	%*	n	%*	n	%^		
Total	365	21.5	1,332	78.5	1,697	100		
CHD Diagnosis[ab]								
Severe	37	22.6	127	77.4	164	9.7	0.12	ns
Non Severe	328	21.4	1,205	78.6	1,533	90.3		
Age[b]								
20-34	75	19.5	309	80.5	384	22.6	1.23	ns
35-54	160	22.4	555	77.6	715	42.1		
55-64	130	21.7	468	78.3	598	35.2		
Sex[b]								
Male	141	21.5	516	78.5	657	38.7	0.001	ns
Female	224	21.5	816	78.5	1,040	61.3		
Race								
White	114	18.1	517	81.9	631	37.2	7.77	<0.05
Black	170	24.3	529	75.7	699	41.2		
Missing	81	22.1	286	77.9	367	21.6		

Abbreviations: CMS, Centers for Medicare & Medicaid Services; ACHD, Adult Congenital Heart Defect

[a]Based off Modified Marelli scheme

[b]Age, Sex, and CHD Diagnosis have no missing values

*Row Percentage, ^Column Percentage

745.5 diagnoses included (n=254)

Table 2. Chi-Squared Test for Association Between Diagnoses at Index Admission and 30-Day Hospital Readmissions[a] among a Cohort of Adult Congenital Heart Defect Patients Based on 2010-2013 Georgia CMS Medicaid Claims Data, Retrospective Cohort Design

	Readmitted		Not Readmitted		Total		Chi-Square	P-value
	N=365		N=1,332		N=1,697			
Diagnoses at Index admission[b]	n	%*	n	%^	n	%		
Hypertension	164	44.9	540	40.5	704	41.5		
Fluid/electrolyte disease	128	35.1	265	19.9	393	23.2		
Congestive heart failure, non-hypertensive	123	33.7	257	19.3	380	22.4		
Coronary atherosclerosis	93	25.5	289	21.7	382	22.5		
Screening and history of mental illness	90	24.7	298	22.4	388	22.9		
Hyperlipidemia	86	23.6	335	25.2	421	24.8	53.9	<0.0001
Hypertension complications	81	22.2	229	17.2	310	18.3		
Unclassified	79	21.6	222	16.7	301	17.7		
Diabetes mellitus no complications	77	21.1	261	19.6	338	19.9		
Dysrhythmia	73	20.0	239	17.9	312	18.4		
Heart valve disease	67	18.4	247	18.5	314	18.5		
Diabetes mellitus with complications	63	17.3	145	10.9	208	12.3		
Cardiac anomaly	44	12.1	256	19.2	300	17.7		

Abbreviations: CMS, Centers for Medicare & Medicaid Services; ICD, International Classification of Diseases; CCS, Clinical Classification Software

[a]Readmission within 30 days of index hospitalization discharge date

[b]ICD-9-CM CCS multi-level classification level 3

*Percent of Readmitted

^Percent of Not Readmitted

Diagnoses are not mutually exclusive, duplicate diagnoses categories per patient per claim were deleted

Table 3. Cox-Proportional Hazard Ratio for Association Between Selected Predictors and 30-Day Hospital Readmissions among a Cohort of Adult Congenital Heart Defect Patients Based on 2010-2013 Georgia CMS Medicaid Claims Data, Retrospective Cohort Design

CCS Diagnosis Classification at Index Admission[a]	Model 1[b] (n=1,697)		Model 2[ce] (n=1,330)		Model 3[de] (n=1,330)	
Fluid & Electrolyte Disease	HR	95% CI	HR	95% CI	HR	95% CI
No	ref	-	ref	-	ref	-
Yes	1.59	(1.27-2.00)	1.50	(1.16-1.94)	1.55	(1.20-1.99)
Congestive Heart Failure/Non-Hypertensive						
No	ref	-	ref	-	ref	-
Yes	1.66	(1.32-2.08)	1.55	(1.20-2.00)	1.45	(1.12-1.88)
Diabetes Mellitus						
No	ref	-	ref	-	ref	-
DM with complications	1.22	(0.91-1.64)	1.10	(0.78-1.56)	1.02	(0.71-1.44)
DM without complications	0.90	(0.69-1.18)	0.96	(0.72-1.29)	0.92	(0.68-1.24)
CHD Severity Classification[f]						
Non-Severe	ref		ref		ref	
Severe	1.02	(0.72-1.44)	1.06	(0.72-1.59)	1.16	(0.76-1.77)
DM without comlications	0.90	(0.69-1.18)	0.96	(0.72-1.29)	0.92	(0.68-1.24)
Distances from Patient Residential Zip Code (in miles)[g]						
to Emory Clinic						
< 29.7	ref	-	ref	-	ref	-
≥ 29.7 - 64.7	0.77	(0.60-0.99)	0.80	(0.59-1.08)	0.80	(0.59-1.08)
≥ 64.7 - 131.6	1.15	(0.92-1.44)	1.25	(0.97-1.62)	1.20	(0.93-1.55)
≥ 131.6	0.88	(0.69-1.13)	0.87	(0.66-1.15)	0.89	(0.67-1.18)
to Listed NPI Address						
< 6.1	ref	-	ref	-	ref	-
≥ 6.1 - 14.0	0.87	(0.71-1.09)	0.84	(0.66-1.07)	0.84	(0.66-1.08)
≥ 14.0 - 29.1	0.93	(0.73-1.20)	0.89	(0.66-1.20)	0.89	(0.66-1.20)
≥ 29.1	0.97	(0.75-1.24)	1.05	(0.79-1.40)	1.06	(0.80-1.42)
to Nearest ACHD Provider						
< 15.6	ref	-	ref	-	ref	-
≥ 15.6 - 29.1	1.22	(0.97-1.54)	1.13	(0.87-1.48)	1.14	(0.87-1.49)
≥ 29.1 - 53.0	0.80	(0.62-1.03)	0.90	(0.68-1.19)	0.91	(0.69-1.20)
≥ 53.0	0.88	(0.69-1.12)	0.87	(0.66-1.15)	0.86	(0.65-1.14)
Urban County Residence[h]						
Yes	ref	-	ref	-	ref	-
No	0.92	(0.73-1.16)	1.04	(0.80-1.35)	1.03	(0.80-1.35)

Abbreviations: HR, Hazard Ratio; CI, Confidence Interval; CMS, Centers for Medicare & Medicaid Services; NPI, National Provider Index; ICD, International Classification of Diseases; CCS, Clinical Classification Software; ACHD, Adult Congenital Heart Disease; NCHS, National Center for Health Statistics;

[a] ICD-9-CM CCS multi-level classification level 3

[b] Unadjusted Model

[c] Adjusted for Race

[d] Adjusted for age, sex, race, diagnoses at index admission: fluid & electrolyte disease, congestive heart failure non-hypertensive, and diabetes mellitus complications
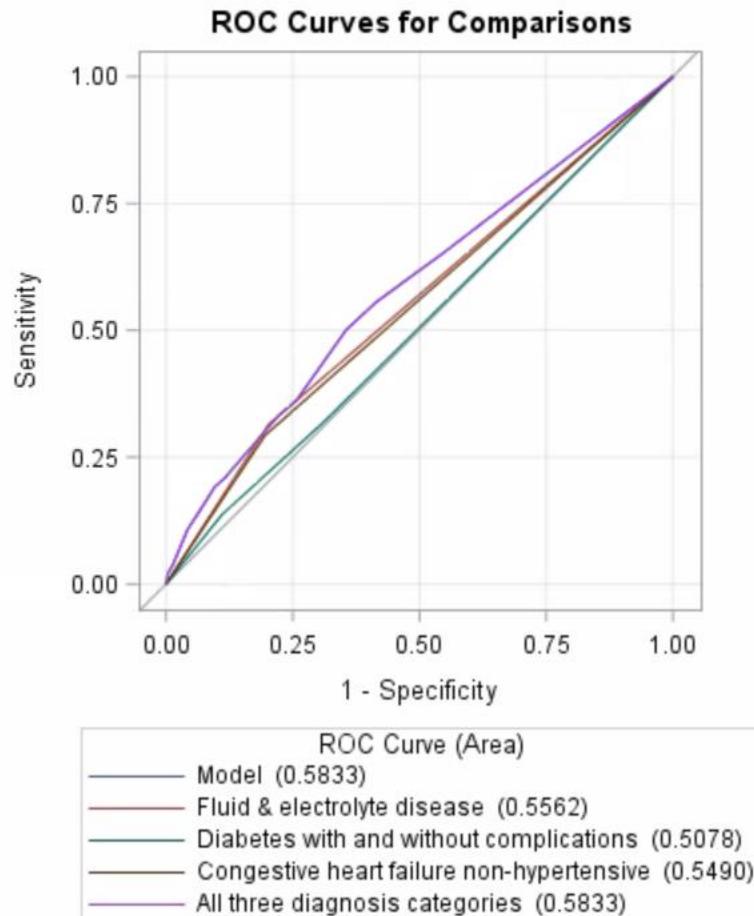
[e] Model excludes observations due to missing values for race (n=367)

[f] Based off a modified Marelli scheme

[g] Categories based off quartile cutpoints (25th percentile, median, 75th percentile) of log transformed distribution

[h] Urban classification based off NCHS 2013 urban-rural classification scheme for counties

FIGURES

ROC Curves for Comparisons

ROC Curve (Area)
— Model (0.5833)
— Fluid & electrolyte disease (0.5562)
— Diabetes with and without complications (0.5078)
— Congestive heart failure non-hypertensive (0.5490)
— All three diagnosis categories (0.5833)
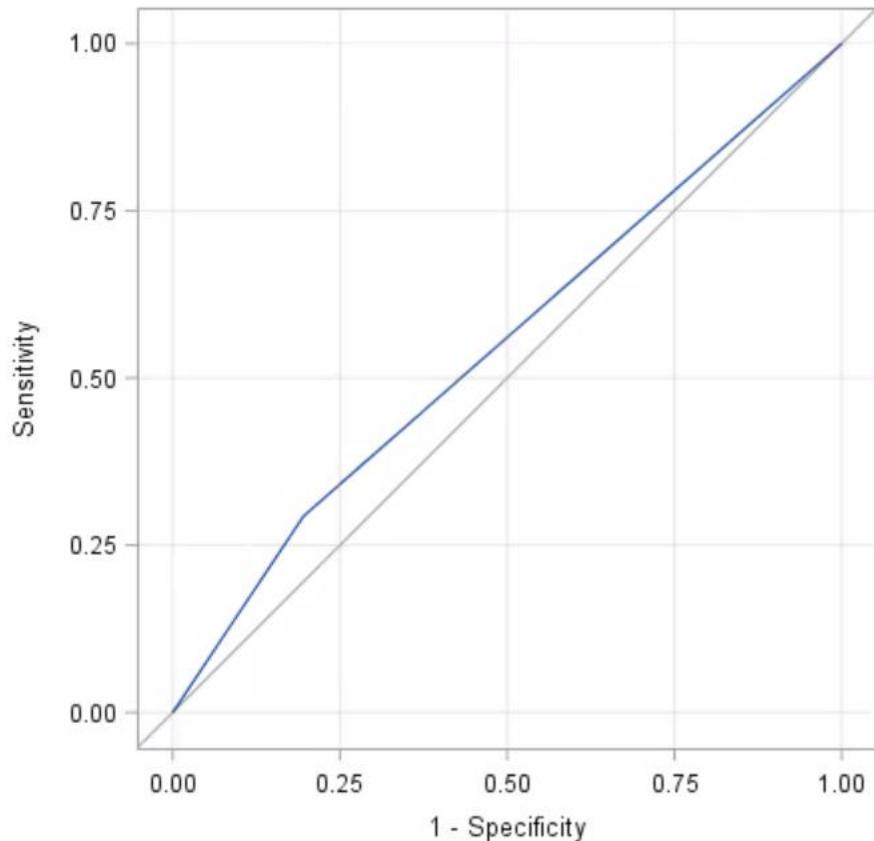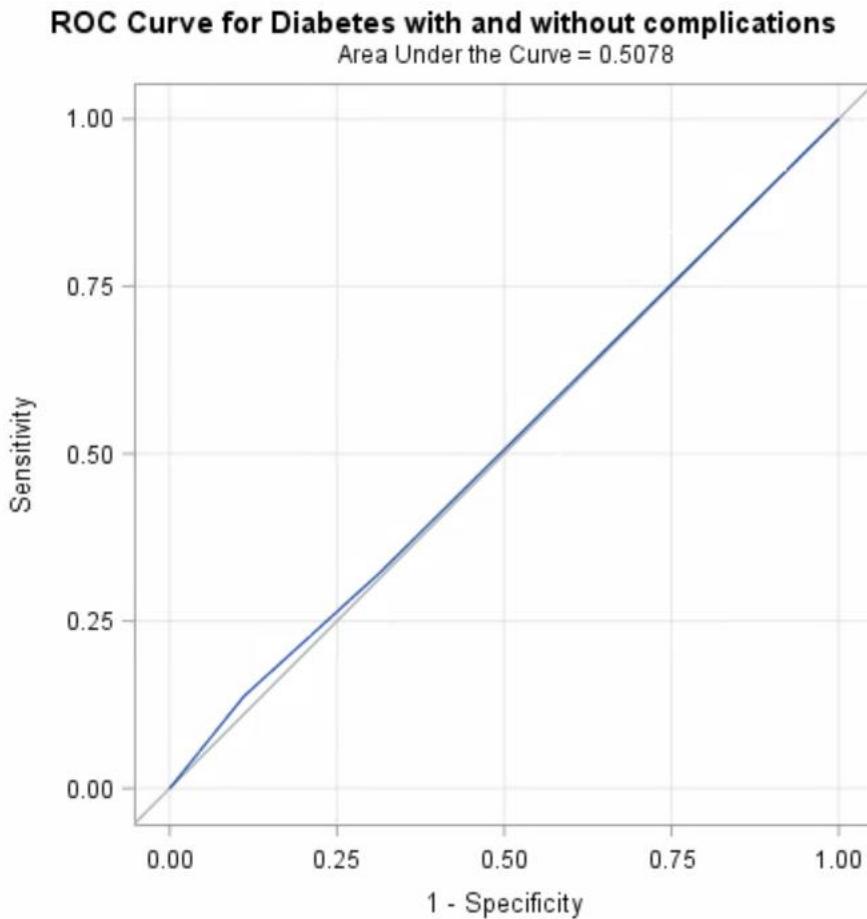
Figure 1. Receiver-operator curves comparing prediction of 30-day readmission with logistic models containing three separate diagnoses at index admission and a model with all three included

SUPPLIMENTARY FIGURES
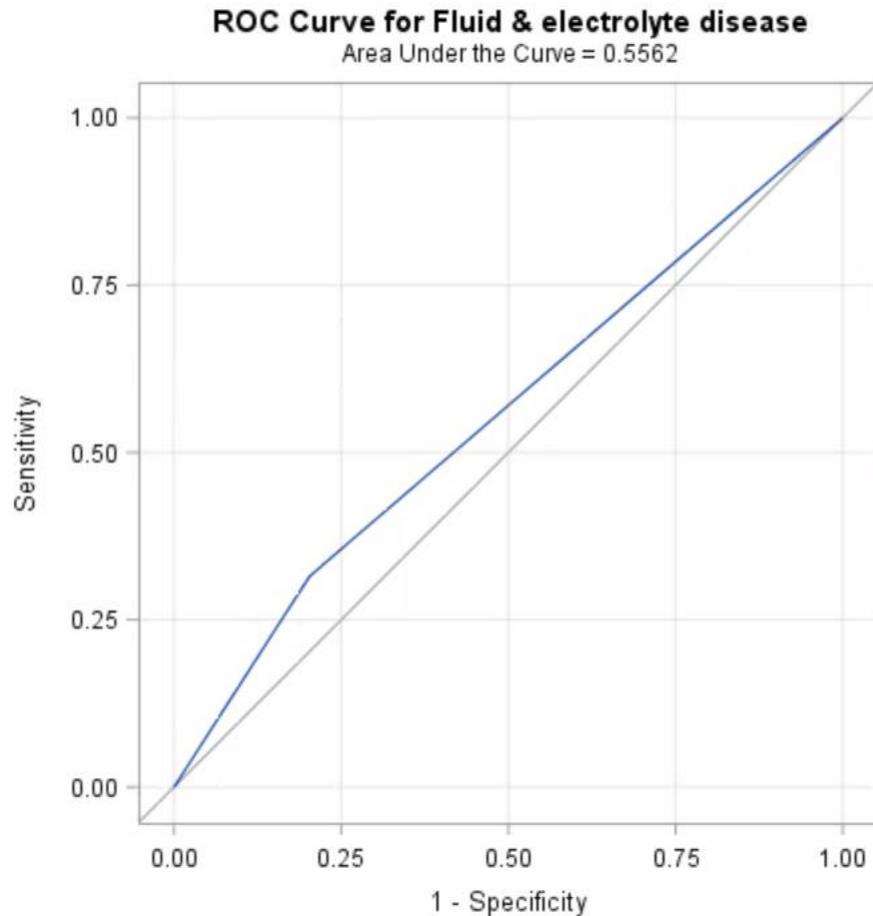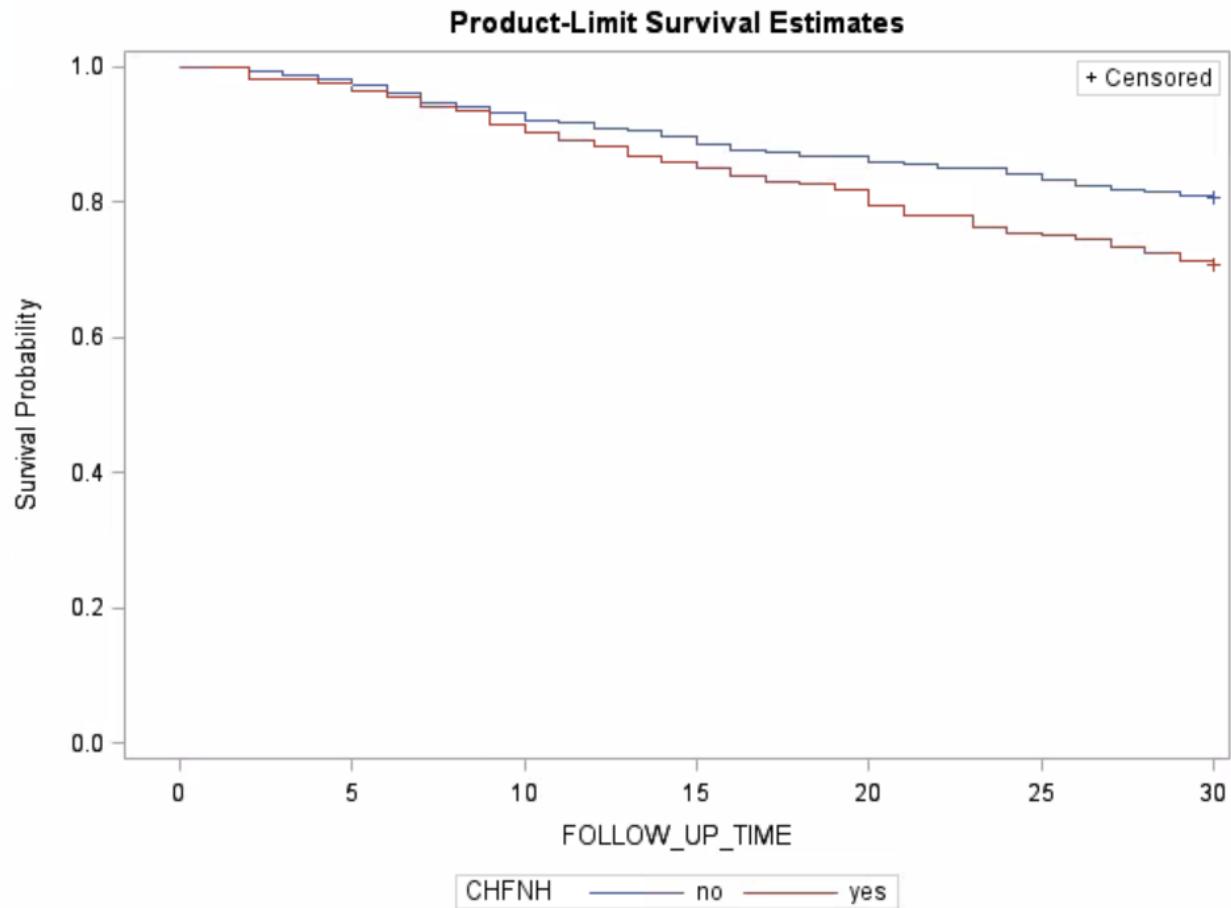
Supplementary Figure 1. Receiver-operator curve predicting 30-day readmission using a logistic model containing congestive heart failure non-hypertensive as a diagnosis category at index admission
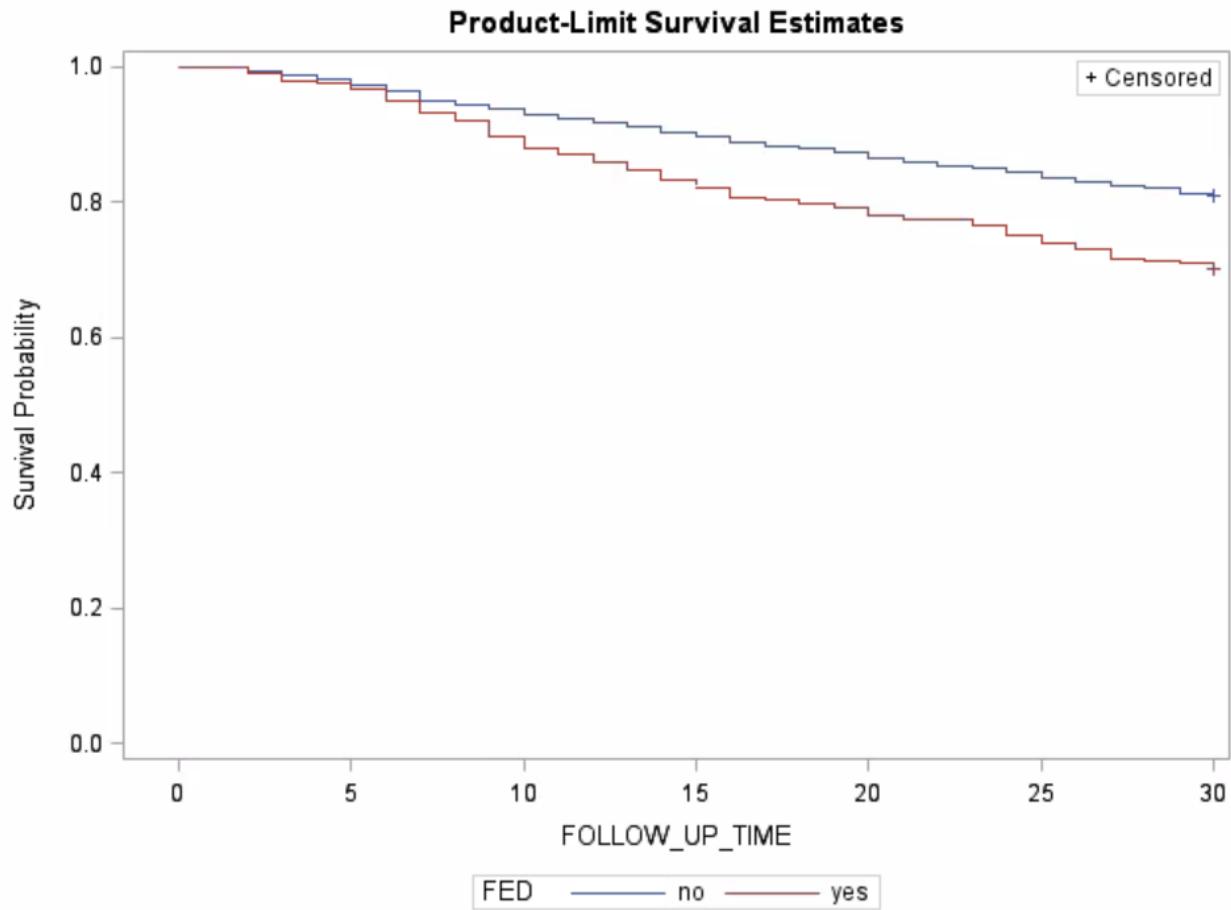
Supplementary Figure 2. Receiver-operator curve predicting 30-day readmission using a logistic model containing diabetes with and without complications as a diagnosis category at index admission
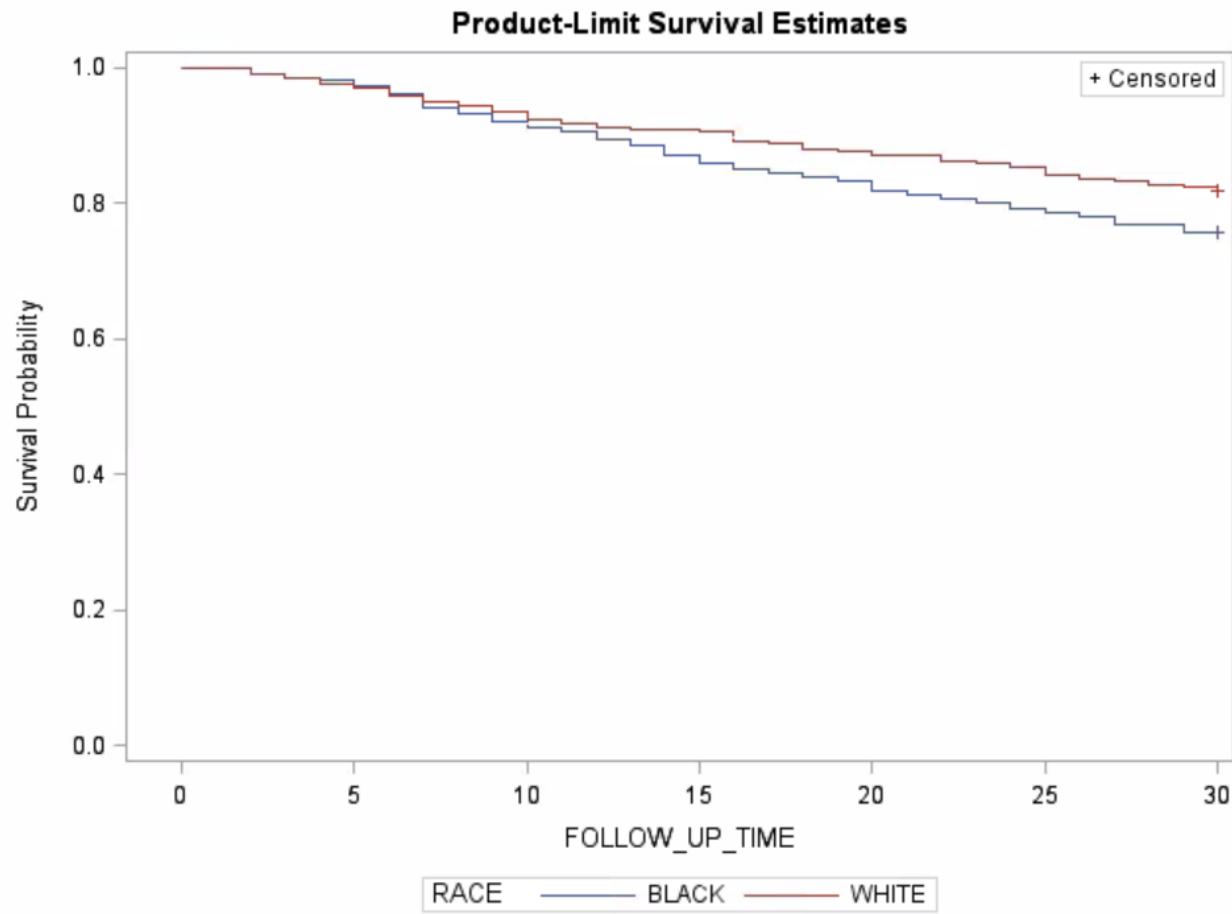
Supplementary Figure 3. Receiver-operator curve predicting 30-day readmission using a logistic model containing fluid & electrolyte disease as a diagnosis category at index admission

Supplementary Figure 4. Kaplan Meier curve for the unadjusted association between congestive heart failure non-hypertensive and time until readmission

Supplementary Figure 5. Kaplan Meier curve for the unadjusted association between fluid & electrolyte disease and time until readmission

Supplementary Figure 6. Kaplan Meier curve for the unadjusted association between race and time until readmission

CHAPTER IV: EXTENDED ANALYSIS

Characteristics of the Cohort

  The final analytic dataset included a cohort of 1,697 patients, 365 of whom experienced a subsequent admission within 30 days. The only predictor from Table 1 associated with 30-day readmission is race with a significantly higher proportion of black patients having a readmission within 30 days compared to white patients. There are 13 Asian patients initially included for analyses (6 with a readmission and 7 without); however, we decided to exclude these individuals due to low cell counts. CHD severity, age, and sex are not significantly different between patients with a 30-day readmission and those without.

Diagnosis Categories at Readmission

  A separate descriptive analysis compares the diagnoses at index readmission and diagnoses at readmission among those who were readmitted (see supplementary Table 1). No significant differences are found among the top 13 comorbid diagnosis categories by incidence within the population.

Proportional Hazards Assumption

  The proportional hazards (PH) assumption tests race, age, sex, CHD severity, and diagnosis categories at index admission including CHF non-hypertensive, DM with and without complications, and fluid & electrolyte disease. The PH assumption is first tested using log(-log(survival)) survival curves. The log(-log(survival)) survival curves do not show any significant evidence that the hazard in the exposed is different from the unexposed over time (Supplementary Figures 13-19). A goodness of fit test was then conducted for predictors. Schoenfeld residuals are obtained from the Cox-Proportional model and ranks are given to the patients with 30-day readmissions in the order from which they occurred (days since index

admission). Correlation assessment using SAS Proc Corr, analyzes the association between the Schoenfeld residual and the rank variable. The resulting p-values for each predictor are > 0.05. Lastly, time-dependent variables are created for each covariate using the time distributions $g(t) = t$ and $g(t) = \ln(t)$. Each predictor is inserted into a Cox-Proportional model separately for each time distribution. The chi-square test statistic and resulting p-values are >0.05. Results from these analyses indicate the PH assumption is met for all predictors.

Distance Analyses

Distance from patient zip code to Emory Clinic is calculated using straight line latitude-longitude coordinates, including patients with listed zip codes outside the state of Georgia. The mean distance was 86.2 miles, standard deviation 86.3 miles, min 2.11 miles and a max of 1,938 miles. Distance from patient zip code to the closest ACHD provider is similarly calculated and resulted in a mean of 38.8 miles, standard deviation of 32.6, min of 0.25 and max 125.7. Lastly, distance from patient zip code to the listed NPI address is calculated and found to have a mean of 27.6 miles, standard deviation of 78.5, min of 0 and max of 1,980. Because of the extremely high variance in the resulting distributions, we log transformed the distance measures. After log transformation, the distribution results are as follows:

	Distance to Emory Clinic – Log transform (mile equivalent)	Distance to Nearest ACHD Provider – Log transform (mile equivalent)	Distance to Listed NPI Address – Log transform (mile equivalent)
Mean	4.02 (55.7)	3.20 (24.5)	1.15 (3.2)
Standard Deviation	1.04 (2.83)	1.12 (3.1)	0.41 (1.5)
Min	0.75 (2.12)	-1.39 (0.3)	-9.21 (0)
Max	7.57 (1939.1)	4.91 (135.6)	7.59 (1978.3)
25th Percentile	3.39 (29.7)	2.75 (15.6)	1.81 (6.1)
Medium	4.17 (64.7)	3.37 (29.1)	2.64 (14.0)
75th Percentile	4.88 (131.6)	3.97 (53.0)	3.37 (29.1)

Before log-transformation, a Cox-Proportional model was run on categories of travel distance in miles. The categories were <10 miles, ≥10-20 miles, ≥20-30 miles, and ≥30 miles. No significant differences were found in hazard of 30-day readmission except for the unadjusted models comparing those who live more than 30 miles from Emory (HR = 0.78), and an ACHD provider (HR = 0.79). After adjustment in the fully adjusted gold standard model and the final model adjusting for race, these associations were found to be null.

Kaplan-Meier Curves

Kaplan-Meier curves assess the unadjusted association between predictors and time until readmission (Figures 6-12). These predictors include age, race, sex, CHD severity, CHF non-hypertensive, DM with and without complications, and fluid & electrolyte disease. No significant differences between categories are found for age, CHD severity, or sex. Among the three DM categories (DM with complications, DM without complications, and no DM), DM with complications have slightly lower survival probability, meaning the patients in this category experience more readmissions over time than the other two categories. Survival probabilities remain similar for the three DM categories until around day 25 where those with DM with complications have a greater drop in survival probability than the other two categories. The Kaplan-Meier curve for CHF non-hypertensive displays survival probabilities that diverge between 7-10 days into follow-up time and continue to diverge to the end of follow-up. Similarly, for the Kaplan-Meier curve analyzing fluid & electrolyte disease, the survival probabilities diverge around 7-10 days and continues through the end of follow-up. Race also displays divergence in the Kaplan-Meier curve from around 12 days onwards. The similarities between the Kaplan-Meier curves for CHF and fluid & electrolyte disease may be due to physiological ties. In addition, previous literature indicates a predictor for increased readmissions

is not following-up within 1 week of discharge. The timing of the readmissions for patients with

CHF, fluid & electrolyte disease, and black patients support this hypothesis as they all tend to be

readmitted between 7-10 days after discharge.

CHAPTER V: PUBLIC HEALTH IMPLICATIONS AND FUTURE TRENDS

This study identifies risk factors associated with increased rates of 30-day readmission in an ACHD population. Predictors include black race and diagnosis categories including CHF non-hypertensive, fluid & electrolyte disease, and DM with complications. Physicians and hospital systems currently target CHF patients for reducing readmission rates. Examples include hospital initiatives using home-visiting programs, multidisciplinary HF clinic interventions, and structured telephone support [18]. Our study may help with identifying risk groups, within the broader ACHD population, who can be targeted for reducing readmission.

A major factor that could likely decrease hospital readmission rates is with adequate physician follow-up in the days following discharge from a hospital admission [43]. This study tried to assess if longer travel distances to follow-up care facilities such as the Emory Clinic, the nearest Georgia ACHD provider, or the NPI address listed on the claim, were associated with an increase in readmission rates. There was no statistical evidence to suggest this was the case. However, results may not accurately reflect the travel burden for several reasons. One of which is the facilities used in the study may not be where patients are receiving follow-up care. Future studies would benefit from having robust data on patient follow-up and accurate travel data considering modes of transportation and traffic. Data on outpatient clinic visits post-discharge would be helpful in identifying other risk factors associated with increased readmission.

With the implementation of the Hospital Readmissions Reduction Program (HRRP), reductions in 30-day readmission rates have become a target for quality improvement. Provider incentives outlined in the HRRP are primarily focused on reducing readmission rates which in theory improves the quality of care for the patient and patient outcomes. The current literature has yet to establish a direct link between 30-day hospital readmission and patient outcome

measures [44]. Because of this, there is doubt regarding the use of financial incentives for providers and whether there is any relationship to an increase in quality of care or improvement of patient outcomes [44]. Future research should focus on how 30-day readmission rates are associated with patient outcomes and quality of care.

Racial differences in 30-day readmissions are likely due to many factors influencing the access to care for black populations compared to white. These barriers may include inadequate transportation for follow-up, monetary issues preventing medication dispersal, and cultural barriers that may prevent the consumption of a recommended diet compliant with their disease status. These cultural and social barriers likely lead to more complications associated with the populations chronic disease state. More research detailing specific racial barriers for access to health would give insight for targeted intervention strategies for reducing readmission rates in the black ACHD population.

This study raises further questions when analyzing ACHD populations: Is the Marelli scheme for classifying CHD severity adequate or is there evidence of misclassification? Is travel distance a true barrier for follow-up care in an ACHD population?

APPENDICES

APPENDIX A: CHD Severity Classification Based on a Modified Marelli Scheme

ICD9 Diagnosis Code	Diagnosis Desc	Severity 5 Classification	Sev5 Desc	Sev5 Flag1 Severe	Sev5 Flag2 Shunt	Sev5 Flag3 Valve	Sev5 Flag5 Other
745.0	COMMON TRUNCUS	1	Severe	1	0	0	0
745.1	COMPL TRANSPOS GREAT VES - unbillable code	1	Severe	1	0	0	0
745.10	COMPL TRANSPOS GREAT VES	1	Severe	1	0	0	0
745.11	DOUBLE OUTLET RT VENTRIC	1	Severe	1	0	0	0
745.12	CORRECT TRANSPOS GRT VES	1	Severe	1	0	0	0
745.19	TRANSPOS GREAT VESS NEC	1	Severe	1	0	0	0
745.2	TETRALOGY OF FALLOT	1	Severe	1	0	0	0
745.3	COMMON VENTRICLE	1	Severe	1	0	0	0
745.4	VENTRICULAR SEPT DEFECT	2	Shunt	0	1	0	0
745.5	SECUNDUM ATRIAL SEPT DEF	2	Shunt	0	1	0	0
745.6	ENDOCARD CUSHION DEF NOS - unbillable code	1	Severe	1	0	0	0
745.60	ENDOCARD CUSHION DEF NOS	1	Severe	1	0	0	0
745.61	OSTIUM PRIMUM DEFECT	2	Shunt	0	1	0	0
745.69	ENDOCARD CUSHION DEF NEC	1	Severe	1	0	0	0
745.7	COR BILOCULARE	5	Other	0	0	0	1
745.8	SEPTAL CLOSURE ANOM NEC	2	Shunt	0	1	0	0
745.9	SEPTAL CLOSURE ANOM NOS	2	Shunt	0	1	0	0
746.0	PULMONARY VALVE ANOM NOS - unbillable code	3	Valve	0	0	1	0
746.00	PULMONARY VALVE ANOM NOS	3	Valve	0	0	1	0
746.01	CONG PULMON VALV ATRESIA	1	Severe	1	0	0	0
746.02	CONG PULMON VALVE STENOS	3	Valve	0	0	1	0
746.09	PULMONARY VALVE ANOM NEC	3	Valve	0	0	1	0
746.1	CONG TRICUSP ATRES/STEN	1	Severe	1	0	0	0
746.2	EBSTEIN-s ANOMALY	3	Valve	0	0	1	0
746.3	CONG AORTA VALV STENOSIS	3	Valve	0	0	1	0
746.4	CONG AORTA VALV INSUFFIC	3	Valve	0	0	1	0
746.5	CONGEN MITRAL STENOSIS	3	Valve	0	0	1	0
746.6	CONG MITRAL INSUFFICIENC	3	Valve	0	0	1	0
746.7	HYPOPLAS LEFT HEART SYND	1	Severe	1	0	0	0

ICD9 Diagnosis Code	Diagnosis Desc	Severity 5 Classification	Sev5 Desc	Sev5 Flag1 Severe	Sev5 Flag2 Shunt	Sev5 Flag3 Valve	Sev5 Flag5 Other
746.8	CONG HEART ANOMALY NOS - unbillable code	5	Other	0	0	0	1
746.81	CONG SUBAORTIC STENOSIS	3	Valve	0	0	1	0
746.82	COR TRIATRIATUM	5	Other	0	0	0	1
746.83	INFUNDIB PULMON STENOSIS	3	Valve	0	0	1	0
746.84	OBSTRUCT HEART ANOM NEC	5	Other	0	0	0	1
746.85	CORONARY ARTERY ANOMALY	5	Other	0	0	0	1
746.87	MALPOSITION OF HEART	5	Other	0	0	0	1
746.89	CONG HEART ANOMALY NEC	5	Other	0	0	0	1
746.9	CONG HEART ANOMALY NOS	5	Other	0	0	0	1
747.0	PATENT DUCTUS ARTERIOSUS	2	Shunt	0	1	0	0
747.1	COARCTATION OF AORTA - unbillable code	3	Valve	0	0	1	0
747.10	COARCTATION OF AORTA	3	Valve	0	0	1	0
747.11	INTERRUPT OF AORTIC ARCH	1	Severe	1	0	0	0
747.2	CONG ANOM OF AORTA NOS - unbillable code	5	Other	0	0	0	1
747.20	CONG ANOM OF AORTA NOS	5	Other	0	0	0	1
747.21	ANOMALIES OF AORTIC ARCH	5	Other	0	0	0	1
747.22	AORTIC ATRESIA/STENOSIS	3	Valve	0	0	1	0
747.29	CONG ANOM OF AORTA NEC	5	Other	0	0	0	1
747.3	PULMONARY ARTERY ANOM (end 2011)	3	Valve	0	0	1	0
747.31	Pulmon art coarct/atres (Begin 2011)	3	Valve	0	0	1	0
747.39	Oth anom pul artery/circ (Begin 2011)	3	Valve	0	0	1	0
747.4	GREAT VEIN ANOMALY NOS - unbillable code	5	Other	0	0	0	1
747.40	GREAT VEIN ANOMALY NOS	5	Other	0	0	0	1
747.41	TOT ANOM PULM VEN CONNEC	1	Severe	1	0	0	0
747.42	PART ANOM PULM VEN CONN	2	Shunt	0	1	0	0
747.49	GREAT VEIN ANOMALY NEC	5	Other	0	0	0	1
747.9	CIRCULATORY ANOMALY NOS	5	Other	0	0	0	1
648.51	CONGEN CV DIS-DELIVERED	5	Other	0	0	0	1
648.52	CONGEN CV DIS-DEL W P/P	5	Other	0	0	0	1
648.53	CONGEN CV DIS-ANTEPARTUM	5	Other	0	0	0	1
648.54	CONGEN CV DIS-POSTPARTUM	5	Other	0	0	0	1

ICD9 Diagnosis Code	Diagnosis Desc	Severity 5 Classification	Sev5 Desc	Sev5 Flag1 Severe	Sev5 Flag2 Shunt	Sev5 Flag3 Valve	Sev5 Flag5 Other
V13.65	Hx-cong malform-heart (Begin 2010)	5	Other	0	0	0	1
648.50	CONGEN CV DIS PREG-UNSP	5	Other	0	0	0	1

Appendix B: List of Adult Congenital Heart Defect Clinics in Georgia

1 - Central Georgia Heart Center - Warner Robins   Adult
2 - Central Georgia Heart Center - Macon   Adult
3 - Central Georgia Heart Center - Milledgeville   Adult
4 - Georgia Heart Physicians - Macon   Adult
5 - Adairsville Family Medicine - Adairsville   Adult
6 - Wellstar Medical Group - Hiram   Adult
7 - Wellstar Medical Group - Douglasville   Adult
8 - Wellstar Medical Group - Cartersville   Adult
9 - Savannah Children's Heart - Savannah   Adult
10 - Oconee Heart Vascular Center - Athens   Adult
11 - Harbin-Cardiology Acworth - Acworth   Adult
12 - Harbin-Cardiology Calhoun - Calhoun   Adult
13 - Harbin-Cardiology Cartersville - Cartersville   Adult
14 - Harbin-Cardiology Rome - Rome   Adult

Appendix C: Supplementary Figures and Tables

SUPPLIMENTARY TABLES & FIGURES

Supplimentary Table 1. Chi-Squared Test for Association Between Diagnoses at Index Admission and Diagnoses at Readmission Among Patients with a 30-DayReadmission[a] in A Cohort of Adult Congenital Heart Defect Patients Based on 2010-2013 Georgia CMS Medicaid Claims Data

	Readmission N=365		Index Admission N=365			
Diagnoses Classification[b]	n	%*	n	%*	Chi-Square	P-Value
Hypertension	162	44.4	164	44.9		
Congestive Heart Failure, non-hypertensive	114	31.2	123	33.7		
Fluid/electrolyte disease	111	30.4	128	35.1		
Hyperlipidemia	99	27.1	86	23.6		
Diabetes mellitus no complications	91	24.9	77	21.1		
Coronary atherosclerosis	90	24.7	93	25.5	16.6	ns
Hypertension complications	84	23.0	81	22.2		
Unclassified	83	22.7	79	21.6		
Heart valve disease	79	21.6	67	18.4		
Anemia	79	21.6	70	19.2		
Dysrhythmia	73	20.0	73	20.0		
Screening and history of mental illness	72	19.7	90	24.7		
Diabetes mellitus with complications	53	14.5	90	24.7		
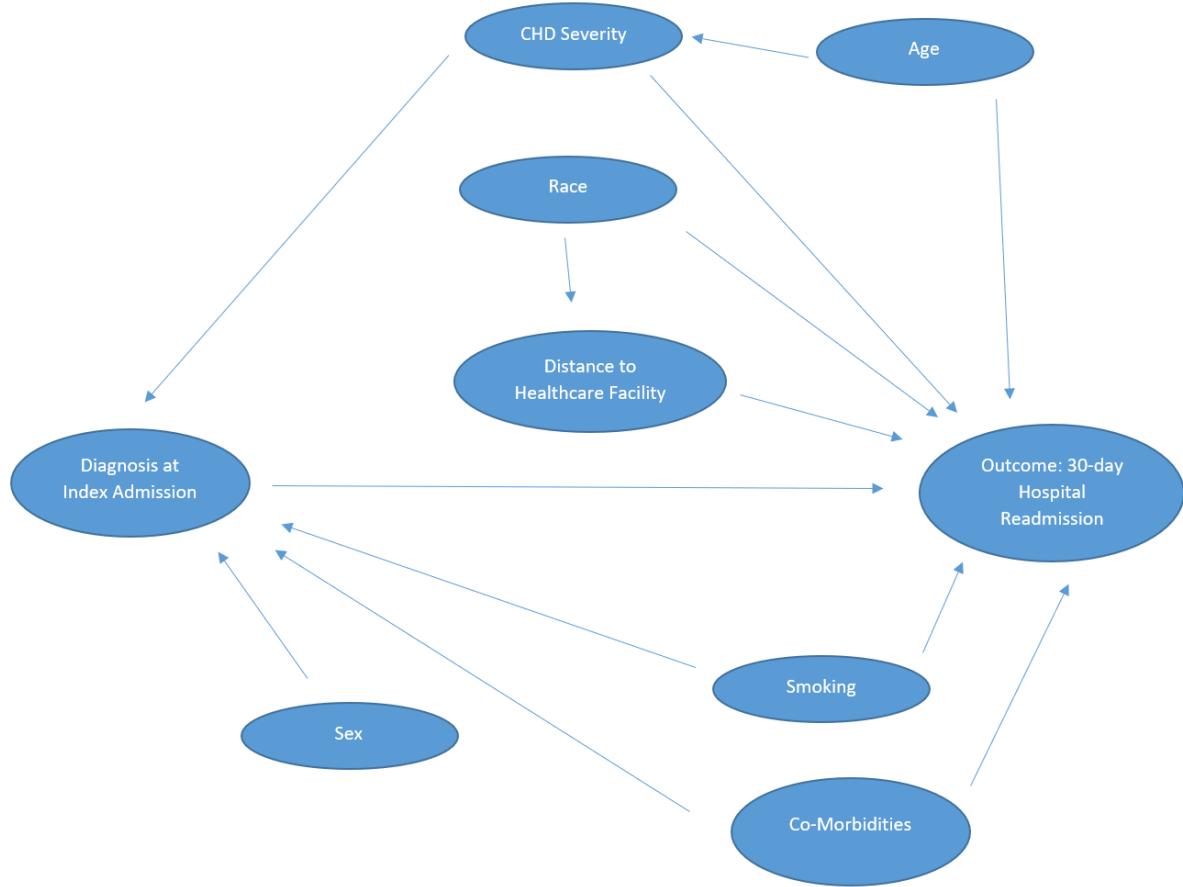
Abbreviations: CMS, Centers for Medicare & Medicaid Services; ICD, International Classification of Diseases; CCS, Clinical Classification Software

[a]Readmission within 30 days of index hospitalization discharge date
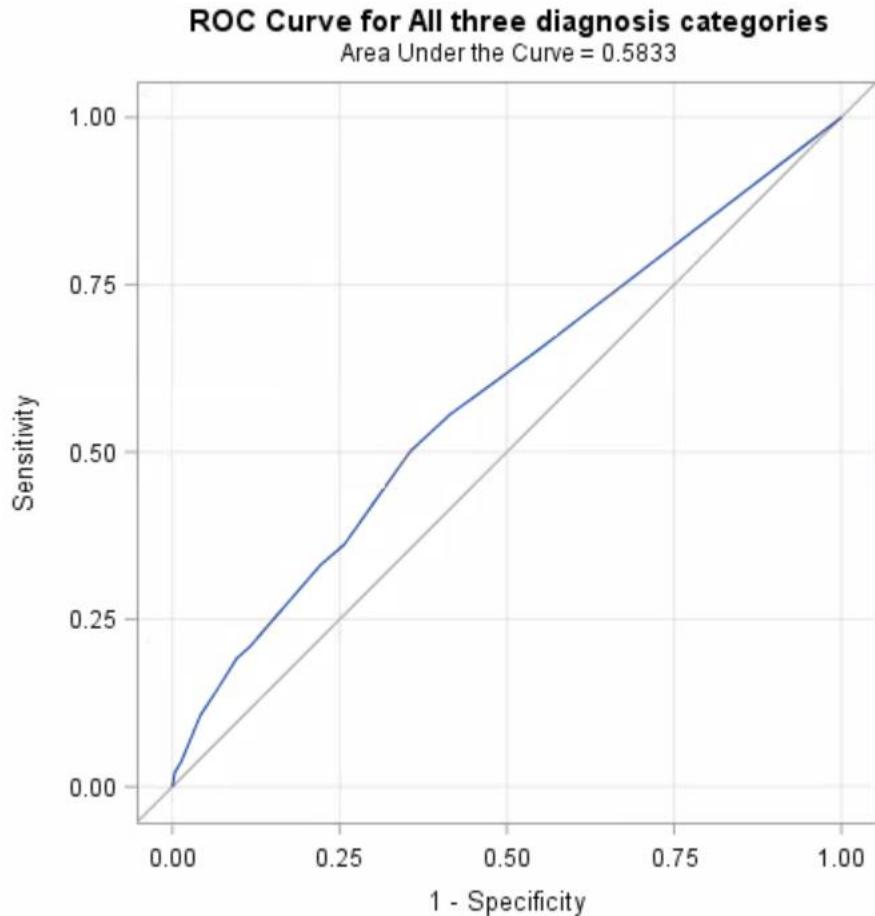
[b]ICD-9-CM CCS multi-level classification level 3

*Percent of readmitted patients
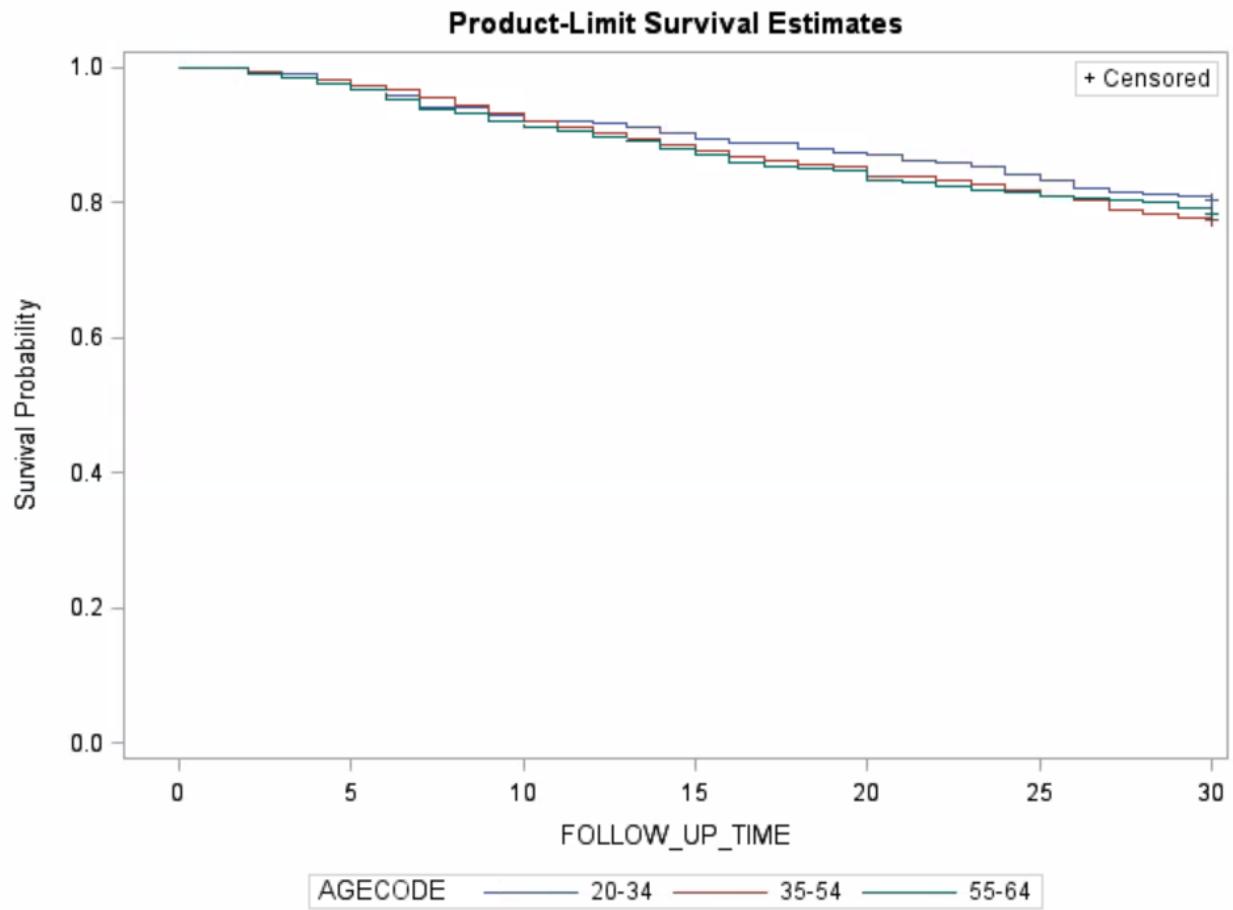
Diagnoses are not mutually exclusive, duplicate diagnoses categories per patient per claim were deleted
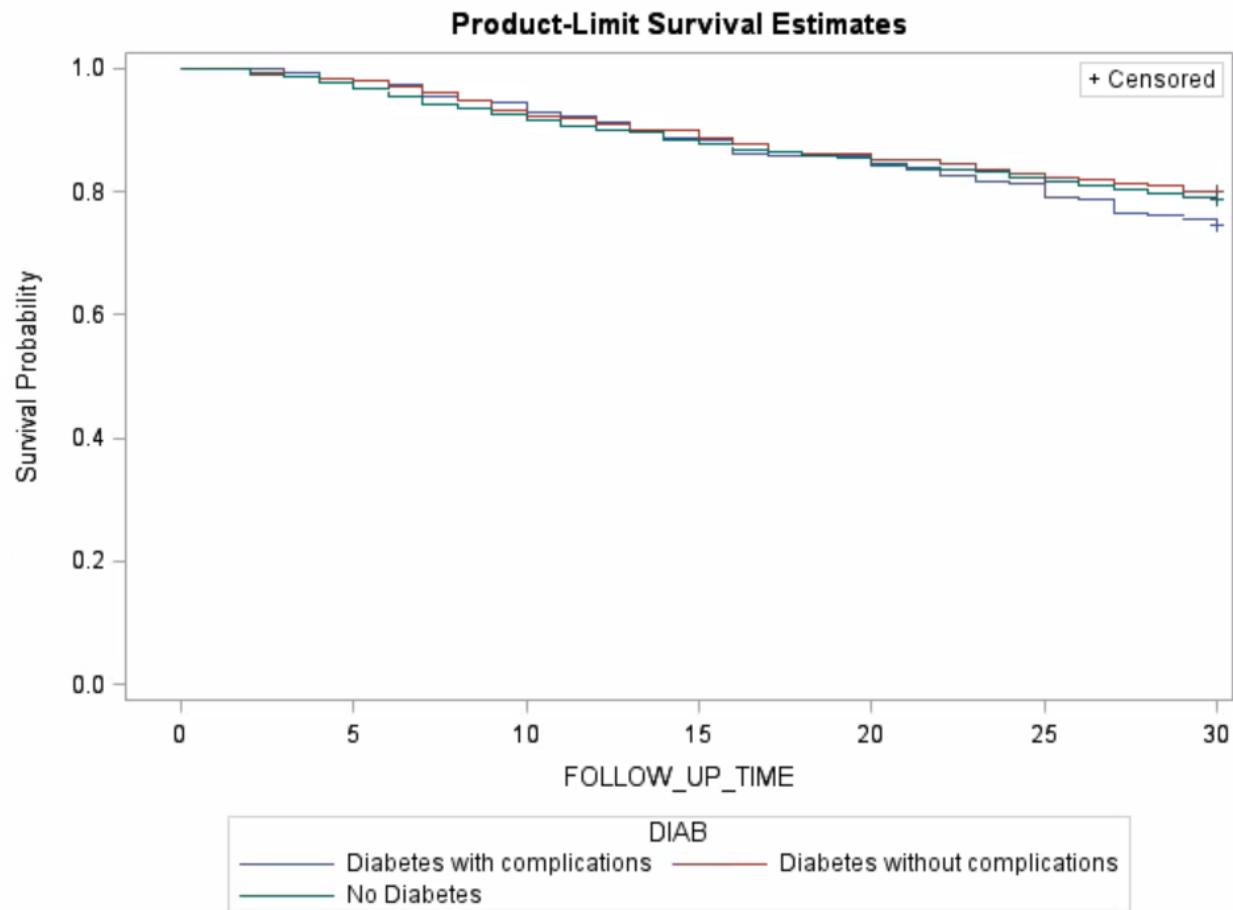
Supplementary Figure 7. Directed Acyclic Graph (DAG)
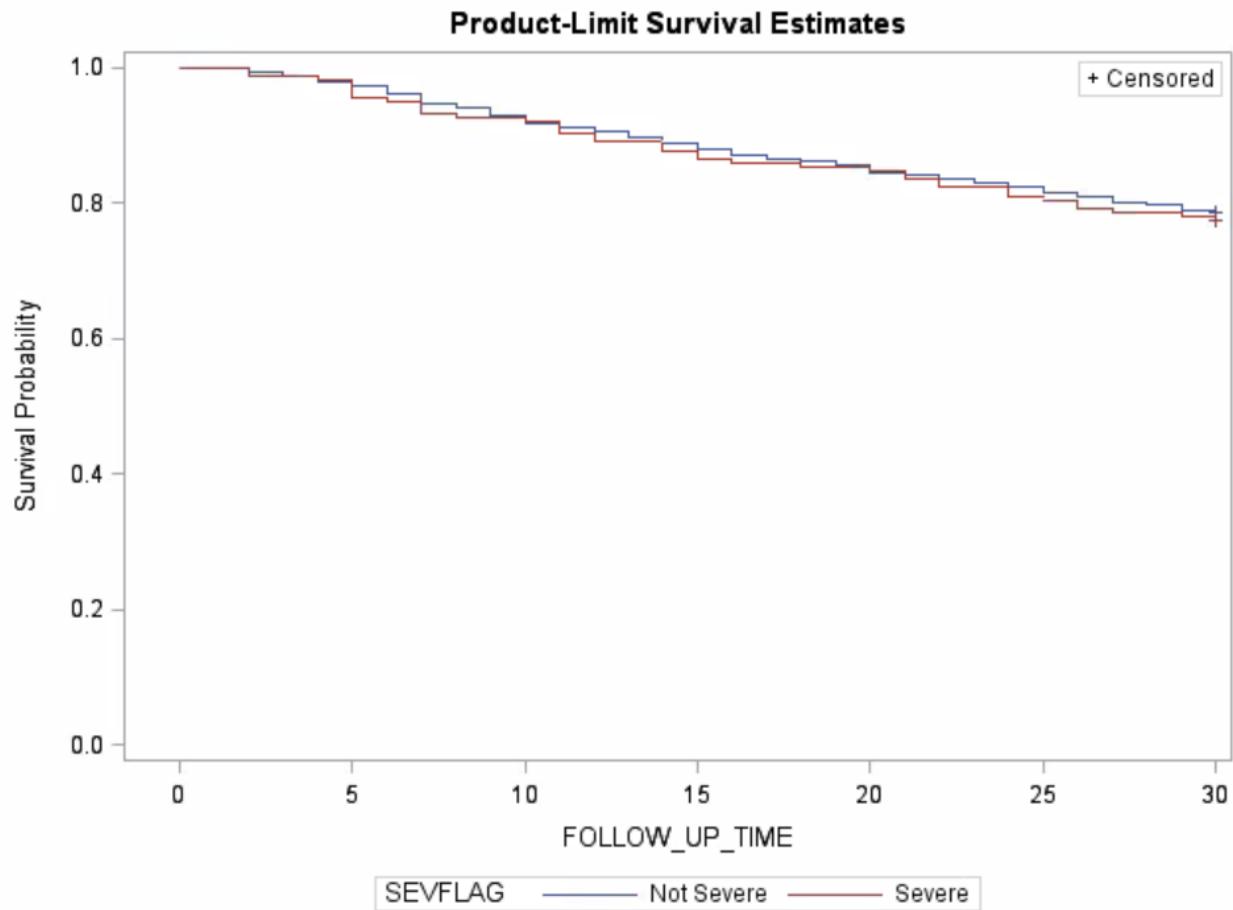
Supplementary Figure 8. Receiver-operator curve predicting 30-day readmission using a logistic model containing three diagnosis categories at index admission: congestive heart failure non-hypertensive, fluid & electrolyte disease, and diabetes with and without complications
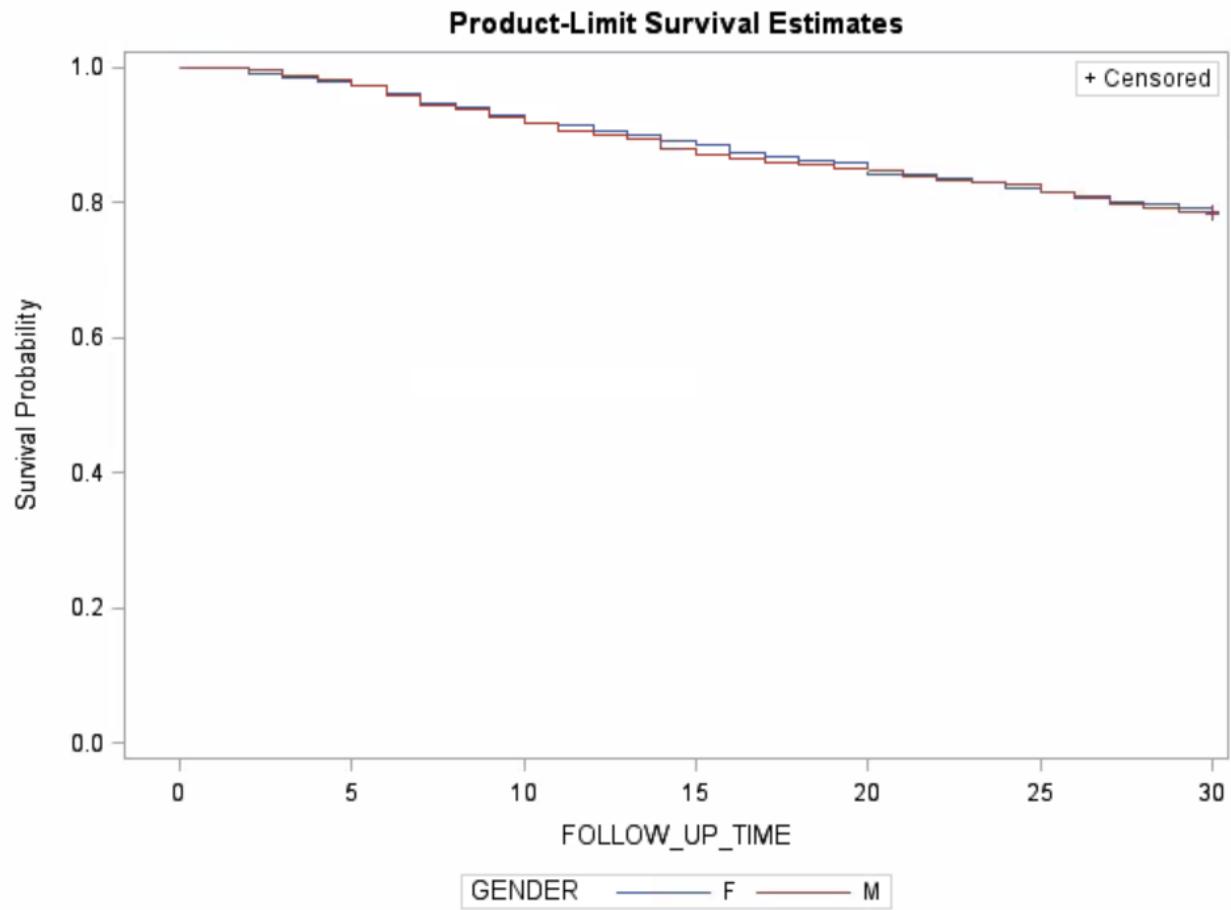
Supplementary Figure 9. Kaplan Meier curve for the unadjusted association between age categories and time until readmission
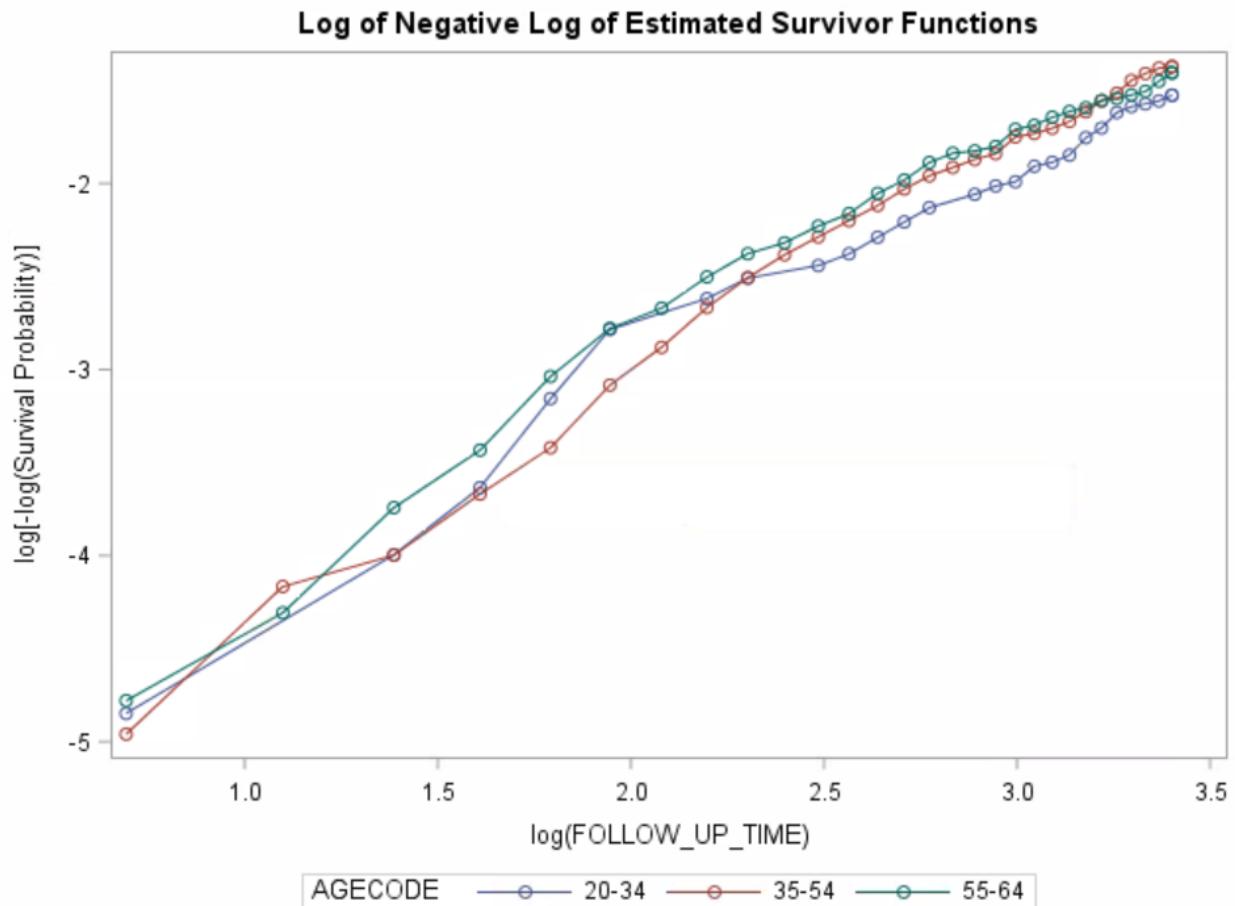
Supplementary Figure 10. Kaplan Meier curve for the unadjusted association between diabetes mellitus with and without complications and time until readmission
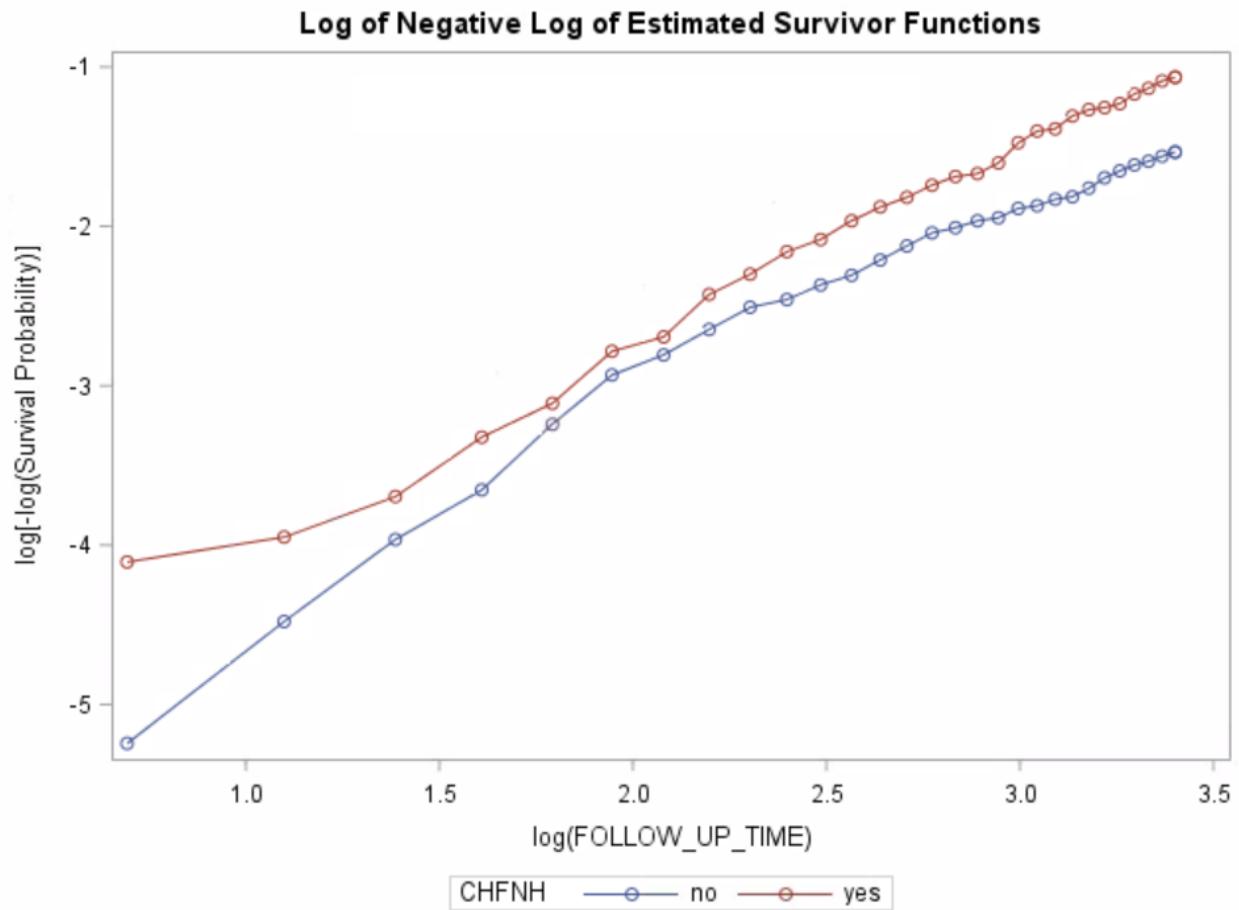
Supplementary Figure 11. Kaplan Meier curve for the unadjusted association between CHD severity and time until readmission
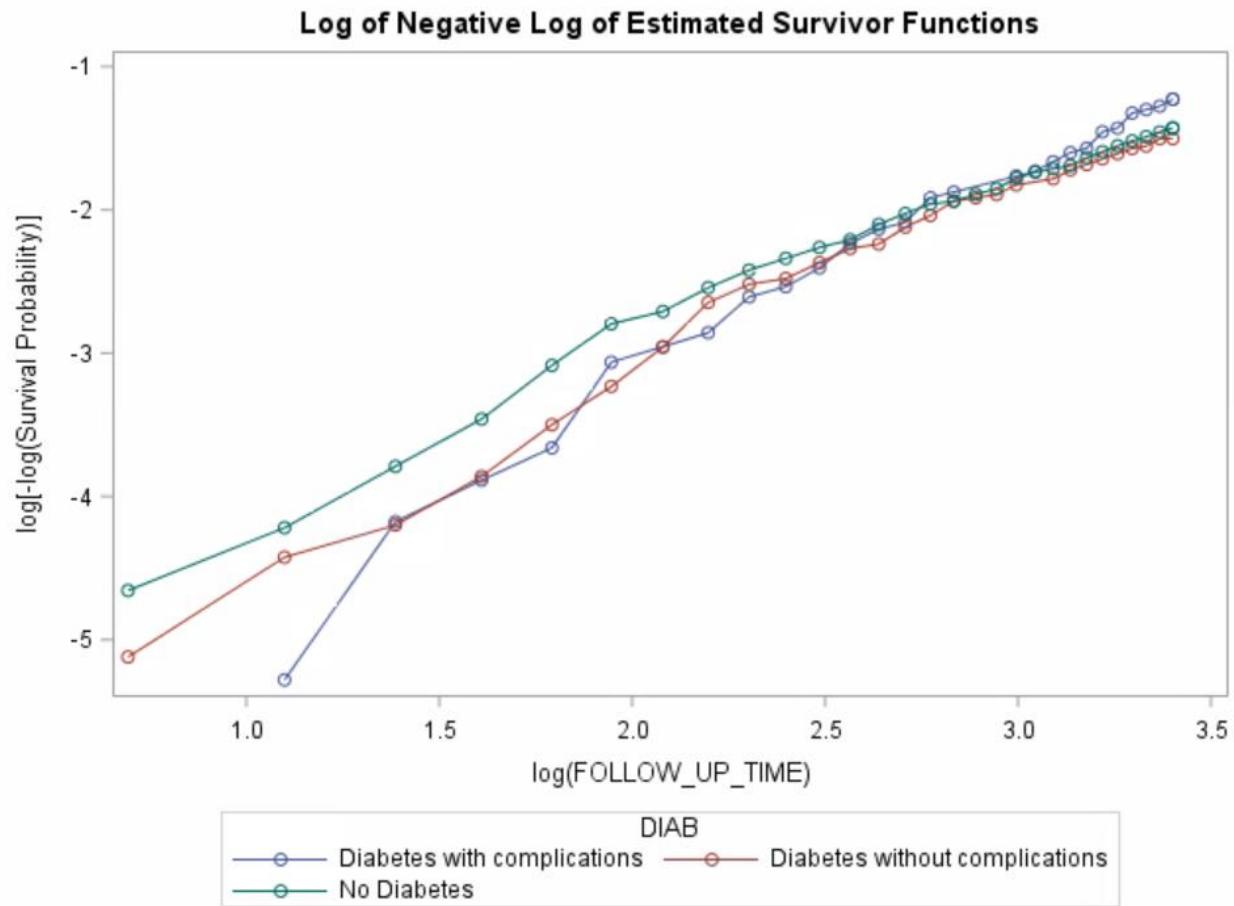
Supplementary Figure 12. Kaplan Meier curve for the unadjusted association between gender and time until readmission
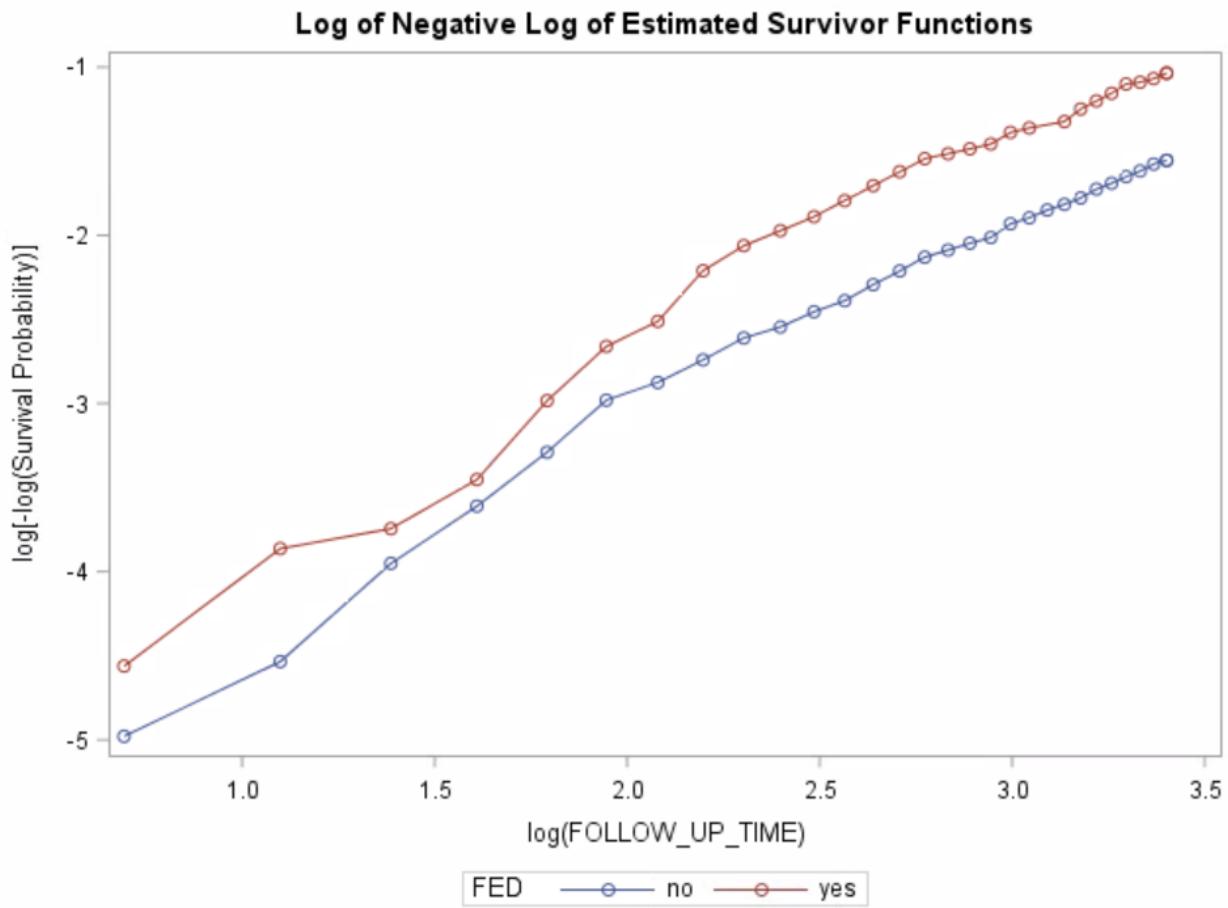
Supplementary Figure 13. Log-log survival curves testing the PH assumption for age categories
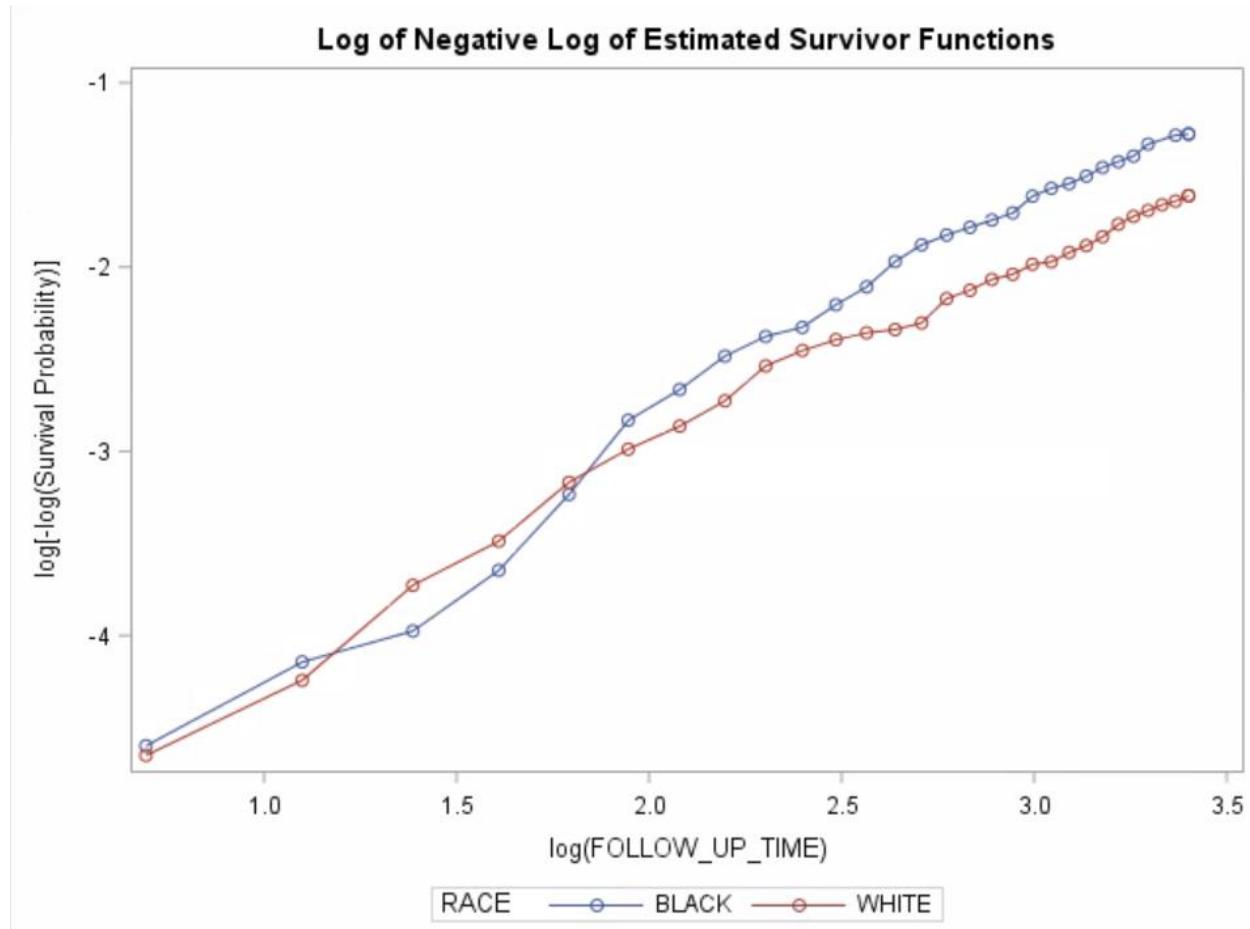
Supplementary Figure 14. Log-log survival curves testing the PH assumption for congestive heart failure non-hypertensive
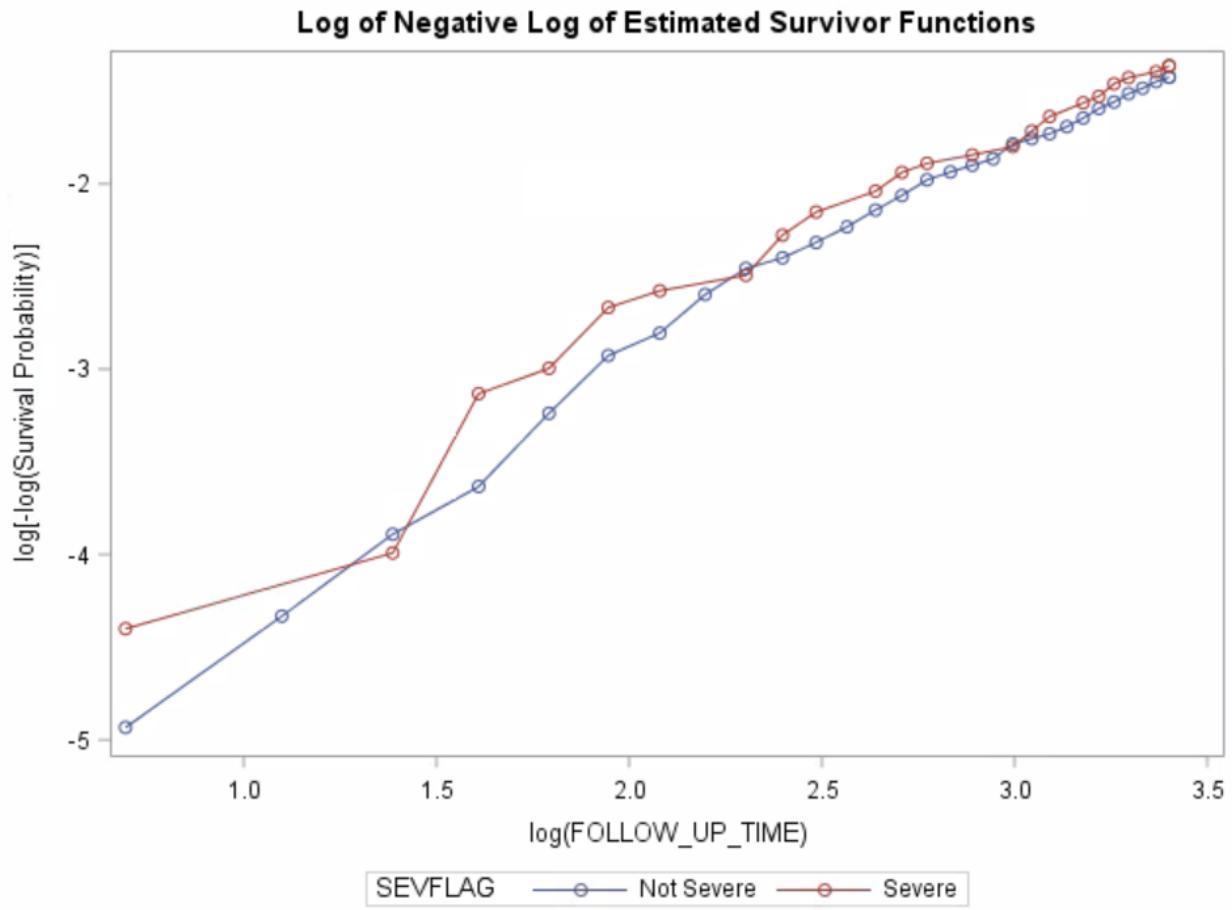
Supplementary Figure 15. Log-log survival curves testing the PH assumption for diabetes mellitus with and without complications
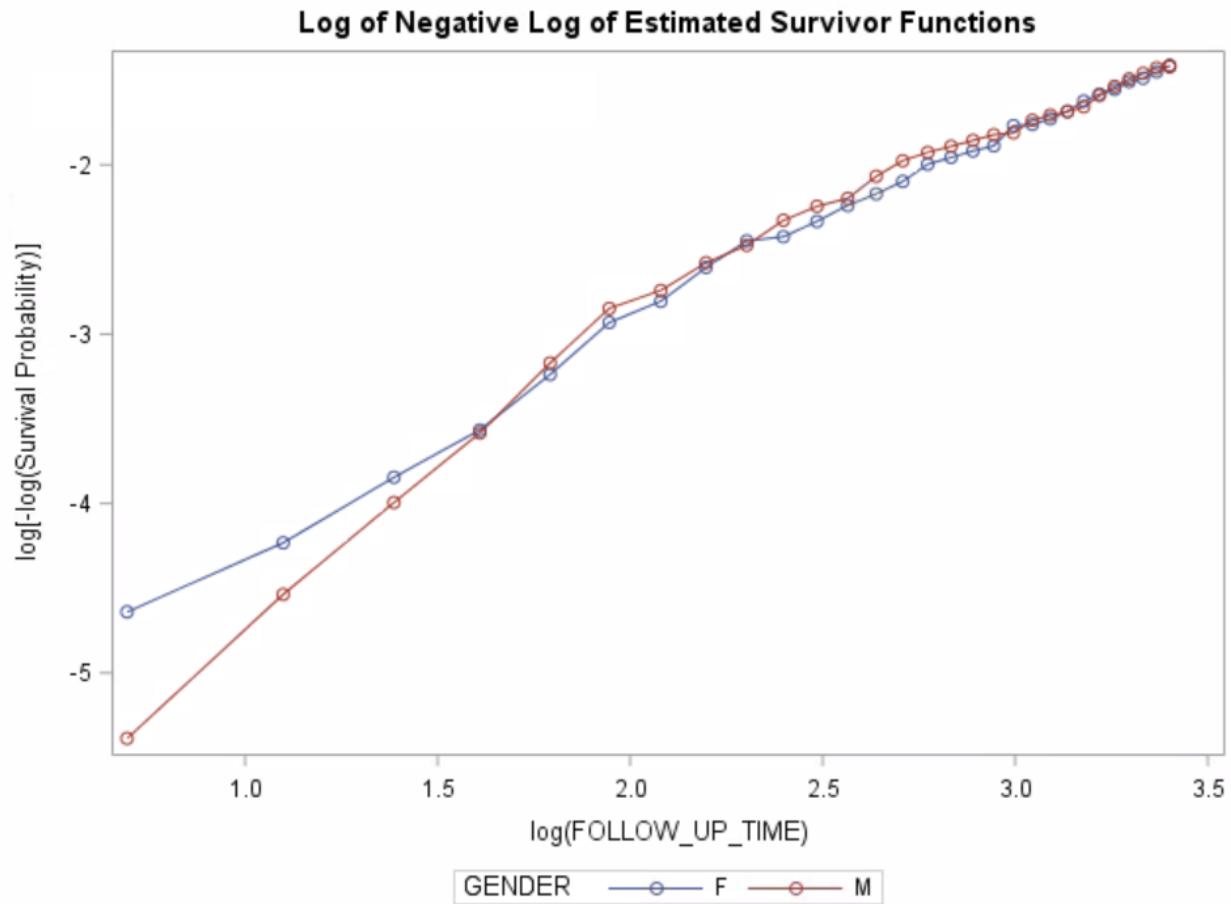
Supplementary Figure 16. Log-log survival curves testing the PH assumption for fluid & electrolyte disease

Supplementary Figure 17. Log-log survival curves testing the PH assumption for race

Supplementary Figure 18. Log-log survival curves testing the PH assumption for CHD severity

Supplementary Figure 19. Log-log survival curves testing the PH assumption for gender

Appendix D: ICD-9-CM Codes and Corresponding CCS Multilevel Classification (Level 7)

7   Diseases of the circulatory system - 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121

7.1   Hypertension- 98 99

7.1.1   Essential hypertension [98.] - 4011 4019

7.1.2   Hypertension with complications and secondary hypertension [99.] - 99

7.1.2.1   Hypertensive heart and/or renal disease - 40200 40201 40210 40211 40290 40291 4030 40300 40301 4031 40310 40311 4039 40390 40391 4040 40400 40401 40402 40403 4041 40410 40411 40412 40413 4049 40490 40491 40492 40493

7.1.2.2   Other hypertensive complications - 40501 40509 40511 40519 40591 40599 4372

7.2   Diseases of the heart - 96 97 100 101 102 103 104 105 106 107 108

7.2.1   Heart valve disorders [96.] - 96

7.2.1.1   Chronic rheumatic disease of the heart valves - 3940 3941 3942 3949 3950 3951 3952 3959 3960 3961 3962 3963 3968 3969 3970 3971 3979

7.2.1.2   Nonrheumatic mitral valve disorders - 4240

7.2.1.3   Nonrheumatic aortic valve disorders - 4241

7.2.1.4   Other heart valve disorders - 4242 4243 42490 42491 42499 7852 7853 V422 V433

7.2.2   Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by TB or STD) [97.] 97

7.2.2.1   Cardiomyopathy - 4250 4251 42511 42518 4252 4253 4254 4257 4258 4259

7.2.2.2   Other peri-; endo-; and myocarditis - 03282 03640 03641 03642 03643 07420 07421 07422 07423 11281 11503 11504 11513 11514 11593 11594 1303 3910 3911 3912 3918 3919 3920 393 3980 39890 39899 4200 42090 42091 42099 4210 4211 4219 4220 42290 42291 42292 42293 42299 4230 4231 4232 4233 4238 4239 4290

7.2.3   Acute myocardial infarction [100.] - 4100 41000 41001 41002 4101 41010 41011 41012 4102 41020 41021 41022 4103 41030 41031 41032 4104 41040 41041 41042 4105 41050 41051 41052 4106 41060 41061 41062 4107 41070 41071 41072 4108 41080 41081 41082 4109 41090 41091 41092

7.2.4   Coronary atherosclerosis and other heart disease [101.] - 41406

7.2.4.1   Angina pectoris - 4130 4131 4139

7.2.4.2   Unstable angina (intermediate coronary syndrome) - 4111

7.2.4.3   Other acute and subacute forms of ischemic heart disease - 4110 4118 41181 41189

7.2.4.4   Coronary atherosclerosis - 4140 41400 41401 4142 4143 4144 V4582

7.2.4.5   Other forms of chronic heart disease - 412 4148 4149 V4581

7.2.5   Nonspecific chest pain [102.] - 78650 78651 78659

7.2.6   Pulmonary heart disease [103.] - 4150 4151 41512 41513 41519 4160 4161 4162 4168 4169 4170 4171 4178 4179 V1255

7.2.7   Other and ill-defined heart disease [104.] - 41410 41411 41412 41419 4291 4292 4293 4295 4296 42971 42979 42981 42982 42983 42989 4299

7.2.8   Conduction disorders [105.] - 105

7.2.8.1   Atrioventricular block - 4260 42610 42611 42612 42613

7.2.8.2   Bundle branch block - 4262 4263 4264 42650 42651 42652 42653 42654

7.2.8.3   Anomalous atrioventricular excitation - 4267

7.2.8.4   Other conduction disorders - 4266 42681 42682 42689 4269 V450 V4500 V4501 V4502 V4509 V533 V5331 V5332 V5339

7.2.9   Cardiac dysrhythmias [106.] - 106

7.2.9.1   Paroxysmal supraventricular tachycardia - 4270

7.2.9.2   Paroxysmal ventricular tachycardia - 4271

7.2.9.3   Atrial fibrillation - 42731

7.2.9.4   Atrial flutter - 42732

7.2.9.5   Premature beats - 42760 42761 42769

7.2.9.6   Sinoatrial node dysfunction - 42781

7.2.9.7   Other cardiac dysrhythmias - 4272 42789 4279 7850 7851

7.2.10   Cardiac arrest and ventricular fibrillation [107.] - 42741 42742 4275

7.2.11   Congestive heart failure; nonhypertensive [108.] - 42820 42821 42822 42823 42830 42831 42832 42833 42840 42841 42842 42843

7.2.11.1 Congestive heart failure - 4280

7.2.11.2 Heart failure - 39891 4281 4289

7.3   Cerebrovascular disease - 109 110 111 112 113

7.3.1   Acute cerebrovascular disease [109.] - 109

7.3.1.1   Intracranial hemorrhage - 430 431 4320 4321 4329

7.3.1.2   Occlusion of cerebral arteries - 43301 43311 43321 43331 43381 43391 4340 43400 43401 4341 43410 43411 4349 43490 43491

7.3.1.3   Acute but ill-defined cerebrovascular accident - 34660 34661 34662 34663 436

7.3.2   Occlusion or stenosis of precerebral arteries [110.] - 4330 43300 4331 43310 4332 43320 4333 43330 4338 43380 4339 43390

7.3.3   Other and ill-defined cerebrovascular disease [111.] - 4370 4371 4373 4374 4375 4376 4377 4378 4379

7.3.4   Transient cerebral ischemia [112.] - 4350 4351 4352 4353 4358 4359

7.3.5   Late effects of cerebrovascular disease [113.] - 438 4380 43810 43811 43812 43813 43814 43819 43820 43821 43822 43830 43831 43832 43840 43841 43842 43850 43851 43852 43853 4386 4387 43881 43882 43883 43884 43885 43889 4389

7.4   Diseases of arteries; arterioles; and capillaries - 114 115 116 117

7.4.1   Peripheral and visceral atherosclerosis [114.] - 114

7.4.1.1   Atherosclerosis of arteries of extremities - 4402 44020 44021 44022 44023 44029 4404

7.4.1.2   Peripheral vascular disease unspecified - 4439

7.4.1.3   Other peripheral and visceral atherosclerosis - 4400 4401 4408 4409 5570 5571 5579

7.4.2   Aortic; peripheral; and visceral artery aneurysms [115.] - 44321 44322 44323 44324 44329

7.4.2.1   Abdominal aortic aneurysm; without rupture - 4414 44772

7.4.2.2   Other aneurysm - 4410 44100 44101 44102 44103 4411 4412 4413 4415 4416 4417 4419 4420 4421 4422 4423 44281 44282 44283 44284 44289 4429 44770 44771 44773

7.4.3   Aortic and peripheral arterial embolism or thrombosis [116.] - 44501 44502 44581 44589

7.4.3.1   Arterial embolism and thrombosis of lower extremity artery - 44422

7.4.3.2   Other arterial embolism and thrombosis - 4440 44401 44409 4441 44421 44481 44489 4449

7.4.4   Other circulatory disease [117.] - 117

7.4.4.1   Hypotension - 4580 4581 4588 4589

7.4.4.2   Other and unspecified circulatory disease - 4430 4431 44381 44382 44389 4460 4461 4462 44620 44621 44629 4463 4464 4465 4466 4467 4470 4471 4472 4473 4474 4475 4476 4478 4479 4480 4481 4489 4590 45989 4599 7859 79430 79431 79439 7962 V125 V1250 V1253 V1254 V1259 V151 V421 V432 V4321 V4322 V434 V717

7.5   Diseases of veins and lymphatics - 118 119 120 121

7.5.1   Phlebitis; thrombophlebitis and thromboembolism [118.] - 118

7.5.1.1   Phlebitis and thrombophlebitis - 4510 45111 45119 4512 45181 45182 45183 45184 45189 4519 V1252

7.5.1.2   Other venous embolism and thrombosis - 452 4530 4531 4532 4533 45340 45341 45342 45350 45351 45352 4536 45371 45372 45373 45374 45375 45376 45377 45379 4538 45381 45382 45383 45384 45385 45386 45387 45389 4539 V1251

7.5.2   Varicose veins of lower extremity [119.] 4540 4541 4542 4548 4549

7.5.3   Hemorrhoids [120.] - 4550 4551 4552 4553 4554 4555 4556 4557 4558 4559

7.5.4   Other diseases of veins and lymphatics [121.] - 4563 4564 4565 4566 4568 4570 4571

4572 4578 4579 4591 45910 45911 45912 45913 45919 4592 45930 45931 45932 45933 45939

45981

Appendix E: ICD-9-CM Codes and Corresponding CCS Multilevel Classification (All Levels)

Revised 04/18/16
Multi-level CCS Category and Diagnoses   CCS Code

1   Infectious and parasitic diseases   1 2 3 4 5 6 7 8 9 10

1.1   Bacterial infection   1   2   3   9

1.1.1   Tuberculosis [1.]   -

        01000 01001 01002 01003 01004 01005 01006 01010 01011 01012
        01013 01014 01015 01016 01080 01081 01082 01083 01084 01085
        01086 01090 01091 01092 01093 01094 01095 01096 01100 01101
        01102 01103 01104 01105 01106 01110 01111 01112 01113 01114
        01115 01116 01120 01121 01122 01123 01124 01125 01126 01130
        01131 01132 01133 01134 01135 01136 01140 01141 01142 01143
        01144 01145 01146 01150 01151 01152 01153 01154 01155 01156
        01160 01161 01162 01163 01164 01165 01166 01170 01171 01172
        01173 01174 01175 01176 01180 01181 01182 01183 01184 01185
        01186 01190 01191 01192 01193 01194 01195 01196 01200 01201
        01202 01203 01204 01205 01206 01210 01211 01212 01213 01214
        01215 01216 01220 01221 01222 01223 01224 01225 01226 01230
        01231 01232 01233 01234 01235 01236 01280 01281 01282 01283
        01284 01285 01286 01300 01301 01302 01303 01304 01305 01306
        01310 01311 01312 01313 01314 01315 01316 01320 01321 01322
        01323 01324 01325 01326 01330 01331 01332 01333 01334 01335
        01336 01340 01341 01342 01343 01344 01345 01346 01350 01351
        01352 01353 01354 01355 01356 01360 01361 01362 01363 01364
        01365 01366 01380 01381 01382 01383 01384 01385 01386 01390
        01391 01392 01393 01394 01395 01396 01400 01401 01402 01403
        01404 01405 01406 01480 01481 01482 01483 01484 01485 01486
        01500 01501 01502 01503 01504 01505 01506 01510 01511 01512
        01513 01514 01515 01516 01520 01521 01522 01523 01524 01525
        01526 01550 01551 01552 01553 01554 01555 01556 01560 01561
        01562 01563 01564 01565 01566 01570 01571 01572 01573 01574
        01575 01576 01580 01581 01582 01583 01584 01585 01586 01590
        01591 01592 01593 01594 01595 01596 01600 01601 01602 01603
        01604 01605 01606 01610 01611 01612 01613 01614 01615 01616
        01620 01621 01622 01623 01624 01625 01626 01630 01631 01632
        01633 01634 01635 01636 01640 01641 01642 01643 01644 01645
        01646 01650 01651 01652 01653 01654 01655 01656 01660 01661
        01662 01663 01664 01665 01666 01670 01671 01672 01673 01674

01675 01676 01690 01691 01692 01693 01694 01695 01696 01700
01701 01702 01703 01704 01705 01706 01710 01711 01712 01713
01714 01715 01716 01720 01721 01722 01723 01724 01725 01726
01730 01731 01732 01733 01734 01735 01736 01740 01741 01742
01743 01744 01745 01746 01750 01751 01752 01753 01754 01755
01756 01760 01761 01762 01763 01764 01765 01766 01770 01771
01772 01773 01774 01775 01776 01780 01781 01782 01783 01784
01785 01786 01790 01791 01792 01793 01794 01795 01796 01800
01801 01802 01803 01804 01805 01806 01880 01881 01882 01883
01884 01885 01886 01890 01891 01892 01893 01894 01895 01896
1370 1371 1372 1373 1374 V1201

1.1.2   Septicemia (except in labor) [2.]   2

1.1.2.1 Streptococcal septicemia   -

0380

1.1.2.2 Staphylococcal septicemia   -

0381 03810 03811 03812 03819

1.1.2.3 E. Coli septicemia   -

03842

1.1.2.4 Other gram negative septicemia   -

03840 03841 03843 03844 03849

1.1.2.5 Other specified septicemia   -

0031 0202 0223 0362 0382 0383 0545

1.1.2.6 Unspecified septicemia   -

0388 0389 449 77181 7907 99591 99592

1.1.3   Sexually transmitted infections (not HIV or hepatitis) [9.]   -

0900 0901 0902 0903 09040 09041 09042 09049 0905 0906
0907 0909 0910 0911 0912 0913 0914 09150 09151 09152
09161 09162 09169 0917 09181 09182 09189 0919 0920 0929
0930 0931 09320 09321 09322 09323 09324 09381 09382 09389
0939 0940 0941 0942 0943 09481 09482 09483 09484 09485

09486 09487 09489 0949 0950 0951 0952 0953 0954 0955
0956 0957 0958 0959 096 0970 0971 0979 0980 09810
09811 09812 09813 09814 09815 09816 09817 09819 0982 09830
09831 09832 09833 09834 09835 09836 09837 09839 09840 09841
09842 09843 09849 09850 09851 09852 09853 09859 0986 0987
09881 09882 09883 09884 09885 09886 09889 0990 0991 0992
0993 0994 09940 09941 09949 09950 09951 09952 09953 09954
09955 09956 09959 0998 0999 79505 79515 79519 79675 79679

1.1.4   Other bacterial infections [3.]   -

0200 0208 0209 0218 0219 0228 0229 0230 0231 0232
0233 0238 0239 024 025 0260 0269 0270 0271 0272
0278 0279 0300 0301 0302 0303 0308 0309 0312 0318
0319 03289 0329 0330 0331 0338 0339 0341 0363 03681
03689 0369 037 0392 0393 0394 0398 0399 0400 0401
0402 0403 04042 04081 04082 04089 0410 04100 04101 04102
04103 04104 04105 04109 0411 04110 04111 04112 04119 0412
0413 0414 04141 04142 04143 04149 0415 0416 0417 0418
04181 04182 04183 04184 04185 04186 04189 0419 390 3929
7953 79531 79539 V090 V091 V092 V093 V094 V0950 V0951
V096 V0970 V0971 V0980 V0981 V0990 V0991 V1204

1.2   Mycoses [4.]   4

1.2.1   Candidiasis of the mouth (thrush)   -

1120

1.2.2   Other mycoses   -

1100 1101 1102 1103 1104 1105 1106 1108 1109 1110
1111 1112 1113 1118 1119 1121 1122 1123 1125 11282
11284 11285 11289 1129 1141 1143 1149 11500 11509 11510
11519 11590 11599 1160 1161 1162 1170 1171 1172 1173
1174 1175 1176 1177 1178 1179 118

1.3   Viral infection   5 6 7

1.3.1   HIV infection [5.]   -

042 0420 0421 0422 0429 0430 0431 0432 0433 0439
0440 0449 07953 27910 27919 79571 7958 V08

1.3.2   Hepatitis [6.]   -

> 0700 0701 0702 07020 07021 07022 07023 0703 07030 07031
> 07032 07033 0704 07041 07042 07043 07044 07049 0705 07051
> 07052 07053 07054 07059 0706 07070 07071 0709 07271 57140
> 57141 57142 57149 5731 5732 5733

1.3.3   Other viral infections [7.]   7

1.3.3.1 Herpes zoster infection   -

> 05310 05311 05312 05313 05314 05319 05371 05379 0538 0539

1.3.3.2 Herpes simplex infection   -

> 0540 05410 05411 05412 05413 05419 0542 0546 05471 05473
> 05474 05479 0548 0549 05810 05811 05812 05881 05882 05889

1.3.3.3 Other and unspecified viral infection   -

> 0500 0501 0502 0509 0510 05101 05102 0511 0512 0519
> 0522 0527 0528 0529 05579 0558 0559 05600 05609 05679
> 0568 0569 0570 0578 0579 05900 05901 05909 05910 05911
> 05912 05919 05920 05921 05922 0598 0599 0600 0601 0609
> 061 0650 0651 0652 0653 0654 0658 0659 0660 0661
> 0663 0664 06640 06642 06649 0668 0669 071 0720 0723
> 07272 07279 0728 0729 0737 0738 0739 0740 0741 0743
> 0748 075 0780 0781 07810 07811 07812 07819 0782 0783
> 0784 0785 0786 0787 07881 07882 07888 07889 0790 0791
> 0792 0793 0794 07950 07951 07952 07959 0796 0798 07981
> 07982 07983 07988 07989 0799 07998 07999 7908

1.4   Other infections; including parasitic [8.]   -

> 080 0810 0811 0812 0819 0820 0821 0822 0823 08240
> 08241 08249 0828 0829 0831 0832 0838 0839 0840 0841
> 0842 0843 0844 0845 0846 0847 0848 0849 0850 0851
> 0852 0853 0854 0855 0859 0860 0861 0862 0863 0864
> 0865 0869 0870 0871 0879 0880 0888 08881 08882 08889
> 0889 1000 10089 1009 101 1020 1021 1022 1023 1024
> 1025 1026 1027 1028 1029 1030 1031 1032 1033 1039
> 1040 1048 1049 1200 1201 1202 1203 1208 1209 1210
> 1211 1212 1213 1214 1215 1216 1218 1219 1220 1221
> 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231
> 1232 1233 1234 1235 1236 1238 1239 124 1250 1251

1252 1253 1254 1255 1256 1257 1259 1260 1261 1262
1263 1268 1269 1270 1271 1272 1273 1274 1275 1276
1277 1278 1279 1280 1281 1288 1289 129 1305 1307
1308 1309 13100 13101 13102 13103 13109 1318 1319 1320
1321 1322 1323 1329 1330 1338 1339 1340 1341 1342
1348 1349 135 1360 1361 1362 13621 13629 1364 1365
1368 1369 1398 V120 V1200 V1203 V1209

1.5   Immunizations and screening for infectious disease [10.]   -

7955 79551 79552 7956 79579 V010 V011 V012 V013 V014
V015 V016 V017 V0171 V0179 V018 V0181 V0182 V0183 V0184
V0189 V019 V020 V021 V022 V023 V024 V025 V0251 V0252
V0253 V0254 V0259 V026 V0260 V0261 V0262 V0269 V027 V028
V029 V030 V031 V032 V033 V034 V035 V036 V037 V038
V0381 V0382 V0389 V039 V040 V041 V042 V043 V044 V045
V046 V047 V048 V0481 V0482 V0489 V050 V051 V052 V053
V054 V058 V059 V060 V061 V062 V063 V064 V065 V066
V068 V069 V286 V712 V7182 V7183 V730 V731 V732 V733
V734 V735 V736 V738 V7381 V7388 V7389 V739 V7398 V7399
V740 V741 V742 V743 V744 V745 V746 V748 V749 V750
V751 V752 V753 V754 V755 V756 V757 V758 V759

2   Neoplasms   11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47

2.1   Colorectal cancer   14 15

2.1.1   Cancer of colon [14.]   -

1530 1531 1532 1533 1534 1535 1536 1537 1538 1539
1590 20910 20911 20912 20913 20914 20915 20916 2303 V1005

2.1.2   Cancer of rectum and anus [15.]   -

1540 1541 1542 1543 1548 20917 2304 2305 2306 79670
79671 79672 79673 79674 79676 V1006

2.2   Other gastrointestinal cancer   12 13 16 17 18

2.2.1   Cancer of esophagus [12.]   -

1500 1501 1502 1503 1504 1505 1508 1509 2301 V1003

2.2.2   Cancer of stomach [13.]   -

     1510 1511 1512 1513 1514 1515 1516 1518 1519 20923
     2302 V1004

2.2.3   Cancer of liver and intrahepatic bile duct [16.]   -

     1550 1551 1552 2308 V1007

2.2.4   Cancer of pancreas [17.]   -

     1570 1571 1572 1573 1574 1578 1579

2.2.5   Cancer of other GI organs; peritoneum [18.]   -

     1520 1521 1522 1523 1528 1529 1560 1561 1562 1568
     1569 1580 1588 1589 1591 1598 1599 20900 20901 20902
     20903 2307 2309 V1000 V1009

2.3   Cancer of bronchus; lung [19.]   -

     1622 1623 1624 1625 1628 1629 20921 2312 V1011

2.4   Cancer of skin   22 23

2.4.1   Melanomas of skin [22.]   -

     1720 1721 1722 1723 1724 1725 1726 1727 1728 1729
     V1082

2.4.2   Other non-epithelial cancer of skin [23.]   -

     1730 17300 17301 17302 17309 1731 17310 17311 17312 17319
     1732 17320 17321 17322 17329 1733 17330 17331 17332 17339
     1734 17340 17341 17342 17349 1735 17350 17351 17352 17359
     1736 17360 17361 17362 17369 1737 17370 17371 17372 17379
     1738 17380 17381 17382 17389 1739 17390 17391 17392 17399
     20931 20932 20933 20934 20935 20936 2320 2321 2322 2323
     2324 2325 2326 2327 2328 2329 V1083

2.5   Cancer of breast [24.]   -

     1740 1741 1742 1743 1744 1745 1746 1748 1749 1750
     1759 2330 V103

2.6   Cancer of uterus and cervix   25 26

2.6.1   Cancer of uterus [25.]   -

179 1820 1821 1828 2332 V1042

2.6.2   Cancer of cervix [26.]   -

1800 1801 1808 1809 2331 7950 79501 79502 79503 79504
79506 V1041

2.7   Cancer of ovary and other female genital organs   27 28

2.7.1   Cancer of ovary [27.]   -

1830 V1043

2.7.2   Cancer of other female genital organs [28.]   -

181 1832 1833 1834 1835 1838 1839 1840 1841 1842
1843 1844 1848 1849 2333 23330 23331 23332 23339 79516
V1040 V1044

2.8   Cancer of male genital organs   29 30 31

2.8.1   Cancer of prostate [29.]   -

185 2334 V1046

2.8.2   Cancer of testis [30.]   -

1860 1869 V1047

2.8.3   Cancer of other male genital organs [31.]   -

1871 1872 1873 1874 1875 1876 1877 1878 1879 2335
2336 V1045 V1048 V1049

2.9   Cancer of urinary organs   32 33 34

2.9.1   Cancer of bladder [32.]   -

1880 1881 1882 1883 1884 1885 1886 1887 1888 1889
2337 V1051

2.9.2   Cancer of kidney and renal pelvis [33.]   -

1890 1891 20924 V1052 V1053

2.9.3   Cancer of other urinary organs [34.]   -

1892 1893 1894 1898 1899 2339 V1050 V1059

2.10   Cancer of lymphatic and hematopoietic tissue   37 38 39 40

2.10.1   Hodgkins disease [37.]   -

20100 20101 20102 20103 20104 20105 20106 20107 20108 20110
20111 20112 20113 20114 20115 20116 20117 20118 20120 20121
20122 20123 20124 20125 20126 20127 20128 20140 20141 20142
20143 20144 20145 20146 20147 20148 20150 20151 20152 20153
20154 20155 20156 20157 20158 20160 20161 20162 20163 20164
20165 20166 20167 20168 20170 20171 20172 20173 20174 20175
20176 20177 20178 20190 20191 20192 20193 20194 20195 20196
20197 20198 V1072

2.10.2   Non-Hodgkins lymphoma [38.]   -

20000 20001 20002 20003 20004 20005 20006 20007 20008 20010
20011 20012 20013 20014 20015 20016 20017 20018 20020 20021
20022 20023 20024 20025 20026 20027 20028 20030 20031 20032
20033 20034 20035 20036 20037 20038 20040 20041 20042 20043
20044 20045 20046 20047 20048 20050 20051 20052 20053 20054
20055 20056 20057 20058 20060 20061 20062 20063 20064 20065
20066 20067 20068 20070 20071 20072 20073 20074 20075 20076
20077 20078 20080 20081 20082 20083 20084 20085 20086 20087
20088 20200 20201 20202 20203 20204 20205 20206 20207 20208
20210 20211 20212 20213 20214 20215 20216 20217 20218 20220
20221 20222 20223 20224 20225 20226 20227 20228 20270 20271
20272 20273 20274 20275 20276 20277 20278 20280 20281 20282
20283 20284 20285 20286 20287 20288 20290 20291 20292 20293
20294 20295 20296 20297 20298 V1071 V1079

2.10.3   Leukemias [39.]   -

20240 20241 20242 20243 20244 20245 20246 20247 20248 2031

20310 20311 20312 2040 20400 20401 20402 2041 20410 20411
20412 2042 20420 20421 20422 2048 20480 20481 20482 2049
20490 20491 20492 2050 20500 20501 20502 2051 20510 20511
20512 2052 20520 20521 20522 2053 20530 20531 20532 2058
20580 20581 20582 2059 20590 20591 20592 2060 20600 20601
20602 2061 20610 20611 20612 2062 20620 20621 20622 2068
20680 20681 20682 2069 20690 20691 20692 2070 20700 20701
20702 2071 20710 20711 20712 2072 20720 20721 20722 2078
20780 20781 20782 2080 20800 20801 20802 2081 20810 20811
20812 2082 20820 20821 20822 2088 20880 20881 20882 2089
20890 20891 20892 V1060 V1061 V1062 V1063 V1069

2.10.4   Multiple myeloma [40.]   -

2030 20300 20301 20302 2038 20380 20381 20382

2.11   Cancer; other primary   11 20 21 35 36 41

2.11.1   Cancer of head and neck [11.]   -

1400 1401 1403 1404 1405 1406 1408 1409 1410 1411
1412 1413 1414 1415 1416 1418 1419 1420 1421 1422
1428 1429 1430 1431 1438 1439 1440 1441 1448 1449
1450 1451 1452 1453 1454 1455 1456 1458 1459 1460
1461 1462 1463 1464 1465 1466 1467 1468 1469 1470
1471 1472 1473 1478 1479 1480 1481 1482 1483 1488
1489 1490 1491 1498 1499 1600 1601 1602 1603 1604
1605 1608 1609 1610 1611 1612 1613 1618 1619 1950
2300 2310 V1001 V1002 V1021

2.11.2   Cancer; other respiratory and intrathoracic [20.]   -

1620 1630 1631 1638 1639 1650 1658 1659 2311 2318
2319 V1012 V1020 V1022

2.11.3   Cancer of bone and connective tissue [21.]   -

1700 1701 1702 1703 1704 1705 1706 1707 1708 1709
1710 1712 1713 1714 1715 1716 1717 1718 1719

2.11.4   Cancer of brain and nervous system [35.]   -

1910 1911 1912 1913 1914 1915 1916 1917 1918 1919
1920 1921 1922 1923 1928 1929 V1085 V1086

2.11.5   Cancer of thyroid [36.]   -

   193 25802 25803 V1087

2.11.6   Cancer; other and unspecified primary [41.]   -

   1640 1641 1642 1643 1648 1649 1760 1761 1762 1763
   1764 1765 1768 1769 1900 1901 1902 1903 1904 1905
   1906 1907 1908 1909 1940 1941 1943 1944 1945 1946
   1948 1949 1951 1952 1953 1954 1955 1958 20230 20231
   20232 20233 20234 20235 20236 20237 20238 20250 20251 20252
   20253 20254 20255 20256 20257 20258 20260 20261 20262 20263
   20264 20265 20266 20267 20268 20922 20925 20926 20927 2340
   2348 2349 7951 79510 79511 79512 79513 79514 V1029 V1081
   V1084 V1088 V1089 V109 V1090 V1091 V711

2.12   Secondary malignancies [42.]   42

2.12.1   Secondary malignancy of lymph nodes   -

   1960 1961 1962 1963 1965 1966 1968 1969 20971

2.12.2   Secondary malignancy of lung   -

   1970

2.12.3   Secondary malignancy of liver   -

   1977 20972

2.12.4   Secondary malignancy of brain/spine   -

   1983

2.12.5   Secondary malignancy of bone   -

   1985 20973

2.12.6   Other secondary malignancy   -

   1971 1972 1973 1974 1975 1976 1978 1980 1981 1982
   1984 1986 1987 19881 19882 19889 20974 51181 78951

2.13   Malignant neoplasm without specification of site [43.]   -

1990 1991 1992 20920 20929 20930 20970 20975 20979

2.14   Neoplasms of unspecified nature or uncertain behavior [44.]   -

2350 2351 2352 2353 2354 2355 2356 2357 2358 2359
2360 2361 2362 2363 2364 2365 2366 2367 23690 23691
23699 2370 2371 2372 2373 2374 2375 2376 2377 23770
23771 23772 23773 23779 2379 2380 2381 2382 2383 2384
2385 2386 2387 23871 23872 23873 23874 23875 23876 23877
23879 2388 2389 2390 2391 2392 2393 2394 2395 2396
2397 2398 23981 23989 2399

2.15   Maintenance chemotherapy; radiotherapy [45.]   45

2.15.1   Radiotherapy   -

V580 V661 V671

2.15.2   Chemotherapy   -

V581 V5811 V5812 V662 V672

2.16   Benign neoplasms   46 47

2.16.1   Benign neoplasm of uterus [46.]   -

2180 2181 2182 2189 2190 2191 2198 2199

2.16.2   Other and unspecified benign neoplasm [47.]   47

2.16.2.1 Benign neoplasm of ovary   -

220

2.16.2.2 Benign neoplasm of colon   -

20950 20951 20952 20953 20954 20955 20956 20957 2113 2114
V1272

2.16.2.3 Benign neoplasm of the thyroid   -

226

2.16.2.4 Benign neoplasm of cerebral meninges   -

    2252

2.16.2.5 Other and unspecified benign neoplasms   -

    20940 20941 20942 20943 20960 20961 20962 20963 20964 20965
    20966 20967 20969 2100 2101 2102 2103 2104 2105 2106
    2107 2108 2109 2110 2111 2112 2115 2116 2117 2118
    2119 2120 2121 2122 2123 2124 2125 2126 2127 2128
    2129 2130 2131 2132 2133 2134 2135 2136 2137 2138
    2139 2140 2141 2142 2143 2144 2148 2149 2150 2152
    2153 2154 2155 2156 2157 2158 2159 2160 2161 2162
    2163 2164 2165 2166 2167 2168 2169 217 2210 2211
    2212 2218 2219 2220 2221 2222 2223 2224 2228 2229
    2230 2231 2232 2233 22381 22389 2239 2240 2241 2242
    2243 2244 2245 2246 2247 2248 2249 2250 2251 2253
    2254 2258 2259 2270 2271 2273 2274 2275 2276 2278
    2279 22800 22801 22802 22803 22804 22809 2281 2290 2298
    2299

3   Endocrine; nutritional; and metabolic diseases and immunity disorders   48 49 50
51 52 53 54 55 56 57 58

3.1   Thyroid disorders [48.]   48

3.1.1   Thyrotoxicosis with or without goiter   -

    24200 24201 24210 24211 24220 24221 24230 24231 24240 24241
    24280 24281 24290 24291

3.1.2   Other thyroid disorders   -

    2400 2409 2410 2411 2419 243 2440 2441 2442 2443
    2448 2449 2450 2451 2452 2453 2454 2458 2459 2460
    2461 2462 2463 2468 2469 7945

3.2   Diabetes mellitus without complication [49.]   -

    24900 25000 25001 7902 79021 79022 79029 7915 7916 V4585
    V5391 V6546

3.3   Diabetes mellitus with complications [50.]   50

3.3.1   Diabetes with ketoacidosis or uncontrolled diabetes   -

24901 24910 24911 25002 25003 25010 25011 25012 25013

3.3.2   Diabetes with renal manifestations   -

24940 24941 25040 25041 25042 25043

3.3.3   Diabetes with ophthalmic manifestations   -

24950 24951 25050 25051 25052 25053

3.3.4   Diabetes with neurological manifestations   -

24960 24961 25060 25061 25062 25063

3.3.5   Diabetes with circulatory manifestations   -

24970 24971 25070 25071 25072 25073

3.3.6   Diabetes with unspecified complications   -

24990 24991 25090 25091

3.3.7   Diabetes with other manifestations   -

24920 24921 24930 24931 24980 24981 25020 25021 25022 25023
25030 25031 25032 25033 25080 25081 25082 25083 25092 25093

3.4   Other endocrine disorders [51.]   -

2510 2511 2512 2513 2514 2515 2518 2519 2520 25200
25201 25202 25208 2521 2528 2529 2530 2531 2532 2533
2534 2535 2536 2537 2538 2539 2540 2541 2548 2549
2550 2551 25510 25511 25512 25513 25514 2552 2553 2554
25541 25542 2555 2556 2558 2559 2560 2561 2562 2563
2564 2568 2569 2570 2571 2572 2578 2579 2580 25801
2581 2588 2589 2590 2591 2592 2593 2594 2595 25950
25951 25952 2598 2599 7946

3.5   Nutritional deficiencies [52.]   52

3.5.1   Unspecified protein-calorie malnutrition   -

2639

3.5.2   Other malnutrition   -

260 261 262 2630 2631 2632 2638 2640 2641 2642
2643 2644 2645 2646 2647 2648 2649 2650 2651 2652
2660 2661 2662 2669 267 2680 2681 2682 2689 2690
2691 2692 2693 2698 2699 7994 V121

3.6   Disorders of lipid metabolism [53.]   -

2720 2721 2722 2723 2724

3.7   Gout and other crystal arthropathies [54.]   -

2740 27400 27401 27402 27403 27410 27411 27419 27481 27482
27489 2749 71210 71211 71212 71213 71214 71215 71216 71217
71218 71219 71220 71221 71222 71223 71224 71225 71226 71227
71228 71229 71230 71231 71232 71233 71234 71235 71236 71237
71238 71239 71280 71281 71282 71283 71284 71285 71286 71287
71288 71289 71290 71291 71292 71293 71294 71295 71296 71297
71298 71299

3.8   Fluid and electrolyte disorders [55.]   55

3.8.1   Hyposmolality   -

2761

3.8.2   Hypovolemia   -

2765 27650 27651 27652

3.8.3   Hyperpotassemia   -

2767

3.8.4   Hypopotassemia   -

2768

3.8.5   Other fluid and electrolyte disorders   -

2760 2762 2763 2764 2766 27669 2769 9951

3.9   Cystic fibrosis [56.]   -

        27700 27701 27702 27703 27709

3.10   Immunity disorders [57.]   -

        27900 27901 27902 27903 27904 27905 27906 27909 27911 27912
        27913 2792 2793 2794 27941 27949 2798 2799

3.11   Other nutritional; endocrine; and metabolic disorders [58.]   58

3.11.1 Disorders of mineral metabolism   -

        2750 27502 27503 27509 2751 2752 2753 2754 27540 27541
        27542 27549 2755 2758 2759

3.11.2 Obesity   -

        2780 27800 27801 27802 27803 79391 V8521 V8522 V8523 V8524
        V8525 V8530 V8531 V8532 V8533 V8534 V8535 V8536 V8537 V8538
        V8539 V854 V8541 V8542 V8543 V8544 V8545 V8554

3.11.3 Other and unspecified metabolic; nutritional; and endocrine disorders   -

        2700 2701 2702 2703 2704 2705 2706 2707 2708 2709
        2710 2711 2712 2713 2714 2718 2719 2725 2726 2727
        2728 2729 2730 2731 2732 2733 2734 2738 2739 27501
        2771 2772 2773 27730 27731 27739 2774 2775 2776 2777
        2778 27781 27782 27784 27785 27786 27787 27789 2779 2781
        2782 2783 2784 2788 7831 7832 78321 78322 7833 7834
        78340 78341 78342 78343 7835 7837 7839 7947 7957 V122
        V1221 V1229 V850 V8551 V8553

4   Diseases of the blood and blood-forming organs   59 60 61 62 63
64

4.1   Anemia   59 60 61

4.1.1   Acute posthemorrhagic anemia [60.]   -

        2851

4.1.2   Sickle cell anemia [61.]   -

28241 28242 2825 28260 28261 28262 28263 28264 28268 28269

4.1.3   Deficiency and other anemia [59.]   59

4.1.3.1   Iron deficiency anemia   -

2801 2808 2809

4.1.3.2   Other deficiency anemia   -

2810 2811 2812 2813 2814 2818 2819

4.1.3.3   Aplastic anemia   -

2840 28401 28409 2841 28411 28412 28419 2848 28481 28489
2849

4.1.3.4   Chronic blood loss anemia   -

2800

4.1.3.5   Acquired hemolytic anemia   -

2830 2831 28310 28311 28319 2832 2839

4.1.3.6   Other specified anemia   -

2820 2821 2822 2823 2824 28240 28243 28244 28245 28246
28247 28249 2827 2828 2829 2842 2850 28521 28522 28529
2858

4.1.3.7   Anemia; unspecified   -

2859

4.2   Coagulation and hemorrhagic disorders [62.]   62

4.2.1   Coagulation defects   -

2860 2861 2862 2863 2864 2865 28652 28653 28659 2866
2867 2869 28981 28982

4.2.2   Thrombocytopenia   -

2873 28730 28731 28732 28733 28739 2874 28749 2875 28984

4.2.3   Other coagulation and hemorrhagic disorders   -

2870 2871 2872 2878 2879 7827

4.3   Diseases of white blood cells [63.]   -

2880 28800 28801 28802 28803 28804 28809 2881 2882 2883
2884 28850 28851 28859 28860 28861 28862 28863 28864 28865
28866 28869 2888 2889 28953

4.4   Other hematologic conditions [64.]   -

2890 2894 28950 28951 28952 28959 2896 2897 2898 28983
28989 2899 7900 79001 79009 V123 V582

5   Mental illness   650 651 652 653 654 655 656
657 658 659 660 661 662 663 670

5.1   Adjustment disorders [650]   -

3090 3091 30922 30923 30924 30928 30929 3093 3094 30982
30983 30989 3099

5.2   Anxiety disorders [651]   -

29384 30000 30001 30002 30009 30010 30020 30021 30022 30023
30029 3003 3005 30089 3009 3080 3081 3082 3083 3084
3089 30981 3130 3131 31321 31322 3133 31382 31383

5.3   Attention deficit, conduct, and disruptive behavior disorders [652.]   652

5.3.1   Conduct disorder [6521]   -

31200 31201 31202 31203 31210 31211 31212 31213 31220 31221
31222 31223 3124 3128 31281 31282 31289 3129

5.3.2   Oppositional defiant disorder [6522]   -

31381

5.3.3   Attention deficit disorder and Attention deficit hyperactivity disorder [6523]   -

31400 31401 3141 3142 3148 3149

5.4   Delirium, dementia, and amnestic and other cognitive disorders [653]   -

2900 29010 29011 29012 29013 29020 29021 2903 29040 29041
29042 29043 2908 2909 2930 2931 2940 2941 29410 29411
29420 29421 2948 2949 3100 3102 3108 31081 31089 3109
3310 3311 33111 33119 3312 33182 797

5.5   Developmental disorders [654.]   654

5.5.1   Communication disorders [6541]   -

3070 3079 31531 31534 31535 31539 V401

5.5.2   Developmental disabilities [6542]   -

31501 31502 31509 31532 3155 3158

5.5.3   Intellectual disabilities [6543]   -

317 3180 3181 3182 319

5.5.4   Learning disorders [6544]   -

31500 3151 3152 3159 V400

5.5.5   Motor skill disorders [6545]   -

3154

5.6   Disorders usually diagnosed in infancy, childhood, or adolescence [655.]   655

5.6.1   Elimination disorders [6551]   -

3076 3077

5.6.2   Other disorders of infancy childhood or adolescence [6552]   -

3073 30921 31323 31389 3139

5.6.3   Pervasive developmental disorders [6553]   -

29900 29901 29910 29911 29980 29981 29990 29991

5.6.4   Tic disorders [6554]   -

30720 30721 30722 30723

5.7   Impulse control disorders, not elsewhere classified [656]   -

31230 31231 31232 31233 31234 31235 31239

5.8   Mood disorders [657.]   657

5.8.1   Bipolar disorders [6571]   -

29600 29601 29602 29603 29604 29605 29606 29610 29611 29612
29613 29614 29615 29616 29640 29641 29642 29643 29644 29645
29646 29650 29651 29652 29653 29654 29655 29656 29660 29661
29662 29663 29664 29665 29666 2967 29680 29681 29682 29689
29690 29699

5.8.2   Depressive disorders [6572]   -

29383 29620 29621 29622 29623 29624 29625 29626 29630 29631
29632 29633 29634 29635 29636 3004 311

5.9   Personality disorders [658]   -

3010 30110 30111 30112 30113 30120 30121 30122 3013 3014
30150 30151 30159 3016 3017 30181 30182 30183 30184 30189
3019

5.10   Schizophrenia and other psychotic disorders [659]   -

29381 29382 29500 29501 29502 29503 29504 29505 29510 29511
29512 29513 29514 29515 29520 29521 29522 29523 29524 29525
29530 29531 29532 29533 29534 29535 29540 29541 29542 29543
29544 29545 29550 29551 29552 29553 29554 29555 29560 29561
29562 29563 29564 29565 29570 29571 29572 29573 29574 29575
29580 29581 29582 29583 29584 29585 29590 29591 29592 29593
29594 29595 2970 2971 2972 2973 2978 2979 2980 2981
2982 2983 2984 2988 2989

5.11   Alcohol-related disorders [660]   -

2910 2911 2912 2913 2914 2915 2918 29181 29182 29189

2919 30300 30301 30302 30303 30390 30391 30392 30393 30500
30501 30502 30503 3575 4255 5353 53530 53531 5710 5711
5712 5713 76071 9800

5.12   Substance-related disorders [661]   -

2920 29211 29212 2922 29281 29282 29283 29284 29285 29289
2929 30400 30401 30402 30403 30410 30411 30412 30413 30420
30421 30422 30423 30430 30431 30432 30433 30440 30441 30442
30443 30450 30451 30452 30453 30460 30461 30462 30463 30470
30471 30472 30473 30480 30481 30482 30483 30490 30491 30492
30493 30520 30521 30522 30523 30530 30531 30532 30533 30540
30541 30542 30543 30550 30551 30552 30553 30560 30561 30562
30563 30570 30571 30572 30573 30580 30581 30582 30583 30590
30591 30592 30593 64830 64831 64832 64833 64834 65550 65551
65553 76072 76073 76075 7795 96500 96501 96502 96509 V6542

5.13   Suicide and intentional self-inflicted injury [662]   -

E9500 E9501 E9502 E9503 E9504 E9505 E9506 E9507 E9508 E9509
E9510 E9511 E9518 E9520 E9521 E9528 E9529 E9530 E9531 E9538
E9539 E954 E9550 E9551 E9552 E9553 E9554 E9555 E9556 E9557
E9559 E956 E9570 E9571 E9572 E9579 E9580 E9581 E9582 E9583
E9584 E9585 E9586 E9587 E9588 E9589 E959 V6284

5.14   Screening and history of mental health and substance abuse codes [663.]   663

5.14.1   Codes related to mental health disorders [6631]   -

33392 V110 V111 V112 V114 V118 V119 V154 V1541 V1542
V1549 V1582 V6285 V663 V701 V702 V7101 V7102 V7109 V790
V792 V793 V798 V799

5.14.2   Codes related to substance-related disorders [6632]   -

3051 30510 30511 30512 30513 7903 V113 V791

5.15   Miscellaneous mental health disorders [670.]   670

5.15.1   Dissociative disorders [6701]   -

30012 30013 30014 30015 3006

5.15.2   Eating disorders [6702]   -

3071 30750 30751 30752 30753 30754 30759

5.15.3   Factitious disorders [6703]   -

30016 30019

5.15.4   Psychogenic disorders [6704]   -

3060 3061 3062 3063 3064 30650 30652 30653 30659 3066
3067 3068 3069

5.15.5   Sexual and gender identity disorders [6705]   -

3021 3022 3023 3024 30250 30251 30252 30253 3026 30270
30271 30272 30273 30274 30275 30276 30279 30281 30282 30283
30284 30285 30289 3029 30651

5.15.6   Sleep disorders [6706]   -

30740 30741 30742 30743 30744 30745 30746 30747 30748 30749

5.15.7   Somatoform disorders [6707]   -

30011 3007 30081 30082 30780 30781 30789

5.15.8   Mental disorders due to general medical conditions not elsewhere classified [6708]   -

29389 2939 3101

5.15.9   Other miscellaneous mental conditions [6709]   -

316 64840 64841 64842 64843 64844 V402 V403 V4031 V4039
V409 V673

6   Diseases of the nervous system and sense organs   76 77 78 79 80
81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

6.1   Central nervous system infection   76 77 78

6.1.1   Meningitis (except that caused by TB or STD) [76.]   -

00321 0360 0470 0471 0478 0479 0490 0491 0530 05472
0721 10081 11283 1142 11501 11511 11591 3200 3201 3202

3203 3207 3208 32081 32082 32089 3209 3210 3211 3212
3213 3214 3218 3220 3221 3222 3229

6.1.2   Encephalitis (except that caused by TB or STD) [77.]   -

0361 0462 0498 0499 0520 0543 0550 05601 05821 05829
0620 0621 0622 0623 0624 0625 0628 0629 0630 0631
0632 0638 0639 064 0662 06641 0722 1300 1390 3230
32301 32302 3231 3232 3234 32341 32342 3235 32351 32352
3236 32361 32362 32363 3237 32371 32372 3238 32381 32382
3239 34120 34121 34122

6.1.3   Other CNS infection and poliomyelitis [78.]   -

04500 04501 04502 04503 04510 04511 04512 04513 04520 04521
04522 04523 04590 04591 04592 04593 0460 0461 04611 04619
0463 04671 04672 04679 0468 0469 048 138 3240 3241
3249 326 V1202

6.2   Hereditary and degenerative nervous system conditions   79 80 81

6.2.1   Parkinsons disease [79.]   -

3320

6.2.2   Multiple sclerosis [80.]   -

340

6.2.3   Other hereditary and degenerative nervous system conditions [81.]   81

6.2.3.1 Disorders of the autonomic nervous system   -

3370 33700 33701 33709 3371 3373 3379

6.2.3.2 Other and unspecified hereditary and degenerative nervous conditions   -

3300 3301 3302 3303 3308 3309 3313 3314 3315 3316
3317 33181 33189 3319 3330 3331 3332 3333 3334 3335
3336 3337 33371 33372 33379 33381 33382 33383 33384 33385
33389 33390 33391 33393 33394 33399 3340 3341 3342 3343
3344 3348 3349 3350 33510 33511 33519 33520 33521 33522
33523 33524 33529 3358 3359 3360 3361 3362 3363 3368
3369

6.3   Paralysis [82.]   82

6.3.1   Hemiplegia   -

3420 34200 34201 34202 3421 34210 34211 34212 34280 34281
34282 3429 34290 34291 34292

6.3.2   Other paralysis   -

3430 3431 3432 3433 3434 3438 3439 3440 34400 34401
34402 34403 34404 34409 3441 3442 3443 34430 34431 34432
3444 34440 34441 34442 3445 34460 3448 34481 34489 3449
78072 7814

6.4   Epilepsy; convulsions [83.]   83

6.4.1   Epilepsy   -

3450 34500 34501 3451 34510 34511 3452 3453 3454 34540
34541 3455 34550 34551 3456 34560 34561 3457 34570 34571
3458 34580 34581 3459 34590 34591

6.4.2   Convulsions   -

7803 78031 78032 78033 78039

6.5   Headache; including migraine [84.]   84

6.5.1   Migraine   -

33900 33901 33902 33903 33904 3460 34600 34601 34602 34603
3461 34610 34611 34612 34613 3462 34620 34621 34622 34623
34630 34631 34632 34633 34640 34641 34642 34643 34650 34651
34652 34653 34670 34671 34672 34673 3468 34680 34681 34682
34683 3469 34690 34691 34692 34693

6.5.2   Other headache   -

33905 33909 33910 33911 33912 33920 33921 33922 3393 33941
33942 33943 33944 33981 33982 33983 33984 33985 33989 7840

6.6   Coma; stupor; and brain damage [85.]   -

3481 7800 78001 78003 78009

6.7   Eye disorders   86 87 88 89 90 91

6.7.1   Cataract [86.]   -

36600 36601 36602 36603 36604 36609 36610 36611 36612 36613
36614 36615 36616 36617 36618 36619 36620 36621 36622 36623
36630 36631 36632 36633 36634 36641 36642 36643 36644 36645
36646 36650 36651 36652 36653 3668 3669 V431

6.7.2   Retinal detachments; defects; vascular occlusion; and retinopathy [87.]   87

6.7.2.1   Retinal detachment with defect   -

36100 36101 36102 36103 36104 36105 36106 36107

6.7.2.2   Other retinal detachment or defect   -

36110 36111 36112 36113 36114 36119 3612 36130 36131 36132
36133 36181 36189 3619

6.7.2.3   Other retinal disorders   -

36201 36202 36203 36204 36205 36206 36207 36210 36211 36212
36213 36214 36215 36216 36217 36218 36220 36221 36222 36223
36224 36225 36226 36227 36229 36230 36231 36232 36233 36234
36235 36236 36237 36240 36241 36242 36243 36250 36251 36252
36253 36254 36255 36256 36257 36260 36261 36262 36263 36264
36265 36266 36270 36271 36272 36273 36274 36275 36276 36277
36281 36282 36283 36284 36285 36289 3629

6.7.3   Glaucoma [88.]   -

36500 36501 36502 36503 36504 36505 36506 36510 36511 36512
36513 36514 36515 36520 36521 36522 36523 36524 36531 36532
36541 36542 36543 36544 36551 36552 36559 36560 36561 36562
36563 36564 36565 36570 36571 36572 36573 36574 36581 36582
36583 36589 3659

6.7.4   Blindness and vision defects [89.]   -

3670 3671 36720 36721 36722 36731 36732 3674 36751 36752

36753 36781 36789 3679 36800 36801 36802 36803 36810 36811
36812 36813 36814 36815 36816 3682 36830 36831 36832 36833
36834 36840 36841 36842 36843 36844 36845 36846 36847 36851
36852 36853 36854 36855 36859 36860 36861 36862 36863 36869
3688 3689 36900 36901 36902 36903 36904 36905 36906 36907
36908 36910 36911 36912 36913 36914 36915 36916 36917 36918
36920 36921 36922 36923 36924 36925 3693 3694 36960 36961
36962 36963 36964 36965 36966 36967 36968 36969 36970 36971
36972 36973 36974 36975 36976 3698 3699 V410

6.7.5   Inflammation; infection of eye (except that caused by TB or STD) [90.]   -

0213 03281 05320 05321 05322 05329 05440 05441 05442 05443
05444 05449 05571 0760 0761 0769 0770 0771 0772 0773
0774 0778 0779 07798 07799 11502 11512 11592 1301 1302
1391 36000 36001 36002 36003 36004 36011 36012 36013 36014
36019 36300 36301 36303 36304 36305 36306 36307 36308 36310
36311 36312 36313 36314 36315 36320 36321 36322 36400 36401
36402 36403 36404 36405 36410 36411 36421 36422 36423 36424
3643 37020 37021 37022 37023 37024 37031 37032 37033 37034
37035 37040 37044 37049 37050 37052 37054 37055 37059 3708
3709 37200 37201 37202 37203 37204 37205 37206 37210 37211
37212 37213 37214 37215 37220 37221 37222 37230 37231 37233
37239 37300 37301 37302 37311 37312 37313 37331 37332 37333
37334 3734 3735 3736 3738 3739 37500 37501 37502 37503
37530 37531 37532 37533 37541 37542 37543 37600 37601 37602
37603 37604 37610 37611 37612 37613 37730 37731 37732 37733
37734 37739 37900 37901 37902 37903 37904 37905 37906 37907
37909 37960 37961 37962 37963

6.7.6   Other eye disorders [91.]   -

36020 36021 36023 36024 36029 36030 36031 36032 36033 36034
36040 36041 36042 36043 36044 36050 36051 36052 36053 36054
36055 36059 36060 36061 36062 36063 36064 36065 36069 36081
36089 3609 36330 36331 36332 36333 36334 36335 36340 36341
36342 36343 36350 36351 36352 36353 36354 36355 36356 36357
36361 36362 36363 36370 36371 36372 3638 3639 36441 36442
36451 36452 36453 36454 36455 36456 36457 36459 36460 36461
36462 36463 36464 36470 36471 36472 36473 36474 36475 36476
36477 3648 36481 36482 36489 3649 37000 37001 37002 37003
37004 37005 37006 37007 37060 37061 37062 37063 37064 37100
37101 37102 37103 37104 37105 37110 37111 37112 37113 37114
37115 37116 37120 37121 37122 37123 37124 37130 37131 37132
37133 37140 37141 37142 37143 37144 37145 37146 37148 37149
37150 37151 37152 37153 37154 37155 37156 37157 37158 37160

37161 37162 37170 37171 37172 37173 37181 37182 37189 3719
37234 37240 37241 37242 37243 37244 37245 37250 37251 37252
37253 37254 37255 37256 37261 37262 37263 37264 37271 37272
37273 37274 37275 3728 37281 37289 3729 3732 37400 37401
37402 37403 37404 37405 37410 37411 37412 37413 37414 37420
37421 37422 37423 37430 37431 37432 37433 37434 37441 37443
37444 37445 37446 37450 37451 37452 37453 37454 37455 37456
37481 37482 37483 37484 37485 37486 37487 37489 3749 37511
37512 37513 37514 37515 37516 37520 37521 37522 37551 37552
37553 37554 37555 37556 37557 37561 37569 37581 37589 3759
37621 37622 37630 37631 37632 37633 37634 37635 37636 37640
37641 37642 37643 37644 37645 37646 37647 37650 37651 37652
3766 37681 37682 37689 3769 37700 37701 37702 37703 37704
37710 37711 37712 37713 37714 37715 37716 37721 37722 37723
37724 37741 37742 37743 37749 37751 37752 37753 37754 37761
37762 37763 37771 37772 37773 37775 3779 37800 37801 37802
37803 37804 37805 37806 37807 37808 37810 37811 37812 37813
37814 37815 37816 37817 37818 37820 37821 37822 37823 37824
37830 37831 37832 37833 37834 37835 37840 37841 37842 37843
37844 37845 37850 37851 37852 37853 37854 37855 37856 37860
37861 37862 37863 37871 37872 37873 37881 37882 37883 37884
37885 37886 37887 3789 37911 37912 37913 37914 37915 37916
37919 37921 37922 37923 37924 37925 37926 37927 37929 37931
37932 37933 37934 37939 37940 37941 37942 37943 37945 37946
37949 37950 37951 37952 37953 37954 37955 37956 37957 37958
37959 3798 37990 37991 37992 37993 37999 78193 V411 V425
V430 V456 V4561 V4569 V522 V531 V720

6.8   Ear conditions   92 93 94

6.8.1   Otitis media and related conditions [92.]   92

6.8.1.1 Suppurative and unspecified otitis media   -

38200 38201 38202 3821 3822 3823 3824 3829

6.8.1.2 Other otitis media and related conditions   -

0552 38100 38101 38102 38103 38104 38105 38106 38110 38119
38120 38129 3813 3814 38150 38151 38152 38160 38161 38162
38163 3817 38181 38189 3819 38300 38301 38302 3831 38320
38321 38322 38330 38331 38332 38333 38381 38389 3839 38420
38421 38422 38423 38424 38425 38481 38482 3849 38500 38501
38502 38503 38509 38510 38511 38512 38513 38519 38521 38522

38523 38524 3870 3871 3872 3878 3879

6.8.2   Conditions associated with dizziness or vertigo [93.]   -

38600 38601 38602 38603 38604 38610 38611 38612 38619 3862
38630 38631 38632 38633 38634 38635 38640 38641 38642 38643
38648 38650 38651 38652 38653 38654 38655 38656 38658 3868
3869 7804

6.8.3   Other ear and sense organ disorders [94.]   -

38000 38001 38002 38003 38010 38011 38012 38013 38014 38015
38016 38021 38022 38023 38030 38031 38032 38039 3804 38050
38051 38052 38053 38081 38089 3809 38400 38401 38409 3841
38530 38531 38532 38533 38535 38582 38583 38589 3859 38800
38801 38802 38810 38811 38812 3882 38830 38831 38832 38840
38841 38842 38843 38844 38845 3885 38860 38861 38869 38870
38871 38872 3888 3889 38900 38901 38902 38903 38904 38905
38906 38908 38910 38911 38912 38913 38914 38915 38916 38917
38918 3892 38920 38921 38922 3897 3898 3899 V412 V413
V4985 V532 V721 V7211 V7212 V7219

6.9   Other nervous system disorders [95.]   -

35781 35782 35789 35971 35979 35981 35989

6.9.1   Disorders of the peripheral nervous system   -

3501 3502 3508 3509 3510 3511 3518 3519 3520 3521
3522 3523 3524 3525 3526 3529 3530 3531 3532 3533
3534 3535 3536 3538 3539 3540 3541 3542 3543 3544
3545 3548 3549 3550 3551 3552 3553 3554 3555 3556
3557 35571 35579 3558 3559 3560 3561 3562 3563 3564
3568 3569 3570 3571 3572 3573 3574 3576 3577 3578
3579 3580 35800 35801 3581 3582 35830 35831 35839 3588
3589 3590 3591 3592 35921 35922 35923 35924 35929 3593
3594 3595 3596 3598 3599

6.9.2   Other central nervous system disorders   -

325 32702 32715 32730 32731 32732 32733 32734 32735 32736
32737 32739 32753 33183 3321 33720 33721 33722 33729 3380
3410 3411 3418 3419 34461 347 34700 34701 34710 34711
3480 3482 3483 34830 34831 34839 3484 3485 3488 34881
34882 34889 3489 3492 34981 34982 34989 3499 V1241 V5301

6.9.3   Other nervous system symptoms and disorders   -

        33811 33812 33818 33819 33821 33822 33828 33829 3383 3384
        7810 7811 7812 7813 7817 7818 7820 7843 7845 78451
        78452 78459 78460 78461 78469 7920 7930 79400 79401 79402
        79409 79410 79411 79412 79413 79414 79415 79416 79417 79419
        7961 79951 79952 79953 79954 79955 79959 V124 V1240 V1242
        V1249 V415 V452 V484 V485 V493 V530 V5302 V5309

7   Diseases of the circulatory system   96 97 98 99 100 101
102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121

7.1   Hypertension   98 99

7.1.1   Essential hypertension [98.]   -

        4011 4019

7.1.2   Hypertension with complications and secondary hypertension [99.]   99

7.1.2.1   Hypertensive heart and/or renal disease   -

        40200 40201 40210 40211 40290 40291 4030 40300 40301 4031
        40310 40311 4039 40390 40391 4040 40400 40401 40402 40403
        4041 40410 40411 40412 40413 4049 40490 40491 40492 40493

7.1.2.2   Other hypertensive complications   -

        4010 40501 40509 40511 40519 40591 40599 4372

7.2   Diseases of the heart   96 97 100 101 102 103
104 105 106 107 108

7.2.1   Heart valve disorders [96.]   96

7.2.1.1   Chronic rheumatic disease of the heart valves   -

        3940 3941 3942 3949 3950 3951 3952 3959 3960 3961
        3962 3963 3968 3969 3970 3971 3979

7.2.1.2   Nonrheumatic mitral valve disorders   -

4240

7.2.1.3 Nonrheumatic aortic valve disorders   -

4241

7.2.1.4 Other heart valve disorders   -

4242 4243 42490 42491 42499 7852 7853 V422 V433

7.2.2 Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by TB or STD) [97.] 97

7.2.2.1 Cardiomyopathy   -

4250 4251 42511 42518 4252 4253 4254 4257 4258 4259

7.2.2.2 Other peri-; endo-; and myocarditis   -

03282 03640 03641 03642 03643 07420 07421 07422 07423 11281
11503 11504 11513 11514 11593 11594 1303 3910 3911 3912
3918 3919 3920 393 3980 39890 39899 4200 42090 42091
42099 4210 4211 4219 4220 42290 42291 42292 42293 42299
4230 4231 4232 4233 4238 4239 4290

7.2.3 Acute myocardial infarction [100.]   -

4100 41000 41001 41002 4101 41010 41011 41012 4102 41020
41021 41022 4103 41030 41031 41032 4104 41040 41041 41042
4105 41050 41051 41052 4106 41060 41061 41062 4107 41070
41071 41072 4108 41080 41081 41082 4109 41090 41091 41092

7.2.4 Coronary atherosclerosis and other heart disease [101.]   -

41406

7.2.4.1 Angina pectoris   -

4130 4131 4139

7.2.4.2 Unstable angina (intermediate coronary syndrome)   -

4111

7.2.4.3   Other acute and subacute forms of ischemic heart disease   -

4110 4118 41181 41189

7.2.4.4   Coronary atherosclerosis   -

4140 41400 41401 4142 4143 4144 V4582

7.2.4.5   Other forms of chronic heart disease   -

412 4148 4149 V4581

7.2.5   Nonspecific chest pain [102.]   -

78650 78651 78659

7.2.6   Pulmonary heart disease [103.]   -

4150 4151 41512 41513 41519 4160 4161 4162 4168 4169
4170 4171 4178 4179 V1255

7.2.7   Other and ill-defined heart disease [104.]   -

41410 41411 41412 41419 4291 4292 4293 4295 4296 42971
42979 42981 42982 42983 42989 4299

7.2.8   Conduction disorders [105.]   105

7.2.8.1   Atrioventricular block   -

4260 42610 42611 42612 42613

7.2.8.2   Bundle branch block   -

4262 4263 4264 42650 42651 42652 42653 42654

7.2.8.3   Anomalous atrioventricular excitation   -

4267

7.2.8.4   Other conduction disorders   -

4266 42681 42682 42689 4269 V450 V4500 V4501 V4502 V4509
V533 V5331 V5332 V5339

39891 4281 4289

7.4.1.1   Atherosclerosis of arteries of extremities   -

4402 44020 44021 44022 44023 44029 4404

7.4.1.2   Peripheral vascular disease unspecified   -

4439

7.4.1.3   Other peripheral and visceral atherosclerosis   -

4400 4401 4408 4409 5570 5571 5579

7.4.2   Aortic; peripheral; and visceral artery aneurysms [115.]   -

44321 44322 44323 44324 44329

7.4.2.1   Abdominal aortic aneurysm; without rupture   -

4414 44772

7.4.2.2   Other aneurysm   -

4410 44100 44101 44102 44103 4411 4412 4413 4415 4416
4417 4419 4420 4421 4422 4423 44281 44282 44283 44284
44289 4429 44770 44771 44773

7.4.3   Aortic and peripheral arterial embolism or thrombosis [116.]   -

44501 44502 44581 44589

7.4.3.1   Arterial embolism and thrombosis of lower extremity artery   -

44422

7.4.3.2   Other arterial embolism and thrombosis   -

4440 44401 44409 4441 44421 44481 44489 4449

7.4.4   Other circulatory disease [117.]   117

7.4.4.1   Hypotension   -

4580 4581 4588 4589

7.4.4.2   Other and unspecified circulatory disease   -

4430 4431 44381 44382 44389 4460 4461 4462 44620 44621
44629 4463 4464 4465 4466 4467 4470 4471 4472 4473
4474 4475 4476 4478 4479 4480 4481 4489 4590 45989
4599 7859 79430 79431 79439 7962 V125 V1250 V1253 V1254
V1259 V151 V421 V432 V4321 V4322 V434 V717

7.5   Diseases of veins and lymphatics   118 119 120 121

7.5.1   Phlebitis; thrombophlebitis and thromboembolism [118.]   118

7.5.1.1   Phlebitis and thrombophlebitis   -

        4510 45111 45119 4512 45181 45182 45183 45184 45189 4519
        V1252

7.5.1.2   Other venous embolism and thrombosis   -

        452 4530 4531 4532 4533 45340 45341 45342 45350 45351
        45352 4536 45371 45372 45373 45374 45375 45376 45377 45379
        4538 45381 45382 45383 45384 45385 45386 45387 45389 4539
        V1251

7.5.2   Varicose veins of lower extremity [119.]   -

        4540 4541 4542 4548 4549

7.5.3   Hemorrhoids [120.]   -

        4550 4551 4552 4553 4554 4555 4556 4557 4558 4559

7.5.4   Other diseases of veins and lymphatics [121.]   -

        4563 4564 4565 4566 4568 4570 4571 4572 4578 4579
        4591 45910 45911 45912 45913 45919 4592 45930 45931 45932
        45933 45939 45981

8   Diseases of the respiratory system   122 123 124 125 126
127 128 129 130 131 132 133 134

8.1   Respiratory infections   122 123 124 125 126

8.1.1   Pneumonia (except that caused by TB or STD) [122.]   122

8.1.1.1   Pneumococcal pneumonia   -

   481

8.1.1.2   Other bacterial pneumonia   -

   00322 0203 0204 0205 0212 0221 0310 0391 4820 4821
   4822 4823 48230 48231 48232 48239 4824 48240 48241 48242
   48249 4828 48281 48282 48283 48284 48289 4829

8.1.1.3   Pneumonia; organism unspecified   -

   486

8.1.1.4   Other pneumonia   -

   0521 0551 0730 0830 1124 1140 1144 1145 11505 11515
   11595 1304 1363 4800 4801 4802 4803 4808 4809 483
   4830 4831 4838 4841 4843 4845 4846 4847 4848 485
   5130 5171

8.1.2   Influenza [123.]   -

   4870 4871 4878 488 4880 48801 48802 48809 4881 48811
   48812 48819 48881 48882 48889

8.1.3   Acute and chronic tonsillitis [124.]   -

   463 4740 47400 47401 47402 47410 47411 47412 4742 4748
   4749 475

8.1.4   Acute bronchitis [125.]   -

   4660 4661 46611 46619

8.1.5   Other upper respiratory infections [126.]   126

8.1.5.1   Acute upper respiratory infections of multiple or unspecified sites   -

   4658 4659

8.1.5.2   Chronic sinusitis   -

4730 4731 4732 4733 4738 4739 78491

8.1.5.3 Croup   -

4644

8.1.5.4 Other and unspecified upper respiratory infections   -

0320 0321 0322 0323 0340 460 4610 4611 4612 4613
4618 4619 462 4640 46400 46401 46410 46411 46420 46421
46430 46431 46450 46451 4650

8.2   Chronic obstructive pulmonary disease and bronchiectasis [127.]   127

8.2.1   Emphysema   -

4928

8.2.2   Chronic airway obstruction; not otherwise specified   -

496

8.2.3   Obstructive chronic bronchitis   -

4912 49120 49121 49122

8.2.4   Other chronic pulmonary disease   -

490 4910 4911 4918 4919 4920 494 4940 4941

8.3   Asthma [128.]   128

8.3.1.1 Chronic obstructive asthma without status asthmaticus or exacerbation   -

49320

8.3.1.2 Chronic obstructive asthma with status asthmaticus   -

49321

8.3.1.3 Chronic obstructive asthma with acute exacerbation   -

49322

8.3.2.1   Other asthma without status asthmaticus or exacerbation   -

　　　49300 49310 49382 49390

8.3.2.2   Other asthma with status asthmaticus   -

　　　49301 49311 49391

8.3.2.3   Other asthma with acute exacerbation   -

　　　49302 49312 49381 49392

8.4   Aspiration pneumonitis; food/vomitus [129.]   -

　　5070

8.5   Pleurisy; pneumothorax; pulmonary collapse [130.]   130

8.5.1   Pleurisy; pleural effusion   -

　　5110 5111 5118 51189 5119

8.5.2   Pulmonary collapse; interstitial and compensatory emphysema   -

　　5180 5181 5182

8.5.3   Empyema and pneumothorax   -

　　5100 5109 5120 5128 51281 51282 51283 51284 51289

8.6   Respiratory failure; insufficiency; arrest (adult) [131.]   -

　　V462

8.6.1   Respiratory failure   -

　　51881 51884

8.6.2   Other respiratory insufficiency   -

　　5173 5185 51851 51852 51853 51882 51883 7991 V461 V4611
　　V4612 V4613 V4614

8.7   Lung disease due to external agents [132.]   -

4950 4951 4952 4953 4954 4955 4956 4957 4958 4959
500 501 502 503 504 505 5060 5061 5062 5063
5064 5069 5071 5078 5080 5081 5082 5088 5089

8.8   Other lower respiratory disease [133.]   133

8.8.1   Postinflammatory pulmonary fibrosis   -

515

8.8.2   Painful respiration   -

78652

8.8.3   Other and unspecified lower respiratory disease   -

5131 514 5160 5161 5162 5163 51630 51631 51632 51633
51634 51635 51636 51637 5164 5165 51661 51662 51663 51664
51669 5168 5169 5172 5178 5183 5184 51889 5194 5198
5199 7825 78600 78601 78602 78603 78604 78605 78606 78607
78609 7862 7863 78630 78631 78639 7864 7866 7867 7868
7869 7931 79311 79319 7942 V126 V1260 V1261 V1269 V426

8.9   Other upper respiratory disease [134.]   -

470 4710 4711 4718 4719 4720 4721 4722 4760 4761
4770 4772 4778 4779 4780 4781 47811 47819 47820 47821
47822 47824 47825 47826 47829 47830 47831 47832 47833 47834
4784 4785 4786 47870 47871 47874 47875 47879 4788 4789
5191 51911 51919 5192 5193 7841 78440 78441 78442 78443
78444 78449 7847 7848 7849 78499 7861 V414 V440 V550

9   Diseases of the digestive system   135 136 137 138 139
140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155

9.1   Intestinal infection [135.]   -

0010 0011 0019 0020 0021 0022 0023 0029 0030 00320
00329 0038 0039 0040 0041 0042 0043 0048 0049 0050
0051 0052 0053 0054 0058 00581 00589 0059 0060 0061
0062 0063 0064 0065 0066 0068 0069 0070 0071 0072
0073 0074 0075 0078 0079 0080 00800 00801 00802 00803
00804 00809 0081 0082 0083 00841 00842 00843 00844 00845

00846 00847 00849 0085 0086 00861 00862 00863 00864 00865
00866 00867 00869 0088 0090 0091 0092 0093 0211 0222

9.2   Disorders of teeth and jaw [136.]   -

5200 5201 5202 5203 5204 5205 5206 5207 5208 5209
5210 52100 52101 52102 52103 52104 52105 52106 52107 52108
52109 5211 52110 52111 52112 52113 52114 52115 5212 52120
52121 52122 52123 52124 52125 5213 52130 52131 52132 52133
52134 52135 5214 52140 52141 52142 52149 5215 5216 5217
5218 52181 52189 5219 5220 5221 5222 5223 5224 5225
5226 5227 5228 5229 5230 52300 52301 5231 52310 52311
5232 52320 52321 52322 52323 52324 52325 5233 52330 52331
52332 52333 5234 52340 52341 52342 5235 5236 5238 5239
5240 52400 52401 52402 52403 52404 52405 52406 52407 52409
5241 52410 52411 52412 52419 5242 52420 52421 52422 52423
52424 52425 52426 52427 52428 52429 5243 52430 52431 52432
52433 52434 52435 52436 52437 52439 5244 5245 52450 52451
52452 52453 52454 52455 52456 52457 52459 5246 52460 52461
52462 52463 52464 52469 52470 52471 52472 52473 52474 52475
52476 52479 5248 52481 52482 52489 5249 5250 5251 52510
52511 52512 52513 52519 5252 52520 52521 52522 52523 52524
52525 52526 5253 52540 52541 52542 52543 52544 52550 52551
52552 52553 52554 52560 52561 52562 52563 52564 52565 52566
52567 52569 52571 52572 52573 52579 5258 5259 5260 5261
5262 5263 5264 5265 52661 52662 52663 52669 52681 52689
5269 78492 V523 V534 V585 V722

9.3   Diseases of mouth; excluding dental [137.]   -

5270 5271 5272 5273 5274 5275 5276 5277 5278 5279
5280 52800 52809 5281 5282 5283 5284 5285 5286 5287
52871 52872 52879 5288 5289 5290 5291 5292 5293 5294
5295 5296 5298 5299 7924

9.4   Upper gastrointestinal disorders   138 139 140 141

9.4.1   Esophageal disorders [138.]   138

9.4.1.1 Esophagitis   -

5301 53010 53011 53012 53013 53019

9.4.1.2 Other esophageal disorders   -

4561 45621 5300 5302 53020 53021 5303 5304 5305 5306
5308 53081 53083 53084 53085 53089 5309

9.4.2   Gastroduodenal ulcer (except hemorrhage) [139.]   139

9.4.2.1   Gastric ulcer   -

53110 53111 53130 53131 53150 53151 53170 53171 53190 53191

9.4.2.2   Duodenal ulcer   -

53210 53211 53230 53231 53250 53251 53270 53271 53290 53291

9.4.2.3   Peptic ulcer; site unspecified   -

53310 53311 53330 53331 53350 53351 53370 53371 53390 53391
V1271

9.4.2.4   Gastrojejunal ulcer   -

53410 53411 53430 53431 53450 53451 53470 53471 53490 53491

9.4.3   Gastritis and duodenitis [140.]   140

9.4.3.1   Acute gastritis   -

5350 53500 53501

9.4.3.2   Other specified gastritis   -

5351 53510 53511 5352 53520 53521 5354 53540 53541 53570
53571

9.4.3.3   Unspecified gastritis and gastroduodenitis   -

5355 53550 53551

9.4.3.4   Duodenitis   -

5356 53560 53561

9.4.4   Other disorders of stomach and duodenum [141.]   -

5360 5361 5362 5363 5368 5369 5370 5371 5372 5373
5374 5375 5376 53781 53782 53783 53784 53789 5379

9.5   Abdominal hernia [143.]   143

9.5.1.1 Inguinal hernia with obstruction or gangrene   -

55000 55001 55002 55003 55010 55011 55012 55013

9.5.1.2 Inguinal hernia without obstruction or gangrene   -

55090 55091 55092 55093

9.5.2   Diaphragmatic hernia   -

5513 5523 5533

9.5.3.1 Femoral hernia with obstruction/gangrene   -

55100 55101 55102 55103 55200 55201 55202 55203

9.5.3.2 Femoral hernia without obstruction/gangrene   -

55300 55301 55302 55303

9.5.3.3 Umbilical hernia with obstruction/gangrene   -

5511 5521

9.5.3.4 Umbilical hernia without obstruction/gangrene   -

5531

9.5.3.5 Ventral hernia with obstruction/gangrene   -

55120 55129 55220 55229

9.5.3.6 Ventral hernia without obstruction/gangrene   -

55320 55329

9.5.3.7 Incisional hernia with obstruction/gangrene   -

55121 55221

9.5.3.8   Incisional hernia without obstruction/gangrene   -

55321

9.5.3.9   Other and unspecified hernia   -

5518 5519 5528 5529 5538 5539

9.6   Lower gastrointestinal disorders   142 144 145 146 147
148

9.6.1   Appendicitis and other appendiceal conditions [142.]   142

9.6.1.1   Acute appendicitis with abscess or peritonitis   -

5400 5401

9.6.1.2   Acute appendicitis without abscess or peritonitis   -

5409

9.6.1.3   Acute appendicitis; not otherwise specified   -

541

9.6.1.4   Other appendiceal conditions   -

542 5430 5439

9.6.2   Regional enteritis and ulcerative colitis [144.]   -

5550 5551 5552 5559 556 5560 5561 5562 5563 5564
5565 5566 5568 5569

9.6.3   Intestinal obstruction without hernia [145.]   145

9.6.3.1   Paralytic ileus   -

5601

9.6.3.2   Impaction of intestine   -

56030 56032 56039

9.6.3.3   Peritoneal or intestinal adhesions   -

56081

9.6.3.4   Other intestinal obstruction   -

5600 5602 56031 56089 5609

9.6.4   Diverticulosis and diverticulitis [146.]   146

9.6.4.1   Diverticulosis   -

56200 56202 56210 56212

9.6.4.2   Diverticulitis   -

56201 56203 56211 56213

9.6.5   Anal and rectal conditions [147.]   -

5646 5650 5651 566 5690 5691 5692 56941 56942 56943
56944 56949

9.6.6   Peritonitis and intestinal abscess [148.]   -

03283 5670 5671 5672 56721 56722 56723 56729 56738 56739
5678 56781 56782 56789 5679 5695

9.7   Biliary tract disease [149.]   149

9.7.1   Cholelithiasis with acute cholecystitis   -

57400 57401

9.7.2   Cholelithiasis with other cholecystitis   -

57410 57411

9.7.3   Cholelithiasis without mention of cholecystitis   -

57420 57421

9.7.4   Calculus of bile duct   -

57430 57431 57440 57441 57450 57451 57460 57461 57470 57471
57480 57481 57490 57491

9.7.5   Cholecystitis without cholelithiasis   -

5750 5751 57510 57511 57512

9.7.6   Other biliary tract disease   -

5752 5753 5754 5755 5756 5758 5759 5760 5761 5762
5763 5764 5765 5768 5769 7933

9.8   Liver disease   150 151

9.8.1   Liver disease; alcohol-related [150.]   150

9.8.2   Other liver diseases [151.]   151

9.8.2.1 Cirrhosis of liver without mention of alcohol   -

5715

9.8.2.2 Liver abscess and sequelae of chronic liver disease   -

5720 5721 5722 5723 5724 5728 5735

9.8.2.3 Ascites   -

7895 78959

9.8.2.4 Other and unspecified liver disorders   -

570 5716 5718 5719 5730 5734 5738 5739 7824 7891
7904 7905 7948 V427

9.9   Pancreatic disorders (not diabetes) [152.]   152

9.9.1   Acute pancreatitis   -

5770

9.9.2   Chronic pancreatitis   -

    5771

9.9.3   Other pancreatic disorders   -

    5772 5778 5779 5794

9.10   Gastrointestinal hemorrhage [153.]   153

9.10.1   Hemorrhage from gastrointestinal ulcer   -

    53100 53101 53120 53121 53140 53141 53160 53161 53200 53201
    53220 53221 53240 53241 53260 53261 53300 53301 53320 53321
    53340 53341 53360 53361 53400 53401 53420 53421 53440 53441
    53460 53461

9.10.2   Melena   -

    5781

9.10.3   Gastroesophageal laceration syndrome   -

    5307

9.10.4   Other esophageal bleeding   -

    4560 45620 53082

9.10.5   Hemorrhage of rectum and anus   -

    5693

9.10.6   Hematemesis   -

    5780

9.10.7   Hemorrhage of gastrointestinal tract   -

    5789

9.11   Noninfectious gastroenteritis [154.]   -

    55841 55842 5589

9.12   Other gastrointestinal disorders [155.]   -

56986

9.12.1   Constipation   -

5640 56400 56401 56402 56409

9.12.2   Dysphagia   -

7872 78720 78721 78722 78723 78724 78729

9.12.3   Other and unspecified gastrointestinal disorders   -

538 5581 5582 5641 5645 5647 5648 56481 56489 5649
5680 56881 56882 56889 5689 56981 56982 56983 56984 56985
56987 56989 5699 5790 5791 5792 5798 5799 7871 7873
7874 7875 7876 78760 78761 78762 78763 7877 7879 78791
78799 7892 7893 78930 78931 78932 78933 78934 78935 78936
78937 78939 7894 78940 78941 78942 78943 78944 78945 78946
78947 78949 7899 7921 7934 7936 V127 V1270 V1279 V416
V441 V442 V443 V444 V453 V473 V535 V5350 V5351 V5359
V551 V552 V553 V554

10   Diseases of the genitourinary system   156 157 158 159 160
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175

10.1   Diseases of the urinary system   156 157 158 159 160
161 162 163

10.1.1   Nephritis; nephrosis; renal sclerosis [156.]   -

5800 5804 58081 58089 5809 5810 5811 5812 5813 58181
58189 5819 5820 5821 5822 5824 58281 58289 5829 5830
5831 5832 5834 5836 5837 58381 58389 5839 587

10.1.2   Acute and unspecified renal failure [157.]   157

10.1.2.1 Acute renal failure   -

5845 5846 5847 5848 5849

10.1.2.2 Unspecified renal failure   -

586

10.1.3   Chronic kidney disease [158.]   -

585 5851 5852 5853 5854 5855 5856 5859 7925 V420
V451 V4511 V4512 V560 V561 V562 V5631 V5632 V568

10.1.4   Urinary tract infections [159.]   159

10.1.4.1 Infections of kidney   -

59000 59001 59010 59011 5902 5903 59080 59081 5909

10.1.4.2 Cystitis and urethritis   -

03284 5950 5951 5952 5953 5954 59581 59582 59589 5959
5970 59780 59781 59789 59800 59801

10.1.4.3 Urinary tract infection; site not specified   -

5990

10.1.5   Calculus of urinary tract [160.]   160

10.1.5.1 Calculus of kidney   -

5920

10.1.5.2 Calculus of ureter   -

5921

10.1.5.3 Other and unspecified urinary calculus   -

5929 5940 5941 5942 5948 5949 7880 V1301

10.1.6   Other diseases of kidney and ureters [161.]   161

10.1.6.1 Hydronephrosis   -

591

10.1.6.2 Other and unspecified diseases of kidney and ureters   -

5880 5881 5888 58881 58889 5889 5890 5891 5899 5930
5931 5932 5933 5934 5935 5936 5937 59370 59371 59372
59373 59381 59382 59389 5939

10.1.7   Other diseases of bladder and urethra [162.]   162

10.1.7.1 Bladder neck obstruction   -

5960

10.1.7.2 Other and unspecified diseases of bladder and urethra   -

5961 5962 5963 5964 5965 59651 59652 59653 59654 59655
59659 5966 5967 5968 59689 5969 5981 5982 5988 5989
5991 5992 5993 5994 5995 59981 59982 59983 59984

10.1.8   Genitourinary symptoms and ill-defined conditions [163.]   163

10.1.8.1 Hematuria   -

5997 59970 59971 59972

10.1.8.2 Retention of urine   -

7882 78820 78821 78829

10.1.8.3 Other and unspecified genitourinary symptoms   -

5996 59960 59969 5998 59989 5999 7881 7883 78830 78831
78832 78833 78834 78835 78836 78837 78838 78839 7884 78841
78842 78843 7885 7886 78861 78862 78863 78864 78865 78869
7887 7888 7889 78891 78899 7910 7911 7912 7913 7914
7917 7919 7935 7944 V130 V1300 V1302 V1303 V1309 V417
V435 V445 V4450 V4451 V4452 V4459 V446 V474 V475 V536
V555 V556

10.2   Diseases of male genital organs   164 165 166

10.2.1   Hyperplasia of prostate [164.]   -

600 6000 60000 60001 6001 60010 60011 6002 60020 60021

6003 6009 60090 60091

10.2.2   Inflammatory conditions of male genital organs [165.]   -

6010 6011 6012 6013 6014 6018 6019 6031 6040 60490
60491 60499 6071 6072 6080 6084

10.2.3   Other male genital disorders [166.]   -

6020 6021 6022 6023 6028 6029 6030 6038 6039 605
6060 6061 6068 6069 6070 6073 60781 60782 60783 60784
60785 60789 6079 6081 6082 60820 60821 60822 60823 60824
6083 60881 60882 60883 60884 60885 60886 60887 60889 6089
7922

10.3   Diseases of female genital organs   167 168 169 170 171
172 173 174 175

10.3.1   Nonmalignant breast conditions [167.]   -

6100 6101 6102 6103 6104 6108 6109 6110 6111 6112
6113 6114 6115 6116 61171 61172 61179 6118 61181 61182
61183 61189 6119 6120 6121 7938 79380 79381 79382 79389

10.3.2   Inflammatory diseases of female pelvic organs [168.]   168

10.3.2.1 Pelvic peritoneal adhesions   -

6146

10.3.2.2 Cervicitis and endocervicitis   -

6160

10.3.2.3 Pelvic inflammatory disease (PID)   -

6149

10.3.2.4 Other inflammatory diseases of female pelvic organs   -

6140 6141 6142 6143 6144 6145 6147 6148 6150 6151
6159 61610 61611 6162 6163 6164 61650 61651 6168 61681
61689 6169 62571

10.3.3   Endometriosis [169.]   -

6170 6171 6172 6173 6174 6175 6176 6178 6179

10.3.4   Prolapse of female genital organs [170.]   -

6180 61800 61801 61802 61803 61804 61805 61809 6181 6182
6183 6184 6185 6186 6187 6188 61881 61882 61883 61884
61889 6189

10.3.5   Menstrual disorders [171.]   -

6253 6260 6261 6262 6263 6264 6265 6266 6268 6269

10.3.6   Ovarian cyst [172.]   -

6200 6201 6202

10.3.7   Menopausal disorders [173.]   -

25631 25639 6270 6271 6272 6273 6274 6278 6279 V074

10.3.8   Female infertility [174.]   -

6280 6281 6282 6283 6284 6288 6289

10.3.9   Other female genital disorders [175.]   -

79509 V1321 V1322 V1323 V1324 V1329

10.3.9.1 Female genital pain and other symptoms   -

6250 6251 6252 6254 6255 6256 62570 62579 6258 6259

10.3.9.2 Other and unspecified female genital disorders   -

6190 6191 6192 6198 6199 6203 6204 6205 6206 6207
6208 6209 6210 6211 6212 6213 62130 62131 62132 62133
62134 62135 6214 6215 6216 6217 6218 6219 6220 6221
62210 62211 62212 6222 6223 6224 6225 6226 6227 6228
6229 6230 6231 6232 6233 6234 6235 6236 6237 6238
6239 6240 62401 62402 62409 6241 6242 6243 6244 6245
6246 6248 6249 6267 6290 6291 62920 62921 62922 62923
62929 6298 62981 62989 6299 V132 V557 V723

11   Complications of pregnancy; childbirth; and the puerperium   176 177
178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196

11.1   Contraceptive and procreative management [176.]   -

V2503

11.1.1   Sterilization   -

V252 V2651 V2652

11.1.2   Other contraceptive and procreation management   -

V157 V2501 V2502 V2504 V2509 V251 V2511 V2512 V2513 V253
V2540 V2541 V2542 V2543 V2549 V255 V258 V259 V260 V261
V262 V2621 V2622 V2629 V263 V2631 V2632 V2633 V2634 V2635
V2639 V264 V2641 V2642 V2649 V268 V2681 V2682 V2689 V269
V455 V4551 V4552 V4559

11.2   Abortion-related disorders   177 178 179

11.2.1   Spontaneous abortion [177.]   -

63400 63401 63402 63410 63411 63412 63420 63421 63422 63430
63431 63432 63440 63441 63442 63450 63451 63452 63460 63461
63462 63470 63471 63472 63480 63481 63482 63490 63491 63492

11.2.2   Induced abortion [178.]   -

63500 63501 63502 63510 63511 63512 63520 63521 63522 63530
63531 63532 63540 63541 63542 63550 63551 63552 63560 63561
63562 63570 63571 63572 63580 63581 63582 63590 63591 63592
63600 63601 63602 63610 63611 63612 63620 63621 63622 63630
63631 63632 63640 63641 63642 63650 63651 63652 63660 63661
63662 63670 63671 63672 63680 63681 63682 63690 63691 63692
63700 63701 63702 63710 63711 63712 63720 63721 63722 63730
63731 63732 63740 63741 63742 63750 63751 63752 63760 63761
63762 63770 63771 63772 63780 63781 63782 63790 63791 63792
6380 6381 6382 6383 6384 6385 6386 6387 6388 6389

11.2.3   Postabortion complications [179.]   -

6390 6391 6392 6393 6394 6395 6396 6398 6399

11.3   Complications mainly related to pregnancy   180 181 182 183
184 185 186

11.3.1   Ectopic pregnancy [180.]   -

   6330 63300 63301 6331 63310 63311 6332 63320 63321 6338
   63380 63381 6339 63390 63391

11.3.2   Hemorrhage during pregnancy; abruptio placenta; placenta previa [182.]   182

11.3.2.1 Placenta previa   -

   64100 64101 64103 64110 64111

11.3.2.2 Abruptio placenta   -

   64120 64121 64123

11.3.2.3 Other hemorrhage during pregnancy; childbirth and the puerperium   -

   64000 64001 64003 64080 64081 64083 64090 64091 64093 64113
   64130 64131 64133 64180 64181 64183 64190 64191 64193

11.3.3   Hypertension complicating pregnancy; childbirth and the puerperium [183.]   183

11.3.3.1 Preeclampsia and eclampsia   -

   64240 64241 64242 64243 64244 64250 64251 64252 64253 64254
   64260 64261 64262 64263 64264 64270 64271 64272 64273 64274

11.3.3.2 Other hypertension in pregnancy   -

   64200 64201 64202 64203 64204 64210 64211 64212 64213 64214
   64220 64221 64222 64223 64224 64230 64231 64232 64233 64234
   64290 64291 64292 64293 64294

11.3.4   Early or threatened labor [184.]   184

11.3.4.1 Threatened premature labor   -

   64400 64403

11.3.4.2 Early onset of delivery   -

    64420 64421

11.3.4.3 Other early or threatened labor   -

    64410 64413

11.3.5   Prolonged pregnancy [185.]   -

    64500 64501 64503 64510 64511 64513 64520 64521 64523

11.3.6   Diabetes or abnormal glucose tolerance complicating pregnancy; childbirth; or the pue -

    64800 64801 64802 64803 64804 64880 64881 64882 64883 64884

11.3.7   Other complications of pregnancy [181.]   181

11.3.7.1 Infections of genitourinary tract during pregnancy   -

    64660 64661 64662 64663 64664

11.3.7.2 Anemia during pregnancy   -

    64820 64821 64822 64823 64824

11.3.7.4 Missed abortion   -

    632

11.3.7.5 Hyperemesis gravidarum   -

    64300 64301 64303 64310 64311 64313

11.3.7.6 Infectious and parasitic complications in mother affecting pregnancy   -

    64700 64701 64702 64703 64704 64710 64711 64712 64713 64714
    64720 64721 64722 64723 64724 64730 64731 64732 64733 64734
    64740 64741 64742 64743 64744 64750 64751 64752 64753 64754
    64760 64761 64762 64763 64764 64780 64781 64782 64783 64784
    64790 64791 64792 64793 64794

11.3.7.7 Other and unspecified complications of pregnancy   -

    630 631 6310 6318 64320 64321 64323 64380 64381 64383

64390 64391 64393 64600 64601 64603 64610 64611 64612 64613
64614 64620 64621 64622 64623 64624 64630 64631 64633 64640
64641 64642 64643 64644 64650 64651 64652 64653 64654 64670
64671 64673 64680 64681 64682 64683 64684 64690 64691 64693
64810 64811 64812 64813 64814 64850 64851 64852 64853 64854
64860 64861 64862 64863 64864 64870 64871 64872 64873 64874
64890 64891 64892 64893 64894 64900 64901 64902 64903 64904
64910 64911 64912 64913 64914 64920 64921 64922 64923 64924
64930 64931 64932 64933 64934 64940 64941 64942 64943 64944
64950 64951 64953 64960 64961 64962 64963 64964 V2342 V2387
V271 V272 V273 V274 V275 V276 V277 V279

11.4   Indications for care in pregnancy; labor; and delivery   187 188 189
190 191

11.4.1   Malposition; malpresentation [187.]   187

11.4.1.1 Breech presentation   -

65220 65221 65223

11.4.1.2 Other malposition; malpresentation   -

65200 65201 65203 65210 65211 65213 65230 65231 65233 65240
65241 65243 65250 65251 65253 65260 65261 65263 65270 65271
65273 65280 65281 65283 65290 65291 65293 66000 66001 66003

11.4.2   Fetopelvic disproportion; obstruction [188.]   188

11.4.2.1 Fetopelvic disproportion   -

65340 65341 65343

11.4.2.2 Other disproportion or obstruction   -

65300 65301 65303 65310 65311 65313 65320 65321 65323 65330
65331 65333 65350 65351 65353 65360 65361 65363 65370 65371
65373 65380 65381 65383 65390 65391 65393 66010 66011 66013
66020 66021 66023 66030 66031 66033 66040 66041 66043 66050
66051 66053 66060 66061 66063 66070 66071 66073 66080 66081
66083 66090 66091 66093 67810 67811 67813

11.4.3   Previous cesarean section [189.]   -

65420 65421 65423

66310 66311 66313

11.5.1.2 Other and unspecified cord entanglement with or without compression -

66320 66321 66323 66330 66331 66333

11.5.1.3 Other umbilical cord complications -

66300 66301 66303 66340 66341 66343 66350 66351 66353 66360
66361 66363 66380 66381 66383 66390 66391 66393

11.5.2 Trauma to perineum and vulva [193.] 193

11.5.2.1 First degree perineal laceration -

66400 66401 66404

11.5.2.2 Second degree perineal laceration -

66410 66411 66414 66460 66461 66464

11.5.2.3 Third degree perineal laceration -

66420 66421 66424

11.5.2.4 Fourth degree perineal laceration -

66430 66431 66434

11.5.2.5 Other perineal laceration and trauma -

66440 66441 66444 66450 66451 66454 66480 66481 66484 66490
66491 66494

11.5.3 Forceps delivery [194.] -

66950 66951

11.6 Other complications of birth; puerperium affecting management of mother [195.] -

V2341 V2349

11.6.1 Postpartum hemorrhage -

66600 66602 66604 66610 66612 66614 66620 66622 66624 66630
66632 66634

11.6.2   Complications of the puerperium   -

67000 67002 67004 67010 67012 67014 67020 67022 67024 67030
67032 67034 67080 67082 67084 67100 67101 67102 67103 67104
67110 67111 67112 67113 67114 67120 67121 67122 67123 67124
67130 67131 67133 67140 67142 67144 67150 67151 67152 67153
67154 67180 67181 67182 67183 67184 67190 67191 67192 67193
67194 67200 67202 67204 67300 67301 67302 67303 67304 67310
67311 67312 67313 67314 67320 67321 67322 67323 67324 67330
67331 67332 67333 67334 67380 67381 67382 67383 67384 67400
67401 67402 67403 67404 67410 67412 67414 67420 67422 67424
67430 67432 67434 67440 67442 67444 67451 67452 67454 67480
67482 67484 67490 67492 67494 67500 67501 67502 67503 67504
67510 67511 67512 67513 67514 67520 67521 67522 67523 67524
67580 67581 67582 67583 67584 67590 67591 67592 67593 67594
67600 67601 67602 67603 67604 67610 67611 67612 67613 67614
67620 67621 67622 67623 67624 67630 67631 67632 67633 67634
67640 67641 67642 67643 67644 67650 67651 67652 67653 67654
67660 67661 67662 67663 67664 67680 67681 67682 67683 67684
67690 67691 67692 67693 67694

11.6.3   Cervical incompetence   -

64970 64971 64973 65450 65451 65452 65453 65454

11.6.4   Rhesus isoimmunization   -

65610 65611 65613

11.6.5   Intrauterine death   -

65640 65641 65643

11.6.6   Failed induction   -

65900 65901 65903 65910 65911 65913

11.6.7   Other obstetrical trauma   -

66500 66501 66503 66510 66511 66512 66514 66520 66522 66524
66530 66531 66534 66540 66541 66544 66550 66551 66554 66560
66561 66564 66570 66571 66572 66574 66580 66581 66582 66583
66584 66590 66591 66592 66593 66594

11.6.8   Other and unspecified complications of birth; puerperium affecting management of moth -

64981 64982 65103 65113 65123 65130 65131 65133 65140 65141
65143 65150 65151 65153 65160 65161 65163 65183 65193 65400
65401 65402 65403 65404 65410 65411 65412 65413 65414 65430
65431 65432 65433 65434 65440 65441 65442 65443 65444 65460
65461 65462 65463 65464 65470 65471 65472 65473 65474 65480
65481 65482 65483 65484 65490 65491 65492 65493 65494 65500
65501 65503 65510 65511 65513 65520 65521 65523 65530 65531
65533 65540 65541 65543 65560 65561 65563 65570 65571 65573
65580 65581 65583 65590 65591 65593 65600 65601 65603 65620
65621 65623 65650 65651 65653 65660 65661 65663 65670 65671
65673 65680 65681 65683 65690 65691 65693 65920 65921 65923
65930 65931 65933 65940 65941 65943 65950 65951 65953 65960
65961 65963 65970 65971 65973 65980 65981 65983 65990 65991
65993 66700 66702 66704 66710 66712 66714 66800 66801 66802
66803 66804 66810 66811 66812 66813 66814 66820 66821 66822
66823 66824 66880 66881 66882 66883 66884 66890 66891 66892
66893 66894 66900 66901 66902 66903 66904 66910 66911 66912
66913 66914 66920 66921 66922 66923 66924 66930 66932 66934
66940 66941 66942 66943 66944 66960 66961 66970 66971 66980
66981 66982 66983 66984 66990 66991 66992 66993 66994 67450
67453 677 67800 67801 67803 67900 67901 67902 67903 67904
67910 67911 67912 67913 67914 V230 V231 V232 V233 V234
V235 V237 V238 V2381 V2382 V2383 V2384 V2385 V2386 V2389
V239

11.7   Normal pregnancy and/or delivery [196.]   196

11.7.1   Normal delivery   -

650

11.7.2   Multiple gestation   -

65100 65101 65110 65111 65120 65121 65170 65171 65173 65180
65181 65190 65191 V9100 V9101 V9102 V9103 V9109 V9110 V9111
V9112 V9119 V9120 V9121 V9122 V9129 V9190 V9191 V9192 V9199

11.7.3   Outcome of delivery (V codes)   -

V220 V221 V222 V240 V241 V242 V270 V724 V7242

12   Diseases of the skin and subcutaneous tissue   197 198 199 200

12.1   Skin and subcutaneous tissue infections [197.]   197

12.1.1.1 Cellulitis and abscess of fingers and toes   -

    68100 68101 68102 68110 68111 6819

12.1.1.2 Cellulitis and abscess of face   -

    6820

12.1.1.3 Cellulitis and abscess of arm   -

    6823

12.1.1.4 Cellulitis and abscess of hand   -

    6824

12.1.1.5 Cellulitis and abscess of leg   -

    6826

12.1.1.6 Cellulitis and abscess of foot   -

    6827

12.1.1.7 Other cellulitis and abscess   -

    6821 6822 6825 6828 6829 68600 68601 68609

12.1.2   Other skin and subcutaneous infections   -

    0201 0210 0220 0311 03285 035 0390 6800 6801 6802
    6803 6804 6805 6806 6807 6808 6809 684 6850 6851
    6860 6861 6868 6869

12.2   Other inflammatory condition of skin [198.]   -

    690 69010 69011 69012 69018 6908 69276 69277 6940 6941
    6942 6943 6944 6945 69460 69461 6948 6949 6950 6951
    69510 69511 69512 69513 69514 69515 69519 6952 6953 6954
    69550 69551 69552 69553 69554 69555 69556 69557 69558 69559

69581 69589 6959 6960 6961 6962 6963 6964 6965 6968
6970 6971 6978 6979 6980 6981 6982 6983 6984 6988
6989

12.3   Chronic ulcer of skin [199.]   199

12.3.1   Decubitus ulcer   -

7070 70700 70701 70702 70703 70704 70705 70706 70707 70709
70720 70721 70722 70723 70724 70725

12.3.2   Chronic ulcer of leg or foot   -

7071 70710 70711 70712 70713 70714 70715 70719

12.3.3   Other chronic skin ulcer   -

7078 7079

12.4   Other skin disorders [200.]   -

69275 700 7010 7011 7012 7013 7014 7015 7018 7019
702 7020 7021 70211 70219 7028 7030 7038 7039 70400
70401 70402 70409 7041 7042 7043 70441 70442 7048 7049
7050 7051 70521 70522 70581 70582 70583 70589 7059 7060
7061 7062 7063 7068 7069 7090 70900 70901 70909 7091
7092 7093 7094 7098 7099 7808 7821 7822 V133 V423

13   Diseases of the musculoskeletal system and connective tissue   201 202
203 204 205 206 207 208 209 210 211 212

13.1   Infective arthritis and osteomyelitis (except that caused by TB or STD) [201.]   -

00323 00324 0261 03682 05671 71100 71101 71102 71103 71104
71105 71106 71107 71108 71109 71110 71111 71112 71113 71114
71115 71116 71117 71118 71119 71120 71121 71122 71123 71124
71125 71126 71127 71128 71129 71130 71131 71132 71133 71134
71135 71136 71137 71138 71139 71140 71141 71142 71143 71144
71145 71146 71147 71148 71149 71150 71151 71152 71153 71154
71155 71156 71157 71158 71159 71160 71161 71162 71163 71164
71165 71166 71167 71168 71169 71170 71171 71172 71173 71174
71175 71176 71177 71178 71179 71180 71181 71182 71183 71184
71185 71186 71187 71188 71189 71190 71191 71192 71193 71194
71195 71196 71197 71198 71199 73000 73001 73002 73003 73004

73005 73006 73007 73008 73009 73010 73011 73012 73013 73014
73015 73016 73017 73018 73019 73020 73021 73022 73023 73024
73025 73026 73027 73028 73029 73030 73031 73032 73033 73034
73035 73036 73037 73038 73039 73070 73071 73072 73073 73074
73075 73076 73077 73078 73079 73080 73081 73082 73083 73084
73085 73086 73087 73088 73089 73090 73091 73092 73093 73094
73095 73096 73097 73098 73099

13.2   Non-traumatic joint disorders   202 203 204

13.2.1   Rheumatoid arthritis and related disease [202.]   -

7140 7141 7142 71430 71431 71432 71433 7144 71481 71489
7149 7200

13.2.2   Osteoarthritis [203.]   203

13.2.2.1 Osteoarthritis; localized   -

71510 71511 71512 71513 71514 71515 71516 71517 71518 71520
71521 71522 71523 71524 71525 71526 71527 71528 71530 71531
71532 71533 71534 71535 71536 71537 71538

13.2.2.2 Osteoarthritis; generalized and unspecified   -

71500 71504 71509 71580 71589 71590 71591 71592 71593 71594
71595 71596 71597 71598 V134

13.2.3   Other non-traumatic joint disorders [204.]   -

7130 7131 7132 7133 7134 7135 7136 7137 7138 71600
71601 71602 71603 71604 71605 71606 71607 71608 71609 71620
71621 71622 71623 71624 71625 71626 71627 71628 71629 71630
71631 71632 71633 71634 71635 71636 71637 71638 71639 71640
71641 71642 71643 71644 71645 71646 71647 71648 71649 71650
71651 71652 71653 71654 71655 71656 71657 71658 71659 71660
71661 71662 71663 71664 71665 71666 71667 71668 71680 71681
71682 71683 71684 71685 71686 71687 71688 71689 71690 71691
71692 71693 71694 71695 71696 71697 71698 71699 71810 71811
71812 71813 71814 71815 71817 71818 71819 71820 71821 71822
71823 71824 71825 71826 71827 71828 71829 71850 71851 71852
71853 71854 71855 71856 71857 71858 71859 71860 71865 71870
71871 71872 71873 71874 71875 71876 71877 71878 71879 71880
71881 71882 71883 71884 71885 71886 71887 71888 71889 71890

71891 71892 71893 71894 71895 71897 71898 71899 71900 71901
71902 71903 71904 71905 71906 71907 71908 71909 71910 71911
71912 71913 71914 71915 71916 71917 71918 71919 71920 71921
71922 71923 71924 71925 71926 71927 71928 71929 71930 71931
71932 71933 71934 71935 71936 71937 71938 71939 71940 71941
71942 71943 71944 71945 71946 71947 71948 71949 71950 71951
71952 71953 71954 71955 71956 71957 71958 71959 71960 71961
71962 71963 71964 71965 71966 71967 71968 71969 7197 71970
71975 71976 71977 71978 71979 71980 71981 71982 71983 71984
71985 71986 71987 71988 71989 71990 71991 71992 71993 71994
71995 71996 71997 71998 71999

13.3 Spondylosis; intervertebral disc disorders; other back problems [205.]   205

13.3.1 Spondylosis and allied disorders   -

7210 7211 7212 7213 72141 72142 7215 7216 7217 7218
72190 72191

13.3.2 Intervertebral disc disorders   -

7220 72210 72211 7222 72230 72231 72232 72239 7224 72251
72252 7226 72270 72271 72272 72273 72280 72281 72282 72283
72290 72291 72292 72293

13.3.3.1 Cervical radiculitis   -

7234

13.3.3.2 Spinal stenosis; lumbar region   -

72402 72403

13.3.3.3 Lumbago   -

7242

13.3.3.4 Sciatica   -

7243

13.3.3.5 Thoracic or lumbosacral neuritis or radiculitis; unspecified   -

7244

13.3.3.6 Backache; unspecified   -

    7245

13.3.3.7 Other back pain and disorders   -

    7201 7202 72081 72089 7209 7230 7231 7232 7233 7235
    7236 7237 7238 7239 72400 72401 72409 7241 7246 72470
    72471 72479 7248 7249

13.4   Osteoporosis [206.]   -

    73300 73301 73302 73303 73309

13.5   Pathological fracture [207.]   -

    7331 73310 73311 73312 73313 73314 73315 73316 73319 73393
    73394 73395 73396 73397 73398 V1351

13.6   Acquired deformities   208 209

13.6.1   Acquired foot deformities [208.]   -

    7271 734 7350 7351 7352 7353 7354 7355 7358 7359
    73670 73671 73672 73673 73674 73675 73676 73679

13.6.2   Other acquired deformities [209.]   -

    71840 71841 71842 71843 71844 71845 71846 71847 71848 71849
    73600 73601 73602 73603 73604 73605 73606 73607 73609 7361
    73620 73621 73622 73629 73630 73631 73632 73639 73641 73642
    7365 7366 73681 73689 7369 7370 73710 73711 73712 73719
    73720 73721 73722 73729 73733 73734 73739 73740 73741 73742
    73743 7378 7379 7380 7381 73810 73811 73812 73819 7382
    7383 7384 7385 7386 7387 7388 7389

13.7   Systemic lupus erythematosus and connective tissue disorders [210.]   -

    7100 7101 7102 7103 7104 7108 7109

13.8   Other connective tissue disease [211.]   -

    32752 56731 7105 725 7260 72610 72611 72612 72613 72619
    7262 72630 72631 72632 72633 72639 7264 7265 72660 72661
    72662 72663 72664 72665 72669 72670 72671 72672 72673 72679

7268 72690 72691 72700 72701 72702 72703 72704 72705 72706
72709 7272 7273 72740 72741 72742 72743 72749 72750 72751
72759 72760 72761 72762 72763 72764 72765 72766 72767 72768
72769 72781 72782 72783 72789 7279 7280 72810 72811 72812
72813 72819 7282 7283 7284 7285 7286 72871 72879 72881
72882 72883 72884 72885 72886 72887 72888 72889 7289 7290
7291 7292 72930 72931 72939 7294 7295 7296 72971 72972
72973 72979 72981 72982 72989 7299 72990 72991 72992 72999
7819 78191 78192 78194 78199 7937 V135 V1359 V436 V4360
V4361 V4362 V4363 V4364 V4365 V4366 V4369 V437 V454 V481
V482 V483 V490 V491 V492 V495 V4960 V4961 V4962 V4963
V4964 V4965 V4966 V4967 V4970 V4971 V4972 V4973 V4974 V4975
V4976 V4977 V537

13.9   Other bone disease and musculoskeletal deformities [212.]   -

7310 7311 7312 7313 7318 7320 7321 7322 7323 7324
7325 7326 7327 7328 7329 73320 73321 73322 73329 7333
73340 73341 73342 73343 73344 73345 73349 7335 7336 7337
73381 73382 73390 73391 73392 73399 73730 73731 73732 7390
7391 7392 7393 7394 7395 7396 7397 7398 7399 V424
V486 V487 V494 V8821 V8822 V8829

14   Congenital anomalies   213 214 215 216 217

14.1   Cardiac and circulatory congenital anomalies [213.]   -

V1365

14.1.1   Transposition of great vessels   -

74510

14.1.2   Tetralogy of Fallot   -

7452

14.1.3   Ventricular septal defect   -

7454

14.1.4   Atrial septal defect   -

7455

14.1.5   Endocardial cushion defects   -

74560 74561 74569

14.1.6   Pulmonary valve atresia and stenosis   -

74600 74601 74602 74609

14.1.7   Aortic valve stenosis   -

7463

14.1.8   Patent ductus arteriosus   -

7470

14.1.9   Coarctation of aorta   -

74710

14.1.10   Pulmonary artery anomalies   -

7473 74731 74732 74739

14.1.11   Cerebrovascular anomalies   -

74781

14.1.12   Double outlet right ventricle   -

74511

14.1.13   Common ventricle   -

7453

14.1.14   Congenital insufficiency of aortic valve   -

7464

14.1.15   Hypoplastic left heart syndrome   -

7467

14.1.16   Gastrointestinal vessel congenital anomaly   -

74761

14.1.17 Persistent fetal circulation   -

74783

14.1.18 Other anomalies of bulbus cordis and cardiac septal closure   -

7450 74512 74519 7457 7458 7459

14.1.19 Other heart valve congenital anomalies   -

7461 7462 7465 7466

14.1.20 Other congenital anomalies of the heart   -

74681 74682 74683 74684 74685 74686 74687 74689 7469

14.1.21 Other congenital anomalies of aorta   -

74711 74720 74721 74722 74729

14.1.22 Other circulatory congenital anomalies   -

74740 74741 74742 74749 7475 7476 74760 74762 74763 74764
74769 74782 74789 7479

14.2   Digestive congenital anomalies [214.]   -

V1367

14.2.1   Esophageal atresia/tracheoesophageal fistula   -

7503

14.2.2   Pyloric stenosis   -

7505

14.2.3   Rectal and large intestine atresia/stenosis   -

7512

14.2.4   Hirshsprungs disease   -

7513

14.2.5   'Meckel's diverticulum'   -

    7510

14.2.6   Atresia and stenosis of small intestine   -

    7511

14.2.7   Anomalies of intestinal fixation   -

    7514

14.2.8   Other upper gastrointestinal congenital anomalies   -

    7500 75010 75011 75012 75013 75015 75016 75019 75021 75022
    75023 75024 75025 75026 75027 75029 7504 7506 7507 7508
    7509

14.2.9   Other lower gastrointestinal congenital anomalies   -

    7515 75160 75161 75162 75169 7517 7518 7519

14.3   Genitourinary congenital anomalies [215.]   -

    V1362

14.3.1   Undescended testicle   -

    7525 75251 75252

14.3.2   Hypospadias and epispadias   -

    7526 75261 75262 V1361

14.3.3   Obstructive genitourinary defect   -

    7532 75320 75321 75322 75323 75329

14.3.4   Polycystic kidney   -

    75312 75313 75314

14.3.5   Other cystic kidney disease   -

    7531 75310 75311 75315 75316 75317 75319

14.3.6   Embyronic cyst of fallopian tubes and broad ligaments   -

75211

14.3.7   Other congenital anomalies of genitalia   -

7520 75210 75219 7522 7523 75231 75232 75233 75234 75235
75236 75239 75240 75241 75242 75243 75244 75245 75246 75247
75249 75263 75264 75265 75269 7527 7528 75281 75289 7529

14.3.8   Other congenital anomalies of urinary system   -

7530 7533 7534 7535 7536 7537 7538 7539

14.4   Nervous system congenital anomalies [216.]   -

V1363

14.4.1   Spina bifida   -

74100 74101 74102 74103 74190 74191 74192 74193

14.4.2   Congenital hydrocephalus   -

7423

14.4.3   Other spinal cord congenital anomalies   -

74251 74253 74259

14.4.4   Microcephalus   -

7421

14.4.5   Other nervous system congenital anomalies   -

7400 7401 7402 7420 7422 7424 7428 7429

14.5   Other congenital anomalies [217.]   217

14.5.1   Cleft palate without cleft lip   -

74900 74901 74902 74903 74904

14.5.2   Cleft lip with or without cleft palate   -

74910 74911 74912 74913 74914 74920 74921 74922 74923 74924 74925

14.5.3   Congenital anomalies of the eye   -

74300 74303 74306 74310 74311 74312 74320 74321 74322 74330 74331 74332 74333 74334 74335 74336 74337 74339 74341 74342 74343 74344 74345 74346 74347 74348 74349 74351 74352 74353 74354 74355 74356 74357 74358 74359 74361 74362 74363 74364 74365 74366 74369 7438 7439

14.5.4   Microtia (incomplete development of external ear)   -

74423

14.5.5   Branchial cleft cyst or fistula   -

74441 74442

14.5.6   Other face and neck congenital anomalies   -

74400 74401 74402 74403 74404 74405 74409 7441 74421 74422 74424 74429 7443 74443 74446 74447 74449 7445 74481 74482 74483 74484 74489 7449

14.5.7   Congenital anomalies of larynx trachea and bronchus   -

7482 7483

14.5.8   Other respiratory congenital anomalies   -

7480 7481 7484 7485 74860 74861 74869 7488 7489

14.5.9   Foot deformities   -

75450 75451 75452 75453 75459 75460 75461 75462 75469 75470 75471 75479

14.5.10   Congenital hip dislocation   -

75430 75431 75432 75433 75435

14.5.11   Polydactyly (extra digits) and syndactyly (webbing between digits)   -

75500 75501 75502 75510 75511 75512 75513 75514

14.5.12 Congenital absence of lower limb -

75530 75531 75532 75533 75534 75535 75536 75537 75538 75539

14.5.13 Congenital hip deformity -

75561 75562 75563

14.5.14 Other congenital anomalies of limbs -

75442 75520 75521 75522 75523 75524 75525 75526 75527 75528
75529 7554 75550 75551 75552 75553 75554 75555 75556 75557
75558 75559 75560 75564 75565 75566 75567 75569 7558 7559

14.5.15 Congenital anomalies of skull and facial bones -

7560

14.5.16 Lumbosacral spondylolysis -

75611

14.5.17 Spondylolisthesis -

75612

14.5.18 Other spinal congenital anomalies -

75610 75613 75614 75615 75616 75617 75619

14.5.19 Osteogenesis imperfecta -

75651

14.5.20 Congenital anomalies of the diaphragm -

7566

14.5.21 Congenital anomalies of abdominal wall -

7567 75670 75671 75672 75673 75679

14.5.22 Congenital pigmentary anomalies of skin -

75733

14.5.23   Other congenital anomalies of integument   -

7570 7571 7572 75731 75732 75739 7574 7575 7576 7578
7579

14.5.24   Pectus excavatum   -

75481

14.5.25   'Down's Syndrome'   -

7580

14.5.26   All other congenital anomalies   -

7540 7541 7542 75440 75441 75443 75444 75482 75489 7562
7563 7564 75650 75652 75653 75654 75655 75656 75659 75681
75682 75683 75689 7569 7581 7582 7583 75831 75832 75833
75839 7584 7585 7586 7587 7588 75881 75889 7589 7590
7591 7592 7593 7594 7595 7596 7597 7598 75981 75982
75983 75989 7599 7952 V136 V1364 V1366 V1368 V1369

15   Certain conditions originating in the perinatal period   218 219 220 221
222 223 224

15.1   Liveborn [218.]   -

76520 76529 V300 V3000 V3001 V301 V302 V310 V3100 V3101
V311 V312 V320 V3200 V3201 V321 V322 V330 V3300 V3301
V331 V332 V340 V3400 V3401 V341 V342 V350 V3500 V3501
V351 V352 V360 V3600 V3601 V361 V362 V370 V3700 V3701
V371 V372 V390 V3900 V3901 V391 V392

15.2   Short gestation; low birth weight; and fetal growth retardation [219.]   -

7640 76400 76401 76402 76403 76404 76405 76406 76407 76408
76409 7641 76410 76411 76412 76413 76414 76415 76416 76417
76418 76419 7642 76420 76421 76422 76423 76424 76425 76426
76427 76428 76429 7649 76490 76491 76492 76493 76494 76495
76496 76497 76498 76499 7650 76500 76501 76502 76503 76504
76505 76506 76507 76508 76509 7651 76510 76511 76512 76513
76514 76515 76516 76517 76518 76519 76521 76522 76523 76524
76525 76526 76527 76528 V2130 V2131 V2132 V2133 V2134 V2135

15.3   Intrauterine hypoxia and birth asphyxia [220.]   -

7680 7681 7682 7683 7684 7685 7686 7687 76870 76871
76872 76873 7689 77088

15.4   Respiratory distress syndrome [221.]   -

769

15.5   Hemolytic jaundice and perinatal jaundice [222.]   -

7730 7731 7732 7733 7734 7735 7740 7741 7742 77430
77431 77439 7744 7745 7746 7747

15.6   Birth trauma [223.]   -

7670 7671 76711 76719 7672 7673 7674 7675 7676 7677
7678 7679

15.7   Other perinatal conditions [224.]   -

77081 77082 77083 77084 77089 77182 77183 77189 77981 77982
77984 77989 78091 78092

15.7.1   Respiratory conditions of fetus and newborn; other than respiratory distress   -

7700 7701 7702 7703 7704 7705 7706 7707 7708 77087
7709

15.7.2   Infections specific to the perinatal period   -

04041 7710 7711 7712 7713 7714 7715 7716 7717 7718

15.7.3   Endocrine and metabolic disturbances of fetus and newborn   -

7750 7751 7752 7753 7754 7755 7756 7757 7758 77581
77589 7759

15.7.4   Other and unspecified perinatal conditions   -

7600 7601 7602 7603 7604 7605 7606 76061 76062 76063
76064 76070 76074 76076 76077 76078 76079 7608 7609 7610
7611 7612 7613 7614 7615 7616 7617 7618 7619 7620
7621 7622 7623 7624 7625 7626 7627 7628 7629 7630
7631 7632 7633 7634 7635 7636 7637 7638 76381 76382

76383 76384 76389 7639 7660 7661 7662 76621 76622 77010
77011 77012 77013 77014 77015 77016 77017 77018 77085 77086
7720 7721 77210 77211 77212 77213 77214 7722 7723 7724
7725 7726 7728 7729 7760 7761 7762 7763 7764 7765
7766 7767 7768 7769 7771 7772 7773 7774 7775 77750
77751 77752 77753 7776 7778 7779 7780 7781 7782 7783
7784 7785 7786 7787 7788 7789 7790 7791 7792 7793
77931 77932 77933 77934 7794 7796 7797 7798 77983 77985
7799 7897 V137 V502

16   Injury and poisoning   225 226 227 228 229 230
231 232 233 234 235 236 237 238 239 240 241 242 243 244

16.1   Joint disorders and dislocations; trauma-related [225.]   -

71610 71611 71612 71613 71614 71615 71616 71617 71618 71619
7170 7171 7172 7173 71740 71741 71742 71743 71749 7175
7176 7177 71781 71782 71783 71784 71785 71789 7179 71800
71801 71802 71803 71804 71805 71807 71808 71809 71830 71831
71832 71833 71834 71835 71836 71837 71838 71839 8300 8301
83100 83101 83102 83103 83104 83109 83110 83111 83112 83113
83114 83119 83200 83201 83202 83203 83204 83209 83210 83211
83212 83213 83214 83219 8322 83300 83301 83302 83303 83304
83305 83309 83310 83311 83312 83313 83314 83315 83319 83400
83401 83402 83410 83411 83412 83500 83501 83502 83503 83510
83511 83512 83513 8360 8361 8362 8363 8364 83650 83651
83652 83653 83654 83659 83660 83661 83662 83663 83664 83669
8370 8371 83800 83801 83802 83803 83804 83805 83806 83809
83810 83811 83812 83813 83814 83815 83816 83819 83900 83901
83902 83903 83904 83905 83906 83907 83908 83910 83911 83912
83913 83914 83915 83916 83917 83918 83920 83921 83930 83931
83940 83941 83942 83949 83950 83951 83952 83959 83961 83969
83971 83979 8398 8399 9056

16.2   Fractures   226 228 229 230 231

16.2.1   Fracture of neck of femur (hip) [226.]   -

82000 82001 82002 82003 82009 82010 82011 82012 82013 82019
82020 82021 82022 82030 82031 82032 8208 8209 9053 V5413
V5423

16.2.2   Skull and face fractures [228.]   -

80000 80001 80002 80003 80004 80005 80006 80009 80050 80051
80052 80053 80054 80055 80056 80059 80100 80101 80102 80103
80104 80105 80106 80109 80150 80151 80152 80153 80154 80155
80156 80159 8020 8021 80220 80221 80222 80223 80224 80225
80226 80227 80228 80229 80230 80231 80232 80233 80234 80235
80236 80237 80238 80239 8024 8025 8026 8027 8028 8029
80300 80301 80302 80303 80304 80305 80306 80309 80350 80351
80352 80353 80354 80355 80356 80359 80400 80401 80402 80403
80404 80405 80406 80409 80450 80451 80452 80453 80454 80455
80456 80459 9050

16.2.3   Fracture of upper limb [229.]   -

81345 V5410 V5411 V5412 V5420 V5421 V5422

16.2.3.1 Fracture of humerus   -

81200 81201 81202 81203 81209 81210 81211 81212 81213 81219
81220 81221 81230 81231 81240 81241 81242 81243 81244 81249
81250 81251 81252 81253 81254 81259

16.2.3.2 Fracture of radius and ulna   -

81300 81301 81302 81303 81304 81305 81306 81307 81308 81310
81311 81312 81313 81314 81315 81316 81317 81318 81320 81321
81322 81323 81330 81331 81332 81333 81340 81341 81342 81343
81344 81346 81347 81350 81351 81352 81353 81354 81380 81381
81382 81383 81390 81391 81392 81393

16.2.3.3 Other fracture of upper limb   -

81000 81001 81002 81003 81010 81011 81012 81013 81100 81101
81102 81103 81109 81110 81111 81112 81113 81119 81400 81401
81402 81403 81404 81405 81406 81407 81408 81409 81410 81411
81412 81413 81414 81415 81416 81417 81418 81419 81500 81501
81502 81503 81504 81509 81510 81511 81512 81513 81514 81519
81600 81601 81602 81603 81610 81611 81612 81613 8170 8171
8180 8181 8190 8191 9052

16.2.4   Fracture of lower limb [230.]   -

82340 82341 82342 V5414 V5415 V5416 V5424 V5425 V5426

16.2.4.1 Fracture of tibia and fibula   -

82300 82301 82302 82310 82311 82312 82320 82321 82322 82330

82331 82332 82380 82381 82382 82390 82391 82392

16.2.4.2 Fracture of ankle   -

8240 8241 8242 8243 8244 8245 8246 8247 8248 8249

16.2.4.3 Other fracture of lower limb   -

82100 82101 82110 82111 82120 82121 82122 82123 82129 82130
82131 82132 82133 82139 8220 8221 8250 8251 82520 82521
82522 82523 82524 82525 82529 82530 82531 82532 82533 82534
82535 82539 8260 8261 8270 8271 9054

16.2.5   Other fractures [231.]   -

V5417 V5419 V5427 V5429

16.2.5.1 Fracture of vertebral column without mention of spinal cord injury   -

80500 80501 80502 80503 80504 80505 80506 80507 80508 80510
80511 80512 80513 80514 80515 80516 80517 80518 8052 8053
8054 8055 8056 8057 8058 8059

16.2.5.2 Fracture of ribs; closed   -

80700 80701 80702 80703 80704 80705 80706 80707 80708 80709

16.2.5.3 Fracture of pelvis   -

8080 8081 8082 8083 80841 80842 80843 80844 80849 80851
80852 80853 80854 80859 8088 8089

16.2.5.4 Other and unspecified fracture   -

80710 80711 80712 80713 80714 80715 80716 80717 80718 80719
8072 8073 8074 8075 8076 8090 8091 8280 8281 8290
8291 9051 9055 V1352 V540 V5401 V5402 V5409 V664 V674

16.3   Spinal cord injury [227.]   -

34939 80600 80601 80602 80603 80604 80605 80606 80607 80608
80609 80610 80611 80612 80613 80614 80615 80616 80617 80618
80619 80620 80621 80622 80623 80624 80625 80626 80627 80628
80629 80630 80631 80632 80633 80634 80635 80636 80637 80638
80639 8064 8065 80660 80661 80662 80669 80670 80671 80672
80679 8068 8069 9072 95200 95201 95202 95203 95204 95205

95206 95207 95208 95209 95210 95211 95212 95213 95214 95215
95216 95217 95218 95219 9522 9523 9524 9528 9529

16.4   Intracranial injury [233.]   -

V1552

16.4.1   Concussion   -

8500 8501 85011 85012 8502 8503 8504 8505 8509

16.4.2   Other intracranial injury   -

80010 80011 80012 80013 80014 80015 80016 80019 80020 80021
80022 80023 80024 80025 80026 80029 80030 80031 80032 80033
80034 80035 80036 80039 80040 80041 80042 80043 80044 80045
80046 80049 80060 80061 80062 80063 80064 80065 80066 80069
80070 80071 80072 80073 80074 80075 80076 80079 80080 80081
80082 80083 80084 80085 80086 80089 80090 80091 80092 80093
80094 80095 80096 80099 80110 80111 80112 80113 80114 80115
80116 80119 80120 80121 80122 80123 80124 80125 80126 80129
80130 80131 80132 80133 80134 80135 80136 80139 80140 80141
80142 80143 80144 80145 80146 80149 80160 80161 80162 80163
80164 80165 80166 80169 80170 80171 80172 80173 80174 80175
80176 80179 80180 80181 80182 80183 80184 80185 80186 80189
80190 80191 80192 80193 80194 80195 80196 80199 80310 80311
80312 80313 80314 80315 80316 80319 80320 80321 80322 80323
80324 80325 80326 80329 80330 80331 80332 80333 80334 80335
80336 80339 80340 80341 80342 80343 80344 80345 80346 80349
80360 80361 80362 80363 80364 80365 80366 80369 80370 80371
80372 80373 80374 80375 80376 80379 80380 80381 80382 80383
80384 80385 80386 80389 80390 80391 80392 80393 80394 80395
80396 80399 80410 80411 80412 80413 80414 80415 80416 80419
80420 80421 80422 80423 80424 80425 80426 80429 80430 80431
80432 80433 80434 80435 80436 80439 80440 80441 80442 80443
80444 80445 80446 80449 80460 80461 80462 80463 80464 80465
80466 80469 80470 80471 80472 80473 80474 80475 80476 80479
80480 80481 80482 80483 80484 80485 80486 80489 80490 80491
80492 80493 80494 80495 80496 80499 85100 85101 85102 85103
85104 85105 85106 85109 85110 85111 85112 85113 85114 85115
85116 85119 85120 85121 85122 85123 85124 85125 85126 85129
85130 85131 85132 85133 85134 85135 85136 85139 85140 85141
85142 85143 85144 85145 85146 85149 85150 85151 85152 85153
85154 85155 85156 85159 85160 85161 85162 85163 85164 85165
85166 85169 85170 85171 85172 85173 85174 85175 85176 85179
85180 85181 85182 85183 85184 85185 85186 85189 85190 85191

85192 85193 85194 85195 85196 85199 85200 85201 85202 85203
85204 85205 85206 85209 85210 85211 85212 85213 85214 85215
85216 85219 85220 85221 85222 85223 85224 85225 85226 85229
85230 85231 85232 85233 85234 85235 85236 85239 85240 85241
85242 85243 85244 85245 85246 85249 85250 85251 85252 85253
85254 85255 85256 85259 85300 85301 85302 85303 85304 85305
85306 85309 85310 85311 85312 85313 85314 85315 85316 85319
85400 85401 85402 85403 85404 85405 85406 85409 85410 85411
85412 85413 85414 85415 85416 85419 9070

16.5   Crushing injury or internal injury [234.]   -

8600 8601 8602 8603 8604 8605 86100 86101 86102 86103
86110 86111 86112 86113 86120 86121 86122 86130 86131 86132
8620 8621 86221 86222 86229 86231 86232 86239 8628 8629
8630 8631 86320 86321 86329 86330 86331 86339 86340 86341
86342 86343 86344 86345 86346 86349 86350 86351 86352 86353
86354 86355 86356 86359 86380 86381 86382 86383 86384 86385
86389 86390 86391 86392 86393 86394 86395 86399 86400 86401
86402 86403 86404 86405 86409 86410 86411 86412 86413 86414
86415 86419 86500 86501 86502 86503 86504 86509 86510 86511
86512 86513 86514 86519 86600 86601 86602 86603 86610 86611
86612 86613 8670 8671 8672 8673 8674 8675 8676 8677
8678 8679 86800 86801 86802 86803 86804 86809 86810 86811
86812 86813 86814 86819 8690 8691 90000 90001 90002 90003
9001 90081 90082 90089 9009 9010 9011 9012 9013 90140
90141 90142 90181 90182 90183 90189 9019 9020 90210 90211
90219 90220 90221 90222 90223 90224 90225 90226 90227 90229
90231 90232 90233 90234 90239 90240 90241 90242 90249 90250
90251 90252 90253 90254 90255 90256 90259 90281 90282 90287
90289 9029 90300 90301 90302 9031 9032 9033 9034 9035
9038 9039 9040 9041 9042 9043 90440 90441 90442 90450
90451 90452 90453 90454 9046 9047 9048 9049 9064 9080
9081 9082 9083 9084 925 9251 9252 9260 92611 92612
92619 9268 9269 92700 92701 92702 92703 92709 92710 92711
92720 92721 9273 9278 9279 92800 92801 92810 92811 92820
92821 9283 9288 9289 9290 9299

16.6   Open wounds   235 236

16.6.1   Open wounds of head; neck; and trunk [235.]   -

8700 8701 8702 8703 8704 8708 8709 8710 8711 8712
8713 8714 8715 8716 8717 8719 87200 87201 87202 87210
87211 87212 87261 87262 87263 87264 87269 87271 87272 87273

87274 87279 8728 8729 8730 8731 87320 87321 87322 87323
87329 87330 87331 87332 87333 87339 87340 87341 87342 87343
87344 87349 87350 87351 87352 87353 87354 87359 87360 87361
87362 87363 87364 87365 87369 87370 87371 87372 87373 87374
87375 87379 8738 8739 87400 87401 87402 87410 87411 87412
8742 8743 8744 8745 8748 8749 8750 8751 8760 8761
8770 8771 8780 8781 8782 8783 8784 8785 8786 8787
8788 8789 8790 8791 8792 8793 8794 8795 8796 8797
8798 8799 9060

16.6.2 Open wounds of extremities [236.] -

88000 88001 88002 88003 88009 88010 88011 88012 88013 88019
88020 88021 88022 88023 88029 88100 88101 88102 88110 88111
88112 88120 88121 88122 8820 8821 8822 8830 8831 8832
8840 8841 8842 8850 8851 8860 8861 8870 8871 8872
8873 8874 8875 8876 8877 8900 8901 8902 8910 8911
8912 8920 8921 8922 8930 8931 8932 8940 8941 8942
8950 8951 8960 8961 8962 8963 8970 8971 8972 8973
8974 8975 8976 8977 9058 9059 9061

16.7   Sprains and strains [232.] -

8400 8401 8402 8403 8404 8405 8406 8407 8408 8409
8410 8411 8412 8413 8418 8419 84200 84201 84202 84209
84210 84211 84212 84213 84219 8430 8431 8438 8439 8440
8441 8442 8443 8448 8449 84500 84501 84502 84503 84509
84510 84511 84512 84513 84519 8460 8461 8462 8463 8468
8469 8470 8471 8472 8473 8474 8479 8480 8481 8482
8483 84840 84841 84842 84849 8485 8488 8489 9057

16.8   Superficial injury; contusion [239.] -

9062 9063 9100 9101 9102 9103 9104 9105 9106 9107
9108 9109 9110 9111 9112 9113 9114 9115 9116 9117
9118 9119 9120 9121 9122 9123 9124 9125 9126 9127
9128 9129 9130 9131 9132 9133 9134 9135 9136 9137
9138 9139 9140 9141 9142 9143 9144 9145 9146 9147
9148 9149 9150 9151 9152 9153 9154 9155 9156 9157
9158 9159 9160 9161 9162 9163 9164 9165 9166 9167
9168 9169 9170 9171 9172 9173 9174 9175 9176 9177
9178 9179 9180 9181 9182 9189 9190 9191 9192 9193
9194 9195 9196 9197 9198 9199 920 9210 9211 9212
9213 9219 9220 9221 9222 9223 92231 92232 92233 9224
9228 9229 92300 92301 92302 92303 92309 92310 92311 92320
92321 9233 9238 9239 92400 92401 92410 92411 92420 92421

9243 9244 9245 9248 9249

16.9   Burns [240.]   -

9065 9066 9067 9068 9069 9400 9401 9402 9403 9404
9405 9409 94100 94101 94102 94103 94104 94105 94106 94107
94108 94109 94110 94111 94112 94113 94114 94115 94116 94117
94118 94119 94120 94121 94122 94123 94124 94125 94126 94127
94128 94129 94130 94131 94132 94133 94134 94135 94136 94137
94138 94139 94140 94141 94142 94143 94144 94145 94146 94147
94148 94149 94150 94151 94152 94153 94154 94155 94156 94157
94158 94159 94200 94201 94202 94203 94204 94205 94209 94210
94211 94212 94213 94214 94215 94219 94220 94221 94222 94223
94224 94225 94229 94230 94231 94232 94233 94234 94235 94239
94240 94241 94242 94243 94244 94245 94249 94250 94251 94252
94253 94254 94255 94259 94300 94301 94302 94303 94304 94305
94306 94309 94310 94311 94312 94313 94314 94315 94316 94319
94320 94321 94322 94323 94324 94325 94326 94329 94330 94331
94332 94333 94334 94335 94336 94339 94340 94341 94342 94343
94344 94345 94346 94349 94350 94351 94352 94353 94354 94355
94356 94359 94400 94401 94402 94403 94404 94405 94406 94407
94408 94410 94411 94412 94413 94414 94415 94416 94417 94418
94420 94421 94422 94423 94424 94425 94426 94427 94428 94430
94431 94432 94433 94434 94435 94436 94437 94438 94440 94441
94442 94443 94444 94445 94446 94447 94448 94450 94451 94452
94453 94454 94455 94456 94457 94458 94500 94501 94502 94503
94504 94505 94506 94509 94510 94511 94512 94513 94514 94515
94516 94519 94520 94521 94522 94523 94524 94525 94526 94529
94530 94531 94532 94533 94534 94535 94536 94539 94540 94541
94542 94543 94544 94545 94546 94549 94550 94551 94552 94553
94554 94555 94556 94559 9460 9461 9462 9463 9464 9465
9470 9471 9472 9473 9474 9478 9479 94800 94810 94811
94820 94821 94822 94830 94831 94832 94833 94840 94841 94842
94843 94844 94850 94851 94852 94853 94854 94855 94860 94861
94862 94863 94864 94865 94866 94870 94871 94872 94873 94874
94875 94876 94877 94880 94881 94882 94883 94884 94885 94886
94887 94888 94890 94891 94892 94893 94894 94895 94896 94897
94898 94899 9490 9491 9492 9493 9494 9495

16.10   Complications   237 238

16.10.1 Complication of device; implant or graft [237.]   -

41403 41405

16.10.1.1 Malfunction of device; implant; and graft -

41402 41404 41407 44030 44031 44032 56960 56961 56969 59682
59683 99600 99601 99602 99603 99604 99609 9961 9962 99630
99631 99632 99639 9964 99640 99641 99642 99643 99644 99645
99646 99647 99649 99651 99652 99653 99654 99655 99656 99657
99659

16.10.1.2 Infection and inflammation--internal prosthetic device; implant; and graft -

9966 99660 99661 99662 99663 99664 99665 99666 99667 99668
99669 99931 99932 99933

16.10.1.3 Other complications of internal prosthetic device; implant; and graft -

62931 62932 9967 99670 99671 99672 99673 99674 99675 99676
99677 99678 99679

16.10.1.4 Complications of transplants and reattached limbs -

27950 27951 27952 27953 99680 99681 99682 99683 99684 99685
99686 99687 99688 99689 99690 99691 99692 99693 99694 99695
99696 99699

16.10.2   Complications of surgical procedures or medical care [238.] -

99524 99831 99832 V1553 V1580 V1583 V9001 V9009

16.10.2.1 Cardiac complications -

4294 45821 45829 9971

16.10.2.2 Respiratory complications -

5187 9973 99731 99732 99739

16.10.2.3 Gastrointestinal complications -

53901 53909 53981 53989 5642 5643 5644 5696 56971 56979
5793 9974 99741 99749

16.10.2.4 Urinary complications -

59681 9975

16.10.2.5 Hemorrhage or hematoma complicating a procedure -

9981 99811 99812 99813

16.10.2.6 Postoperative infection -

51901 53086 53641 99762 9985 99851 99859 9993

16.10.2.7 Other complications of surgical and medical procedures -

27661 27783 27788 2853 28741 3490 3491 34931 41511 4582
5121 5122 5190 51900 51902 51909 53087 53640 53642 53649
56962 78062 78063 78066 9093 9954 99586 9970 99700 99701
99702 99709 9972 99760 99761 99769 99771 99772 99779 9979
99791 99799 9980 99800 99801 99802 99809 9982 9983 99830
99833 9984 9986 9987 9988 99881 99882 99883 99889 9989
9990 9991 9992 99934 99939 9994 99941 99942 99949 9995
99951 99952 99959 9996 99960 99961 99962 99963 99969 9997
99970 99971 99972 99973 99974 99975 99976 99977 99978 99979
9998 99980 99981 99982 99983 99984 99985 99988 99989 9999

16.11   Poisoning   241 242 243

16.11.1   Poisoning by psychotropic agents [241.] -

9690 96900 96901 96902 96903 96904 96905 96909 9691 9692
9693 9694 9695 9696 9697 96970 96971 96972 96973 96979
9698 9699

16.11.2   Poisoning by other medications and drugs [242.] -

52801 52802 9090 9095 9600 9601 9602 9603 9604 9605
9606 9607 9608 9609 9610 9611 9612 9613 9614 9615
9616 9617 9618 9619 9620 9621 9622 9623 9624 9625
9626 9627 9628 9629 9630 9631 9632 9633 9634 9635
9638 9639 9640 9641 9642 9643 9644 9645 9646 9647
9648 9649 9651 9654 9655 9656 96561 96569 9657 9658
9659 9660 9661 9662 9663 9664 9670 9671 9672 9673
9674 9675 9676 9678 9679 9680 9681 9682 9683 9684
9685 9686 9687 9689 9700 9701 9708 97081 97089 9709
9710 9711 9712 9713 9719 9720 9721 9722 9723 9724
9725 9726 9727 9728 9729 9730 9731 9732 9733 9734
9735 9736 9738 9739 9740 9741 9742 9743 9744 9745
9746 9747 9750 9751 9752 9753 9754 9755 9756 9757
9758 9760 9761 9762 9763 9764 9765 9766 9767 9768
9769 9770 9771 9772 9773 9774 9778 9779 9780 9781

9782 9783 9784 9785 9786 9788 9789 9790 9791 9792
9793 9794 9795 9796 9797 9799 9952 99520 99521 99522
99523 99527 99529

16.11.3   Poisoning by nonmedicinal substances [243.]   -

9091 9801 9802 9803 9808 9809 981 9820 9821 9822
9823 9824 9828 9830 9831 9832 9839 9840 9841 9848
9849 9850 9851 9852 9853 9854 9855 9856 9858 9859
986 9870 9871 9872 9873 9874 9875 9876 9877 9878
9879 9880 9881 9882 9888 9889 9890 9891 9892 9893
9894 9895 9896 9897 9898 98981 98982 98983 98984 98989
9899

16.12   Other injuries and conditions due to external causes [244.]   -

7960 7990 79901 79902 9071 9073 9074 9075 9079 9085
9086 9089 9092 9094 9099 9300 9301 9302 9308 9309
931 932 9330 9331 9340 9341 9348 9349 9350 9351
9352 936 937 938 9390 9391 9392 9393 9399 9500
9501 9502 9503 9509 9510 9511 9512 9513 9514 9515
9516 9517 9518 9519 9530 9531 9532 9533 9534 9535
9538 9539 9540 9541 9548 9549 9550 9551 9552 9553
9554 9555 9556 9557 9558 9559 9560 9561 9562 9563
9564 9565 9568 9569 9570 9571 9578 9579 9580 9581
9582 9583 9584 9585 9586 9587 9588 95890 95891 95892
95893 95899 9590 95901 95909 9591 95911 95912 95913 95914
95919 9592 9593 9594 9595 9596 9597 9598 9599 990
9910 9911 9912 9913 9914 9915 9916 9918 9919 9920
9921 9922 9923 9924 9925 9926 9927 9928 9929 9930
9931 9932 9933 9934 9938 9939 9940 9941 9942 9943
9944 9945 9946 9947 9948 9949 9955 99550 99551 99552
99553 99554 99555 99559 99580 99581 99582 99583 99584 99585
99589 99590 99593 99594 V155 V1551 V1559 V156 V1588 V713
V714 V716 V9010 V9011 V9012 V902 V9031 V9032 V9033 V9039
V9081 V9083 V9089 V909

17   Symptoms; signs; and ill-defined conditions and factors influencing health status   245
246 247 248 249 250 251 252 253 254 255 256 257 258

17.1   Symptoms; signs; and ill-defined conditions   245 246 247 248
249 250 251 252 253

17.1.1   Syncope [245.]   -

7802

17.1.2   Fever of unknown origin [246.]   -

7806 78060 78061

17.1.3   Lymphadenitis [247.]   -

2891 2892 2893 683 7856

17.1.4   Gangrene [248.]   -

44024 7854

17.1.5   Shock [249.]   -

78550 78551 78552 78559

17.1.6   Nausea and vomiting [250.]   -

7870 78701 78702 78703 78704

17.1.7   Abdominal pain [251.]   -

7890 78900 78901 78902 78903 78904 78905 78906 78907 78909
78960 78961 78962 78963 78964 78965 78966 78967 78969

17.1.8   Malaise and fatigue [252.]   -

7807 78071 78079

17.1.9   Allergic reactions [253.]   -

4771 5186 5583 6910 6918 6920 6921 6922 6923 6924
6925 6926 69270 69271 69272 69273 69274 69279 69281 69282
69283 69284 69289 6929 6930 6931 6938 6939 7080 7081
7082 7083 7084 7085 7088 7089 9950 9953 99560 99561
99562 99563 99564 99565 99566 99567 99568 99569 9957 V071
V1381 V140 V141 V142 V143 V144 V145 V146 V147 V148
V149 V150 V1501 V1502 V1503 V1504 V1505 V1506 V1507 V1508
V1509 V727

17.2   Factors influencing health care   254 255 256 257 258

17.2.1   Rehabilitation care; fitting of prostheses; and adjustment of devices [254.]   -

V520 V521 V524 V528 V529 V538 V570 V571 V572 V5721
V5722 V573 V574 V5781 V5789 V579 V5882

17.2.2   Administrative/social admission [255.]   -

V200 V201 V202 V2031 V2032 V600 V601 V602 V603 V604
V605 V606 V608 V6081 V6089 V609 V610 V6101 V6102 V6103
V6104 V6105 V6106 V6107 V6108 V6109 V611 V6110 V6111 V6112
V6120 V6121 V6122 V6123 V6124 V6125 V6129 V613 V6141 V6142
V6149 V615 V616 V617 V618 V619 V620 V621 V622 V6221
V6222 V6229 V623 V624 V625 V626 V6281 V6282 V6283 V6289
V629 V630 V631 V632 V638 V639 V650 V651 V6511 V6519
V652 V653 V654 V6540 V6541 V6543 V6544 V6545 V6549 V655
V658 V659 V680 V681 V682 V6881 V6889 V689

17.2.3   Medical examination/evaluation [256.]   -

V290 V291 V292 V293 V298 V299 V6801 V6809 V700 V703
V704 V705 V706 V707 V708 V709 V718 V719 V7231 V7232
V725 V726 V7260 V7261 V7262 V7263 V7269 V728 V7281 V7282
V7283 V7284 V7285 V7286 V729

17.2.4   Other aftercare [257.]   -

V51 V510 V518 V539 V5390 V5399 V548 V5481 V5482 V5489
V549 V558 V559 V583 V5830 V5831 V5832 V584 V5841 V5842
V5843 V5844 V5849 V5861 V5862 V5863 V5864 V5865 V5866 V5867
V5868 V5869 V5871 V5872 V5873 V5874 V5875 V5876 V5877 V5878
V588 V5881 V5883 V5889 V589 V660 V665 V666 V667 V669
V670 V6700 V6701 V6709 V6751 V6759 V676 V679

17.2.5   Other screening for suspected conditions (not mental disorders or infectious disease) -

7929 79500 79507 79508 79518 7954 79677 79678 V280 V281
V282 V283 V284 V285 V288 V2881 V2882 V2889 V289 V715
V7181 V7189 V7240 V7241 V760 V761 V7610 V7611 V7612 V7619
V762 V763 V7641 V7642 V7643 V7644 V7645 V7646 V7647 V7649
V7650 V7651 V7652 V768 V7681 V7689 V769 V770 V771 V772
V773 V774 V775 V776 V777 V778 V779 V7791 V7799 V780
V781 V782 V783 V788 V789 V800 V8001 V8009 V801 V802
V803 V810 V811 V812 V813 V814 V815 V816 V820 V821
V822 V823 V824 V825 V826 V8271 V8279 V828 V8281 V8289
V829

18   Residual codes; unclassified; all E codes [259. and 260.]   -

3020 32700 32701 32709 32710 32711 32712 32713 32714 32719
32720 32721 32722 32723 32724 32725 32726 32727 32729 32740
32741 32742 32743 32744 32749 32751 32759 3278 78002 7801
78050 78051 78052 78053 78054 78055 78056 78057 78058 78059
78064 78065 7809 78093 78094 78095 78096 78097 78099 7815
7816 7823 78261 78262 7828 7829 7830 7836 7842 7901
7906 7909 79091 79092 79093 79094 79095 79099 7932 7939
79399 7949 79581 79582 79589 7963 7964 7965 7966 7969
7980 7981 7982 7989 7992 79921 79922 79923 79924 79925
79929 7993 7998 79981 79982 79989 7999 E0000 E0001 E0002
E0008 E0009 E0010 E0011 E0020 E0021 E0022 E0023 E0024 E0025
E0026 E0027 E0028 E0029 E0030 E0031 E0032 E0033 E0039 E0040
E0041 E0042 E0043 E0044 E0049 E0050 E0051 E0052 E0053 E0054
E0059 E0060 E0061 E0062 E0063 E0064 E0065 E0066 E0069 E0070
E0071 E0072 E0073 E0074 E0075 E0076 E0077 E0078 E0079 E0080
E0081 E0082 E0083 E0084 E0089 E0090 E0091 E0092 E0093 E0094
E0095 E0099 E0100 E0101 E0102 E0103 E0109 E0110 E0111 E0119
E0120 E0121 E0122 E0129 E0130 E0131 E0132 E0133 E0134 E0135
E0138 E0139 E0140 E0141 E0149 E0150 E0151 E0152 E0159 E0160
E0161 E0162 E0169 E0170 E0179 E0180 E0181 E0182 E0183 E0190
E0191 E0192 E0199 E0290 E0291 E0292 E0299 E030 E8000 E8001
E8002 E8003 E8008 E8009 E8010 E8011 E8012 E8013 E8018 E8019
E8020 E8021 E8022 E8023 E8028 E8029 E8030 E8031 E8032 E8033
E8038 E8039 E8040 E8041 E8042 E8043 E8048 E8049 E8050 E8051
E8052 E8053 E8058 E8059 E8060 E8061 E8062 E8063 E8068 E8069
E8070 E8071 E8072 E8073 E8078 E8079 E8100 E8101 E8102 E8103
E8104 E8105 E8106 E8107 E8108 E8109 E8110 E8111 E8112 E8113
E8114 E8115 E8116 E8117 E8118 E8119 E8120 E8121 E8122 E8123
E8124 E8125 E8126 E8127 E8128 E8129 E8130 E8131 E8132 E8133
E8134 E8135 E8136 E8137 E8138 E8139 E8140 E8141 E8142 E8143
E8144 E8145 E8146 E8147 E8148 E8149 E8150 E8151 E8152 E8153
E8154 E8155 E8156 E8157 E8158 E8159 E8160 E8161 E8162 E8163
E8164 E8165 E8166 E8167 E8168 E8169 E8170 E8171 E8172 E8173
E8174 E8175 E8176 E8177 E8178 E8179 E8180 E8181 E8182 E8183
E8184 E8185 E8186 E8187 E8188 E8189 E8190 E8191 E8192 E8193
E8194 E8195 E8196 E8197 E8198 E8199 E8200 E8201 E8202 E8203
E8204 E8205 E8206 E8207 E8208 E8209 E8210 E8211 E8212 E8213
E8214 E8215 E8216 E8217 E8218 E8219 E8220 E8221 E8222 E8223
E8224 E8225 E8226 E8227 E8228 E8229 E8230 E8231 E8232 E8233
E8234 E8235 E8236 E8237 E8238 E8239 E8240 E8241 E8242 E8243
E8244 E8245 E8246 E8247 E8248 E8249 E8250 E8251 E8252 E8253
E8254 E8255 E8256 E8257 E8258 E8259 E8260 E8261 E8262 E8263
E8264 E8268 E8269 E8270 E8272 E8273 E8274 E8278 E8279 E8280
E8282 E8284 E8288 E8289 E8290 E8294 E8298 E8299 E8300 E8301

E8302 E8303 E8304 E8305 E8306 E8307 E8308 E8309 E8310 E8311
E8312 E8313 E8314 E8315 E8316 E8317 E8318 E8319 E8320 E8321
E8322 E8323 E8324 E8325 E8326 E8327 E8328 E8329 E8330 E8331
E8332 E8333 E8334 E8335 E8336 E8337 E8338 E8339 E8340 E8341
E8342 E8343 E8344 E8345 E8346 E8347 E8348 E8349 E8350 E8351
E8352 E8353 E8354 E8355 E8356 E8357 E8358 E8359 E8360 E8361
E8362 E8363 E8364 E8365 E8366 E8367 E8368 E8369 E8370 E8371
E8372 E8373 E8374 E8375 E8376 E8377 E8378 E8379 E8380 E8381
E8382 E8383 E8384 E8385 E8386 E8387 E8388 E8389 E8400 E8401
E8402 E8403 E8404 E8405 E8406 E8407 E8408 E8409 E8410 E8411
E8412 E8413 E8414 E8415 E8416 E8417 E8418 E8419 E8426 E8427
E8428 E8429 E8430 E8431 E8432 E8433 E8434 E8435 E8436 E8437
E8438 E8439 E8440 E8441 E8442 E8443 E8444 E8445 E8446 E8447
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