

ORIGINAL RESEARCH

# Sodium-Glucose Cotransporter-2 Inhibitor Prevents Stroke in Patients With Diabetes and Atrial Fibrillation

Sheng-Nan Chang, MD, MSc, PhD; Jien-Jiun Chen , MD; Pang-Shuo Huang , MD; Cho-Kai Wu, MD, PhD; Yi-Chih Wang , MD, PhD; Juey-Jen Hwang , MD, PhD; Chia-Ti Tsai , MD, PhD

**BACKGROUND:** Atrial fibrillation (AF) is associated with increasing risk of thromboembolic or ischemic stroke. The CHA<sub>2</sub>DS<sub>2</sub>-VASc score is a well-established predictor of AF stroke. Patients with AF have an increased risk of stroke if they have diabetes. Use of sodium-glucose cotransporter-2 inhibitor (SGLT2i) has been shown to be associated with favorable cardiovascular outcomes in patients with diabetes. It was unknown whether use of SGLT2i decreased stroke risk in patients with AF who have diabetes.

**METHODS AND RESULTS:** A total of 9116 patients with AF and diabetes from the National Taiwan University historical cohort were longitudinally followed up for 5 years (January 2016–December 2020). The risk of stroke related to SGLT2i use was evaluated by Cox model, adjusting CHA<sub>2</sub>DS<sub>2</sub>-VASc score in the propensity score–matched population with 474 SGLT2i users and 3235 nonusers. Adverse thromboembolic end points during follow-up were defined as ischemic stroke. The mean age was 73.2±10.5 years, and 61% of patients were men. There were no significant differences of baseline characteristics between users and nonusers of SGLT2i, including CHA<sub>2</sub>DS<sub>2</sub>-VASc score in the propensity score–matched population. The stroke rate was 3.4% (95% CI, 2.8–4.2) patient-years in SGLT2i users and 4.3% (95% CI, 4.0–4.6) in nonusers ( $P=0.021$ ). SGLT2i users had a 20% reduction of stroke (hazard ratio, 0.80 [95% CI, 0.64–0.99];  $P=0.043$ ) after adjustment for the CHA<sub>2</sub>DS<sub>2</sub>-VASc score.

**CONCLUSIONS:** Use of SGLT2i was associated with a lower stroke risk in patients with diabetes and AF, and it may be considered to escalate SGLT2i to the first-line treatment in patients with diabetes and AF.

**Key Words:** atrial fibrillation ■ diabetes ■ oral hypoglycemic agent ■ sodium-glucose cotransporter-2 inhibitor ■ stroke ■ thromboembolism

**A**trial fibrillation (AF) is the most common cardiac arrhythmia worldwide.<sup>1</sup> Clinically, AF is associated with increasing risk of ischemic stroke, heart failure, hospitalization, and mortality.<sup>2</sup> Hence, it is critical to modify AF risks and prevent its complications. Currently, the CHADS<sub>2</sub>VASc score has been used for evaluating the risk of embolic stroke in patients with AF.<sup>2</sup> Among the parameters of the CHADS<sub>2</sub>VASc score, diabetes is significantly

associated with AF occurrence and increasing stroke risk around 2-fold.<sup>3</sup> It might be attributable to insulin resistance and hyperglycemia status of the patients with diabetes, which engenders inflammation, neuro-hormonal imbalance, disturbance of reactive oxygen species generation, expansion of epicardial adipose, myocardial remodeling, cardiac fibrosis, atrial structural alteration, and the change of the atrial electrical properties.<sup>1,4,5</sup>

Correspondence to: Chia-Ti Tsai, MD, PhD, Division of Cardiology, Department of Internal Medicine, National Taiwan University College of Medicine and Hospital, No. 7, Chung-Shan South Road, Taipei 100, Taiwan. Email: [cttsai1999@gmail.com](mailto:cttsai1999@gmail.com); [cttsai@ntuh.gov.tw](mailto:cttsai@ntuh.gov.tw)

This article was sent to Kathryn A. Wood, RN, PhD, Guest Editor, for review by expert referees, editorial decision, and final disposition.

Supplemental Material is available at <https://www.ahajournals.org/doi/suppl/10.1161/JAHA.122.027764>

For Sources of Funding and Disclosures, see page 8.

© 2023 The Authors. Published on behalf of the American Heart Association, Inc., by Wiley. This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

JAHA is available at: [www.ahajournals.org/journal/jaha](http://www.ahajournals.org/journal/jaha)

## CLINICAL PERSPECTIVE

### What Is New?

- This study was the first to investigate the relationship between use of sodium-glucose cotransporter-2 inhibitor and embolic events among patients with atrial fibrillation and diabetes.

### What Are the Clinical Implications?

- The results of our study indicated that sodium-glucose cotransporter-2 inhibitor reduced the risk of ischemic stroke in patients with atrial fibrillation and diabetes, and sodium-glucose cotransporter-2 inhibitor might be considered as first-line treatment for those patients.
- Second, we did not study the effects of sodium-glucose cotransporter-2 inhibitor on stroke outcomes of different stroke subtypes because of limitation on data availability of integrated database.

## Nonstandard Abbreviations and Acronyms

<b>NTUH</b>	National Taiwan University Hospital
<b>SGLT2i</b>	sodium-glucose cotransporter-2 inhibitor

Sodium glucose cotransporter-2 inhibitor (SGLT2i) is a new class of antihyperglycemic drug. It selectively inhibits transporters, found exclusively in the proximal convoluted tubule of the kidneys, thereby preventing sodium and glucose reabsorption, increases urinary glucose excretion, and decreases blood glucose levels. Several trials, including the EMPA-REG OUTCOME,<sup>6</sup> CANVAS,<sup>7</sup> DECLARE-TIMI 58,<sup>8</sup> CREDENCE,<sup>9</sup> DAPA-HF,<sup>10</sup> and EMPEROR-Reduced trials,<sup>11</sup> have demonstrated various cardiovascular benefits of SGLT2i on patients with diabetes.

From the animal studies, SGLT2i could decrease oxidative stress in cardiomyocytes, reverse myocardial remodeling, and reduce electronic alterations.<sup>5</sup> These pleiotropic effects of SGLT2i are theoretically beneficial for decreasing AF occurrence and subsequently sequelae. However, none of these studies were particularly designed to evaluate the direct effects of SGLT2i on AF. Whether SGLT2i could decrease the risk of stroke or systemic embolization in patients with diabetes and AF remains unknown. Thus, we hypothesize SGLT2i could prevent AF-related events among patients with diabetes and clarify this point of view by the present study.

## METHODS

The authors declare that all supporting data are available within the article (and its online supplementary files).

### Study Population

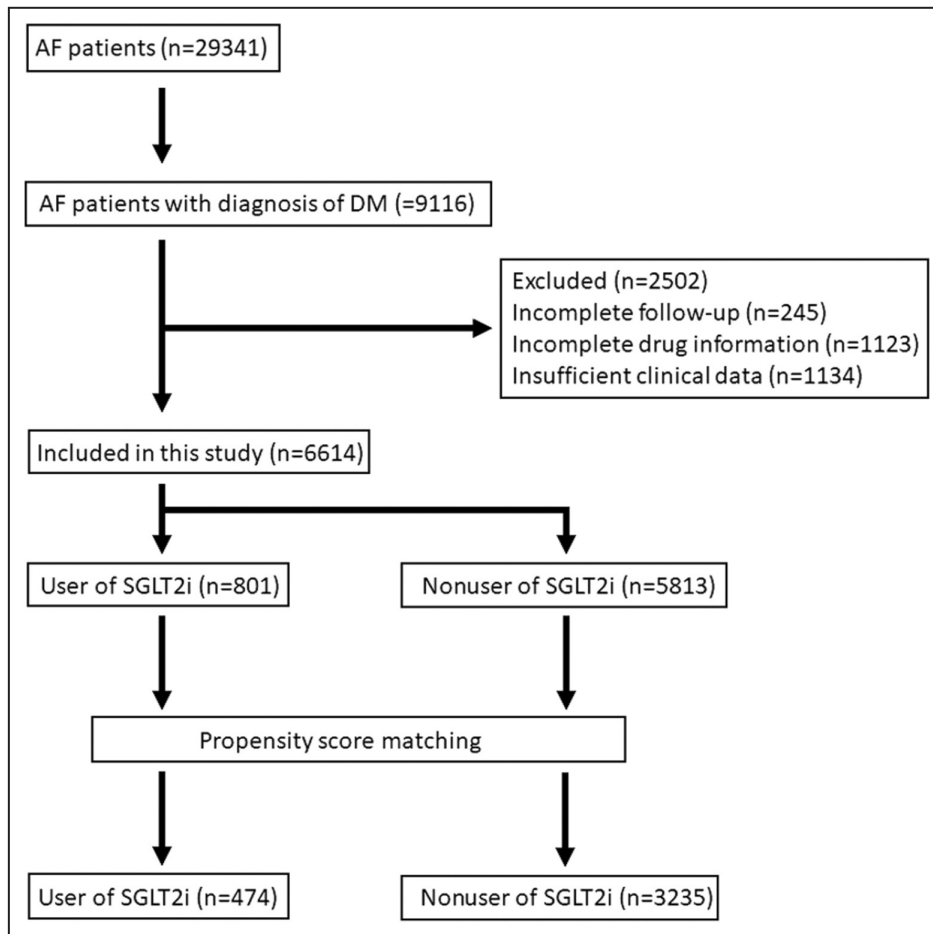
This was a historical longitudinal follow-up cohort study using medical data collected from National Taiwan University Hospital (NTUH) Integrative Medical Database.<sup>12,13</sup> The NTUH Integrative Medical Database is maintained by the NTUH and contains all records of inpatient, outpatient, and emergency department visits to the NTUH since 2006. The Research Ethics Committee of the NTUH approved the study (200911002R and 202011019RINC). It waived the need for informed consent because of the historical nature of the database study and no patient-identifying data. All patients with persistent or paroxysmal AF were enrolled in this registry. The diagnosis of AF was determined by taking the patient's history, serial ECG, or ambulatory ECG monitoring.

A total of 29341 patients with AF were recruited since January 2010. Our central hypothesis in this study was that use of SGLT2i could decrease the risk of ischemic stroke in patients with AF and diabetes. Therefore, among the 29341 patients with AF, a total of 9116 patients with AF with a concomitant diagnosis of diabetes were selected and followed up since January 2016, when SGLT2i was introduced into the Taiwan market, until the first occurrence of ischemic stroke or until December 2020. After exclusion of patients with incomplete clinical data, follow-up, and drug information, 6614 patients were included in the analyses (Figure 1). Diabetes was diagnosed by fasting glucose >125 mg/dL and hemoglobin A1c >6.5% or under oral hypoglycemic agent or insulin use.

We selected patients with a concomitant diagnosis of diabetes also at the baseline time point to serve as our study population (n=9116). We did not have the medical information before the baseline time point and, therefore, we did not have the information on how near the diagnoses of AF and diabetes were made.

### Clinical and Outcome Assessments

All the baseline characteristics were collected as previously described.<sup>14–16</sup> The medical diagnoses of hypertension (blood pressure consistently >140/90 mmHg or treated with hypertension medication), heart failure (admission for congestive heart failure), and vascular disease (peripheral arterial disease, coronary artery disease, and myocardial infarction) were according to current practice guidelines to ensure medical insurance payment and were defined in the present study based on *International Classification of Diseases (ICD)*



**Figure 1. Consort diagram.**

Flowchart of the patients assessed in this study. AF indicates atrial fibrillation; DM, diabetes; and SGLT2i, sodium-glucose cotransporter-2 inhibitor.

codes. The ICD codes of these diagnoses are provided in [Table S1](#).

The CHA<sub>2</sub>DS<sub>2</sub>-VASc scores were calculated and recorded as measures of stroke risk. The CHA<sub>2</sub>DS<sub>2</sub>-VASc score is based on a point system in which 2 points are assigned for a history of stroke and age >75 years, and 1 point is assigned for presence of hypertension, diabetes, congestive heart failure, and vascular diseases or female sex.<sup>17</sup> We categorized the patients into 2 groups (CHA<sub>2</sub>DS<sub>2</sub>-VASc score ≤2 and >2), because CHA<sub>2</sub>DS<sub>2</sub>-VASc score ≤2 is associated with a lower risk of stroke.<sup>18–20</sup> As mentioned previously, we started to follow up the patients since January 2016 because SGLT2i was introduced to our Taiwan market in 2016. We calculated the CHA<sub>2</sub>DS<sub>2</sub>-VASc score at the start of the follow-up (January 2016).

The dose for empagliflozin was 25 mg once per day, and the dose for dapagliflozin was 10 mg once per day. Standard therapeutic doses were also given for other diabetes medications. Because we considered a class effect, we lumped diabetes medications of the same class into 1 group. For use of insulin, patients with use

of regular insulin, basal insulin, or both were all considered insulin users. As mentioned, all the patients with AF with a concomitant diagnosis of diabetes were enrolled in January 2010, and we started to follow up the patients since January 2016 because SGLT2i was introduced to our Taiwan market in 2016. Therefore, the timing from the diagnosis of diabetes to initiation of SGLT2i was at least 5 years.

Adverse thromboembolic end points during follow-up were defined as incident episodes of ischemic stroke. Ischemic stroke was defined as sudden-onset and focal or global neurological deficits that were not explained by other origins, with supporting evidence from imaging studies. Hemorrhagic stroke was excluded from the study because it was generally a complication of use of anticoagulant and not related to AF per se.

### Statistical Analysis

Propensity score matching was performed with the nearest neighbor matching method and a caliper of 0.2 SD of the logit of the estimated propensity score

to balance the baseline characteristics. The maximum matched control number was 7 for each treatment unit, producing a population of 472 patients with SGLT2i treatment and 3743 without SGLT2i treatment. Propensity scores were calculated by the logistic regression model, with the treatment of SGLT2i as the dependent variable and the following well-established risk factors and potential confounders of estimating AF-related stroke as the independent covariates: age, sex, hypertension, diabetes, coronary artery disease, peripheral artery occlusive disease, congestive heart failure, and history of stroke.<sup>21–23</sup>

Continuous variables are presented as means±SDs, and categorical variables are presented as percentages. The comparison of data was performed by using the  $\chi^2$  test (categorical variables) or the Student *t*-test (continuous variables). The time to first episode of stroke event was depicted with the Kaplan-Meier estimate of the survival function. The difference between the survival curves was tested by the log-rank statistics. The independent effect of variables to predict thromboembolic events was calculated using a Cox proportional hazards regression model. We used the scaled *Schoenfeld residuals* to evaluate the proportional hazard assumption. Hazard ratios (HRs) and 95% CIs were calculated accordingly.

To account for the correlation between matched individuals in the propensity score–matched population, the robust variance estimator was used to calculate the SE in the Cox regression. We also performed stratified analysis. The matched cases and controls were divided into 4 strata; and in each stratum, the propensity scores of cases were similar with those of controls. The average HR across the 4 strata was calculated to estimate the average treatment effect.  $P < 0.05$  was considered statistically significant. Statistical analysis was performed using STATA version 17 for Windows (STATA, Inc, College Station, TX).

## RESULTS

### Baseline Characteristics

Baseline characteristics of study patients with ( $n=801$ ) or without ( $n=5813$ ) the use of SGLT2i are summarized in Table 1. We hypothesized that this was a class effect, and we lumped use of empagliflozin and dapagliflozin together. There were no patients taking canagliflozin during the follow-up period because it was late in the Taiwan market. Therefore, we did not include the use of canagliflozin in our study.

The mean age was younger in the SGLT2i group. The percentages of patients with congestive heart failure and vascular disease were higher in the SGLT2i group. The mean CHADS<sub>2</sub>-VASC score was also lower in the SGLT2i group. To avoid the confounding effect

**Table 1. Baseline Characteristics of Patients With Diabetes and AF in the Original Study Population**

Variable	SGLT2i nonusers	SGLT2i users	P value
	(N=5813)	(N=801)	
Age, y	72.4±11.0	67.5±10.5	<0.0001
<65	1364/5813 (23.46)	300/801 (37.45)	<0.0001
65–75	1720/5813 (29.59)	290/801 (36.20)	
≥75	2729/5813 (46.94)	211/801 (26.34)	
Female sex	2152/5813 (37.02)	281/801 (35.08)	0.286
History of stroke	997/5813 (17.15)	129/801 (16.10)	0.460
CHF	1619/5813 (27.85)	332/801 (41.45)	<0.0001
Hypertension	4362/5813 (75.04)	621/801 (77.53)	0.125
Vascular	2382/5813 (41.00)	469/801 (58.55)	<0.0001
CAD	1999/5813 (34.39)	404/801 (50.44)	<0.0001
PAOD	383/5813 (6.59)	65/801 (8.11)	0.107
CHA <sub>2</sub> DS <sub>2</sub> -VASC score	3.41±1.81	3.13±1.78	<0.0001

Data are given as mean±SD or number/total (percentage). AF indicates atrial fibrillation; CAD, coronary artery disease; CHF, congestive heart failure; PAOD, peripheral arterial occlusion disease; and SGLT2i, sodium-glucose cotransporter-2 inhibitor.

of these comorbidities, we also created a propensity score–matched population with 474 SGLT2i users and 3235 nonusers, and the baseline characteristics of these patients are summarized in Table 2.

### CHA<sub>2</sub>DS<sub>2</sub>-VASC Score as a Predictor of Incident Stroke Events

At the end of the follow-up, 809 patients with AF and diabetes developed ischemic stroke in the propensity score–matched population. The stroke rate was 3.4% (95% CI, 2.8–4.2) patient-years in SGLT2i users and 4.3% (95% CI, 4.0–4.6) in nonusers ( $P=0.021$ ). We first investigated whether CHADS<sub>2</sub>-VASC score was associated with risk of stroke in the propensity score–matched population.<sup>24,25</sup> As expected, CHADS<sub>2</sub>-VASC score was incrementally associated with the risk of stroke. Using the univariate Cox model, we found that there was a 24% increase of risk of stroke with a 1-point increase of CHADS<sub>2</sub>-VASC score in this long-term follow-up cohort (HR, 1.24 [95% CI, 1.20–1.29];  $P < 0.001$ ).

The event-free survival from stroke comparing patients with different levels of CHADS<sub>2</sub>-VASC score is shown in Figure 2. Patients with a higher CHADS<sub>2</sub>-VASC score were more likely to develop ischemic stroke than those with a lower CHADS<sub>2</sub>-VASC score (log-rank  $P < 0.001$ ).

### Use of SGLT2i Was Associated With a Lower Risk of Stroke

In the present study, our central hypothesis was to investigate whether the risk of ischemic stroke was decreased in those patients with AF taking SGLT2i independent of the CHADS<sub>2</sub>-VASC score. In the original



**Table 2. Baseline Characteristics of Patients With Diabetes and AF in the Propensity Score–Matched Population**

Variable	SGLT2i nonusers	SGLT2i users	P value
	(N=3235)	(N=474)	
Age, y	73.6±10.2	72.9±11.4	0.200
<65	711/3235 (21.98)	97/474 (20.46)	0.585
65–75	1029/3235 (31.81)	161/474 (33.97)	
≥75	1495/3235 (46.21)	216/474 (45.57)	
Female sex	1288/3235 (39.81)	182/474 (38.4)	0.556
History of stroke	763/3235 (23.59)	106/474 (22.36)	0.557
CHF	1270/3235 (39.3)	190/474 (40.08)	0.790
Hypertension	2393/3235 (73.97)	357/474 (75.32)	0.532
Vascular	1323/3235 (40.9)	212/474 (44.73)	0.114
CAD	1098/3235 (33.94)	179/474 (37.76)	0.102
PAOD	225/3235 (6.96)	33/474 (6.96)	0.996
CHA <sub>2</sub> DS <sub>2</sub> -VAsC score	3.44±1.91	3.35±1.83	0.350

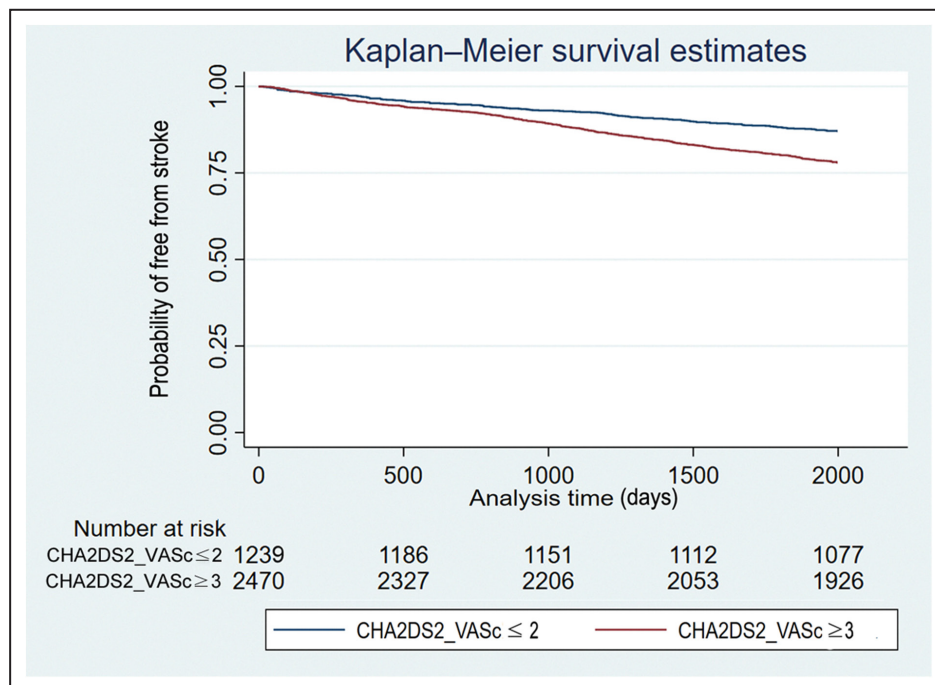
Data are given as mean±SD or number/total (percentage). AF indicates atrial fibrillation; CAD, coronary artery disease; CHF, congestive heart failure; PAOD, peripheral arterial occlusion disease; and SGLT2i, sodium-glucose cotransporter-2 inhibitor.

study population, we found that use of SGLT2i was associated with a lower risk of stroke. Using the univariable Cox model, there was a 17% decrease in stroke risk (HR, 0.83 [95% CI, 0.70–0.98];  $P=0.030$ ). The event-free survival from stroke comparing patients with or without use of SGLT2i is shown in Figure 3.

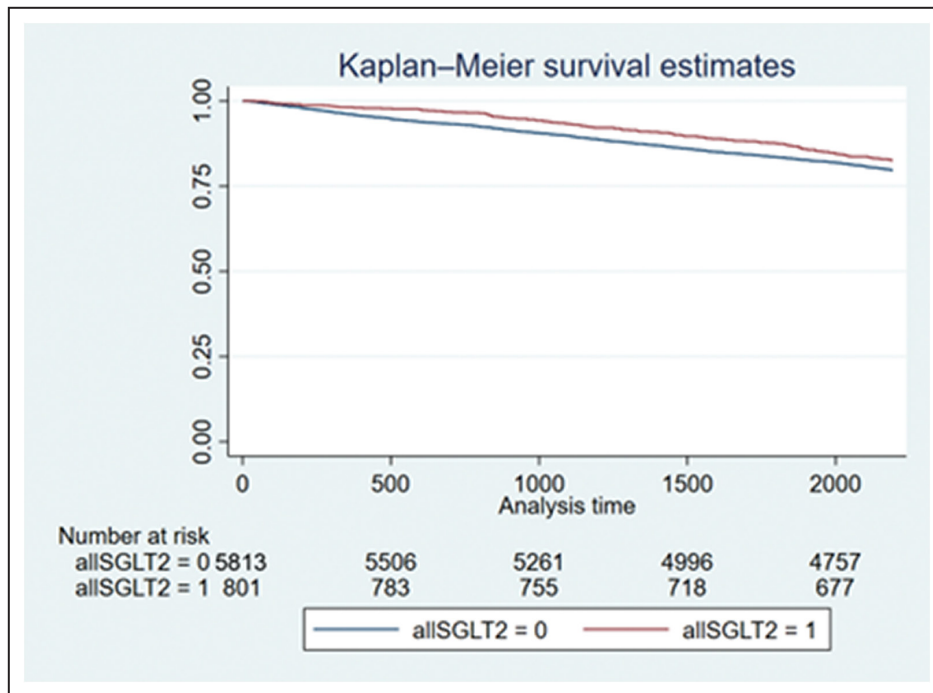
Patients with use of SGLT2i were less likely to develop ischemic stroke than those not taking SGLT2i (log-rank  $P=0.030$ ). After adjusting for the CHA<sub>2</sub>DS<sub>2</sub>-VAsC score using the multivariable Cox model, there was a trend that use of SGLT2i was associated with a lower risk of stroke (HR, 0.86 [95% CI, 0.73–1.03];  $P=0.094$ ).

Because the baseline characteristics and the mean CHA<sub>2</sub>DS<sub>2</sub>-VAsC score were significantly different between the SGLT2i users and nonusers, it is possible that the association of SGLT2i use with a lower risk was confounded by the CHA<sub>2</sub>DS<sub>2</sub>-VAsC score. Therefore, the association of SGLT2i use with a lower stroke risk was also evaluated in the propensity score–matched population. Using the univariable Cox model, there was a 23% decrease in stroke risk (HR, 0.77 [95% CI, 0.62–0.96];  $P=0.023$ ). The event-free survival from stroke comparing patients with or without use of SGLT2i is shown in Figure 4. Patients with use of SGLT2i were less likely to develop ischemic stroke than those not taking SGLT2i (log-rank  $P=0.025$ ).

After adjusting for the CHA<sub>2</sub>DS<sub>2</sub>-VAsC score using the multivariable Cox model, use of SGLT2i was still associated with a 20% decrease of risk of stroke (HR, 0.80 [95% CI, 0.64–0.99];  $P=0.043$ ). We used the scaled Schoenfeld residuals to evaluate the proportional hazard assumption. The  $P$  values for CHA<sub>2</sub>DS<sub>2</sub>-VAsC score and SGLT2i use were 0.108 and 0.170, respectively. The  $P$  value for the global model was 0.107. These results indicated no violation of the proportional



**Figure 2. Kaplan-Meier curves showing the development of ischemic stroke among patients with different levels of CHA<sub>2</sub>DS<sub>2</sub>-VAsC score in the propensity score–matched population.** The log-rank analysis showed a significant difference ( $P<0.001$ ).



**Figure 3.** Kaplan-Meier curves showing the development of ischemic stroke among patients with and without use of SGLT2 inhibitor in the original study population. The log-rank analysis showed significant difference ( $P=0.030$ ). SGLT2 indicates sodium-glucose cotransporter-2.

hazard assumption. We also performed stratified analysis based on the propensity scores. There was a 21% decrease in risk of stroke in patients with use of SGLT2i. The average HR across the 4 propensity score strata was 0.79 (95% CI, 0.63–0.98;  $P=0.035$ ).

## DISCUSSION

### Main Findings of This Study

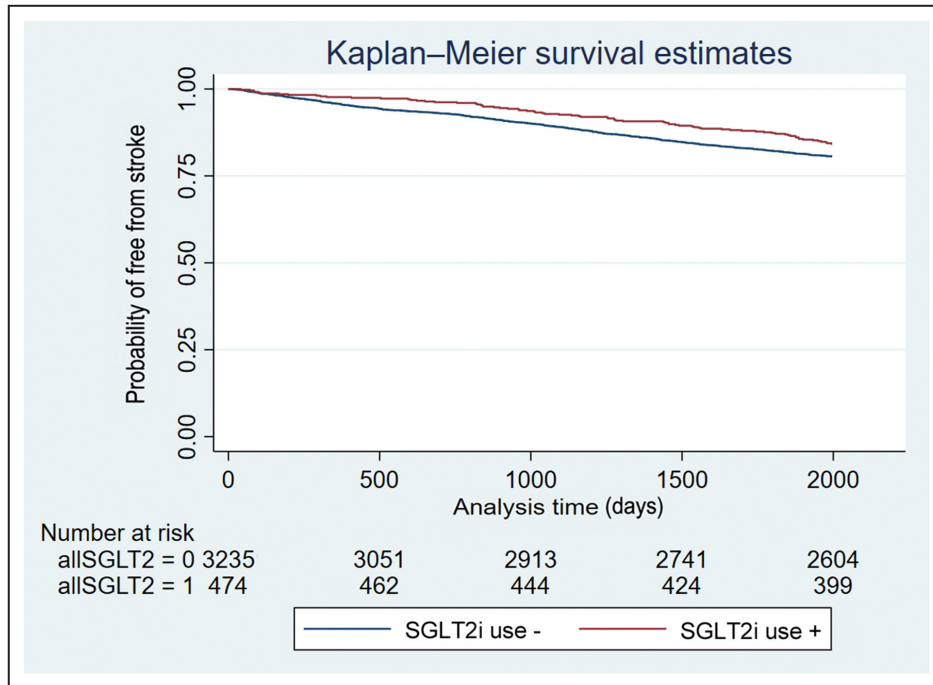
This was the first and largest study specifically aiming to investigate the relationship between SGLT2i and embolic events among patients with diabetes and AF. Our results showed that SGLT2i decreased the risk of ischemic stroke after adjustment of CHA<sub>2</sub>DS<sub>2</sub>-VASC score. Therefore, we recommended to upgrade SGLT2i for glycemic control in clinical practice, especially for the patients with diabetes and AF.

### Diabetes and Thrombogenic Burden

Diabetes is associated with a 40% higher risk of AF occurrence in the general population.<sup>1</sup> For patients with AF, diabetes is also an independent risk factor of the ischemic events.<sup>1</sup> Thrombotic events and their complications have become the leading cause of death in patients with diabetes.<sup>26</sup> Because diabetes is closely accompanied with various metabolic

abnormalities (elevated blood pressure, hyperglycemia, hyperinsulinemia, increased triglyceride, and reduced high-density lipoprotein),<sup>1,27,28</sup> it is widely accepted that the pathogenesis of thrombosis among patients with diabetes is multifactorial.<sup>28</sup> These metabolic impairments related to diabetes often induce vascular damage.<sup>29</sup> As for the thrombosis formation, vascular endothelium injury is the early stage, followed by coagulation cascade alternation.<sup>30</sup> For the coagulation abnormality induced by diabetes, inflammation, hyperreactive platelets (overexpressed P-selectin), upregulation of prothrombotic factors (von Willebrand factor, fibrinogen, tissue factor, and clotting factor VII), and suppression of fibrinolysis (decreased antithrombin-III and increased plasminogen activator inhibitor-1 levels) have been noted to be mediated by the presence of insulin resistance and hyperglycemia.<sup>27,28,31–34</sup>

What is even more, diabetes also impairs nitric oxide synthase activity and enhances the production of reactive oxygen species, thus resulting in diminished nitrogen oxide bioavailability.<sup>30</sup> All of these increase thrombotic events and deteriorate the clinical condition of the patients with diabetes and AF.<sup>30</sup> In consideration of diabetes, AF, and ischemic events all together, it is urgent to evaluate the pleiotropic effects of hypoglycemic agents for the thrombosis prevention as well as glycemic control. That was the reason why we



**Figure 4.** Kaplan-Meier curves showing the development of ischemic stroke among patients with and without use of SGLT2i in the propensity score-matched population.

The log-rank analysis showed significant difference ( $P=0.025$ ). SGLT2i indicates sodium-glucose cotransporter-2 inhibitor.

evaluated the antithrombotic effects of SGLT2i in the present study.

### Why Is SGLT2i Able to Prevent Embolic Events in Patients With Diabetes and AF?

Our data indicated that SGLT2i was beneficial for reducing ischemic stroke in patients with diabetes and AF. There were many exploratory studies about SGLT2i and its pleiotropic effects. From the literature review, SGLT2i has been noted to have favorable effects on improving blood pressure, body weight, albuminuria, lipid profile, arterial stiffness, and endothelial dysfunction via insulin-independent mechanisms. These specific characteristics of SGLT2i seem to be capable of reducing both AF occurrence and thrombosis formation and, hence, preventing the embolic events.

Previous studies have defined a proof-of-concept and a mechanistic link between SGLT2i and changes of AF occurrence. The post hoc analysis of the DECLARE-TIMI 58 trial confirmed that dapagliflozin (one kind of the SGLT2i) was superior to placebo in reducing AF incidence of patients with diabetes irrespective of baseline AF (HR, 0.81 [95% CI, 0.68–0.95]).<sup>35</sup> In another word, dapagliflozin reduced the risk of AF by 19% among patients with diabetes in comparison with placebo.<sup>35</sup> There are several potential mechanisms whereby SGLT2i reduces the incidence of AF. First, SGLT2i can prevent

glucotoxicity in the heart, improve mitochondrial function, and alleviate atrial remodeling.<sup>36</sup> Second, SGLT2i reduces epicardial adipose tissue and fat mass and thus spares the atrium from proinflammatory signals driving remodeling and fibrosis.<sup>36</sup> Third, SGLT2i is effective to relieve filling pressure by the peculiar diuretic effect and preload reduction.<sup>3</sup> Finally, SGLT2i can reduce sympathetic nervous system activation and counteract AF triggers by modulating cardiomyocyte Na-H exchange and mitochondrial function.<sup>37,38</sup>

As for the assumption of the SGLT2i to reduce thrombotic burden, it is still under debate. SGLT2i has been supposed to be related to reducing blood pressure and increasing hemoconcentration that might amplify the risk of thrombosis formation.<sup>3</sup> However, the study focused on the association of SGLT2i and plasminogen activator inhibitor-1 showed totally different results. Empagliflozin (another kind of SGLT2i) reduced the plasma plasminogen activator inhibitor-1 concentration through its synergistic actions of a glucose-lowering effect, visceral fat area loss, and restoring the adipokine balance.<sup>39</sup> Another meta-analysis study, including 29 randomized control trials and 56 035 patients with diabetes, found that the incidence of the venous thromboembolism (eg, deep vein thrombosis and pulmonary embolism) was not significantly different between SGLT2i and control group (relative risk [RR], 0.98 [95% CI, 0.75–1.28]).<sup>40</sup>

What are the underlying mechanisms of SGLT2i to prevent thrombosis formation? Previously, studies have suggested a link between an active inflammatory process in the heart, especially at left atrial appendages, and thrombosis formation in patients with AF.<sup>41,42</sup> From the animal studies, therapy with the SGLT2i ibragliflozin not only improved hyperglycemia, hyperlipidemia, hepatic steatosis, and oxidative stress but also various parameters of inflammation in mice with diabetes.<sup>8</sup> The SGLT2i dapagliflozin also ameliorated glucose homeostasis and decreased markers of inflammation in mice with diabetes.<sup>43</sup> Moreover, studies in experimental models of atherosclerosis have shown that various SGLT2i agents (eg, luseogliflozin, dapagliflozin, and empagliflozin) ameliorated the progression of atherosclerosis by reducing oxidative stress, mitigating vascular inflammation, and preventing platelet activation.<sup>43,44</sup> Therefore, possible mechanisms of SGLT2i for reducing thrombosis formation were supposed to reduce inflammation in patients with AF.<sup>5,45</sup>

Despite these studies, there has been no study examining the direct effect of SGLT2i on patients with diabetes and AF. Therefore, whether SGLT2i decreases the risk of embolic stroke of AF remains unclear. To the best of our knowledge, this was the first and largest observational study to evaluate the preventive effects of SGLT2i of patients with diabetes and AF in the real-world practice. In the present study, we clearly demonstrated SGLT2i was beneficial in reducing the risk of embolic stroke for patients with diabetes and AF. This effect was consistently significant after adjustment of CHA<sub>2</sub>DS<sub>2</sub>-VASc score.

In the current practice, SGLT2i has been recommended as a second- or third-line agent following metformin or sulphonylurea.<sup>5</sup> In this study, we first demonstrated the protective effect of SGLT2i in patients with AF was superior to sulphonylurea or insulin. Accordingly, we suggested the place of SGLT2i in glucose-lowering therapy algorithm should be upgraded in patients with both diabetes and AF. SGLT2i should be used before sulphonylurea therapy for the concerns of primary prevention of embolic stroke in patients with diabetes if they also have AF.

## Limitations

There were limitations in the present study. First, this was not a randomized study. However, it may not be feasible to do a randomized study at the current stage because SGLT2i was not primarily used for stroke prevention. The results of our observational study may justify future randomized clinical trials for this purpose. Second, it would be better to study the effects of SGLT2i on stroke outcomes of different stroke subtypes in this study. Third, we only selected individuals with drug use throughout the follow-up period without

change of medication. We did not have the information of the effect of change in medication during the study follow-up. Finally, we did not provide the real evidence on why SGLT2i could prevent AF-related stroke.

## CONCLUSIONS

In the present study, we explored the role of SGLT2i in preventing thromboembolic events for the patients with diabetes and AF. To sum up, our data were the first to reveal SGLT2i was associated with a lower risk of embolic stroke in comparison with other hypoglycemic therapy. In addition, SGLT2i provided greater protection against the development of thromboembolic complications than would be expected from its effects on glycemic control alone. As patients with diabetes are vulnerable for cardiac arrhythmia and embolic stroke, oral hypoglycemic agents with additional pleiotropic effects on thromboembolic prevention are more suitable for them in clinical use. Our results provided a new direction for the role of SGLT2i in the therapeutic strategy of diabetes.

## ARTICLE INFORMATION

Received January 23, 2023; accepted April 25, 2023.

### Affiliations

Division of Cardiology, Department of Internal Medicine, National Taiwan University Hospital Yun-Lin Branch, Yun-Lin, Taiwan (S-N.C., J-J.C., P-S.H.); Division of Cardiology, Department of Internal Medicine (C-K.W., Y-C.W., J-J.H., C-T.T.), and Cardiovascular Center (C-K.W., Y-C.W., J-J.H., C-T.T.), National Taiwan University Hospital, Taipei, Taiwan.

### Acknowledgments

We immensely thank the National Taiwan University Hospital Integrative Medical Database facility staff and the support of the National Science and Technology Council. Author contributions: Regarding the contribution of each author, Dr Chang collected the data and worked on the drafting of the manuscript. Drs Chen, Huang, and Wu provided cases and worked for data analysis and data interpretation. Drs Wang and Hwang critically reviewed the manuscript for important intellectual content. Dr Tsai designed the whole study and oversaw the whole program. All authors have read and agreed to the published version of the manuscript.

### Sources of Funding

This work was supported by the grants from Ministry of Science and Technology (National Science and Technology Council) (109-2314-B-002-244-MY3 and 110-2314-B-002-201-MY2).

### Disclosures

None.

### Supplemental Material

Table S1

## REFERENCES

- Ling AW, Chan CC, Chen SW, Kao YW, Huang CY, Chan YH, Chu PH. The risk of new-onset atrial fibrillation in patients with type 2 diabetes mellitus treated with sodium glucose cotransporter 2 inhibitors versus dipeptidyl peptidase-4 inhibitors. *Cardiovasc Diabetol*. 2020;19:188. doi: 10.1186/s12933-020-01162-w
- Böhm M, Slawik J, Brueckmann M, Mattheus M, George JT, Ofstad AP, Inzucchi SE, Fitchett D, Anker SD, Marx N, et al. Efficacy of



- empagliflozin on heart failure and renal outcomes in patients with atrial fibrillation: data from the EMPA-REG OUTCOME trial. *Eur J Heart Fail*. 2020;22:126–135. doi: 10.1002/ehfj.1663
3. Haloot J, Krokro L, Badin A. Effect of SGLT2 inhibitors on patients with atrial fibrillation. *J Atr Fibrillation*. 2021;14:20200502. doi: 10.4022/jafib.20200502
  4. Iyngkaran P, Thomas MC, Neil C, Jelinek M, Cooper M, Horowitz JD, Hare DL, Kaye DM. The heart failure with preserved ejection fraction conundrum-redefining the problem and finding common ground? *Curr Heart Fail Rep*. 2020;17:34–42. doi: 10.1007/s11897-020-00454-2
  5. Li D, Liu Y, Hidru TH, Yang X, Wang Y, Chen C, Li KHC, Tang Y, Wei Y, Tse G, et al. Protective effects of sodium-glucose transporter 2 inhibitors on atrial fibrillation and atrial flutter: a systematic review and meta-analysis of randomized placebo-controlled trials. *Front Endocrinol (Lausanne)*. 2021;12:619586. doi: 10.3389/fendo.2021.619586
  6. Fitchett D, Inzucchi SE, Cannon CP, McGuire DK, Scirica BM, Johansen OE, Sambeviski S, Kaspers S, Pfarr E, George JT, et al. Empagliflozin reduced mortality and hospitalization for heart failure across the spectrum of cardiovascular risk in the EMPA-REG OUTCOME trial. *Circulation*. 2019;139:1384–1395. doi: 10.1161/circulationaha.118.037778
  7. Neal B, Perkovic V, Mahaffey KW, de Zeeuw D, Fulcher G, Erondu N, Shaw W, Law G, Desai M, Matthews DR. Canagliflozin and cardiovascular and renal events in type 2 diabetes. *N Engl J Med*. 2017;377:644–657. doi: 10.1056/NEJMoa1611925
  8. Wiviott SD, Raz I, Bonaca MP, Mosenzon O, Kato ET, Cahn A, Silverman MG, Zelniker TA, Kuder JF, Murphy SA, et al. Dapagliflozin and cardiovascular outcomes in type 2 diabetes. *N Engl J Med*. 2019;380:347–357. doi: 10.1056/NEJMoa1812389
  9. Perkovic V, Jardine MJ, Neal B, Bompoint S, Heerspink HJL, Charytan DM, Edwards R, Agarwal R, Bakris G, Bull S, et al. Canagliflozin and renal outcomes in type 2 diabetes and nephropathy. *N Engl J Med*. 2019;380:2295–2306. doi: 10.1056/NEJMoa1811744
  10. Shah AM, Cikes M, Prasad N, Li G, Getchevski S, Claggett B, Rizkala A, Lukashevich I, O'Meara E, Ryan JJ, et al. Echocardiographic features of patients with heart failure and preserved left ventricular ejection fraction. *J Am Coll Cardiol*. 2019;74:2858–2873. doi: 10.1016/j.jacc.2019.09.063
  11. Packer M, Anker SD, Butler J, Filippatos G, Pocock SJ, Carson P, Januzzi J, Verma S, Tsutsui H, Brueckmann M, et al. Cardiovascular and renal outcomes with empagliflozin in heart failure. *N Engl J Med*. 2020;383:1413–1424. doi: 10.1056/NEJMoa2022190
  12. Chen WC, Hsiao MY, Wang TG. Prognostic factors of functional outcome in post-acute stroke in the rehabilitation unit. *J Formos Med Assoc*. 2022;121:670–678. doi: 10.1016/j.jfma.2021.07.009
  13. Hsu CN, Huang K, Lin FJ, Ou HT, Huang LY, Kuo HC, Wang CC, Toh S. Continuity and completeness of electronic health record data for patients treated with oral hypoglycemic agents: findings from healthcare delivery systems in Taiwan. *Front Pharmacol*. 2022;13:845949. doi: 10.3389/fphar.2022.845949
  14. Tsai CT, Lai LP, Lin JL, Chiang FT, Hwang JJ, Ritchie MD, Moore JH, Hsu KL, Tseng CD, Liao CS, et al. Renin-angiotensin system gene polymorphisms and atrial fibrillation. *Circulation*. 2004;109:1640–1646. doi: 10.1161/01.Cir.0000124487.36586.26
  15. Tsai CT, Hsieh CS, Chang SN, Chuang EY, Ueng KC, Tsai CF, Lin TH, Wu CK, Lee JK, Lin LY, et al. Genome-wide screening identifies a KCNIP1 copy number variant as a genetic predictor for atrial fibrillation. *Nat Commun*. 2016;7:10190. doi: 10.1038/ncomms10190
  16. Chang SN, Lai LP, Chiang FT, Lin JL, Hwang JJ, Tsai CT. C-reactive protein gene polymorphism predicts the risk of thromboembolic stroke in patients with atrial fibrillation: a more than 10-year prospective follow-up study. *J Thromb Haemost*. 2017;15:1541–1546. doi: 10.1111/jth.13735
  17. Lip GY, Nieuwlaar R, Pisters R, Lane DA, Crijns HJ. Refining clinical risk stratification for predicting stroke and thromboembolism in atrial fibrillation using a novel risk factor-based approach: the Euro Heart Survey on Atrial Fibrillation. *Chest*. 2010;137:263–272. doi: 10.1378/chest.09-1584
  18. Chiang CE, Wu TJ, Ueng KC, Chao TF, Chang KC, Wang CC, Lin YJ, Yin WH, Kuo JY, Lin WS, et al. 2016 guidelines of the Taiwan Heart Rhythm Society and the Taiwan Society of Cardiology for the management of atrial fibrillation. *J Formos Med Assoc*. 2016;115:893–952. doi: 10.1016/j.jfma.2016.10.005
  19. Tomasdotir M, Friberg L, Hijazi Z, Lindbäck J, Oldgren J. Risk of ischemic stroke and utility of CHA(2)DS(2)-VASc score in women and men with atrial fibrillation. *Clin Cardiol*. 2019;42:1003–1009. doi: 10.1002/clc.23257
  20. Chen LY, Norby FL, Chamberlain AM, MacLehose RF, Bengtson LGS, Lutsey PL, Alonso A. CHA(2)DS(2)-VASc score and stroke prediction in atrial fibrillation in whites, blacks, and Hispanics. *Stroke*. 2019;50:28–33. doi: 10.1161/strokeaha.118.021453
  21. Sulzgruber P, Wassmann S, Semb AG, Doehner W, Widimsky P, Gremmel T, Kaski JC, Savarese G, Rosano GMC, Borghi C, et al. Oral anticoagulation in patients with non-valvular atrial fibrillation and a CHA2DS2-VASc score of 1: a current opinion of the European Society of Cardiology Working Group on cardiovascular pharmacotherapy and European Society of Cardiology Council on stroke. *Eur Heart J Cardiovasc Pharmacother*. 2019;5:171–180. doi: 10.1093/ehjcvp/pvz016
  22. Joundi RA, Cipriano LE, Sposato LA, Saposnik G. Ischemic stroke risk in patients with atrial fibrillation and CHA2DS2-VASc score of 1: systematic review and meta-analysis. *Stroke*. 2016;47:1364–1367. doi: 10.1161/strokeaha.115.012609
  23. Aamodt AH, Sandset PM, Atar D, Tveit A, Russell D. Atrial fibrillation and stroke. *Tidsskr nor Laegeforen*. 2013;133:1453–1457. doi: 10.4045/tidsskr.12.0850
  24. Nagarajrao HS, Penman AD, Taylor HA, Mosley TH, Butler K, Skelton TN, Samdarshi TE, Aru G, Fox ER. The predictive value of left atrial size for incident ischemic stroke and all-cause mortality in African Americans: the atherosclerosis risk in communities (ARIC) study. *Stroke*. 2008;39:2701–2706. doi: 10.1161/strokeaha.108.515221
  25. Bouzas-Mosquera A, Broullón FJ, Álvarez-García N, Méndez E, Peteiro J, Gándara-Sambade T, Prada O, Mosquera VX, Castro-Beiras A. Left atrial size and risk for all-cause mortality and ischemic stroke. *CMAJ*. 2011;183:E657–E664. doi: 10.1503/cmaj.091688
  26. Xin G, Wei Z, Ji C, Zheng H, Gu J, Ma L, Huang W, Morris-Natschke SL, Yeh JL, Zhang R, et al. Metformin uniquely prevents thrombosis by inhibiting platelet activation and mtDNA release. *Sci Rep*. 2016;6:36222. doi: 10.1038/srep36222
  27. Grant PJ. Beneficial effects of metformin on haemostasis and vascular function in man. *Diabetes Metab*. 2003;29:6S44–6S52. doi: 10.1016/s1262-3636(03)72787-6
  28. Markowicz-Plasecka M, Sadkowska A, Huttunen KM, Podsiedlik M, Mikiciuk-Olasik E, Sikora J. An investigation into the pleiotropic activity of metformin. A glimpse of haemostasis. *Eur J Pharmacol*. 2020;872:172984. doi: 10.1016/j.ejphar.2020.172984
  29. Colwell JA. Pathophysiology of vascular disease in diabetes: effects of gliclazide. *Am J Med*. 1991;90:50s–54s. doi: 10.1016/0002-9343(91)90418-w
  30. Lu DY, Huang CC, Huang PH, Chung CM, Lin SJ, Chen JW, Chan WL, Leu HB. Metformin use in patients with type 2 diabetes mellitus is associated with reduced risk of deep vein thrombosis: a non-randomized, pair-matched cohort study. *BMC Cardiovasc Disord*. 2014;14:187. doi: 10.1186/1471-2261-14-187
  31. Hess K, Grant PJ. Inflammation and thrombosis in diabetes. *Thromb Haemost*. 2011;105(suppl 1):S43–S54. doi: 10.1160/th10-11-0739
  32. Bodary PF, Vargas FB, King SA, Jongeward KL, Wickenheiser KJ, Eitzman DT. Pioglitazone protects against thrombosis in a mouse model of obesity and insulin resistance. *J Thromb Haemost*. 2005;3:2149–2153. doi: 10.1111/j.1538-7836.2005.01551.x
  33. Lim HS, Chong AY, Freestone B, Blann AD, Lip GY. The effect of multi-factorial intervention on plasma von Willebrand factor, soluble E-selectin and tissue factor in diabetes mellitus: implications for atherosclerotic vascular disease. *Diabet Med*. 2005;22:249–255. doi: 10.1111/j.1464-5491.2004.01388.x
  34. Perriello G, Pampanelli S, Brunetti P, di Pietro C, Mariz S. Long-term effects of pioglitazone versus gliclazide on hepatic and humoral coagulation factors in patients with type 2 diabetes. *Diab Vasc Dis Res*. 2007;4:226–230. doi: 10.3132/dvdr.2007.044
  35. Zelniker TA, Bonaca MP, Furtado RHM, Mosenzon O, Kuder JF, Murphy SA, Bhatt DL, Leiter LA, McGuire DK, Wilding JPH, et al. Effect of dapagliflozin on atrial fibrillation in patients with type 2 diabetes mellitus: insights from the DECLARE-TIMI 58 trial. *Circulation*. 2020;141:1227–1234. doi: 10.1161/circulationaha.119.044183
  36. Shao Q, Meng L, Lee S, Tse G, Gong M, Zhang Z, Zhao J, Zhao Y, Li G, Liu T. Empagliflozin, a sodium glucose co-transporter-2 inhibitor, alleviates atrial remodeling and improves mitochondrial function in high-fat diet/streptozotocin-induced diabetic rats. *Cardiovasc Diabetol*. 2019;18:165. doi: 10.1186/s12933-019-0964-4
  37. Peng X, Li L, Zhang M, Zhao Q, Wu K, Bai R, Ruan Y, Liu N. Sodium-glucose cotransporter 2 inhibitors potentially prevent atrial fibrillation by

- ameliorating ion handling and mitochondrial dysfunction. *Front Physiol.* 2020;11:912. doi: [10.3389/fphys.2020.00912](https://doi.org/10.3389/fphys.2020.00912)
38. Sharma A, Verma S. Mechanisms by which glucagon-like-peptide-1 receptor agonists and sodium-glucose cotransporter-2 inhibitors reduce cardiovascular risk in adults with type 2 diabetes mellitus. *Can J Diabetes.* 2020;44:93–102. doi: [10.1016/j.cjcd.2019.09.003](https://doi.org/10.1016/j.cjcd.2019.09.003)
  39. Sakurai S, Jojima T, Iijima T, Tomaru T, Usui I, Aso Y. Empagliflozin decreases the plasma concentration of plasminogen activator inhibitor-1 (PAI-1) in patients with type 2 diabetes: association with improvement of fibrinolysis. *J Diabetes Complicat.* 2020;34:107703. doi: [10.1016/j.jdiacomp.2020.107703](https://doi.org/10.1016/j.jdiacomp.2020.107703)
  40. Wang A, Yang K, Wang T, Zhang N, Tang H, Feng X. Effects of sodium-glucose cotransporter 2 inhibitors on risk of venous thromboembolism in patients with type 2 diabetes: a systematic review and meta-analysis. *Diabetes Metab Res Rev.* 2020;36:e3174. doi: [10.1002/dmrr.3174](https://doi.org/10.1002/dmrr.3174)
  41. Hohmann C, Pfister R, Mollenhauer M, Adler C, Kozlowski J, Wodarz A, Drebber U, Wippermann J, Michels G. Inflammatory cell infiltration in left atrial appendageal tissues of patients with atrial fibrillation and sinus rhythm. *Sci Rep.* 2020;10:1685. doi: [10.1038/s41598-020-58797-8](https://doi.org/10.1038/s41598-020-58797-8)
  42. H. Deng SLW, Xue YM, Zhan XZ. Inflammation was involved in the thrombosis of left atrium in patients with atrial fibrillation. *Eur Heart J.* 2013;34:5640.
  43. Steven S, Frenis K, Oelze M, Kalinovic S, Kuntic M, Bayo Jimenez MT, Vujacic-Mirski K, Helmstädter J, Kröller-Schön S, Münzel T, et al. Vascular inflammation and oxidative stress: major triggers for cardiovascular disease. *Oxid Med Cell Longev.* 2019;2019:7092151. doi: [10.1155/2019/7092151](https://doi.org/10.1155/2019/7092151)
  44. Liu Z, Ma X, Ilyas I, Zheng X, Luo S, Little PJ, Kamato D, Sahebkar A, Wu W, Weng J, et al. Impact of sodium glucose cotransporter 2 (SGLT2) inhibitors on atherosclerosis: from pharmacology to pre-clinical and clinical therapeutics. *Theranostics.* 2021;11:4502–4515. doi: [10.7150/thno.54498](https://doi.org/10.7150/thno.54498)
  45. Lopaschuk GD, Verma S. Mechanisms of cardiovascular benefits of sodium glucose co-transporter 2 (SGLT2) inhibitors: a state-of-the-art review. *JACC Basic Transl Sci.* 2020;5:632–644. doi: [10.1016/j.jacbts.2020.02.004](https://doi.org/10.1016/j.jacbts.2020.02.004)

# **SUPPLEMENTAL MATERIAL**

**Table S1. Diagnoses ICD Codes.**

1. Hypertension	ICD-9	ICD-9-CM Diagnosis Labeling	ICD-10	ICD-10-PCS Diagnosis Labeling
	437.2	Hypertensive encephalopathy	I67.4	Hypertensive encephalopathy
	401.0	Malignant essential hypertension	I10	Essential (primary) hypertension
	401.1	Benign essential hypertension	I10	Essential (primary) hypertension
	401.9	Essential hypertension, unspecified	I10	Essential (primary) hypertension
	402.00	Malignant hypertensive heart disease without congestive heart failure	I11.9	Hypertensive heart disease without heart failure
	402.01	Malignant hypertensive heart disease with congestive heart failure	I11.0	Hypertensive heart disease with heart failure
	402.10	Benign hypertensive heart disease without congestive heart failure	I11.9	Hypertensive heart disease without heart failure
	402.11	Benign hypertensive heart disease with congestive heart failure	I11.0	Hypertensive heart disease with heart failure
	402.90	Unspecified hypertensive heart disease without congestive heart failure	I11.9	Hypertensive heart disease without heart failure
	402.91	Unspecified hypertensive heart disease with congestive heart failure	I11.0	Hypertensive heart disease with heart failure
	403.00	Malignant hypertensive renal disease without mention of renal failure	I12.9	Hypertensive chronic kidney disease with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	403.01	Malignant hypertensive renal disease with renal failure	I12.0	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease
	403.10	Benign hypertensive renal disease without mention of renal failure	I12.9	Hypertensive chronic kidney disease with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	403.11	Benign hypertensive renal disease with renal failure	I12.0	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease
	403.90	Unspecified hypertensive renal disease without mention of renal failure	I12.9	Hypertensive chronic kidney disease with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	403.91	Unspecified hypertensive renal disease with renal failure	I12.0	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage renal disease
	403.91	Unspecified hypertensive renal disease with renal failure	I12.9	Hypertensive chronic kidney disease with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	404.00	Malignant hypertensive heart and renal disease without mention of congestive heart failure or renal failure	I13.10	Hypertensive heart and chronic kidney disease without heart failure, with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease



	404.01	Malignant hypertensive heart and renal disease with congestive heart failure	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	404.02	Malignant hypertensive heart and renal disease with renal failure	I13.11	Hypertensive heart and chronic kidney disease without heart failure, with stage 5 chronic kidney disease, or end stage renal disease
	404.03	Malignant hypertensive heart and renal disease with congestive heart failure and renal failure	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
	404.10	Benign hypertensive heart and renal disease without mention of congestive heart failure or renal failure	I13.10	Hypertensive heart and chronic kidney disease without heart failure, with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	404.11	Benign hypertensive heart and renal disease with congestive heart failure	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	404.12	Benign hypertensive heart and renal disease with renal failure	I13.11	Hypertensive heart and chronic kidney disease without heart failure, with stage 5 chronic kidney disease, or end stage renal disease
	404.13	Benign hypertensive heart and renal disease with congestive heart failure and renal failure	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
	404.90	Unspecified hypertensive heart and renal disease without mention of congestive heart failure or renal failure	I13.10	Hypertensive heart and chronic kidney disease without heart failure, with stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	404.91	Unspecified hypertensive heart and renal disease with congestive heart failure	I13.0	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
	404.92	Unspecified hypertensive heart and renal disease with renal failure	I13.11	Hypertensive heart and chronic kidney disease without heart failure, with stage 5 chronic kidney disease, or end stage renal disease
	404.93	Unspecified hypertensive heart and renal disease with congestive heart failure and renal failure	I13.2	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
	405.01	Malignant renovascular secondary hypertension	I15.0	Renovascular hypertension
	405.09	Other malignant secondary hypertension	I15.8	Other secondary hypertension
	405.11	Benign renovascular secondary hypertension	I15.0	Renovascular hypertension
	405.19	Other benign secondary hypertension	I15.8	Other secondary hypertension

	405.91	Unspecified renovascular secondary hypertension	I15.0	Renovascular hypertension
	405.91	Unspecified renovascular secondary hypertension	I15.1	Hypertension secondary to other renal disorders
	405.99	Other unspecified secondary hypertension	I15.2	Hypertension secondary to endocrine disorders
	405.99	Other unspecified secondary hypertension	I15.8	Other secondary hypertension
	405.99	Other unspecified secondary hypertension	I15.9	Secondary hypertension, unspecified
	416.0	Primary pulmonary hypertension	I27.0	Primary pulmonary hypertension
	416.8	Other chronic pulmonary heart diseases	I27.2	Other secondary pulmonary hypertension
	997.91	Complications affecting other specified body system, not elsewhere classified, hypertension	I97.3	Postprocedural hypertension
2. Diabetes	<b>ICD-9</b>	<b>ICD-9-CM Diagnosis Labeling</b>	<b>ICD-10</b>	<b>ICD-10-PCS Diagnosis Labeling</b>
	250.00	Diabetes mellitus without mention of complication, Type II [non-insulin dependent type][NIDDM type] [adult-onset type] or unspecified type, not stated as uncontrolled	E11.9	Type 2 diabetes mellitus without complications
	250.00	Diabetes mellitus without mention of complication, Type II [non-insulin dependent type][NIDDM type] [adult-onset type] or unspecified type, not stated as uncontrolled	E13.9	Other specified diabetes mellitus without complications
	250.01	Diabetes mellitus without mention of complication, Type I [insulin dependent type] [IDDM] [juvenile type], not stated as uncontrolled	E10.9	Type 1 diabetes mellitus without complications
	250.02	Diabetes mellitus without mention of complication, Type II [non-insulin dependent type] [NIDDM type] [adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
	250.03	Diabetes mellitus without mention of complication, Type I [insulin dependent type] [IDDM] [juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
	250.10	Diabetes with ketoacidosis, Type II [non-insulin dependent type] [NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
	250.11	Diabetes with ketoacidosis, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.10	Type 1 diabetes mellitus with ketoacidosis without coma
	250.12	Diabetes with ketoacidosis, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
	250.12	Diabetes with ketoacidosis, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.69	Type 2 diabetes mellitus with other specified complication
	250.13	Diabetes with ketoacidosis, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.10	Type 1 diabetes mellitus with ketoacidosis without coma

250.13	Diabetes with ketoacidosis, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.00	Diabetes mellitus due to underlying condition with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.01	Diabetes mellitus due to underlying condition with hyperosmolarity with coma
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.00	Drug or chemical induced diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.01	Drug or chemical induced diabetes mellitus with hyperosmolarity with coma
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.00	Type 2 diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.01	Type 2 diabetes mellitus with hyperosmolarity with coma
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.00	Other specified diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
250.20	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.01	Other specified diabetes mellitus with hyperosmolarity with coma
250.21	Diabetes with hyperosmolar coma, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.69	Type 1 diabetes mellitus with other specified complication
250.22	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][ adult-onset type ] or unspecified type, uncontrolled	E11.00	Type 2 diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
250.22	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][ adult-onset type ] or unspecified type, uncontrolled	E11.01	Type 2 diabetes mellitus with hyperosmolarity with coma
250.22	Diabetes with hyperosmolar coma, Type II [non-insulin dependent type][NIDDM type][ adult-onset type ] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
250.23	Diabetes with hyperosmolar coma, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.23	Diabetes with hyperosmolar coma, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.69	Type 1 diabetes mellitus with other specified complication

250.30	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.641	Diabetes mellitus due to underlying condition with hypoglycemia with coma
250.30	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.641	Drug or chemical induced diabetes mellitus with hypoglycemia with coma
250.30	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.641	Type 2 diabetes mellitus with hypoglycemia with coma
250.30	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.11	Other specified diabetes mellitus with ketoacidosis with coma
250.30	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.641	Other specified diabetes mellitus with hypoglycemia with coma
250.31	Diabetes with other coma, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.11	Type 1 diabetes mellitus with ketoacidosis with coma
250.31	Diabetes with other coma, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.641	Type 1 diabetes mellitus with hypoglycemia with coma
250.32	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.641	Type 2 diabetes mellitus with hypoglycemia with coma
250.32	Diabetes with other coma, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
250.33	Diabetes with other coma, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.11	Type 1 diabetes mellitus with ketoacidosis with coma
250.33	Diabetes with other coma, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.40	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.21	Type 2 diabetes mellitus with diabetic nephropathy
250.40	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.22	Type 2 diabetes mellitus with diabetic chronic kidney disease
250.40	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.29	Type 2 diabetes mellitus with other diabetic kidney complication



250.40	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.21	Other specified diabetes mellitus with diabetic nephropathy
250.40	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.22	Other specified diabetes mellitus with diabetic chronic kidney disease
250.40	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.29	Other specified diabetes mellitus with other diabetic kidney complication
250.41	Diabetes with renal manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.21	Type 1 diabetes mellitus with diabetic nephropathy
250.41	Diabetes with renal manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.22	Type 1 diabetes mellitus with diabetic chronic kidney disease
250.41	Diabetes with renal manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.29	Type 1 diabetes mellitus with other diabetic kidney complication
250.42	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.21	Type 2 diabetes mellitus with diabetic nephropathy
250.42	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.22	Type 2 diabetes mellitus with diabetic chronic kidney disease
250.42	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.29	Type 2 diabetes mellitus with other diabetic kidney complication
250.42	Diabetes with renal manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
250.43	Diabetes with renal manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.21	Type 1 diabetes mellitus with diabetic nephropathy
250.43	Diabetes with renal manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.311	Diabetes mellitus due to underlying condition with unspecified diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.319	Diabetes mellitus due to underlying condition with unspecified diabetic retinopathy without macular edema

250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.321	Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.329	Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.331	Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.339	Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.341	Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.349	Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.351	Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.359	Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E08.36	Diabetes mellitus due to underlying condition with diabetic cataract
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.311	Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy with macular edema

250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.319	Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.321	Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.329	Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.331	Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.339	Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.341	Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.349	Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.351	Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.359	Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E09.36	Drug or chemical induced diabetes mellitus with diabetic cataract
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-	E11.311	Type 2 diabetes mellitus with unspecified diabetic retinopathy with macular edema

		onset type ] or unspecified type ,not stated as uncontrolled		
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.319	Type 2 diabetes mellitus with unspecified diabetic retinopathy without macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.321	Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.329	Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.331	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.339	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.341	Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.349	Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.351	Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.359	Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema
	250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.36	Type 2 diabetes mellitus with diabetic cataract



250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E11.39	Type 2 diabetes mellitus with other diabetic ophthalmic complication
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.311	Other specified diabetes mellitus with unspecified diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.319	Other specified diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.321	Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.329	Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.331	Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.339	Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.341	Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.319	Type 2 diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.321	Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.329	Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema

250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.331	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.339	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.341	Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.349	Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.351	Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.359	Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.36	Type 2 diabetes mellitus with diabetic cataract
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.39	Type 2 diabetes mellitus with other diabetic ophthalmic complication
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.311	Other specified diabetes mellitus with unspecified diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.319	Other specified diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.321	Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.329	Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.331	Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema

250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.339	Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.341	Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.349	Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.351	Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.359	Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.36	Other specified diabetes mellitus with diabetic cataract
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E13.39	Other specified diabetes mellitus with other diabetic ophthalmic complication
250.53	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.311	Type 1 diabetes mellitus with unspecified diabetic retinopathy with macular edema
250.53	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.319	Type 1 diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.53	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.36	Type 1 diabetes mellitus with diabetic cataract
250.53	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.39	Type 1 diabetes mellitus with other diabetic ophthalmic complication
250.53	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.40	Diabetes mellitus due to underlying condition with diabetic neuropathy, unspecified
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-	E08.41	Diabetes mellitus due to underlying condition with diabetic mononeuropathy

		onset type] or unspecified type ,not stated as uncontrolled		
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.42	Diabetes mellitus due to underlying condition with diabetic polyneuropathy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.43	Diabetes mellitus due to underlying condition with diabetic autonomic (poly)neuropathy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.44	Diabetes mellitus due to underlying condition with diabetic amyotrophy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.49	Diabetes mellitus due to underlying condition with other diabetic neurological complication
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.40	Drug or chemical induced diabetes mellitus with neurological complications with diabetic neuropathy, unspecified
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.41	Drug or chemical induced diabetes mellitus with neurological complications with diabetic mononeuropathy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.42	Drug or chemical induced diabetes mellitus with neurological complications with diabetic polyneuropathy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.43	Drug or chemical induced diabetes mellitus with neurological complications with diabetic autonomic (poly)neuropathy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.44	Drug or chemical induced diabetes mellitus with neurological complications with diabetic amyotrophy
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.49	Drug or chemical induced diabetes mellitus with neurological complications with other diabetic neurological complication



250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.40	Type 2 diabetes mellitus with diabetic neuropathy, unspecified
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.41	Type 2 diabetes mellitus with diabetic mononeuropathy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.42	Type 2 diabetes mellitus with diabetic polyneuropathy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.43	Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.44	Type 2 diabetes mellitus with diabetic amyotrophy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.49	Type 2 diabetes mellitus with other diabetic neurological complication
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.40	Other specified diabetes mellitus with diabetic neuropathy, unspecified
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.41	Other specified diabetes mellitus with diabetic mononeuropathy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.42	Other specified diabetes mellitus with diabetic polyneuropathy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.43	Other specified diabetes mellitus with diabetic autonomic (poly)neuropathy
250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-	E13.44	Other specified diabetes mellitus with diabetic amyotrophy

		onset type] or unspecified type ,not stated as uncontrolled		
	250.60	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.49	Other specified diabetes mellitus with other diabetic neurological complication
	250.61	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.40	Type 1 diabetes mellitus with diabetic neuropathy, unspecified
	250.61	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.41	Type 1 diabetes mellitus with diabetic mononeuropathy
	250.61	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.44	Type 1 diabetes mellitus with diabetic amyotrophy
	250.61	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.49	Type 1 diabetes mellitus with other diabetic neurological complication
	250.61	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.610	Type 1 diabetes mellitus with diabetic neuropathic arthropathy
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.40	Type 2 diabetes mellitus with diabetic neuropathy, unspecified
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.41	Type 2 diabetes mellitus with diabetic mononeuropathy
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.42	Type 2 diabetes mellitus with diabetic polyneuropathy
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.43	Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.44	Type 2 diabetes mellitus with diabetic amyotrophy
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.49	Type 2 diabetes mellitus with other diabetic neurological complication
	250.62	Diabetes with neurological manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia

	250.63	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.40	Type 1 diabetes mellitus with diabetic neuropathy, unspecified
	250.63	Diabetes with neurological manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.51	Diabetes mellitus due to underlying condition with diabetic peripheral angiopathy without gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.52	Diabetes mellitus due to underlying condition with diabetic peripheral angiopathy with gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E08.59	Diabetes mellitus due to underlying condition with other circulatory complications
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.51	Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy without gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.52	Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy with gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E09.59	Drug or chemical induced diabetes mellitus with other circulatory complications
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.51	Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.52	Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E11.59	Type 2 diabetes mellitus with other circulatory complications

250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.349	Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.351	Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.359	Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.36	Other specified diabetes mellitus with diabetic cataract
250.50	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type ,not stated as uncontrolled	E13.39	Other specified diabetes mellitus with other diabetic ophthalmic complication
250.51	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.311	Type 1 diabetes mellitus with unspecified diabetic retinopathy with macular edema
250.51	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.319	Type 1 diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.51	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.36	Type 1 diabetes mellitus with diabetic cataract
250.51	Diabetes with ophthalmic manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.39	Type 1 diabetes mellitus with other diabetic ophthalmic complication
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.311	Diabetes mellitus due to underlying condition with unspecified diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.319	Diabetes mellitus due to underlying condition with unspecified diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.321	Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy with macular edema

250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.329	Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.331	Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.339	Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.341	Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.349	Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.351	Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.359	Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.36	Diabetes mellitus due to underlying condition with diabetic cataract
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.39	Diabetes mellitus due to underlying condition with other diabetic ophthalmic complication
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E08.39	Diabetes mellitus due to underlying condition with other diabetic ophthalmic complication
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.311	Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.319	Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy without macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.321	Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.329	Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema

	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.331	Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.339	Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.341	Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.349	Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.351	Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.359	Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.36	Drug or chemical induced diabetes mellitus with diabetic cataract
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.39	Drug or chemical induced diabetes mellitus with other diabetic ophthalmic complication
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E09.39	Drug or chemical induced diabetes mellitus with other diabetic ophthalmic complication
	250.52	Diabetes with ophthalmic manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type ] or unspecified type, uncontrolled	E11.311	Type 2 diabetes mellitus with unspecified diabetic retinopathy with macular edema
	357.2	Polyneuropathy in diabetes	E08.42	Diabetes mellitus due to underlying condition with diabetic polyneuropathy
	357.2	Polyneuropathy in diabetes	E09.42	Drug or chemical induced diabetes mellitus with neurological complications with diabetic polyneuropathy
	357.2	Polyneuropathy in diabetes	E10.40	Type 1 diabetes mellitus with diabetic neuropathy, unspecified
	357.2	Polyneuropathy in diabetes	E10.42	Type 1 diabetes mellitus with diabetic polyneuropathy
	357.2	Polyneuropathy in diabetes	E11.40	Type 2 diabetes mellitus with diabetic neuropathy, unspecified

	357.2	Polyneuropathy in diabetes	E11.42	Type 2 diabetes mellitus with diabetic polyneuropathy
	357.2	Polyneuropathy in diabetes	E13.42	Other specified diabetes mellitus with diabetic polyneuropathy
	362.01	Background diabetic retinopathy	E11.311	Type 2 diabetes mellitus with unspecified diabetic retinopathy with macular edema
	362.01	Background diabetic retinopathy	E11.319	Type 2 diabetes mellitus with unspecified diabetic retinopathy without macular edema
	362.01	Background diabetic retinopathy	E11.321	Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
	362.01	Background diabetic retinopathy	E11.329	Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
	362.01	Background diabetic retinopathy	E11.331	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
	362.01	Background diabetic retinopathy	E11.339	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
	362.01	Background diabetic retinopathy	E11.341	Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
	362.01	Background diabetic retinopathy	E11.349	Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
	362.02	Proliferative diabetic retinopathy	E11.351	Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema
	362.02	Proliferative diabetic retinopathy	E11.359	Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema
	366.41	Diabetic cataract	E08.36	Diabetes mellitus due to underlying condition with diabetic cataract
	366.41	Diabetic cataract	E09.36	Drug or chemical induced diabetes mellitus with diabetic cataract
	366.41	Diabetic cataract	E10.36	Type 1 diabetes mellitus with diabetic cataract
	366.41	Diabetic cataract	E11.36	Type 2 diabetes mellitus with diabetic cataract
	366.41	Diabetic cataract	E13.36	Other specified diabetes mellitus with diabetic cataract
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.51	Other specified diabetes mellitus with diabetic peripheral angiopathy without gangrene
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-	E13.52	Other specified diabetes mellitus with diabetic peripheral angiopathy with gangrene

		onset type] or unspecified type ,not stated as uncontrolled		
	250.70	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type ,not stated as uncontrolled	E13.59	Other specified diabetes mellitus with other circulatory complications
	250.71	Diabetes with peripheral circulatory disorders, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.51	Type 1 diabetes mellitus with diabetic peripheral angiopathy without gangrene
	250.71	Diabetes with peripheral circulatory disorders, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.52	Type 1 diabetes mellitus with diabetic peripheral angiopathy with gangrene
	250.71	Diabetes with peripheral circulatory disorders, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.59	Type 1 diabetes mellitus with other circulatory complications
	250.72	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.51	Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene
	250.72	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.52	Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene
	250.72	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.59	Type 2 diabetes mellitus with other circulatory complications
	250.72	Diabetes with peripheral circulatory disorders, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
	250.73	Diabetes with peripheral circulatory disorders, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.51	Type 1 diabetes mellitus with diabetic peripheral angiopathy without gangrene
	250.73	Diabetes with peripheral circulatory disorders, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
	250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.610	Type 2 diabetes mellitus with diabetic neuropathic arthropathy
	250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.618	Type 2 diabetes mellitus with other diabetic arthropathy



250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.620	Type 2 diabetes mellitus with diabetic dermatitis
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.621	Type 2 diabetes mellitus with foot ulcer
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.622	Type 2 diabetes mellitus with other skin ulcer
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.628	Type 2 diabetes mellitus with other skin complications
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.630	Type 2 diabetes mellitus with periodontal disease
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.638	Type 2 diabetes mellitus with other oral complications
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.649	Type 2 diabetes mellitus with hypoglycemia without coma
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
250.80	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.69	Type 2 diabetes mellitus with other specified complication
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.618	Type 1 diabetes mellitus with other diabetic arthropathy
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.620	Type 1 diabetes mellitus with diabetic dermatitis

250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.621	Type 1 diabetes mellitus with foot ulcer
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.622	Type 1 diabetes mellitus with other skin ulcer
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.628	Type 1 diabetes mellitus with other skin complications
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.630	Type 1 diabetes mellitus with periodontal disease
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.638	Type 1 diabetes mellitus with other oral complications
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.649	Type 1 diabetes mellitus with hypoglycemia without coma
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.81	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.69	Type 1 diabetes mellitus with other specified complication
250.82	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
250.82	Diabetes with other specified manifestations, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.69	Type 2 diabetes mellitus with other specified complication
250.83	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
250.83	Diabetes with other specified manifestations, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.69	Type 1 diabetes mellitus with other specified complication
250.90	Diabetes with unspecified complication, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E08.8	Diabetes mellitus due to underlying condition with unspecified complications
250.90	Diabetes with unspecified complication, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E09.8	Drug or chemical induced diabetes mellitus with unspecified complications

	250.90	Diabetes with unspecified complication, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E11.8	Type 2 diabetes mellitus with unspecified complications
	250.90	Diabetes with unspecified complication, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, not stated as uncontrolled	E13.8	Other specified diabetes mellitus with unspecified complications
	250.91	Diabetes with unspecified complication, Type I [insulin dependent type][IDDM][juvenile type], not stated as uncontrolled	E10.8	Type 1 diabetes mellitus with unspecified complications
	250.92	Diabetes with unspecified complication, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.65	Type 2 diabetes mellitus with hyperglycemia
	250.92	Diabetes with unspecified complication, Type II [non-insulin dependent type][NIDDM type][adult-onset type] or unspecified type, uncontrolled	E11.8	Type 2 diabetes mellitus with unspecified complications
	250.93	Diabetes with unspecified complication, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.65	Type 1 diabetes mellitus with hyperglycemia
	250.93	Diabetes with unspecified complication, Type I [insulin dependent type][IDDM][juvenile type], uncontrolled	E10.8	Type 1 diabetes mellitus with unspecified complications
	251.8	Other specified disorders of pancreatic internal secretion	E08.00	Diabetes mellitus due to underlying condition with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
	251.8	Other specified disorders of pancreatic internal secretion	E08.59	Diabetes mellitus due to underlying condition with other circulatory complications
	251.8	Other specified disorders of pancreatic internal secretion	E09.00	Drug or chemical induced diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
	251.8	Other specified disorders of pancreatic internal secretion	E09.59	Drug or chemical induced diabetes mellitus with other circulatory complications
	251.8	Other specified disorders of pancreatic internal secretion	E13.00	Other specified diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
	251.8	Other specified disorders of pancreatic internal secretion	E13.01	Other specified diabetes mellitus with hyperosmolarity with coma
	251.8	Other specified disorders of pancreatic internal secretion	E13.10	Other specified diabetes mellitus with ketoacidosis without coma
	251.8	Other specified disorders of pancreatic internal secretion	E13.11	Other specified diabetes mellitus with ketoacidosis with coma
	251.8	Other specified disorders of pancreatic internal secretion	E13.21	Other specified diabetes mellitus with diabetic nephropathy

	251.8	Other specified disorders of pancreatic internal secretion	E13.22	Other specified diabetes mellitus with diabetic chronic kidney disease
	251.8	Other specified disorders of pancreatic internal secretion	E13.29	Other specified diabetes mellitus with other diabetic kidney complication
	251.8	Other specified disorders of pancreatic internal secretion	E13.39	Other specified diabetes mellitus with other diabetic ophthalmic complication
	251.8	Other specified disorders of pancreatic internal secretion	E13.40	Other specified diabetes mellitus with diabetic neuropathy, unspecified
	251.8	Other specified disorders of pancreatic internal secretion	E13.41	Other specified diabetes mellitus with diabetic mononeuropathy
	251.8	Other specified disorders of pancreatic internal secretion	E13.42	Other specified diabetes mellitus with diabetic polyneuropathy
	251.8	Other specified disorders of pancreatic internal secretion	E13.43	Other specified diabetes mellitus with diabetic autonomic (poly)neuropathy
	251.8	Other specified disorders of pancreatic internal secretion	E13.44	Other specified diabetes mellitus with diabetic amyotrophy
	251.8	Other specified disorders of pancreatic internal secretion	E13.49	Other specified diabetes mellitus with other diabetic neurological complication
	251.8	Other specified disorders of pancreatic internal secretion	E13.59	Other specified diabetes mellitus with other circulatory complications
	251.8	Other specified disorders of pancreatic internal secretion	E13.620	Other specified diabetes mellitus with diabetic dermatitis
	251.8	Other specified disorders of pancreatic internal secretion	E13.621	Other specified diabetes mellitus with foot ulcer
	251.8	Other specified disorders of pancreatic internal secretion	E13.622	Other specified diabetes mellitus with other skin ulcer
	251.8	Other specified disorders of pancreatic internal secretion	E13.628	Other specified diabetes mellitus with other skin complications
	251.8	Other specified disorders of pancreatic internal secretion	E13.638	Other specified diabetes mellitus with other oral complications
	251.8	Other specified disorders of pancreatic internal secretion	E13.641	Other specified diabetes mellitus with hypoglycemia with coma
	251.8	Other specified disorders of pancreatic internal secretion	E13.649	Other specified diabetes mellitus with hypoglycemia without coma
	251.8	Other specified disorders of pancreatic internal secretion	E13.65	Other specified diabetes mellitus with hyperglycemia
	251.8	Other specified disorders of pancreatic internal secretion	E13.69	Other specified diabetes mellitus with other specified complication
	251.8	Other specified disorders of pancreatic internal secretion	E13.8	Other specified diabetes mellitus with unspecified complications
	251.8	Other specified disorders of pancreatic internal secretion	E13.9	Other specified diabetes mellitus without complications

	253.5	Diabetes insipidus	E23.2	Diabetes insipidus
	583.81	Nephritis and nephropathy, not specified as acute or chronic, in diseases classified elsewhere	E10.21	Type 1 diabetes mellitus with diabetic nephropathy
	583.81	Nephritis and nephropathy, not specified as acute or chronic, in diseases classified elsewhere	E11.21	Type 2 diabetes mellitus with diabetic nephropathy
3. Congestive heart failure	ICD-9	ICD-9-CM Diagnosis Labeling	ICD-10	ICD-10-PCS Diagnosis Labeling
	402.01	Malignant hypertensive heart disease with heart failure	I50.1	Left ventricular failure
	402.11	Benign hypertensive heart disease with heart failure	I50.20	Unspecified systolic (congestive) heart failure
	402.91	Unspecified hypertensive heart disease with heart failure	I50.21	Acute systolic (congestive) heart failure
	404.01	Malignant hypertensive heart and renal disease with heart failure	I50.22	Chronic systolic (congestive) heart failure
	404.03	Malignant hypertensive heart and renal disease with heart failure and renal failure	I50.23	Acute on chronic systolic (congestive) heart failure
	404.11	Benign hypertensive heart and renal disease with heart failure	I50.30	Unspecified diastolic (congestive) heart failure
	404.13	Benign hypertensive heart and renal disease with heart failure and renal failure	I50.31	Acute diastolic (congestive) heart failure
	404.91	Unspecified hypertensive heart and renal disease with heart failure	I50.32	Chronic diastolic (congestive) heart failure
	404.93	Unspecified hypertensive heart and renal disease with heart failure and renal failure	I50.33	Acute on chronic diastolic (congestive) heart failure
	428.0	Congestive heart failure	I50.40	Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
	428.1	Left heart failure	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
	428.9	Unspecified heart failure	I50.42	Chronic combined systolic (congestive) and diastolic (congestive) heart failure
	398.91	Rheumatic heart failure	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
4. Coronary artery disease	ICD-9	ICD-9-CM Diagnosis Labeling	ICD-10	ICD-10-PCS Diagnosis Labeling
	429.2	Cardiovascular disease, unspecified	I25.10	Atherosclerotic heart disease of native coronary artery without angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.10	Atherosclerotic heart disease of native coronary artery without angina pectoris
	414.01	Coronary atherosclerosis of native coronary artery	I25.10	Atherosclerotic heart disease of native coronary artery without angina pectoris
	414.01	Coronary atherosclerosis of native coronary artery	I25.110	Atherosclerotic heart disease of native coronary artery with unstable angina pectoris

	414.01	Coronary atherosclerosis of native coronary artery	I25.111	Atherosclerotic heart disease of native coronary artery with angina pectoris with documented spasm
	414.01	Coronary atherosclerosis of native coronary artery	I25.118	Atherosclerotic heart disease of native coronary artery with other forms of angina pectoris
	414.01	Coronary atherosclerosis of native coronary artery	I25.119	Atherosclerotic heart disease of native coronary artery with unspecified angina pectoris
	414.11	Aneurysm of coronary vessels	I25.41	Coronary artery aneurysm
	414.11	Aneurysm of coronary vessels	I25.42	Coronary artery dissection
	414.05	Coronary atherosclerosis	I25.700	Atherosclerosis of coronary artery bypass graft(s), unspecified, with unstable angina pectoris
	414.05	Coronary atherosclerosis	I25.701	Atherosclerosis of coronary artery bypass graft(s), unspecified, with angina pectoris with documented spasm
	414.05	Coronary atherosclerosis	I25.708	Atherosclerosis of coronary artery bypass graft(s), unspecified, with other forms of angina pectoris
	414.05	Coronary atherosclerosis	I25.709	Atherosclerosis of coronary artery bypass graft(s), unspecified, with unspecified angina pectoris
	414.02	Coronary atherosclerosis of autologous vein bypass graft	I25.710	Atherosclerosis of autologous vein coronary artery bypass graft(s) with unstable angina pectoris
	414.02	Coronary atherosclerosis of autologous vein bypass graft	I25.711	Atherosclerosis of autologous vein coronary artery bypass graft(s) with angina pectoris with documented spasm
	414.02	Coronary atherosclerosis of autologous vein bypass graft	I25.718	Atherosclerosis of autologous vein coronary artery bypass graft(s) with other forms of angina pectoris
	414.02	Coronary atherosclerosis of autologous vein bypass graft	I25.719	Atherosclerosis of autologous vein coronary artery bypass graft(s) with unspecified angina pectoris
	414.04	Coronary atherosclerosis of artery bypass graft	I25.720	Atherosclerosis of autologous artery coronary artery bypass graft(s) with unstable angina pectoris
	414.04	Coronary atherosclerosis of artery bypass graft	I25.721	Atherosclerosis of autologous artery coronary artery bypass graft(s) with angina pectoris with documented spasm
	414.04	Coronary atherosclerosis of artery bypass graft	I25.728	Atherosclerosis of autologous artery coronary artery bypass graft(s) with other forms of angina pectoris
	414.04	Coronary atherosclerosis of artery bypass graft	I25.729	Atherosclerosis of autologous artery coronary artery bypass graft(s) with unspecified angina pectoris
	414.03	Coronary atherosclerosis of nonautologous biological bypass graft	I25.730	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with unstable angina pectoris

	414.05	Coronary atherosclerosis	I25.730	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with unstable angina pectoris
	414.03	Coronary atherosclerosis of nonautologous biological bypass graft	I25.731	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with angina pectoris with documented spasm
	414.05	Coronary atherosclerosis	I25.731	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with angina pectoris with documented spasm
	414.03	Coronary atherosclerosis of nonautologous biological bypass graft	I25.738	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with other forms of angina pectoris
	414.05	Coronary atherosclerosis	I25.738	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with other forms of angina pectoris
	414.03	Coronary atherosclerosis of nonautologous biological bypass graft	I25.739	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with unspecified angina pectoris
	414.05	Coronary atherosclerosis	I25.739	Atherosclerosis of nonautologous biological coronary artery bypass graft(s) with unspecified angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.750	Atherosclerosis of native coronary artery of transplanted heart with unstable angina
	414.01	Coronary atherosclerosis of native coronary artery	I25.750	Atherosclerosis of native coronary artery of transplanted heart with unstable angina
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.751	Atherosclerosis of native coronary artery of transplanted heart with angina pectoris with documented spasm
	414.01	Coronary atherosclerosis of native coronary artery	I25.751	Atherosclerosis of native coronary artery of transplanted heart with angina pectoris with documented spasm
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.758	Atherosclerosis of native coronary artery of transplanted heart with other forms of angina pectoris
	414.01	Coronary atherosclerosis of native coronary artery	I25.758	Atherosclerosis of native coronary artery of transplanted heart with other forms of angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.759	Atherosclerosis of native coronary artery of transplanted heart with unspecified angina pectoris

	414.01	Coronary atherosclerosis of native coronary artery	I25.759	Atherosclerosis of native coronary artery of transplanted heart with unspecified angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.760	Atherosclerosis of bypass graft of coronary artery of transplanted heart with unstable angina
	414.05	Coronary atherosclerosis	I25.760	Atherosclerosis of bypass graft of coronary artery of transplanted heart with unstable angina
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.761	Atherosclerosis of bypass graft of coronary artery of transplanted heart with angina pectoris with documented spasm
	414.05	Coronary atherosclerosis	I25.761	Atherosclerosis of bypass graft of coronary artery of transplanted heart with angina pectoris with documented spasm
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.768	Atherosclerosis of bypass graft of coronary artery of transplanted heart with other forms of angina pectoris
	414.05	Coronary atherosclerosis	I25.768	Atherosclerosis of bypass graft of coronary artery of transplanted heart with other forms of angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.769	Atherosclerosis of bypass graft of coronary artery of transplanted heart with unspecified angina pectoris
	414.05	Coronary atherosclerosis	I25.769	Atherosclerosis of bypass graft of coronary artery of transplanted heart with unspecified angina pectoris
	414.05	Coronary atherosclerosis	I25.790	Atherosclerosis of other coronary artery bypass graft(s) with unstable angina pectoris
	414.05	Coronary atherosclerosis	I25.791	Atherosclerosis of other coronary artery bypass graft(s) with angina pectoris with documented spasm
	414.05	Coronary atherosclerosis	I25.798	Atherosclerosis of other coronary artery bypass graft(s) with other forms of angina pectoris
	414.05	Coronary atherosclerosis	I25.799	Atherosclerosis of other coronary artery bypass graft(s) with unspecified angina pectoris
	414.05	Coronary atherosclerosis	I25.810	Atherosclerosis of coronary artery bypass graft(s) without angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.811	Atherosclerosis of native coronary artery of transplanted heart without angina pectoris
	414.01	Coronary atherosclerosis of native coronary artery	I25.811	Atherosclerosis of native coronary artery of transplanted heart without angina pectoris
	414.00	Coronary atherosclerosis of unspecified type vessel, native or graft	I25.812	Atherosclerosis of bypass graft of coronary artery of transplanted heart without angina pectoris



	414.02	Coronary atherosclerosis of autologous vein bypass graft	I25.812	Atherosclerosis of bypass graft of coronary artery of transplanted heart without angina pectoris
	414.05	Coronary atherosclerosis	I25.812	Atherosclerosis of bypass graft of coronary artery of transplanted heart without angina pectoris
5. Myocardial infarction	ICD-9	ICD-9-CM Diagnosis Labeling	ICD-10	ICD-10-PCS Diagnosis Labeling
	429.5	Rupture of chordae tendineae	I23.4	Rupture of chordae tendineae as current complication following acute myocardial infarction
	429.6	Rupture of papillary muscle	I23.5	Rupture of papillary muscle as current complication following acute myocardial infarction
	429.71	Acquired cardiac septal defect	I23.1	Atrial septal defect as current complication following acute myocardial infarction
	429.71	Acquired cardiac septal defect	I23.2	Ventricular septal defect as current complication following acute myocardial infarction
	429.79	Other certain sequelae of myocardial infarction, not elsewhere classified	I23.0	Hemopericardium as current complication following acute myocardial infarction
	429.79	Other certain sequelae of myocardial infarction, not elsewhere classified	I23.3	Rupture of cardiac wall without hemopericardium as current complication following acute myocardial infarction
	429.79	Other certain sequelae of myocardial infarction, not elsewhere classified	I23.6	Thrombosis of atrium, auricular appendage, and ventricle as current complications following acute myocardial infarction
	429.79	Other certain sequelae of myocardial infarction, not elsewhere classified	I23.8	Other current complications following acute myocardial infarction
	410.00	Acute myocardial infarction of anterolateral wall, episode of care unspecified	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
	410.01	Acute myocardial infarction of anterolateral wall, initial episode of care	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
	410.01	Acute myocardial infarction of anterolateral wall, initial episode of care	I22.0	Subsequent ST elevation (STEMI) myocardial infarction of anterior wall
	410.02	Acute myocardial infarction of anterolateral wall, subsequent episode of care	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
	410.10	Acute myocardial infarction of other anterior wall, episode of care unspecified	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
	410.11	Acute myocardial infarction of other anterior wall, initial episode of care	I21.01	ST elevation (STEMI) myocardial infarction involving left main coronary artery
	410.11	Acute myocardial infarction of other anterior wall, initial episode of care	I21.02	ST elevation (STEMI) myocardial infarction involving left anterior descending coronary artery
	410.11	Acute myocardial infarction of other anterior wall, initial episode of care	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
	410.11	Acute myocardial infarction of other anterior wall, initial episode of care	I22.0	Subsequent ST elevation (STEMI) myocardial infarction of anterior wall

410.12	Acute myocardial infarction of other anterior wall, subsequent episode of care	I21.09	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
410.20	Acute myocardial infarction of inferolateral wall, episode of care unspecified	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
410.21	Acute myocardial infarction of inferolateral wall, initial episode of care	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
410.21	Acute myocardial infarction of inferolateral wall, initial episode of care	I22.1	Subsequent ST elevation (STEMI) myocardial infarction of inferior wall
410.22	Acute myocardial infarction of inferolateral wall, subsequent episode of care	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
410.30	Acute myocardial infarction of inferoposterior wall, episode of care unspecified	I21.11	ST elevation (STEMI) myocardial infarction involving right coronary artery
410.31	Acute myocardial infarction of inferoposterior wall, initial episode of care	I21.11	ST elevation (STEMI) myocardial infarction involving right coronary artery
410.31	Acute myocardial infarction of inferoposterior wall, initial episode of care	I22.1	Subsequent ST elevation (STEMI) myocardial infarction of inferior wall
410.32	Acute myocardial infarction of inferoposterior wall, subsequent episode of care	I21.11	ST elevation (STEMI) myocardial infarction involving right coronary artery
410.40	Acute myocardial infarction of other inferior wall, episode of care unspecified	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
410.41	Acute myocardial infarction of other inferior wall, initial episode of care	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
410.41	Acute myocardial infarction of other inferior wall, initial episode of care	I22.1	Subsequent ST elevation (STEMI) myocardial infarction of inferior wall
410.42	Acute myocardial infarction of other inferior wall, subsequent episode of care	I21.19	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
410.50	Acute myocardial infarction of other lateral wall, episode of care unspecified	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
410.51	Acute myocardial infarction of other lateral wall, initial episode of care	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
410.51	Acute myocardial infarction of other lateral wall, initial episode of care	I22.8	Subsequent ST elevation (STEMI) myocardial infarction of other sites
410.52	Acute myocardial infarction of other lateral wall, subsequent episode of care	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
410.60	Acute true posterior wall myocardial infarction, episode of care unspecified	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
410.61	Acute true posterior wall myocardial infarction, initial episode of care	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
410.61	Acute true posterior wall myocardial infarction, initial episode of care	I22.8	Subsequent ST elevation (STEMI) myocardial infarction of other sites
410.62	Acute true posterior wall myocardial infarction, subsequent episode of care	I21.29	ST elevation (STEMI) myocardial infarction involving other sites

	410.70	Acute subendocardial infarction, episode of care unspecified	I21.4	Non-ST elevation (NSTEMI) myocardial infarction
	410.71	Acute subendocardial infarction, initial episode of care	I21.4	Non-ST elevation (NSTEMI) myocardial infarction
	410.71	Acute subendocardial infarction, initial episode of care	I22.2	Subsequent non-ST elevation (NSTEMI) myocardial infarction
	410.72	Acute subendocardial infarction, subsequent episode of care	I21.4	Non-ST elevation (NSTEMI) myocardial infarction
	410.80	Acute myocardial infarction of other specified sites, episode of care unspecified	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
	410.81	Acute myocardial infarction of other specified sites, initial episode of care	I21.21	ST elevation (STEMI) myocardial infarction involving left circumflex coronary artery
	410.81	Acute myocardial infarction of other specified sites, initial episode of care	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
	410.81	Acute myocardial infarction of other specified sites, initial episode of care	I22.8	Subsequent ST elevation (STEMI) myocardial infarction of other sites
	410.82	Acute myocardial infarction of other specified sites, subsequent episode of care	I21.29	ST elevation (STEMI) myocardial infarction involving other sites
	410.90	Acute myocardial infarction of unspecified site, episode of care unspecified	I21.3	ST elevation (STEMI) myocardial infarction of unspecified site
	410.91	Acute myocardial infarction of unspecified site, initial episode of care	I21.3	ST elevation (STEMI) myocardial infarction of unspecified site
	410.91	Acute myocardial infarction of unspecified site, initial episode of care	I22.9	Subsequent ST elevation (STEMI) myocardial infarction of unspecified site
	410.92	Acute myocardial infarction of unspecified site, subsequent episode of care	I21.3	ST elevation (STEMI) myocardial infarction of unspecified site
	411.81	Coronary occlusion without myocardial infarction	I24.0	Acute coronary thrombosis not resulting in myocardial infarction
	412	Old myocardial infarction	I25.2	Old myocardial infarction
6. Peripheral artery disease	<b>ICD-9</b>	<b>ICD-9-CM Diagnosis Labeling</b>	<b>ICD-10</b>	<b>ICD-10-PCS Diagnosis Labeling</b>
	440.8	Atherosclerosis of other specified arteries	I70.8	Atherosclerosis of other arteries
	443.89	Other specified peripheral vascular diseases	I73.89	Other specified peripheral vascular diseases
	443.9	Peripheral vascular disease, unspecified	I73.9	Peripheral vascular disease, unspecified
	440.20	Atherosclerosis of the extremities, unspecified	I70.201	Unspecified atherosclerosis of native arteries of extremities, right leg
	440.20	Atherosclerosis of the extremities, unspecified	I70.202	Unspecified atherosclerosis of native arteries of extremities, left leg
	440.20	Atherosclerosis of the extremities, unspecified	I70.203	Unspecified atherosclerosis of native arteries of extremities, bilateral legs
	440.20	Atherosclerosis of the extremities, unspecified	I70.208	Unspecified atherosclerosis of native arteries of extremities, other extremity

	440.20	Atherosclerosis of the extremities, unspecified	I70.209	Unspecified atherosclerosis of native arteries of extremities, unspecified extremity
	440.21	Atherosclerosis of the extremities with intermittent claudication	I70.211	Atherosclerosis of native arteries of extremities with intermittent claudication, right leg
	440.21	Atherosclerosis of the extremities with intermittent claudication	I70.212	Atherosclerosis of native arteries of extremities with intermittent claudication, left leg
	440.21	Atherosclerosis of the extremities with intermittent claudication	I70.213	Atherosclerosis of native arteries of extremities with intermittent claudication, bilateral legs
	440.21	Atherosclerosis of the extremities with intermittent claudication	I70.218	Atherosclerosis of native arteries of extremities with intermittent claudication, other extremity
	440.21	Atherosclerosis of the extremities with intermittent claudication	I70.219	Atherosclerosis of native arteries of extremities with intermittent claudication, unspecified extremity
	440.22	Atherosclerosis of the extremities with rest pain	I70.221	Atherosclerosis of native arteries of extremities with rest pain, right leg
	440.22	Atherosclerosis of the extremities with rest pain	I70.222	Atherosclerosis of native arteries of extremities with rest pain, left leg
	440.22	Atherosclerosis of the extremities with rest pain	I70.223	Atherosclerosis of native arteries of extremities with rest pain, bilateral legs
	440.22	Atherosclerosis of the extremities with rest pain	I70.228	Atherosclerosis of native arteries of extremities with rest pain, other extremity
	440.22	Atherosclerosis of the extremities with rest pain	I70.229	Atherosclerosis of native arteries of extremities with rest pain, unspecified extremity
	440.23	Atherosclerosis of the extremities with ulceration	I70.231	Atherosclerosis of native arteries of right leg with ulceration of thigh
	440.23	Atherosclerosis of the extremities with ulceration	I70.232	Atherosclerosis of native arteries of right leg with ulceration of calf
	440.23	Atherosclerosis of the extremities with ulceration	I70.233	Atherosclerosis of native arteries of right leg with ulceration of ankle
	440.23	Atherosclerosis of the extremities with ulceration	I70.234	Atherosclerosis of native arteries of right leg with ulceration of heel and midfoot
	440.23	Atherosclerosis of the extremities with ulceration	I70.235	Atherosclerosis of native arteries of right leg with ulceration of other part of foot
	440.23	Atherosclerosis of the extremities with ulceration	I70.238	Atherosclerosis of native arteries of right leg with ulceration of other part of lower right leg
	440.23	Atherosclerosis of the extremities with ulceration	I70.239	Atherosclerosis of native arteries of right leg with ulceration of unspecified site
	440.23	Atherosclerosis of the extremities with ulceration	I70.241	Atherosclerosis of native arteries of left leg with ulceration of thigh
	440.23	Atherosclerosis of the extremities with ulceration	I70.242	Atherosclerosis of native arteries of left leg with ulceration of calf

	440.23	Atherosclerosis of the extremities with ulceration	I70.243	Atherosclerosis of native arteries of left leg with ulceration of ankle
	440.23	Atherosclerosis of the extremities with ulceration	I70.244	Atherosclerosis of native arteries of left leg with ulceration of heel and midfoot
	440.23	Atherosclerosis of the extremities with ulceration	I70.245	Atherosclerosis of native arteries of left leg with ulceration of other part of foot
	440.23	Atherosclerosis of the extremities with ulceration	I70.248	Atherosclerosis of native arteries of left leg with ulceration of other part of lower left leg
	440.23	Atherosclerosis of the extremities with ulceration	I70.249	Atherosclerosis of native arteries of left leg with ulceration of unspecified site
	440.23	Atherosclerosis of the extremities with ulceration	I70.25	Atherosclerosis of native arteries of other extremities with ulceration
	440.24	Atherosclerosis of the extremities with gangrene	I70.261	Atherosclerosis of native arteries of extremities with gangrene, right leg
	440.24	Atherosclerosis of the extremities with gangrene	I70.262	Atherosclerosis of native arteries of extremities with gangrene, left leg
	440.24	Atherosclerosis of the extremities with gangrene	I70.263	Atherosclerosis of native arteries of extremities with gangrene, bilateral legs
	440.24	Atherosclerosis of the extremities with gangrene	I70.268	Atherosclerosis of native arteries of extremities with gangrene, other extremity
	440.24	Atherosclerosis of the extremities with gangrene	I70.269	Atherosclerosis of native arteries of extremities with gangrene, unspecified extremity
	440.29	Other atherosclerosis of native arteries of the extremities	I70.291	Other atherosclerosis of native arteries of extremities, right leg
	440.29	Other atherosclerosis of native arteries of the extremities	I70.292	Other atherosclerosis of native arteries of extremities, left leg
	440.29	Other atherosclerosis of native arteries of the extremities	I70.293	Other atherosclerosis of native arteries of extremities, bilateral legs
	440.29	Other atherosclerosis of native arteries of the extremities	I70.298	Other atherosclerosis of native arteries of extremities, other extremity
	440.29	Other atherosclerosis of native arteries of the extremities	I70.299	Other atherosclerosis of native arteries of extremities, unspecified extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.301	Unspecified atherosclerosis of unspecified type of bypass graft(s) of the extremities, right leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.302	Unspecified atherosclerosis of unspecified type of bypass graft(s) of the extremities, left leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.303	Unspecified atherosclerosis of unspecified type of bypass graft(s) of the extremities, bilateral legs
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.308	Unspecified atherosclerosis of unspecified type of bypass graft(s) of the extremities, other extremity

	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.309	Unspecified atherosclerosis of unspecified type of bypass graft(s) of the extremities, unspecified extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.311	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with intermittent claudication, right leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.312	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with intermittent claudication, left leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.313	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with intermittent claudication, bilateral legs
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.318	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with intermittent claudication, other extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.319	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with intermittent claudication, unspecified extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.321	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with rest pain, right leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.322	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with rest pain, left leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.323	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with rest pain, bilateral legs
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.328	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with rest pain, other extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.329	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with rest pain, unspecified extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.331	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of thigh
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.332	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of calf
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.333	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of ankle
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.334	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of heel and midfoot

	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.335	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of other part of foot
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.338	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of other part of lower leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.339	Atherosclerosis of unspecified type of bypass graft(s) of the right leg with ulceration of unspecified site
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.341	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of thigh
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.342	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of calf
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.343	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of ankle
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.344	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of heel and midfoot
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.345	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of other part of foot
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.348	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of other part of lower leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.349	Atherosclerosis of unspecified type of bypass graft(s) of the left leg with ulceration of unspecified site
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.35	Atherosclerosis of unspecified type of bypass graft(s) of other extremity with ulceration
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.361	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with gangrene, right leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.362	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with gangrene, left leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.363	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with gangrene, bilateral legs
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.368	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with gangrene, other extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	170.369	Atherosclerosis of unspecified type of bypass graft(s) of the extremities with gangrene, unspecified extremity

440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.391	Other atherosclerosis of unspecified type of bypass graft(s) of the extremities, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.392	Other atherosclerosis of unspecified type of bypass graft(s) of the extremities, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.393	Other atherosclerosis of unspecified type of bypass graft(s) of the extremities, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.398	Other atherosclerosis of unspecified type of bypass graft(s) of the extremities, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.399	Other atherosclerosis of unspecified type of bypass graft(s) of the extremities, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.601	Unspecified atherosclerosis of nonbiological bypass graft(s) of the extremities, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.602	Unspecified atherosclerosis of nonbiological bypass graft(s) of the extremities, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.603	Unspecified atherosclerosis of nonbiological bypass graft(s) of the extremities, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.608	Unspecified atherosclerosis of nonbiological bypass graft(s) of the extremities, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.609	Unspecified atherosclerosis of nonbiological bypass graft(s) of the extremities, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.611	Atherosclerosis of nonbiological bypass graft(s) of the extremities with intermittent claudication, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.612	Atherosclerosis of nonbiological bypass graft(s) of the extremities with intermittent claudication, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.613	Atherosclerosis of nonbiological bypass graft(s) of the extremities with intermittent claudication, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.618	Atherosclerosis of nonbiological bypass graft(s) of the extremities with intermittent claudication, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.619	Atherosclerosis of nonbiological bypass graft(s) of the extremities with intermittent claudication, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.621	Atherosclerosis of nonbiological bypass graft(s) of the extremities with rest pain, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.622	Atherosclerosis of nonbiological bypass graft(s) of the extremities with rest pain, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.623	Atherosclerosis of nonbiological bypass graft(s) of the extremities with rest pain, bilateral legs



440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.628	Atherosclerosis of nonbiological bypass graft(s) of the extremities with rest pain, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.629	Atherosclerosis of nonbiological bypass graft(s) of the extremities with rest pain, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.631	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of thigh
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.632	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of calf
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.633	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of ankle
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.634	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of heel and midfoot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.635	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of other part of foot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.638	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of other part of lower leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.639	Atherosclerosis of nonbiological bypass graft(s) of the right leg with ulceration of unspecified site
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.641	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of thigh
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.642	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of calf
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.643	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of ankle
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.644	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of heel and midfoot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.645	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of other part of foot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.648	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of other part of lower leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.649	Atherosclerosis of nonbiological bypass graft(s) of the left leg with ulceration of unspecified site
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.65	Atherosclerosis of nonbiological bypass graft(s) of other extremity with ulceration
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.661	Atherosclerosis of nonbiological bypass graft(s) of the extremities with gangrene, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.662	Atherosclerosis of nonbiological bypass graft(s) of the extremities with gangrene, left leg

440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.663	Atherosclerosis of nonbiological bypass graft(s) of the extremities with gangrene, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.668	Atherosclerosis of nonbiological bypass graft(s) of the extremities with gangrene, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.669	Atherosclerosis of nonbiological bypass graft(s) of the extremities with gangrene, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.691	Other atherosclerosis of nonbiological bypass graft(s) of the extremities, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.692	Other atherosclerosis of nonbiological bypass graft(s) of the extremities, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.693	Other atherosclerosis of nonbiological bypass graft(s) of the extremities, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.698	Other atherosclerosis of nonbiological bypass graft(s) of the extremities, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.699	Other atherosclerosis of nonbiological bypass graft(s) of the extremities, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.701	Unspecified atherosclerosis of other type of bypass graft(s) of the extremities, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.702	Unspecified atherosclerosis of other type of bypass graft(s) of the extremities, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.703	Unspecified atherosclerosis of other type of bypass graft(s) of the extremities, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.708	Unspecified atherosclerosis of other type of bypass graft(s) of the extremities, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.709	Unspecified atherosclerosis of other type of bypass graft(s) of the extremities, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.711	Atherosclerosis of other type of bypass graft(s) of the extremities with intermittent claudication, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.712	Atherosclerosis of other type of bypass graft(s) of the extremities with intermittent claudication, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.713	Atherosclerosis of other type of bypass graft(s) of the extremities with intermittent claudication, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.718	Atherosclerosis of other type of bypass graft(s) of the extremities with intermittent claudication, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.719	Atherosclerosis of other type of bypass graft(s) of the extremities with intermittent claudication, unspecified extremity

440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.721	Atherosclerosis of other type of bypass graft(s) of the extremities with rest pain, right leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.722	Atherosclerosis of other type of bypass graft(s) of the extremities with rest pain, left leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.723	Atherosclerosis of other type of bypass graft(s) of the extremities with rest pain, bilateral legs
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.728	Atherosclerosis of other type of bypass graft(s) of the extremities with rest pain, other extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.729	Atherosclerosis of other type of bypass graft(s) of the extremities with rest pain, unspecified extremity
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.731	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of thigh
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.732	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of calf
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.733	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of ankle
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.734	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of heel and midfoot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.735	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of other part of foot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.738	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of other part of lower leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.739	Atherosclerosis of other type of bypass graft(s) of the right leg with ulceration of unspecified site
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.741	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of thigh
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.742	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of calf
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.743	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of ankle
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.744	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of heel and midfoot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.745	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of other part of foot
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.748	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of other part of lower leg
440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.749	Atherosclerosis of other type of bypass graft(s) of the left leg with ulceration of unspecified site

	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.75	Atherosclerosis of other type of bypass graft(s) of other extremity with ulceration
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.761	Atherosclerosis of other type of bypass graft(s) of the extremities with gangrene, right leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.762	Atherosclerosis of other type of bypass graft(s) of the extremities with gangrene, left leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.763	Atherosclerosis of other type of bypass graft(s) of the extremities with gangrene, bilateral legs
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.768	Atherosclerosis of other type of bypass graft(s) of the extremities with gangrene, other extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.769	Atherosclerosis of other type of bypass graft(s) of the extremities with gangrene, unspecified extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.791	Other atherosclerosis of other type of bypass graft(s) of the extremities, right leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.792	Other atherosclerosis of other type of bypass graft(s) of the extremities, left leg
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.793	Other atherosclerosis of other type of bypass graft(s) of the extremities, bilateral legs
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.798	Other atherosclerosis of other type of bypass graft(s) of the extremities, other extremity
	440.30	Atherosclerosis of unspecified bypass graft of the extremities	I70.799	Other atherosclerosis of other type of bypass graft(s) of the extremities, unspecified extremity
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.401	Unspecified atherosclerosis of autologous vein bypass graft(s) of the extremities, right leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.402	Unspecified atherosclerosis of autologous vein bypass graft(s) of the extremities, left leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.403	Unspecified atherosclerosis of autologous vein bypass graft(s) of the extremities, bilateral legs
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.408	Unspecified atherosclerosis of autologous vein bypass graft(s) of the extremities, other extremity
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.409	Unspecified atherosclerosis of autologous vein bypass graft(s) of the extremities, unspecified extremity
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.411	Atherosclerosis of autologous vein bypass graft(s) of the extremities with intermittent claudication, right leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.412	Atherosclerosis of autologous vein bypass graft(s) of the extremities with intermittent claudication, left leg

440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.413	Atherosclerosis of autologous vein bypass graft(s) of the extremities with intermittent claudication, bilateral legs
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.418	Atherosclerosis of autologous vein bypass graft(s) of the extremities with intermittent claudication, other extremity
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.419	Atherosclerosis of autologous vein bypass graft(s) of the extremities with intermittent claudication, unspecified extremity
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.421	Atherosclerosis of autologous vein bypass graft(s) of the extremities with rest pain, right leg
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.422	Atherosclerosis of autologous vein bypass graft(s) of the extremities with rest pain, left leg
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.423	Atherosclerosis of autologous vein bypass graft(s) of the extremities with rest pain, bilateral legs
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.428	Atherosclerosis of autologous vein bypass graft(s) of the extremities with rest pain, other extremity
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.429	Atherosclerosis of autologous vein bypass graft(s) of the extremities with rest pain, unspecified extremity
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.431	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of thigh
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.432	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of calf
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.433	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of ankle
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.434	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of heel and midfoot
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.435	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of other part of foot
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.438	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of other part of lower leg
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.439	Atherosclerosis of autologous vein bypass graft(s) of the right leg with ulceration of unspecified site
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.441	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of thigh
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.442	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of calf
440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.443	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of ankle

	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.444	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of heel and midfoot
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.445	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of other part of foot
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.448	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of other part of lower leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.449	Atherosclerosis of autologous vein bypass graft(s) of the left leg with ulceration of unspecified site
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.45	Atherosclerosis of autologous vein bypass graft(s) of other extremity with ulceration
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.461	Atherosclerosis of autologous vein bypass graft(s) of the extremities with gangrene, right leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.462	Atherosclerosis of autologous vein bypass graft(s) of the extremities with gangrene, left leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.463	Atherosclerosis of autologous vein bypass graft(s) of the extremities with gangrene, bilateral legs
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.468	Atherosclerosis of autologous vein bypass graft(s) of the extremities with gangrene, other extremity
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.469	Atherosclerosis of autologous vein bypass graft(s) of the extremities with gangrene, unspecified extremity
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.491	Other atherosclerosis of autologous vein bypass graft(s) of the extremities, right leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.492	Other atherosclerosis of autologous vein bypass graft(s) of the extremities, left leg
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.493	Other atherosclerosis of autologous vein bypass graft(s) of the extremities, bilateral legs
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.498	Other atherosclerosis of autologous vein bypass graft(s) of the extremities, other extremity
	440.31	Atherosclerosis of autologous vein bypass graft of the extremities	I70.499	Other atherosclerosis of autologous vein bypass graft(s) of the extremities, unspecified extremity
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.501	Unspecified atherosclerosis of nonautologous biological bypass graft(s) of the extremities, right leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.502	Unspecified atherosclerosis of nonautologous biological bypass graft(s) of the extremities, left leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.503	Unspecified atherosclerosis of nonautologous biological bypass graft(s) of the extremities, bilateral legs

440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.508	Unspecified atherosclerosis of nonautologous biological bypass graft(s) of the extremities, other extremity
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.509	Unspecified atherosclerosis of nonautologous biological bypass graft(s) of the extremities, unspecified extremity
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.511	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with intermittent claudication, right leg
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.512	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with intermittent claudication, left leg
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.513	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with intermittent claudication, bilateral legs
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.518	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with intermittent claudication, other extremity
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.519	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with intermittent claudication, unspecified extremity
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.521	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with rest pain, right leg
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.522	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with rest pain, left leg
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.523	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with rest pain, bilateral legs
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.528	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with rest pain, other extremity
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.529	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with rest pain, unspecified extremity
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.531	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of thigh
440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.532	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of calf

	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.533	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of ankle
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.534	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of heel and midfoot
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.535	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of other part of foot
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.538	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of other part of lower leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.539	Atherosclerosis of nonautologous biological bypass graft(s) of the right leg with ulceration of unspecified site
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.541	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of thigh
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.542	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of calf
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.543	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of ankle
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.544	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of heel and midfoot
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.545	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of other part of foot
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.548	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of other part of lower leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.549	Atherosclerosis of nonautologous biological bypass graft(s) of the left leg with ulceration of unspecified site
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.55	Atherosclerosis of nonautologous biological bypass graft(s) of other extremity with ulceration
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.561	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with gangrene, right leg



	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.562	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with gangrene, left leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.563	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with gangrene, bilateral legs
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.568	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with gangrene, other extremity
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.569	Atherosclerosis of nonautologous biological bypass graft(s) of the extremities with gangrene, unspecified extremity
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.591	Other atherosclerosis of nonautologous biological bypass graft(s) of the extremities, right leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.592	Other atherosclerosis of nonautologous biological bypass graft(s) of the extremities, left leg
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.593	Other atherosclerosis of nonautologous biological bypass graft(s) of the extremities, bilateral legs
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.598	Other atherosclerosis of nonautologous biological bypass graft(s) of the extremities, other extremity
	440.32	Atherosclerosis of nonautologous biological bypass graft of the extremities	I70.599	Other atherosclerosis of nonautologous biological bypass graft(s) of the extremities, unspecified extremity
7. Stroke / Ischemic stroke	ICD-9	ICD-9-CM Diagnosis Labeling	ICD-10	ICD-10-PCS Diagnosis Labeling
	433.91	Occlusion and stenosis of unspecified precerebral artery with cerebral infarction	I63.00	Cerebral infarction due to thrombosis of unspecified precerebral artery
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.011	Cerebral infarction due to thrombosis of right vertebral artery
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.012	Cerebral infarction due to thrombosis of left vertebral artery
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.019	Cerebral infarction due to thrombosis of unspecified vertebral artery
	433.01	Occlusion and stenosis of basilar artery with cerebral infarction	I63.02	Cerebral infarction due to thrombosis of basilar artery
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.031	Cerebral infarction due to thrombosis of right carotid artery
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.032	Cerebral infarction due to thrombosis of left carotid artery
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.039	Cerebral infarction due to thrombosis of unspecified carotid artery

	433.81	Occlusion and stenosis of other specified precerebral artery with cerebral infarction	I63.09	Cerebral infarction due to thrombosis of other precerebral artery
	433.91	Occlusion and stenosis of unspecified precerebral artery with cerebral infarction	I63.10	Cerebral infarction due to embolism of unspecified precerebral artery
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.111	Cerebral infarction due to embolism of right vertebral artery
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.112	Cerebral infarction due to embolism of left vertebral artery
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.119	Cerebral infarction due to embolism of unspecified vertebral artery
	433.01	Occlusion and stenosis of basilar artery with cerebral infarction	I63.12	Cerebral infarction due to embolism of basilar artery
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.131	Cerebral infarction due to embolism of right carotid artery
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.132	Cerebral infarction due to embolism of left carotid artery
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.139	Cerebral infarction due to embolism of unspecified carotid artery
	433.81	Occlusion and stenosis of other specified precerebral artery with cerebral infarction	I63.19	Cerebral infarction due to embolism of other precerebral artery
	433.91	Occlusion and stenosis of unspecified precerebral artery with cerebral infarction	I63.20	Cerebral infarction due to unspecified occlusion or stenosis of unspecified precerebral arteries
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.211	Cerebral infarction due to unspecified occlusion or stenosis of right vertebral arteries
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.212	Cerebral infarction due to unspecified occlusion or stenosis of left vertebral arteries
	433.21	Occlusion and stenosis of carotid artery with cerebral infarction	I63.219	Cerebral infarction due to unspecified occlusion or stenosis of unspecified vertebral arteries
	433.01	Occlusion and stenosis of basilar artery with cerebral infarction	I63.22	Cerebral infarction due to unspecified occlusion or stenosis of basilar arteries
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.231	Cerebral infarction due to unspecified occlusion or stenosis of right carotid arteries
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.232	Cerebral infarction due to unspecified occlusion or stenosis of left carotid arteries
	433.11	Occlusion and stenosis of carotid artery with cerebral infarction	I63.239	Cerebral infarction due to unspecified occlusion or stenosis of unspecified carotid arteries
	433.91	Occlusion and stenosis of unspecified precerebral artery with cerebral infarction	I63.29	Cerebral infarction due to unspecified occlusion or stenosis of other precerebral arteries
	434.01	Cerebral thrombosis with cerebral infarction	I63.30	Cerebral infarction due to thrombosis of unspecified cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.311	Cerebral infarction due to thrombosis of right middle cerebral artery

	434.01	Cerebral thrombosis with cerebral infarction	I63.312	Cerebral infarction due to thrombosis of left middle cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.319	Cerebral infarction due to thrombosis of unspecified middle cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.321	Cerebral infarction due to thrombosis of right anterior cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.322	Cerebral infarction due to thrombosis of left anterior cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.329	Cerebral infarction due to thrombosis of unspecified anterior cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.331	Cerebral infarction due to thrombosis of right posterior cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.332	Cerebral infarction due to thrombosis of left posterior cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.339	Cerebral infarction due to thrombosis of unspecified posterior cerebral artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.341	Cerebral infarction due to thrombosis of right cerebellar artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.342	Cerebral infarction due to thrombosis of left cerebellar artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.349	Cerebral infarction due to thrombosis of unspecified cerebellar artery
	434.01	Cerebral thrombosis with cerebral infarction	I63.39	Cerebral infarction due to thrombosis of other cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.40	Cerebral infarction due to embolism of unspecified cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.411	Cerebral infarction due to embolism of right middle cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.412	Cerebral infarction due to embolism of left middle cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.419	Cerebral infarction due to embolism of unspecified middle cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.421	Cerebral infarction due to embolism of right anterior cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.422	Cerebral infarction due to embolism of left anterior cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.429	Cerebral infarction due to embolism of unspecified anterior cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.431	Cerebral infarction due to embolism of right posterior cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.432	Cerebral infarction due to embolism of left posterior cerebral artery

	434.11	Cerebral embolism with cerebral infarction	I63.439	Cerebral infarction due to embolism of unspecified posterior cerebral artery
	434.11	Cerebral embolism with cerebral infarction	I63.441	Cerebral infarction due to embolism of right cerebellar artery
	434.11	Cerebral embolism with cerebral infarction	I63.442	Cerebral infarction due to embolism of left cerebellar artery
	434.11	Cerebral embolism with cerebral infarction	I63.449	Cerebral infarction due to embolism of unspecified cerebellar artery
	434.11	Cerebral embolism with cerebral infarction	I63.49	Cerebral infarction due to embolism of other cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.50	Cerebral infarction due to unspecified occlusion or stenosis of unspecified cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.511	Cerebral infarction due to unspecified occlusion or stenosis of right middle cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.512	Cerebral infarction due to unspecified occlusion or stenosis of left middle cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.519	Cerebral infarction due to unspecified occlusion or stenosis of unspecified middle cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.521	Cerebral infarction due to unspecified occlusion or stenosis of right anterior cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.522	Cerebral infarction due to unspecified occlusion or stenosis of left anterior cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.529	Cerebral infarction due to unspecified occlusion or stenosis of unspecified anterior cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.531	Cerebral infarction due to unspecified occlusion or stenosis of right posterior cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.532	Cerebral infarction due to unspecified occlusion or stenosis of left posterior cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.539	Cerebral infarction due to unspecified occlusion or stenosis of unspecified posterior cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.541	Cerebral infarction due to unspecified occlusion or stenosis of right cerebellar artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.542	Cerebral infarction due to unspecified occlusion or stenosis of left cerebellar artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.549	Cerebral infarction due to unspecified occlusion or stenosis of unspecified cerebellar artery
	433.31	Occlusion and stenosis of multiple and bilateral precerebral arteries with cerebral infarction	I63.59	Cerebral infarction due to unspecified occlusion or stenosis of other cerebral artery
	433.81	Occlusion and stenosis of other specified precerebral artery with cerebral infarction	I63.59	Cerebral infarction due to unspecified occlusion or stenosis of other cerebral artery
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.59	Cerebral infarction due to unspecified occlusion or stenosis of other cerebral artery

	434.01	Cerebral thrombosis with cerebral infarction	I63.6	Cerebral infarction due to cerebral venous thrombosis, nonpyogenic
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.8	Other cerebral infarction
	434.91	Unspecified cerebral artery occlusion with cerebral infarction	I63.9	Cerebral infarction, unspecified
	437.3	Cerebral aneurysm, nonruptured	I67.0	Dissection of cerebral arteries, nonruptured
	437.3	Cerebral aneurysm, nonruptured	I67.1	Cerebral aneurysm, nonruptured
	437.0	Cerebral atherosclerosis	I67.2	Cerebral atherosclerosis
	046.3	Progressive multifocal leukoencephalopathy	I67.3	Progressive vascular leukoencephalopathy
	437.2	Hypertensive encephalopathy	I67.4	Hypertensive encephalopathy
	437.5	Moyamoya disease	I67.5	Moyamoya disease
	437.1	Other generalized ischemic cerebrovascular disease	I67.81	Acute cerebrovascular insufficiency
	437.1	Other generalized ischemic cerebrovascular disease	I67.82	Cerebral ischemia
	348.3	Encephalopathy, unspecified	I67.83	Posterior reversible encephalopathy syndrome
	435.9	Unspecified transient cerebral ischemia	I67.841	Reversible cerebrovascular vasoconstriction syndrome
	435.9	Unspecified transient cerebral ischemia	I67.848	Other cerebrovascular vasospasm and vasoconstriction
	436	Acute, but ill-defined, cerebrovascular disease	I67.89	Other cerebrovascular disease
	437.1	Other generalized ischemic cerebrovascular disease	I67.89	Other cerebrovascular disease
	437.8	Other and ill-defined cerebrovascular disease	I67.89	Other cerebrovascular disease
	437.9	Ill-defined cerebrovascular disease, unspecified	I67.9	Cerebrovascular disease, unspecified
	438.9	Unspecified late effects of cerebrovascular disease	I69.30	Unspecified sequelae of cerebral infarction
	438.0	Cognitive deficits, late effects of cerebrovascular disease	I69.31	Cognitive deficits following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.31	Cognitive deficits following cerebral infarction
	438.11	Aphasia, late effects of cerebrovascular disease	I69.320	Aphasia following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.320	Aphasia following cerebral infarction
	438.12	Dysphasia, late effects of cerebrovascular disease	I69.321	Dysphasia following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.321	Dysphasia following cerebral infarction
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	I69.322	Dysarthria following cerebral infarction
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	I69.323	Fluency disorder following cerebral infarction
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	I69.328	Other speech and language deficits following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.328	Other speech and language deficits following cerebral infarction
	438.31	Monoplegia of upper limb affecting dominant side, late effects of cerebrovascular disease	I69.331	Monoplegia of upper limb following cerebral infarction affecting right dominant side

	438.31	Monoplegia of upper limb affecting dominant side, late effects of cerebrovascular disease	I69.332	Monoplegia of upper limb following cerebral infarction affecting left dominant side
	438.32	Monoplegia of upper limb affecting nondominant side, late effects of cerebrovascular disease	I69.333	Monoplegia of upper limb following cerebral infarction affecting right non-dominant side
	438.32	Monoplegia of upper limb affecting nondominant side, late effects of cerebrovascular disease	I69.334	Monoplegia of upper limb following cerebral infarction affecting left non-dominant side
	438.30	Monoplegia of upper limb affecting unspecified side, late effects of cerebrovascular disease	I69.339	Monoplegia of upper limb following cerebral infarction affecting unspecified side
	438.41	Monoplegia of lower limb affecting dominant side, late effects of cerebrovascular disease	I69.341	Monoplegia of lower limb following cerebral infarction affecting right dominant side
	438.41	Monoplegia of lower limb affecting dominant side, late effects of cerebrovascular disease	I69.342	Monoplegia of lower limb following cerebral infarction affecting left dominant side
	438.42	Monoplegia of lower limb affecting nondominant side, late effects of cerebrovascular disease	I69.343	Monoplegia of lower limb following cerebral infarction affecting right non-dominant side
	438.42	Monoplegia of lower limb affecting nondominant side, late effects of cerebrovascular disease	I69.344	Monoplegia of lower limb following cerebral infarction affecting left non-dominant side
	438.40	Monoplegia of lower limb affecting unspecified side, late effects of cerebrovascular disease	I69.349	Monoplegia of lower limb following cerebral infarction affecting unspecified side
	438.9	Unspecified late effects of cerebrovascular disease	I69.349	Monoplegia of lower limb following cerebral infarction affecting unspecified side
	438.21	Hemiplegia affecting dominant side, late effects of cerebrovascular disease	I69.351	Hemiplegia and hemiparesis following cerebral infarction affecting right dominant side
	438.21	Hemiplegia affecting dominant side, late effects of cerebrovascular disease	I69.352	Hemiplegia and hemiparesis following cerebral infarction affecting left dominant side
	438.22	Hemiplegia affecting nondominant side, late effects of cerebrovascular disease	I69.353	Hemiplegia and hemiparesis following cerebral infarction affecting right non-dominant side
	438.22	Hemiplegia affecting nondominant side, late effects of cerebrovascular disease	I69.354	Hemiplegia and hemiparesis following cerebral infarction affecting left non-dominant side
	438.20	Hemiplegia affecting unspecified side, late effects of cerebrovascular disease	I69.359	Hemiplegia and hemiparesis following cerebral infarction affecting unspecified side
	438.51	Other paralytic syndrome affecting dominant side, late effects of cerebrovascular disease	I69.361	Other paralytic syndrome following cerebral infarction affecting right dominant side
	438.9	Unspecified late effects of cerebrovascular disease	I69.361	Other paralytic syndrome following cerebral infarction affecting right dominant side
	438.51	Other paralytic syndrome affecting dominant side, late effects of cerebrovascular disease	I69.362	Other paralytic syndrome following cerebral infarction affecting left dominant side
	438.9	Unspecified late effects of cerebrovascular disease	I69.362	Other paralytic syndrome following cerebral infarction affecting left dominant side
	438.52	Other paralytic syndrome affecting nondominant side, late effects of cerebrovascular disease	I69.363	Other paralytic syndrome following cerebral infarction affecting right non-dominant side
	438.9	Unspecified late effects of cerebrovascular disease	I69.363	Other paralytic syndrome following cerebral infarction affecting right non-dominant side

	438.52	Other paralytic syndrome affecting nondominant side, late effects of cerebrovascular disease	I69.364	Other paralytic syndrome following cerebral infarction affecting left non-dominant side
	438.9	Unspecified late effects of cerebrovascular disease	I69.364	Other paralytic syndrome following cerebral infarction affecting left non-dominant side
	438.53	Other paralytic syndrome, bilateral, late effects of cerebrovascular disease	I69.365	Other paralytic syndrome following cerebral infarction, bilateral
	438.9	Unspecified late effects of cerebrovascular disease	I69.365	Other paralytic syndrome following cerebral infarction, bilateral
	438.50	Other paralytic syndrome affecting unspecified side, late effects of cerebrovascular disease	I69.369	Other paralytic syndrome following cerebral infarction affecting unspecified side
	438.9	Unspecified late effects of cerebrovascular disease	I69.369	Other paralytic syndrome following cerebral infarction affecting unspecified side
	438.81	Apraxia, late effects of cerebrovascular disease	I69.390	Apraxia following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.390	Apraxia following cerebral infarction
	438.82	Dysphagia, late effects of cerebrovascular disease	I69.391	Dysphagia following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.391	Dysphagia following cerebral infarction
	438.89	Other late effects of cerebrovascular disease	I69.392	Facial weakness following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.392	Facial weakness following cerebral infarction
	438.89	Other late effects of cerebrovascular disease	I69.393	Ataxia following cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.393	Ataxia following cerebral infarction
	438.89	Other late effects of cerebrovascular disease	I69.398	Other sequelae of cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.398	Other sequelae of cerebral infarction
	438.9	Unspecified late effects of cerebrovascular disease	I69.80	Unspecified sequelae of other cerebrovascular disease
	438.0	Cognitive deficits, late effects of cerebrovascular disease	I69.81	Cognitive deficits following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	I69.81	Cognitive deficits following other cerebrovascular disease
	438.11	Aphasia, late effects of cerebrovascular disease	I69.820	Aphasia following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	I69.820	Aphasia following other cerebrovascular disease
	438.12	Dysphasia, late effects of cerebrovascular disease	I69.821	Dysphasia following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	I69.821	Dysphasia following other cerebrovascular disease
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	I69.822	Dysarthria following other cerebrovascular disease
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	I69.823	Fluency disorder following other cerebrovascular disease
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	I69.828	Other speech and language deficits following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	I69.828	Other speech and language deficits following other cerebrovascular disease

	438.31	Monoplegia of upper limb affecting dominant side, late effects of cerebrovascular disease	169.831	Monoplegia of upper limb following other cerebrovascular disease affecting right dominant side
	438.31	Monoplegia of upper limb affecting dominant side, late effects of cerebrovascular disease	169.832	Monoplegia of upper limb following other cerebrovascular disease affecting left dominant side
	438.32	Monoplegia of upper limb affecting nondominant side, late effects of cerebrovascular disease	169.833	Monoplegia of upper limb following other cerebrovascular disease affecting right non-dominant side
	438.32	Monoplegia of upper limb affecting nondominant side, late effects of cerebrovascular disease	169.834	Monoplegia of upper limb following other cerebrovascular disease affecting left non-dominant side
	438.30	Monoplegia of upper limb affecting unspecified side, late effects of cerebrovascular disease	169.839	Monoplegia of upper limb following other cerebrovascular disease affecting unspecified side
	438.41	Monoplegia of lower limb affecting dominant side, late effects of cerebrovascular disease	169.841	Monoplegia of lower limb following other cerebrovascular disease affecting right dominant side
	438.41	Monoplegia of lower limb affecting dominant side, late effects of cerebrovascular disease	169.842	Monoplegia of lower limb following other cerebrovascular disease affecting left dominant side
	438.42	Monoplegia of lower limb affecting nondominant side, late effects of cerebrovascular disease	169.843	Monoplegia of lower limb following other cerebrovascular disease affecting right non-dominant side
	438.42	Monoplegia of lower limb affecting nondominant side, late effects of cerebrovascular disease	169.844	Monoplegia of lower limb following other cerebrovascular disease affecting left non-dominant side
	438.40	Monoplegia of lower limb affecting unspecified side, late effects of cerebrovascular disease	169.849	Monoplegia of lower limb following other cerebrovascular disease affecting unspecified side
	438.9	Unspecified late effects of cerebrovascular disease	169.849	Monoplegia of lower limb following other cerebrovascular disease affecting unspecified side
	438.21	Hemiplegia affecting dominant side, late effects of cerebrovascular disease	169.851	Hemiplegia and hemiparesis following other cerebrovascular disease affecting right dominant side
	438.21	Hemiplegia affecting dominant side, late effects of cerebrovascular disease	169.852	Hemiplegia and hemiparesis following other cerebrovascular disease affecting left dominant side
	438.22	Hemiplegia affecting nondominant side, late effects of cerebrovascular disease	169.853	Hemiplegia and hemiparesis following other cerebrovascular disease affecting right non-dominant side
	438.22	Hemiplegia affecting nondominant side, late effects of cerebrovascular disease	169.854	Hemiplegia and hemiparesis following other cerebrovascular disease affecting left non-dominant side



	438.20	Hemiplegia affecting unspecified side, late effects of cerebrovascular disease	169.859	Hemiplegia and hemiparesis following other cerebrovascular disease affecting unspecified side
	438.51	Other paralytic syndrome affecting dominant side, late effects of cerebrovascular disease	169.861	Other paralytic syndrome following other cerebrovascular disease affecting right dominant side
	438.9	Unspecified late effects of cerebrovascular disease	169.861	Other paralytic syndrome following other cerebrovascular disease affecting right dominant side
	438.51	Other paralytic syndrome affecting dominant side, late effects of cerebrovascular disease	169.862	Other paralytic syndrome following other cerebrovascular disease affecting left dominant side
	438.9	Unspecified late effects of cerebrovascular disease	169.862	Other paralytic syndrome following other cerebrovascular disease affecting left dominant side
	438.52	Other paralytic syndrome affecting nondominant side, late effects of cerebrovascular disease	169.863	Other paralytic syndrome following other cerebrovascular disease affecting right non-dominant side
	438.9	Unspecified late effects of cerebrovascular disease	169.863	Other paralytic syndrome following other cerebrovascular disease affecting right non-dominant side
	438.52	Other paralytic syndrome affecting nondominant side, late effects of cerebrovascular disease	169.864	Other paralytic syndrome following other cerebrovascular disease affecting left non-dominant side
	438.9	Unspecified late effects of cerebrovascular disease	169.864	Other paralytic syndrome following other cerebrovascular disease affecting left non-dominant side
	438.53	Other paralytic syndrome, bilateral, late effects of cerebrovascular disease	169.865	Other paralytic syndrome following other cerebrovascular disease, bilateral
	438.9	Unspecified late effects of cerebrovascular disease	169.865	Other paralytic syndrome following other cerebrovascular disease, bilateral
	438.50	Other paralytic syndrome affecting unspecified side, late effects of cerebrovascular disease	169.869	Other paralytic syndrome following other cerebrovascular disease affecting unspecified side
	438.9	Unspecified late effects of cerebrovascular disease	169.869	Other paralytic syndrome following other cerebrovascular disease affecting unspecified side
	438.81	Apraxia, late effects of cerebrovascular disease	169.890	Apraxia following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	169.890	Apraxia following other cerebrovascular disease
	438.82	Dysphagia, late effects of cerebrovascular disease	169.891	Dysphagia following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	169.891	Dysphagia following other cerebrovascular disease
	438.89	Other late effects of cerebrovascular disease	169.892	Facial weakness following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	169.892	Facial weakness following other cerebrovascular disease

	438.89	Other late effects of cerebrovascular disease	169.893	Ataxia following other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	169.893	Ataxia following other cerebrovascular disease
	438.89	Other late effects of cerebrovascular disease	169.898	Other sequelae of other cerebrovascular disease
	438.9	Unspecified late effects of cerebrovascular disease	169.90	Unspecified sequelae of unspecified cerebrovascular disease
	438.0	Cognitive deficits, late effects of cerebrovascular disease	169.91	Cognitive deficits following unspecified cerebrovascular disease
	438.11	Aphasia, late effects of cerebrovascular disease	169.920	Aphasia following unspecified cerebrovascular disease
	438.12	Dysphasia, late effects of cerebrovascular disease	169.921	Dysphasia following unspecified cerebrovascular disease
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	169.922	Dysarthria following unspecified cerebrovascular disease
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	169.923	Fluency disorder following unspecified cerebrovascular disease
	438.10	Speech and language deficit, unspecified, late effects of cerebrovascular disease	169.928	Other speech and language deficits following unspecified cerebrovascular disease
	438.19	Other Speech and language deficits, late effects of cerebrovascular disease	169.928	Other speech and language deficits following unspecified cerebrovascular disease
	438.31	Monoplegia of upper limb affecting dominant side, late effects of cerebrovascular disease	169.931	Monoplegia of upper limb following unspecified cerebrovascular disease affecting right dominant side
	438.31	Monoplegia of upper limb affecting dominant side, late effects of cerebrovascular disease	169.932	Monoplegia of upper limb following unspecified cerebrovascular disease affecting left dominant side
	438.32	Monoplegia of upper limb affecting nondominant side, late effects of cerebrovascular disease	169.933	Monoplegia of upper limb following unspecified cerebrovascular disease affecting right non-dominant side
	438.32	Monoplegia of upper limb affecting nondominant side, late effects of cerebrovascular disease	169.934	Monoplegia of upper limb following unspecified cerebrovascular disease affecting left non-dominant side
	438.30	Monoplegia of upper limb affecting unspecified side, late effects of cerebrovascular disease	169.939	Monoplegia of upper limb following unspecified cerebrovascular disease affecting unspecified side
	438.41	Monoplegia of lower limb affecting dominant side, late effects of cerebrovascular disease	169.941	Monoplegia of lower limb following unspecified cerebrovascular disease affecting right dominant side
	438.41	Monoplegia of lower limb affecting dominant side, late effects of cerebrovascular disease	169.942	Monoplegia of lower limb following unspecified cerebrovascular disease affecting left dominant side
	438.42	Monoplegia of lower limb affecting nondominant side, late effects of cerebrovascular disease	169.943	Monoplegia of lower limb following unspecified cerebrovascular disease affecting right non-dominant side

	438.42	Monoplegia of lower limb affecting nondominant side, late effects of cerebrovascular disease	169.944	Monoplegia of lower limb following unspecified cerebrovascular disease affecting left non-dominant side
	438.40	Monoplegia of lower limb affecting unspecified side, late effects of cerebrovascular disease	169.949	Monoplegia of lower limb following unspecified cerebrovascular disease affecting unspecified side
	438.21	Hemiplegia affecting dominant side, late effects of cerebrovascular disease	169.951	Hemiplegia and hemiparesis following unspecified cerebrovascular disease affecting right dominant side
	438.21	Hemiplegia affecting dominant side, late effects of cerebrovascular disease	169.952	Hemiplegia and hemiparesis following unspecified cerebrovascular disease affecting left dominant side
	438.22	Hemiplegia affecting nondominant side, late effects of cerebrovascular disease	169.953	Hemiplegia and hemiparesis following unspecified cerebrovascular disease affecting right non-dominant side
	438.22	Hemiplegia affecting nondominant side, late effects of cerebrovascular disease	169.954	Hemiplegia and hemiparesis following unspecified cerebrovascular disease affecting left non-dominant side
	438.20	Hemiplegia affecting unspecified side, late effects of cerebrovascular disease	169.959	Hemiplegia and hemiparesis following unspecified cerebrovascular disease affecting unspecified side
	438.51	Other paralytic syndrome affecting dominant side, late effects of cerebrovascular disease	169.961	Other paralytic syndrome following unspecified cerebrovascular disease affecting right dominant side
	438.51	Other paralytic syndrome affecting dominant side, late effects of cerebrovascular disease	169.962	Other paralytic syndrome following unspecified cerebrovascular disease affecting left dominant side
	438.52	Other paralytic syndrome affecting nondominant side, late effects of cerebrovascular disease	169.963	Other paralytic syndrome following unspecified cerebrovascular disease affecting right non-dominant side
	438.52	Other paralytic syndrome affecting nondominant side, late effects of cerebrovascular disease	169.964	Other paralytic syndrome following unspecified cerebrovascular disease affecting left non-dominant side
	438.53	Other paralytic syndrome, bilateral, late effects of cerebrovascular disease	169.965	Other paralytic syndrome following unspecified cerebrovascular disease, bilateral
	438.50	Other paralytic syndrome affecting unspecified side, late effects of cerebrovascular disease	169.969	Other paralytic syndrome following unspecified cerebrovascular disease affecting unspecified side
	438.81	Apraxia, late effects of cerebrovascular disease	169.990	Apraxia following unspecified cerebrovascular disease
	438.82	Dysphagia, late effects of cerebrovascular disease	169.991	Dysphagia following unspecified cerebrovascular disease
	438.89	Other late effects of cerebrovascular disease	169.992	Facial weakness following unspecified cerebrovascular disease

	438.89	Other late effects of cerebrovascular disease	I69.993	Ataxia following unspecified cerebrovascular disease
	438.89	Other late effects of cerebrovascular disease	I69.998	Other sequelae following unspecified cerebrovascular disease
8. Atrial fibrillation	ICD-9	ICD-9-CM Diagnosis Labeling	ICD-10	ICD-10-PCS Diagnosis Labeling
	427.31	Atrial fibrillation	I48.0	Paroxysmal atrial fibrillation
	427.32	Atrial flutter	I48.1	Persistent atrial fibrillation
	427.31	Atrial fibrillation	I48.2	Chronic atrial fibrillation
	427.31	Atrial fibrillation	I48.91	Unspecified atrial fibrillation