Disease burden of primary biliary cholangitis and associated pruritus based on a cross-sectional US claims analysis

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ABSTRACT

Objective In order to identify areas of unmet need in patients with primary biliary cholangitis (PBC), this study sought to use real-world observational healthcare data to characterise the burden in patients with PBC and in PBC patients with a recorded diagnosis of pruritus.

Design This retrospective, cross-sectional database study compared prevalence of prespecified comorbidities and medications in the PBC population and PBC-pruritus subpopulation with non-cases using an indirect standardisation approach. The PBC population was identified from the US IBM MarketScan Commercial Claims and Medicare Supplemental Database during 2016 using International Classification of Diseases 10th Revision, Clinical Modification codes (≥2 claims for PBC; the PBC-pruritus subpopulation additionally had ≥1 claim for pruritus during this period. Non-cases had no claims for PBC. Indirect age-sex standardised prevalence ratios (iSPR) and 95% confidence intervals (CIs) were calculated for prespecified comorbidities and medications recorded during 2017.

Results The PBC population (N=1963) and PBC-pruritus subpopulation (N=139) had significantly higher prevalence of fatigue (19.9%, iSPR 95% CI: 1.51 (1.36 to 1.66); 26.6%, 2.10 (1.48 to 2.90)), depression/anxiety (21.3%, 1.09 (0.99 to 1.20); 28.1%, 1.46 (1.04 to 2.00)) and sleep-related issues (6.9%, 1.18 (0.99 to 1.40); 14.4%, 2.58 (1.58 to 3.99)) compared with non-cases. Bile acid sequestrants were prescribed in 5.8% and 18.0% of the PBC and PBC-pruritus populations, respectively. In general, a higher prevalence of comorbidities and medication use was observed in the PBC-pruritus subpopulation compared with the PBC population and non-cases. Conclusion Despite availability of treatments for PBC, the PBC population had a higher burden of comorbidities than non-cases. This burden was even greater among the PBC-pruritus subpopulation, with a particularly high prevalence of sleep disorders and depression/anxiety. Despite this, pruritus remains undertreated highlighting a need for treatments specifically indicated for cholestatic pruritus.

INTRODUCTION

Primary biliary cholangitis (PBC) is a rare chronic autoimmune cholestatic liver disease characterised by ductopenia, cholestasis and biliary fibrosis resulting in end-stage liver disease and associated complications.1 The global prevalence of PBC is estimated to range from 1.9 to 40.2 per 100000 individuals.23 Diagnosis is typically made between 55 and 65 years of age, and women are disproportionately affected with a female-to-male ratio of up to 9:1.45

Pruritus is one of the most common conditions associated with PBC, affecting approximately 50% of patients at any given point after...
diagnosis and up to 75% of patients over the course of the disease. Other conditions associated with PBC include extrahepatic autoimmune diseases, as well as symptoms such as abdominal discomfort, bone and joint pain, restless legs syndrome and cognitive dysfunction. The burden associated with PBC may be further compounded by pruritus, which has a profoundly negative impact on the health-related quality of life (HRQoL) of affected patients. Pruritus is also associated with sleep disturbance, fatigue and depression, and suicidal ideation.

The recommended first-line therapy for patients with PBC, for which treatment is usually lifelong, is ursodeoxycholic acid (UDCA). Treatment can improve prognosis and reduce mortality, but does not improve fatigue or alleviate pruritus. Obeticholic acid (OCA) is approved and recommended as second-line therapy for PBC either alone (for those who are unable to tolerate UDCA) or in combination with UDCA (for those without a sufficient response to UDCA). However, pruritus is the most commonly reported adverse effect with OCA, and has been included as a warning and precaution in the prescribing information by the US Food and Drug Administration.

The only treatment for cholestatic pruritus with a specific indication is the bile-acid sequestrant cholestyramine. However, cholestyramine interferes with the absorption of other medications, including UDCA or OCA. It also has several gastrointestinal side effects and tolerability issues. Treatment options for pruritus that are used off-label include rifampicin, fibrates, selective serotonin reuptake inhibitors (eg, sertraline), opiate antagonists (eg, naltrexone) and antihistamines (primarily for their sedative properties). These treatments have limited efficacy.

Large insurance claims databases are particularly invaluable for assessing the real-world management and burden in patients with rare diseases, such as PBC. Insights can be gained into comorbidities, medication usage and measures of disease-related burden among patients with PBC, regardless of physician specialty. The aim of this study was to assess the prevalence of prespecified comorbidities and medication use in patients with PBC, particularly in those with pruritus, and to compare with age-matched and sex-matched individuals without PBC, using claims data from a US health insurance database. Thus, the overarching objective of this study is to better understand and describe the overall holistic burden in the PBC population and those with a recorded diagnosis of pruritus using real-world data in order to identify areas of unmet need with the aim of improving patient care in the future. To the best of our knowledge, this is the first such assessment reported in the literature.

MATERIALS AND METHODS
Study design and data source
This retrospective, cross-sectional study used de-identified US administrative data from the IBM MarketScan Commercial Claims and Medicare Supplemental Database. This database provides a nationally representative sample of insured individuals living in the USA and includes information on inpatient and outpatient medical data and outpatient prescription drug data.

Claims and prescriptions were evaluated during a 12-month observation period (1 January to 31 December 2017) to record the occurrence of events of interest. The reference date was 1 January 2017. The 12-month period immediately prior to this was defined as the lead-in period, during which cases and baseline characteristics were identified.

Eligibility criteria
Eligible patients were required to be at least 18 years of age at reference date with uninterrupted enrolment, including pharmacy and medical benefits, during the lead-in period and throughout the entire observation period, and at least one record of any type during the lead-in period, both for cases and non-cases, to ascertain patients were active in the healthcare system. No exclusion criteria were employed.

Analysis populations
Prevalent PBC cases were identified using 2020 International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes for PBC (K74.3). These cases formed the PBC population, defined as individuals with at least two claims for PBC during the full study period, of which at least one had to occur during the lead-in period. This approach was informed by an earlier validation study, which reported that the optimal algorithm to identify PBC cases in administrative data included the use of at least two PBC-related codes, with a sensitivity of 94% and a positive predictive value of 73%. A subset of the PBC population, hereafter referred to as the PBC-pruritus subpopulation, was identified using the same criteria for PBC; however, individuals were additionally required to have at least one claim for pruritus during the lead-in period. As no ICD-10-CM code exists for PBC-specific pruritus, these patients were identified using a general pruritus code (ICD-10 L29 (pruritus, unspecified)). The non-case populations (ie, comparator populations) were identified as those not meeting the case definition (ie, with no ICD-10-CM diagnosis code for PBC or no PBC-pruritus at any time prior to 31 December 2016).

Study outcome variables and data analysis
Data on prespecified comorbidities and medications of interest were extracted from the data source based on the presence of at least one claim or prescription fill, respectively, during the observation period. The prevalence of comorbidities and medication use in the PBC population, PBC-pruritus subpopulation and non-case population was assessed. Prespecified comorbidities of interest were categorised as either autoimmune conditions (known to be more common in patients with PBC), other liver conditions, or potential symptoms and/or comorbidities associated...
with PBC, such as fatigue, depression or anxiety, and sleep-related issues. Prespecified comorbidities were identified using their respective ICD-10-CM diagnosis codes (see online supplemental file 1). Prespecified concomitant medications (including treatments for PBC, pruritus and other comorbidities) were identified using national drug codes and the Healthcare Common Procedure Coding System. The 30 most common comorbidities and medications in the PBC and PBC-pruritus populations identified from the data are presented in online supplemental tables 1 and 2, respectively.

Age, as on reference date, was determined and categorised into broad groups. Indirect age-sex standardised prevalence ratios (iSPRs) – a ratio of the prevalence of a given comorbidity or medication in the PBC population relative to the prevalence in the non-case population – were calculated. iSPR values greater or less than 1 indicate that the event is either more or less common in the PBC population relative to the non-case population, respectively. This approach improves estimate precision by leveraging the size of the non-case population while accounting for differences in age and sex distributions between the case and non-case populations. Further details of the mathematical approaches used to calculate iSPRs are provided in the online supplemental methods.

Statistical analyses

No formal power calculations were performed. Analyses included complete data available from all eligible cases. To determine potential differences between the case and non-case populations, 95% CIs of iSPRs were calculated. Analyses were conducted using the Instant Health Data Platform (Panalgo, Boston, MA; R V3.2.1).

RESULTS

Patient characteristics

Of 10247555 individuals in the data source, 1963 were included in the PBC population, of whom 139 had a pruritus code during the lead-in period and were included in the PBC-pruritus subpopulation. In both populations, women comprised the majority of cases (PBC population: 90%; PBC-pruritus subpopulation: 91%). Over 40% of all PBC cases were in the 55–64 year age group; fewer than 5% were in the 18–34 year age group, and fewer than 10% were ≥75 years. By contrast, the PBC-pruritus subpopulation was skewed towards the younger (35–54 years) age group compared with the overall PBC population (~40% vs ~30%, respectively; figure 1).

Comorbidities during the observation period

With respect to PBC symptoms of interest, pruritus was observed in 6.8% of the PBC population (based on claims during the observation period), a three-fold higher prevalence relative to non-cases (1.5%) (iSPR (95% CI): 3.24 (2.71 to 3.84)) (table 1), and was more frequently observed in the younger population (18–34 years) compared with other age groups (online supplemental table 3).

Diarrhoea was the most common symptom of interest in the PBC population (9.3%) and the PBC-pruritus subpopulation (13.7%) (table 1, online supplemental figure 1); in both cases, the prevalence of diarrhoea was at least triple that observed in the non-case population (3.1%) (iSPR (95% CI): 2.38 (2.05 to 2.75) and 3.73 (2.25 to 5.83), respectively) (table 1, figure 1). Compared with non-cases (6.6%), the prevalence of urinary tract infection was also higher in the PBC population (13.8%; iSPR (95% CI): 1.37 (1.21 to 1.54)) and in the PBC-pruritus subpopulation (13.0%) (table 1, online supplemental figure 1); however, the iSPR was not significant for the PBC-pruritus subpopulation relative to non-cases as the CI crossed unity (iSPR (95% CI): 1.36 (0.81 to 2.15)) (table 1, figure 2).

Prevalent fatigue, psychiatric conditions and sleep disturbance

Among the prespecified comorbidities, fatigue was most frequently reported in both the PBC population and PBC-pruritus subpopulation compared with non-cases: 19.9% (iSPR (95% CI): 1.51 (1.36 to 1.66)) and 26.6% (iSPR (95% CI): 2.10 (1.48 to 2.90)), respectively (table 1). A higher prevalence of depression or anxiety was also observed in both PBC populations compared with non-cases: 21.3% (iSPR (95% CI): 1.09 (0.99 to 1.20) and 28.1% (iSPR (95% CI): 1.46 (1.04 to 2.00)), respectively (table 1). The prevalence of all prespecified psychiatric comorbidities (except cognitive impairment) was also significantly higher in the PBC-pruritus subpopulation, and the magnitude of the difference relative to non-cases was greater than in the PBC population (figure 2). The greatest difference was observed for sleep-related issues, which was 2.6-fold higher in the PBC-pruritus subpopulation compared with non-cases (14.4%; iSPR (95% CI): 2.58 (1.58 to 3.99)) compared with 1.2-fold higher in the PBC population (6.9%; iSPR (95% CI: 1.18 (0.99 to 1.40)) (table 1).
Liver and autoimmune conditions

Of all the prespecified comorbidities assessed, autoimmune hepatitis showed the greatest difference in prevalence between both the PBC population (9.5%; iSPR (95% CI): 151.31 (130.40 to 174.62)) and the PBC-pruritus subpopulation (12.2%; 218.07 (127.03 to 349.15)) compared with non-cases (table 1, figure 2). This was followed (by descending prevalence in the PBC-pruritus subset) by Sjögren’s syndrome (5.8%, 11.64 (9.60 to 13.98); 11.5%, 25.20 (14.40 to 40.93)) autoimmune thyroid disease (6.3%, 2.89 (2.40 to 3.45); 5.0%, 2.58 (1.04 to 5.31)), autoimmune thyroid disease (3.0%, 2.09 (1.59 to 2.70); 4.3%, 2.92 (1.07 to 6.36)), Raynaud’s syndrome (2.9%, 7.75 (5.87 to 10.04); 2.9%, 7.72 (2.10 to 19.75)) and systemic lupus erythematosus (2.4%, 4.91 (3.60 to 6.52); 1.4%, 2.95 (0.36 to 10.67)) (table 1, figure 2).

Treatments during the observation period

Approved and off-label treatments for PBC

Over 80% of the PBC population and PBC-pruritus subpopulation received UDCA therapy in the 12-month observation period (87.8% and 83.5%, respectively, vs 0.1% for non-cases). The corresponding data for OCA use was 6.9% and 11.5% versus 0%, respectively, indicating greater use of OCA in the PBC-pruritus subpopulation (table 2, figure 3). The use of fibrates, which are sometimes used off-label as a treatment for PBC and are thought to have a benefit on pruritus, was more prevalent in the PBC-pruritus subpopulation compared with the PBC population and non-cases (1.3% and 2.9% vs 1.4%, respectively). Most of the other prespecified medications were also more frequently prescribed in both PBC populations compared with non-cases (table 2, figure 3).

Recommended treatments for pruritus in PBC according to global guidelines

Bile acid sequestrants were the most frequently prescribed pruritus therapies in the PBC-population and PBC-pruritus subpopulation compared with non-cases (5.8% and 18.0% vs 0.4%, respectively) (table 2). A similar trend was also observed for rifampicin (1.5% and 10.8% vs 0.1%) (table 2). Similarly, naltrexone was prescribed to 0.8% and 4.3% of the PBC and PBC-pruritus subpopulation versus 0.1% for non-cases (table 2). A near two-fold higher prevalence of sertraline use was observed in the PBC-pruritus subpopulation relative to the PBC population and non-cases (5.0% and 9.4% vs 3.6%) (table 2). Similarly, antihistamine prescriptions were more than two-fold higher in the PBC-pruritus subpopulation than in the PBC population (15.7% and 34.5% vs 8.5%) (table 2).

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Table 1: Observed crude point prevalence and iSPR of prespecified comorbidities among patients in the PBC population or the PBC-pruritus subpopulation relative to the respective non-case population

| Comorbidity | PBC population (N=1963) | PBC-pruritus subpopulation (N=139) | Non-case population (N=10 245 592)* |
|-------------|-------------------------|-----------------------------------|----------------------------------|
|             | % iSPR (95% CI)†        | % iSPR (95% CI)†                  | % iSPR (95% CI)†                  |
| PBC symptoms of interest |                        |                                   |                                  |
| Diarrhoea   | 9.3 2.38 (2.05 to 2.75) | 13.7 3.73 (2.25 to 5.83)          | 3.1                              |
| Pruritus    | 6.8 3.24 (2.71 to 3.84) | N/A N/A                           | 1.5                              |
| UTI         | 13.8 1.37 (1.21 to 1.54) | 13.0 1.36 (0.81 to 2.15)          | 6.6                              |
| Prevalent psychiatric and other conditions affecting QoL |                        |                                   |                                  |
| Cognitive impairment | 3.1 1.00 (0.77 to 1.29) | 4.3 1.77 (0.65 to 3.85)          | 1.7                              |
| Depression or anxiety | 21.3 1.09 (0.99 to 1.20) | 28.1 1.46 (1.04 to 2.00)          | 15.9                             |
| Fatigue     | 19.9 1.51 (1.36 to 1.66) | 26.6 2.10 (1.48 to 2.90)          | 10.4                             |
| Sleep-related issues | 6.9 1.18 (0.99 to 1.40) | 14.4 2.58 (1.58 to 3.99)          | 4.4                              |
| Liver and autoimmune conditions |                        |                                   |                                  |
| Autoimmune hepatitis | 9.5 151.31 (130.40 to 174.62) | 12.2 218.07 (127.03 to 349.15) | 0.03                             |
| Autoimmune thyroid disease | 3.0 2.09 (1.59 to 2.70) | 4.3 2.92 (1.07 to 6.36)          | 1.0                              |
| Raynaud’s syndrome | 2.9 7.75 (5.87 to 10.04) | 2.9 7.72 (2.10 to 19.75)          | 0.2                              |
| Rheumatoid arthritis | 6.3 2.89 (2.40 to 3.45) | 5.0 2.58 (1.04 to 5.31)          | 1.2                              |
| Sjögren’s syndrome | 5.8 11.64 (9.60 to 13.98) | 11.5 25.20 (14.40 to 40.93)       | 0.2                              |
| SLE         | 2.4 4.91 (3.60 to 6.52)  | 1.4 2.95 (0.36 to 10.67)          | 0.3                              |

*N for the non-case population (N=10 245 592), relates to the comparison versus the PBC population not vs the PBC-pruritus population (N=9 984 009). †Compared with non-case population. CI, confidence interval; iSPRs, indirect age-sex standardised prevalence ratios; N/A, not applicable; PBC, primary biliary cholangitis; QoL, quality of life; SLE, systemic lupus erythematosus; UTI, urinary tract infection.

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The use of immunosuppressants among PBC cases was also significantly higher than in non-cases. The immunosuppressive drugs that were more commonly prescribed in the PBC-pruritus subpopulation relative to the PBC population included corticoids (29.4% and 33.8% vs 17.1%), mycophenolate mofetil (3.5% and 7.9% vs 0.2%), and cyclosporine (0.7% and 0.7% vs 0.03%) (table 2).

Figure 2 Prevalence of prespecified comorbidities among (A) patients in the PBC population (N=1963) or (B) the PBC-pruritus subpopulation (N=139) relative to the respective non-case populations*. *Ns for the non-case population differs between analysis A and B: non-cases for analysis A (PBC population) N=10 245 592; non-cases for analysis B (PBC-pruritus subpopulation) N=9 984 009.

Immunosuppressants
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Other treatments
Additional medications that were prescribed for the treatment of comorbidities that were higher in PBC-pruritus subpopulation than in PBC cases and non-cases included sleep medications (12.9% and 16.6% vs 7.7%), antidiarrhoal treatment (1.1% and 2.2% vs 0.5%) and antihyperlipidaemic agents (including statins) (31.6% and 38.1% vs 20.9%) (table 2).

DISCUSSION
This retrospective cross-sectional study indicates that patients with PBC experience a significant burden from their disease, including a high prevalence of comorbidities, particularly psychiatric disorders, fatigue and sleep disturbance. Furthermore, these comorbidities were more common in the presence of pruritus.

Consistent with the literature, a female-to-male ratio of PBC cases of 9:1 was observed, with most cases between 55 and 64 years of age. By contrast, pruritus was more frequent (15%) in the youngest age group (18–34 years), and a considerable proportion of patients (~40%) in the PBC-pruritus subpopulation was in the 35–54 year age group, suggesting that patients can suffer with pruritus and its consequential impact on well-being and productivity for many years. An association between younger age and persistent high levels of pruritus has also been reported previously based on patient data in the UK.

We observed a low (~7%) prevalence of pruritus in the overall PBC population. This is inconsistent with the published literature that reports approximately 50% of patients are affected at any given point after a PBC diagnosis and up to 75% are affected by it over the course of their disease. The lower prevalence of pruritus we observed may indicate that pruritus is under-reported in observational electronic healthcare databases. It is also possible that physicians may have prescribed a treatment for pruritus, without recording a pruritus diagnosis (discussed further below). The low prevalence of pruritus also highlights the possibility that pruritus remains under-recorded, and diagnosis may be limited to patients with more severe presentations. Nevertheless, the prevalence of pruritus was still significantly higher in the PBC population compared with non-cases.

A key finding of this study is the increased comorbid medical burden for patients with PBC and pruritus relative to non-cases, particularly for comorbidities with a major impact on HRQoL such as psychiatric conditions (depression or anxiety) as well as fatigue and sleep-related issues. The magnitude of difference in the prevalence of these conditions was greater in the PBC-pruritus subpopulation compared with broader PBC group; for example, fatigue was up to two-fold higher in the PBC-pruritus subpopulation and 1.5-fold higher in the broader PBC population versus non-cases. These findings are in agreement with a recently published review of the literature, which concluded that pruritus, fatigue, depression, anxiety and sleep disorders are the most frequently reported symptoms that patients with PBC experience, and these symptoms have a considerable negative impact on their HRQoL. However, it should be emphasised here that comparisons between the PBC population and the PBC-pruritus...
| Medication                  | PBC population (N=1963) | PBC-pruritus subpopulation (N=139) | Non-case population (N=10 245 592)* |
|----------------------------|--------------------------|------------------------------------|-------------------------------------|
|                            | %       | iSPR (95% CI)†      | %       | iSPR (95% CI)†      | %       |
| Antidiarrhoeal therapy     | 1.1     | 1.42 (0.88 to 2.18) | 2.2     | 3.18 (0.66 to 9.30) | 0.5     |
| Antihistamines             | 15.7    | 1.66 (1.48 to 1.86) | 34.5    | 3.62 (2.67 to 4.80) | 8.5     |
| Antihyperlipidaemic therapy| 31.6    | 1.02 (0.94 to 1.11) | 38.1    | 1.45 (1.08 to 1.89) | 20.9    |
| Bile acid sequestrants‡    | 5.8     | 7.86 (6.48 to 9.44) | 18.0    | 28.54 (18.47 to 42.12) | 0.4     |
| Colchicine                 | 1.4     | 3.14 (2.07 to 4.57) | 0       | 0                   | 0.6     |
| Corticoid                  | 29.4    | 1.47 (1.35 to 1.59) | 33.8    | 1.73 (1.27 to 2.30) | 17.1    |
| Cyclosporine               | 0.7     | 20.94 (11.15 to 35.81) | 0.7     | 22.29 (0.56 to 124.20) | 0.03    |
| Fibrates                   | 1.3     | 1.10 (0.72 to 1.61) | 2.9     | 2.14 (0.58 to 5.48) | 1.4     |
| MMF                        | 3.5     | 19.64 (15.25 to 24.90) | 7.9     | 44.51 (22.22 to 79.65) | 0.2     |
| Metformin                  | 8.0     | 0.79 (0.67 to 0.92) | 3.6     | 0.39 (0.13 to 0.91) | 7.6     |
| Methotrexate               | 0.8     | 0.90 (0.51 to 1.46) | 0       | 0                   | 0.5     |
| Naltrexone                 | 0.8     | 8.63 (4.93 to 14.02) | 4.3     | 34.54 (12.67 to 75.17) | 0.1     |
| OCA‡                       | 6.9     | 57.510.56 (48.218.86 to 68.070.71) | 11.5    | 105.298.43 (60.187.15 to 170.998.05) | 0       |
| Penicillamine              | 0.1     | 163.02 (4.13 to 908.31) | 0       | 0                   | 0       |
| Rifampicin‡                | 1.5     | 33.87 (22.68 to 48.65) | 10.8    | 218.08 (122.06 to 359.69) | 0.1     |
| Sertraline‡                | 5.0     | 1.16 (0.94 to 1.41) | 9.4     | 2.16 (1.15 to 3.70) | 3.6     |
| Sleep medications          | 12.9    | 1.22 (1.07 to 1.38) | 16.6    | 1.65 (1.05 to 2.47) | 7.7     |
| Statins                    | 24.5    | 0.84 (0.77 to 0.92) | 23.7    | 0.96 (0.66 to 1.34) | 19.6    |
| UDCA§                      | 87.8    | 766.60 (730.84 to 803.66) | 83.5    | 796.69 (658.32 to 955.55) | 0.1     |

* N for the non-case population (N=10 245 592), relates to the comparison versus the PBC population not versus the PBC-pruritus population (N=9 984 009).
† Compared with non-cases (comparator) population.
‡ Guideline-recommended pruritus treatment (AASLD and EASL).
§ PBC treatment.
AASLD, American Association for the Study of Liver Diseases; CI, confidence interval; EASL, European Association for the Study of the Liver; iSPRs, indirect age-sex standardised prevalence ratios; MMF, mycophenolate mofetil; OCA, obeticholic acid; PBC, primary biliary cholangitis; UDCA, ursodeoxycholic acid.
Diarrhoea is a commonly observed symptom in PBC populations versus the PBC non-pruritus subpopulation (N=139) relative to the respective non-case populations*.

Non-labelling use of off-label therapies, including rifampicin, naltrexone and sertraline, was significantly higher than in non-cases. Although the indication cannot be confirmed based on the available data source, the higher use of these medications is likely related to the higher rate of autoimmune comorbidities, which further adds to the already substantial burden of disease in these patients.

Regarding treatment of PBC, UDCA was prescribed in close to 90% of the PBC population with only 7% of this population receiving OCA. The relatively low OCA usage is perhaps expected in this study given that data from this analysis are from 2017 and OCA was only approved in the USA in 2016. It is also interesting to note that UDCA usage was lower and OCA use higher in the PBC-pruritus subpopulation (84% and 12%, respectively). As UDCA failures have previously been reported to have a higher rate of pruritus and pruritus is a known side effect of OCA, this difference in PBC management in this dataset is likely to arise from a combination of these factors. However, it should be noted that it is not possible to deduce any causal associations from this analysis.

Medications recommended for the treatment of pruritus in PBC were expectedly more prevalent in the PBC population and PBC-pruritus subpopulation compared with non-cases. Bile acid sequestrants were among the most commonly used medications in the PBC-pruritus subpopulation; however, the rate of use was still relatively low (18%) despite cholestyramine being the only approved treatment for cholestatic pruritus. UDCA usage was lower and OCA use higher in the PBC-pruritus subpopulation; however, the rate of use was still relatively low (18%) despite cholestyramine being the only approved treatment for cholestatic pruritus. UDCA failures have previously been reported to have a higher rate of pruritus and pruritus is a known side effect of OCA. This difference in PBC management in this dataset is likely to arise from a combination of these factors. However, it should be noted that it is not possible to deduce any causal associations from this analysis.

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non-cases; however, as for bile acid sequestrants, the overall frequency of use was low (11%, 4% and 9%, respectively). Although not considered effective for cholestatic pruritus according to current guidelines, antihistamines were prescribed to 35% of the PBC-pruritus subpopulation, which is three-fold higher compared with non-cases.

Given that on-label and off-label use of bile acid sequestrants, rifampicin and naltrexone is unlikely to be substantially different between the PBC and non-case populations (with the exception of treating pruritus), the fact that their use in the PBC population in this dataset (5.8%, 1.5% and 0.8%, respectively) was higher compared with the very low rates in non-cases (0.4%, 0.1% and 0.1%, respectively) is likely attributable, at least partly, to their use for treating pruritus. This is also the case, although to a lesser extent, for both sertraline and antihistamines which have higher use in the PBC population relative to non-cases. Together this strongly indicates that there is a large population of patients being treated for pruritus who are not coded for as such in clinical practice and thus are difficult to identify in claims databases, and further supports the point noted above, that the prevalence of pruritus in the PBC sample observed in this analysis is likely a significant underestimate of the true rate.

Reflecting the higher prevalence of sleep disorders, depression and anxiety among the PBC pruritus subpopulation, sleep medications and antidepressants (ie, sertraline) were prescribed more often in this group compared with non-cases. It is important to note that information of indications for each medicine prescribed was not available in the database. Therefore, the relationship between comorbidity and treatment is based merely on clinical assumptions.

Although administrative claims data provide valuable real-world information, there are inherent challenges and limitations with this type of data. Identification of cases was based on ICD codes alone with no available information regarding laboratory parameters and diagnostic criteria, which may vary among physicians. However, to minimise error rates and increase robustness of the results, an eligibility criterion of at least two diagnostic codes for PBC was included. This approach is based on a previous validation study which showed that the optimal algorithm to identify confirmed PBC cases in administrative data included two or more uses of a PBC code, with sensitivity of 94% and positive predictive value of 73%. Nevertheless, the use of ICD codes alone to specify comorbidities may result in underestimation of some comorbidities, as this method assumes that the absence of a code for a given condition implies absence of the condition itself. Moreover, this study could not account for missing data, such as duration, adherence or continuity of treatment, exclusion of over-the-counter medications and the quality of available data that were solely collected for billing purposes. Individuals with chronic conditions typically use healthcare resources to a greater extent than those without such illnesses, potentially introducing artefacts in our analysis and inflating differences between populations. To account for such errors, a healthcare encounter during the lead-in period was specified as an inclusion criterion, which was also applicable to the non-case population. Caution should be exercised when generalising our findings to the wider PBC population, especially in different countries and varying healthcare systems. Additionally, potential differences in clinical practice and socioeconomic discrepancies, such as access to care, should also be considered. Collectively, these limitations highlight that there is a clear need for high quality data, including from both structured and unstructured databases as well as patient-reported outcome data to fully address the burden of PBC and associated pruritus in real-world practice.

Despite these limitations this study is unique in that it provides a comprehensive, real-world perspective of the overall burden of PBC and PBC-associated pruritus in a relatively large population, especially given the rarity of the disease. Our analyses confirm current knowledge regarding the burden of pruritus and highlight the substantial impact of pruritus on psychiatric and sleep disorders in patients with PBC. The results also emphasise that pruritus might be often underdiagnosed and, consequently, undertreated in clinical practice, reflecting a clear unmet need for newer effective and safe treatments for cholestatic pruritus.

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Gungabissoon U, et al. BMJ Open Gastro 2022;9:e000857. doi:10.1136/bmjgast-2021-000857
## PBC codes [ICD-10 Code]

| Code | Description          |
|------|----------------------|
| K74.3| Primary biliary cirrhosis |
| Code  | Description               |
|-------|---------------------------|
| R53.1 | Weakness                  |
| R53.81| Other malaise             |
| R53.82| Chronic fatigue, unspecified |
| R53.83| Other fatigue             |
### SLE codes [ICD-10 Code]

| Code   | Description                                           |
|--------|-------------------------------------------------------|
| M32.0  | Drug-induced systemic lupus erythematosus             |
| M32.10 | Systemic lupus erythematosus, organ or system involvement unspecified |
| M32.11 | Endocarditis in systemic lupus erythematosus          |
| M32.12 | Pericarditis in systemic lupus erythematosus          |
| M32.13 | Lung involvement in systemic lupus erythematosus      |
| M32.14 | Glomerular disease in systemic lupus erythematosus    |
| M32.15 | Tubulo-interstitial nephropathy in systemic lupus erythematosus |
| M32.19 | Other organ or system involvement in systemic lupus erythematosus |
| M32.8  | Other forms of systemic lupus erythematosus           |
| M32.9  | Systemic lupus erythematosus, unspecified             |
### Autoimmune hepatitis codes [ICD-10 Code]

| Code | Description            |
|------|------------------------|
| K75.4| Autoimmune hepatitis  |
**Diabetes (Type II) codes [ICD-10 Code]**

E11.00  Type 2 diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
E11.01  Type 2 diabetes mellitus with hyperosmolarity with coma
E11.10  Type 2 diabetes mellitus with ketoacidosis without coma
E11.11  Type 2 diabetes mellitus with ketoacidosis with coma
E11.21  Type 2 diabetes mellitus with diabetic nephropathy
E11.22  Type 2 diabetes mellitus with diabetic chronic kidney disease
E11.29  Type 2 diabetes mellitus with other diabetic kidney complication
E11.311 Type 2 diabetes mellitus with unspecified diabetic retinopathy with macular edema
E11.319 Type 2 diabetes mellitus with unspecified diabetic retinopathy without macular edema
E11.321 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E11.3211 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, right eye
E11.3212 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, left eye
E11.3213 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, bilateral
E11.3219 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, unspecified eye
E11.329 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E11.3291 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, right eye
E11.3292 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, left eye
E11.3293 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, bilateral
E11.3299 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.331 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
E11.3311 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, right eye
E11.3312 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, left eye
E11.3313 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, bilateral
E11.3319 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, unspecified eye
E11.339 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
E11.3391 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, right eye
E11.3392 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye
E11.3399 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, bilateral
E11.341 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
E11.3411  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, right eye
E11.3412  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, left eye
E11.3413  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, bilateral
E11.3419  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, unspecified eye
E11.349  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
E11.3491  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, right eye
E11.3492  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, left eye
E11.3493  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, bilateral
E11.3499  Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.351  Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema
E11.3511  Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, right eye
E11.3512  Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, left eye
E11.3513  Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, bilateral
E11.3519  Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, unspecified eye
E11.3521  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, right eye
E11.3522  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, left eye
E11.3523  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, bilateral
E11.3529  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, unspecified eye
E11.3531  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, right eye
E11.3532  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, left eye
E11.3533  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, bilateral
E11.3539  Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye
E11.3541  Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, right eye
E11.3542  Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, left eye
E11.3543  Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, bilateral
E11.3549  Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, unspecified eye
E11.3551  Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, right eye
E11.3552  Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, left eye
E11.3553  Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, bilateral
E11.3559  Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, unspecified eye
E11.359  Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema
E11.3591  Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, right eye
E11.3592  Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, left eye
E11.3593  Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, bilateral

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BMJ Open Gastro, et al. Gungabissoon U. doi: 10.1136/bmjgast-2021-000857
| Code    | Description                                                                 |
|---------|-----------------------------------------------------------------------------|
| E11.3599| Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, unspecified eye |
| E11.36  | Type 2 diabetes mellitus with diabetic cataract                               |
| E11.37X1| Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, right eye |
| E11.37X2| Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, left eye |
| E11.37X3| Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, bilateral |
| E11.37X9| Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, unspecified eye |
| E11.39  | Type 2 diabetes mellitus with other diabetic ophthalmic complication          |
| E11.40  | Type 2 diabetes mellitus with diabetic neuropathy, unspecified               |
| E11.41  | Type 2 diabetes mellitus with diabetic mononeuropathy                         |
| E11.42  | Type 2 diabetes mellitus with diabetic polyneuropathy                        |
| E11.43  | Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy            |
| E11.44  | Type 2 diabetes mellitus with diabetic amyotrophy                            |
| E11.49  | Type 2 diabetes mellitus with other diabetic neurological complication        |
| E11.51  | Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene|
| E11.52  | Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene   |
| E11.59  | Type 2 diabetes mellitus with other circulatory complications                |
| E11.610 | Type 2 diabetes mellitus with diabetic neuropathic arthropathy               |
| E11.618 | Type 2 diabetes mellitus with other diabetic arthropathy                     |
| E11.620 | Type 2 diabetes mellitus with diabetic dermatitis                             |
| E11.621 | Type 2 diabetes mellitus with foot ulcer                                     |
| E11.622 | Type 2 diabetes mellitus with other skin ulcer                               |
| E11.628 | Type 2 diabetes mellitus with other skin complications                        |
| E11.630 | Type 2 diabetes mellitus with periodontal disease                            |
| E11.638 | Type 2 diabetes mellitus with other oral complications                        |
| E11.641 | Type 2 diabetes mellitus with hypoglycemia with coma                         |
| E11.649 | Type 2 diabetes mellitus with hypoglycemia without coma                      |
| E11.65  | Type 2 diabetes mellitus with hyperglycemia                                  |
| E11.69  | Type 2 diabetes mellitus with other specified complication                    |
| E11.8   | Type 2 diabetes mellitus with unspecified complications                      |
| E11.9   | Type 2 diabetes mellitus without complications                               |
**Diabetes (overall) codes [ICD-10 Code]**
Excludes gestational diabetes and codes that do not specify pre-existing diabetes in the context of pregnancy.

| Code   | Description                                                                 |
|-------|-----------------------------------------------------------------------------|
| E08.00 | Diabetes mellitus due to underlying condition with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC) |
| E08.01 | Diabetes mellitus due to underlying condition with hyperosmolarity with coma |
| E08.10 | Diabetes mellitus due to underlying condition with ketoacidosis without coma |
| E08.11 | Diabetes mellitus due to underlying condition with ketoacidosis with coma    |
| E08.21 | Diabetes mellitus due to underlying condition with diabetic nephropathy      |
| E08.22 | Diabetes mellitus due to underlying condition with diabetic chronic kidney disease |
| E08.29 | Diabetes mellitus due to underlying condition with other diabetic kidney complication |
| E08.311| Diabetes mellitus due to underlying condition with unspecified diabetic retinopathy with macular edema, right eye |
| E08.312| Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy with macular edema, left eye |
| E08.313| Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy with macular edema, bilateral |
| E08.319| Diabetes mellitus due to underlying condition with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.321| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema, right eye |
| E08.3211| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema, left eye |
| E08.3212| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema, bilateral |
| E08.3219| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.329| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, right eye |
| E08.3291| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, left eye |
| E08.3292| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.331| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema, left eye |
| E08.3311| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy with macular edema, bilateral |
| E08.3319| Diabetes mellitus due to underlying condition with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.339| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, right eye |
| E08.3391| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, left eye |
| E08.3392| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.341| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, right eye |
| E08.3411| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, left eye |
| E08.3413| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy with macular edema, bilateral |
| E08.3419| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.349| Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema |
| Code  | Description                                              |
|-------|-----------------------------------------------------------|
| E08.3491 | Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, right eye |
| E08.3492 | Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, left eye |
| E08.3493 | Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, bilateral |
| E08.3499 | Diabetes mellitus due to underlying condition with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.351 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema |
| E08.3511 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema, right eye |
| E08.3512 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema, left eye |
| E08.3513 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema, bilateral |
| E08.3519 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with macular edema, unspecified eye |
| E08.3521 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment involving the macula, right eye |
| E08.3522 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment involving the macula, left eye |
| E08.3523 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment involving the macula, bilateral |
| E08.3529 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment involving the macula, unspecified eye |
| E08.3531 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, right eye |
| E08.3532 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, left eye |
| E08.3533 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, bilateral |
| E08.3539 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye |
| E08.3541 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, right eye |
| E08.3542 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, left eye |
| E08.3543 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, bilateral |
| E08.3549 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, unspecified eye |
| E08.3551 | Diabetes mellitus due to underlying condition with stable proliferative diabetic retinopathy, right eye |
| E08.3552 | Diabetes mellitus due to underlying condition with stable proliferative diabetic retinopathy, left eye |
| E08.3553 | Diabetes mellitus due to underlying condition with stable proliferative diabetic retinopathy, bilateral |
| E08.3559 | Diabetes mellitus due to underlying condition with stable proliferative diabetic retinopathy, unspecified eye |
| E08.355 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema |
| E08.3591 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema, right eye |
| E08.3592 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema, left eye |
| E08.3593 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema, bilateral |
| E08.3599 | Diabetes mellitus due to underlying condition with proliferative diabetic retinopathy without macular edema, unspecified eye |
| E08.36 | Diabetes mellitus due to underlying condition with diabetic cataract |
| E08.37X1 | Diabetes mellitus due to underlying condition with diabetic macular edema, resolved following treatment, right eye |
| E08.37X2 | Diabetes mellitus due to underlying condition with diabetic macular edema, resolved following treatment, left eye |
| E08.37X3 | Diabetes mellitus due to underlying condition with diabetic macular edema, resolved following treatment, bilateral |
| E08.37X9 | Diabetes mellitus due to underlying condition with diabetic macular edema, resolved following treatment, unspecified eye |
| E08.39 | Diabetes mellitus due to underlying condition with other diabetic ophthalmic complication |
| E08.40 | Diabetes mellitus due to underlying condition with diabetic neuropathy, unspecified |
| E08.41 | Diabetes mellitus due to underlying condition with diabetic mononeuropathy |
| E08.42 | Diabetes mellitus due to underlying condition with diabetic polyneuropathy |
E08.43 Diabetes mellitus due to underlying condition with diabetic autonomic (poly)neuropathy
E08.44 Diabetes mellitus due to underlying condition with diabetic amyotrophy
E08.49 Diabetes mellitus due to underlying condition with other diabetic neurological complication
E08.51 Diabetes mellitus due to underlying condition with diabetic peripheral angiopathy without gangrene
E08.52 Diabetes mellitus due to underlying condition with diabetic peripheral angiopathy with gangrene
E08.59 Diabetes mellitus due to underlying condition with other circulatory complications
E08.610 Diabetes mellitus due to underlying condition with diabetic neuropathic arthropathy
E08.618 Diabetes mellitus due to underlying condition with other diabetic arthropathy
E08.620 Diabetes mellitus due to underlying condition with diabetic dermatitis
E08.621 Diabetes mellitus due to underlying condition with foot ulcer
E08.622 Diabetes mellitus due to underlying condition with other skin ulcer
E08.628 Diabetes mellitus due to underlying condition with other skin complications
E08.630 Diabetes mellitus due to underlying condition with periodontal disease
E08.638 Diabetes mellitus due to underlying condition with other oral complications
E08.641 Diabetes mellitus due to underlying condition with hypoglycemia with coma
E08.649 Diabetes mellitus due to underlying condition with hypoglycemia without coma
E08.65 Diabetes mellitus due to underlying condition with hyperglycemia
E08.69 Diabetes mellitus due to underlying condition with other specified complication
E08.8 Diabetes mellitus due to underlying condition with unspecified complications
E09.00 Drug or chemical induced diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHHC)
E09.01 Drug or chemical induced diabetes mellitus with hyperosmolarity with coma
E09.10 Drug or chemical induced diabetes mellitus with ketoacidosis without coma
E09.11 Drug or chemical induced diabetes mellitus with ketoacidosis with coma
E09.21 Drug or chemical induced diabetes mellitus with diabetic nephropathy
E09.22 Drug or chemical induced diabetes mellitus with diabetic chronic kidney disease
E09.29 Drug or chemical induced diabetes mellitus with other diabetic kidney complication
E09.311 Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy with macular edema
E09.319 Drug or chemical induced diabetes mellitus with unspecified diabetic retinopathy without macular edema
E09.321 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E09.3211 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, right eye
E09.3212 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, left eye
E09.3213 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, bilateral
E09.3219 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, unspecified eye
E09.329 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E09.3291 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, right eye
E09.3292 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, left eye
E09.3293 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, bilateral
E09.3299 Drug or chemical induced diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye
E09.331 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
E09.3311 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, right eye
E09.3312 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, left eye
E09.3313 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, bilateral
E09.3319 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, unspecified eye
E09.339 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
E09.3391 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, right eye
E09.3392 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye
E09.3393 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, bilateral
E09.3399 Drug or chemical induced diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye
E09.341 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
E09.3411 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, right eye
E09.3412 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, left eye
E09.3413 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, bilateral
E09.3419 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, unspecified eye
E09.349 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
E09.3491 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, right eye
E09.3492 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, left eye
E09.3493 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, bilateral
E09.3499 Drug or chemical induced diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye
E09.351 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema
E09.3511 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema, right eye
E09.3512 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema, left eye
E09.3513 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema, bilateral
E09.3519 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with macular edema, unspecified eye
E09.3521 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, right eye
E09.3522 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, left eye
E09.3523 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, bilateral
E09.3529 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, unspecified eye
E09.3531 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, right eye
E09.3532 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, left eye
E09.3533 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, bilateral
E09.3539 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye
E09.3541 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, right eye
E09.3542 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, left eye
E09.3543 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, bilateral
E09.3549 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, unspecified eye
E09.3551 Drug or chemical induced diabetes mellitus with stable proliferative diabetic retinopathy, right eye
E09.3552 Drug or chemical induced diabetes mellitus with stable proliferative diabetic retinopathy, left eye
E09.3553 Drug or chemical induced diabetes mellitus with stable proliferative diabetic retinopathy, bilateral
E09.3559 Drug or chemical induced diabetes mellitus with stable proliferative diabetic retinopathy, unspecified eye
E09.359 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema
E09.3591 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema, right eye
E09.3592 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema, left eye
E09.3593 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema, bilateral
E09.3599 Drug or chemical induced diabetes mellitus with proliferative diabetic retinopathy without macular edema, unspecified eye
E09.36 Drug or chemical induced diabetes mellitus with diabetic cataract
E09.37 Drug or chemical induced diabetes mellitus with diabetic macular edema, resolved following treatment
E09.37X1 Drug or chemical induced diabetes mellitus with diabetic macular edema, resolved following treatment, right eye
E09.37X2 Drug or chemical induced diabetes mellitus with diabetic macular edema, resolved following treatment, left eye
E09.37X9 Drug or chemical induced diabetes mellitus with diabetic macular edema, resolved following treatment, unspecified eye
E09.39 Drug or chemical induced diabetes mellitus with other diabetic ophthalmic complication
E09.40 Drug or chemical induced diabetes mellitus with neurological complications with diabetic neuropathy, unspecified
E09.41 Drug or chemical induced diabetes mellitus with neurological complications with diabetic mononeuropathy
E09.42 Drug or chemical induced diabetes mellitus with neurological complications with diabetic polyneuropathy
E09.43 Drug or chemical induced diabetes mellitus with neurological complications with diabetic autonomic (poly)neuropathy
E09.44 Drug or chemical induced diabetes mellitus with neurological complications with diabetic amyotrophy
E09.49 Drug or chemical induced diabetes mellitus with neurological complications with other diabetic neurological complication
E09.51 Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy without gangrene
E09.52 Drug or chemical induced diabetes mellitus with diabetic peripheral angiopathy with gangrene
E09.59 Drug or chemical induced diabetes mellitus with other circulatory complications
E09.610 Drug or chemical induced diabetes mellitus with diabetic neuropathic arthropathy
E09.618 Drug or chemical induced diabetes mellitus with other diabetic arthropathy
E09.620 Drug or chemical induced diabetes mellitus with diabetic dermatitis
E09.621 Drug or chemical induced diabetes mellitus with foot ulcer
E09.622 Drug or chemical induced diabetes mellitus with other skin ulcer
E09.628 Drug or chemical induced diabetes mellitus with other skin complications
E09.630 Drug or chemical induced diabetes mellitus with periodontal disease
E09.638 Drug or chemical induced diabetes mellitus with other oral complications
E09.641 Drug or chemical induced diabetes mellitus with hypoglycemia with coma
E09.649 Drug or chemical induced diabetes mellitus with hypoglycemia without coma
E09.65 Drug or chemical induced diabetes mellitus with hyperglycemia
E09.69 Drug or chemical induced diabetes mellitus with other specified complication
E09.8 Drug or chemical induced diabetes mellitus with unspecified complications
E09.9 Drug or chemical induced diabetes mellitus without complications
E10.10 Type 1 diabetes mellitus with ketoacidosis without coma
E10.11 Type 1 diabetes mellitus with ketoacidosis with coma
E10.21 Type 1 diabetes mellitus with diabetic nephropathy
E10.22 Type 1 diabetes mellitus with diabetic chronic kidney disease
| Code   | Description                                                                 |
|--------|-----------------------------------------------------------------------------|
| E10.29 | Type 1 diabetes mellitus with other diabetic kidney complication              |
| E10.31 | Type 1 diabetes mellitus with unspecified diabetic retinopathy with macular edema |
| E10.39 | Type 1 diabetes mellitus with unspecified diabetic retinopathy without macular edema |
| E10.32 | Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema |
| E10.321| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, right eye |
| E10.3212| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, left eye |
| E10.3213| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, bilateral |
| E10.3219| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, unspecified eye |
| E10.329| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema |
| E10.3291| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, right eye |
| E10.3292| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, left eye |
| E10.3293| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, bilateral |
| E10.3299| Type 1 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E10.331| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema |
| E10.3311| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, right eye |
| E10.3312| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, left eye |
| E10.3313| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, bilateral |
| E10.3319| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, unspecified eye |
| E10.339| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema |
| E10.3391| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, right eye |
| E10.3392| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye |
| E10.3393| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, bilateral |
| E10.3399| Type 1 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E10.341| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema |
| E10.3411| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, right eye |
| E10.3412| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, left eye |
| E10.3413| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, bilateral |
| E10.3419| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, unspecified eye |
| E10.349| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema |
| E10.3491| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, right eye |
| E10.3492| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, left eye |
| E10.3493| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, bilateral |
| E10.3499| Type 1 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye |
| E10.351| Type 1 diabetes mellitus with proliferative diabetic retinopathy with macular edema |
| E10.3511| Type 1 diabetes mellitus with proliferative diabetic retinopathy with macular edema, right eye |
| E10.3512| Type 1 diabetes mellitus with proliferative diabetic retinopathy with macular edema, left eye |
| E10.3513| Type 1 diabetes mellitus with proliferative diabetic retinopathy with macular edema, bilateral |
| E10.3519| Type 1 diabetes mellitus with proliferative diabetic retinopathy with macular edema, unspecified eye |
| E10.3521| Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, right eye |
E10.3522 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, left eye
E10.3523 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, bilateral
E10.3529 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, unspecified eye
E10.3531 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, right eye
E10.3532 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, left eye
E10.3533 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, bilateral
E10.3539 Type 1 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye
E10.3541 Type 1 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, right eye
E10.3542 Type 1 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, left eye
E10.3543 Type 1 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, bilateral
E10.3549 Type 1 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, unspecified eye
E10.3551 Type 1 diabetes mellitus with stable proliferative diabetic retinopathy, right eye
E10.3552 Type 1 diabetes mellitus with stable proliferative diabetic retinopathy, left eye
E10.3553 Type 1 diabetes mellitus with stable proliferative diabetic retinopathy, bilateral
E10.3559 Type 1 diabetes mellitus with stable proliferative diabetic retinopathy, unspecified eye
E10.359 Type 1 diabetes mellitus with proliferative diabetic retinopathy without macular edema
E10.3591 Type 1 diabetes mellitus with proliferative diabetic retinopathy without macular edema, right eye
E10.3592 Type 1 diabetes mellitus with proliferative diabetic retinopathy without macular edema, left eye
E10.3593 Type 1 diabetes mellitus with proliferative diabetic retinopathy without macular edema, bilateral
E10.3599 Type 1 diabetes mellitus with proliferative diabetic retinopathy without macular edema, unspecified eye
E10.36 Type 1 diabetes mellitus with diabetic cataract
E10.37 Type 1 diabetes mellitus with diabetic macular edema, resolved following treatment
E10.371 Type 1 diabetes mellitus with diabetic macular edema, resolved following treatment, right eye
E10.372 Type 1 diabetes mellitus with diabetic macular edema, resolved following treatment, left eye
E10.373 Type 1 diabetes mellitus with diabetic macular edema, resolved following treatment, bilateral
E10.379 Type 1 diabetes mellitus with diabetic macular edema, resolved following treatment, unspecified eye
E10.39 Type 1 diabetes mellitus with other diabetic ophthalmic complication
E10.40 Type 1 diabetes mellitus with diabetic neuropathy, unspecified
E10.41 Type 1 diabetes mellitus with diabetic mononeuropathy
E10.42 Type 1 diabetes mellitus with diabetic polyneuropathy
E10.43 Type 1 diabetes mellitus with diabetic autonomic (poly)neuropathy
E10.44 Type 1 diabetes mellitus with diabetic amyotrophy
E10.49 Type 1 diabetes mellitus with other diabetic neurological complication
E10.51 Type 1 diabetes mellitus with diabetic peripheral angiopathy without gangrene
E10.52 Type 1 diabetes mellitus with diabetic peripheral angiopathy with gangrene
E10.59 Type 1 diabetes mellitus with other circulatory complications
E10.60 Type 1 diabetes mellitus with diabetic neuropathic arthropathy
E10.61 Type 1 diabetes mellitus with other diabetic arthropathy
E10.62 Type 1 diabetes mellitus with diabetic dermatitis
E10.63 Type 1 diabetes mellitus with foot ulcer
E10.622 Type 1 diabetes mellitus with other skin ulcer
E10.628 Type 1 diabetes mellitus with other skin complications
E10.630 Type 1 diabetes mellitus with periodontal disease
E10.638 Type 1 diabetes mellitus with other oral complications
E10.641 Type 1 diabetes mellitus with hypoglycemia with coma
E10.649 Type 1 diabetes mellitus with hypoglycemia without coma
E10.65 Type 1 diabetes mellitus with hyperglycemia
E10.69 Type 1 diabetes mellitus with other specified complication
E10.8 Type 1 diabetes mellitus with unspecified complications
E10.9 Type 1 diabetes mellitus without complications
E11.00 Type 2 diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
E11.01 Type 2 diabetes mellitus with hyperosmolarity with coma
E11.10 Type 2 diabetes mellitus with ketoacidosis without coma
E11.11 Type 2 diabetes mellitus with ketoacidosis with coma
E11.21 Type 2 diabetes mellitus with diabetic nephropathy
E11.22 Type 2 diabetes mellitus with diabetic chronic kidney disease
E11.29 Type 2 diabetes mellitus with other diabetic kidney complication
E11.311 Type 2 diabetes mellitus with unspecified diabetic retinopathy with macular edema
E11.319 Type 2 diabetes mellitus with unspecified diabetic retinopathy without macular edema
E11.321 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E11.3211 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, right eye
E11.3212 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, left eye
E11.3213 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, bilateral
E11.3219 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.329 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E11.3291 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, right eye
E11.3292 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, left eye
E11.3293 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, bilateral
E11.3299 Type 2 diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.331 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema
E11.3311 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, right eye
E11.3312 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, left eye
E11.3313 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, bilateral
E11.3319 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.339 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema
E11.3391 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, right eye
E11.3392 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye
E11.3393 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, bilateral
E11.3399 Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.341 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema
E11.3411 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, right eye
E11.3412 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, left eye
E11.3413 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, bilateral
E11.3419 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, unspecified eye
E11.349 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema
E11.3491 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, right eye
E11.3492 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, left eye
E11.3493 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, bilateral
E11.3499 Type 2 diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye
E11.351 Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema
E11.3511 Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, right eye
E11.3512 Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, left eye
E11.3513 Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, bilateral
E11.3519 Type 2 diabetes mellitus with proliferative diabetic retinopathy with macular edema, unspecified eye
E11.3521 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, right eye
E11.3522 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, left eye
E11.3523 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, bilateral
E11.3529 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, unspecified eye
E11.3531 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, right eye
E11.3532 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, left eye
E11.3533 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, bilateral
E11.3539 Type 2 diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye
E11.3541 Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, right eye
E11.3542 Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, left eye
E11.3543 Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, bilateral
E11.3549 Type 2 diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, unspecified eye
E11.3551 Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, right eye
E11.3552 Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, left eye
E11.3553 Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, bilateral
E11.3559 Type 2 diabetes mellitus with stable proliferative diabetic retinopathy, unspecified eye
E11.359 Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema
E11.3591 Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, right eye
E11.3592 Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, left eye
E11.3593 Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, bilateral
E11.3599 Type 2 diabetes mellitus with proliferative diabetic retinopathy without macular edema, unspecified eye
E11.36 Type 2 diabetes mellitus with diabetic cataract
E11.37 Type 2 diabetes mellitus with diabetic macular edema
E11.37X1 Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, right eye
E11.37X2 Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, left eye
E11.37X3 Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, bilateral
E11.37X9 Type 2 diabetes mellitus with diabetic macular edema, resolved following treatment, unspecified eye
E11.39 Type 2 diabetes mellitus with other diabetic ophthalmic complication
E11.40 Type 2 diabetes mellitus with diabetic neuroopathy, unspecified
E11.41 Type 2 diabetes mellitus with diabetic mononeuropathy
E11.42 Type 2 diabetes mellitus with diabetic polyneuropathy
E11.43 Type 2 diabetes mellitus with diabetic autonomic (poly)neuropathy
E11.44 Type 2 diabetes mellitus with diabetic amyotrophy
E11.49 Type 2 diabetes mellitus with other diabetic neurological complication
E11.51 Type 2 diabetes mellitus with diabetic peripheral angiopathy without gangrene
E11.52 Type 2 diabetes mellitus with diabetic peripheral angiopathy with gangrene
E11.59 Type 2 diabetes mellitus with other circulatory complications
E11.610 Type 2 diabetes mellitus with diabetic neuropathic arthropathy
E11.618 Type 2 diabetes mellitus with other diabetic arthropathy
E11.620 Type 2 diabetes mellitus with diabetic dermatitis
E11.621 Type 2 diabetes mellitus with foot ulcer
E11.622 Type 2 diabetes mellitus with other skin ulcer
E11.628 Type 2 diabetes mellitus with other skin complications
E11.630 Type 2 diabetes mellitus with periodontal disease
E11.638 Type 2 diabetes mellitus with other oral complications
E11.641 Type 2 diabetes mellitus with hypoglycemia with coma
E11.649 Type 2 diabetes mellitus with hypoglycemia without coma
E11.65 Type 2 diabetes mellitus with hyperglycemia
E11.69 Type 2 diabetes mellitus with other specified complication
E11.8 Type 2 diabetes mellitus with unspecified complications
E11.9 Type 2 diabetes mellitus without complications
E13.00 Other specified diabetes mellitus with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)
E13.01 Other specified diabetes mellitus with hyperosmolarity with coma
E13.10 Other specified diabetes mellitus with ketoacidosis without coma
E13.11 Other specified diabetes mellitus with ketoacidosis with coma
E13.21 Other specified diabetes mellitus with diabetic nephropathy
E13.22 Other specified diabetes mellitus with diabetic chronic kidney disease
E13.29 Other specified diabetes mellitus with other diabetic kidney complication
E13.311 Other specified diabetes mellitus with unspecified diabetic retinopathy with macular edema
E13.319 Other specified diabetes mellitus with unspecified diabetic retinopathy without macular edema
E13.321 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E13.3211 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, right eye
E13.3212 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, left eye
E13.3213 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, bilateral
E13.3219 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema, unspecified eye
E13.3219 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy with macular edema
E13.3291 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, right eye
E13.3291 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema
E13.3292 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, left eye
E13.3293 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, bilateral
E13.3299 Other specified diabetes mellitus with mild nonproliferative diabetic retinopathy without macular edema, unspecified eye
E13.3311 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, right eye
E13.3312 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, left eye
E13.3313 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, bilateral
E13.3319 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy with macular edema, unspecified eye
E13.3391 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, right eye
E13.3392 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye
E13.3393 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, bilateral
E13.3399 Other specified diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, unspecified eye
E13.3411 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, right eye
E13.3412 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, left eye
E13.3413 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, bilateral
E13.3419 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy with macular edema, unspecified eye
E13.3491 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, right eye
E13.3492 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, left eye
E13.3493 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, bilateral
E13.3499 Other specified diabetes mellitus with severe nonproliferative diabetic retinopathy without macular edema, unspecified eye
E13.3511 Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema, right eye
E13.3512 Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema, left eye
E13.3513 Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema, bilateral
E13.3519 Other specified diabetes mellitus with proliferative diabetic retinopathy with macular edema, unspecified eye
E13.3521 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, right eye
E13.3522 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, left eye
E13.3523 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment involving the macula, bilateral
E13.3529 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye
E13.3531 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, right eye
E13.3532 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, left eye
E13.3533 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, bilateral
E13.3539 Other specified diabetes mellitus with proliferative diabetic retinopathy with traction retinal detachment not involving the macula, unspecified eye
E13.3541 Other specified diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, right eye
E13.3542 Other specified diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, left eye
E13.3543 Other specified diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, bilateral
E13.3549 Other specified diabetes mellitus with proliferative diabetic retinopathy with combined traction retinal detachment and rhegmatogenous retinal detachment, unspecified eye
E13.3551 Other specified diabetes mellitus with stable proliferative diabetic retinopathy, right eye
E13.3552 Other specified diabetes mellitus with stable proliferative diabetic retinopathy, left eye
E13.3553 Other specified diabetes mellitus with stable proliferative diabetic retinopathy, bilateral
E13.3559 Other specified diabetes mellitus with stable proliferative diabetic retinopathy, unspecified eye
E13.3591 Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema, right eye
E13.3592 Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema, left eye
E13.3593 Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema, bilateral
E13.3599 Other specified diabetes mellitus with proliferative diabetic retinopathy without macular edema, unspecified eye
E13.36 Other specified diabetes mellitus with diabetic cataract
E13.37X1 Other specified diabetes mellitus with diabetic macular edema, resolved following treatment, right eye
E13.37X2 Other specified diabetes mellitus with diabetic macular edema, resolved following treatment, left eye
E13.37X3 Other specified diabetes mellitus with diabetic macular edema, resolved following treatment, bilateral
E13.37X9 Other specified diabetes mellitus with diabetic macular edema, resolved following treatment, unspecified eye
E13.39 Other specified diabetes mellitus with other diabetic ophthalmic complication
E13.40 Other specified diabetes mellitus with diabetic neuropathy, unspecified
E13.41 Other specified diabetes mellitus with diabetic mononeuropathy
E13.42 Other specified diabetes mellitus with diabetic polyneuropathy
E13.43 Other specified diabetes mellitus with diabetic autonomic (poly)neuropathy
E13.44 Other specified diabetes mellitus with diabetic amyotrophy
E13.49 Other specified diabetes mellitus with other diabetic neurological complication
E13.51 Other specified diabetes mellitus with diabetic peripheral angiopathy without gangrene
E13.52 Other specified diabetes mellitus with diabetic peripheral angiopathy with gangrene
E13.59 Other specified diabetes mellitus with other circulatory complications
E13.60 Other specified diabetes mellitus with diabetic neuropathic arthropathy
E13.61 Other specified diabetes mellitus with diabetic dermatitis
E13.62 Other specified diabetes mellitus with foot ulcer
E13.62 Other specified diabetes mellitus with other skin ulcer
E13.62 Other specified diabetes mellitus with other skin complications
E13.630 Other specified diabetes mellitus with periodontal disease
E13.638 Other specified diabetes mellitus with other oral complications
E13.641 Other specified diabetes mellitus with hypoglycemia with coma
E13.649 Other specified diabetes mellitus with hypoglycemia without coma
E13.65 Other specified diabetes mellitus with hyperglycemia
E13.69 Other specified diabetes mellitus with other specified complication
E13.8 Other specified diabetes mellitus with unspecified complications
E13.9 Other specified diabetes mellitus without complications
O24.011 Pre-existing type 1 diabetes mellitus, in pregnancy, first trimester
O24.012 Pre-existing type 1 diabetes mellitus, in pregnancy, second trimester
O24.013 Pre-existing type 1 diabetes mellitus, in pregnancy, third trimester
O24.019 Pre-existing type 1 diabetes mellitus, in pregnancy, unspecified trimester
O24.02 Pre-existing type 1 diabetes mellitus, in childbirth
O24.03 Pre-existing type 1 diabetes mellitus, in the puerperium
O24.111 Pre-existing type 2 diabetes mellitus, in pregnancy, first trimester
O24.112 Pre-existing type 2 diabetes mellitus, in pregnancy, second trimester
O24.113 Pre-existing type 2 diabetes mellitus, in pregnancy, third trimester
O24.119 Pre-existing type 2 diabetes mellitus, in pregnancy, unspecified trimester
O24.12 Pre-existing type 2 diabetes mellitus, in childbirth
O24.13 Pre-existing type 2 diabetes mellitus, in the puerperium
O24.311 Unspecified pre-existing diabetes mellitus in pregnancy, first trimester
O24.312 Unspecified pre-existing diabetes mellitus in pregnancy, second trimester
O24.313 Unspecified pre-existing diabetes mellitus in pregnancy, third trimester
O24.319 Unspecified pre-existing diabetes mellitus in pregnancy, unspecified trimester
O24.32 Unspecified pre-existing diabetes mellitus in childbirth
O24.33 Unspecified pre-existing diabetes mellitus in the puerperium
O24.811 Other pre-existing diabetes mellitus in pregnancy, first trimester
O24.812 Other pre-existing diabetes mellitus in pregnancy, second trimester
O24.813 Other pre-existing diabetes mellitus in pregnancy, third trimester
O24.819 Other pre-existing diabetes mellitus in pregnancy, unspecified trimester
O24.82 Other pre-existing diabetes mellitus in childbirth
O24.83 Other pre-existing diabetes mellitus in the puerperium
### Anxiety codes [ICD-10 Code]

| Code   | Description                                                                 |
|--------|-----------------------------------------------------------------------------|
| F06.4  | Anxiety disorder due to known physiological condition                       |
| F10.280| Alcohol abuse with alcohol-induced anxiety disorder                          |
| F10.980| Alcohol use, unspecified with alcohol-induced anxiety disorder               |
| F12.180| Cannabis abuse with cannabis-induced anxiety disorder                        |
| F12.280| Cannabis dependence with cannabis-induced anxiety disorder                   |
| F12.980| Cannabis use, unspecified with anxiety disorder                              |
| F13.180| Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic-induced anxiety disorder |
| F13.280| Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced anxiety disorder |
| F13.980| Sedative, hypnotic or anxiolytic use, unspecified with sedative, hypnotic or anxiolytic-induced anxiety disorder |
| F14.180| Cocaine abuse with cocaine-induced anxiety disorder                          |
| F14.280| Cocaine dependence with cocaine-induced anxiety disorder                     |
| F14.980| Cocaine use, unspecified with cocaine-induced anxiety disorder               |
| F15.180| Other stimulant abuse with stimulant-induced anxiety disorder                 |
| F15.280| Other stimulant dependence with stimulant-induced anxiety disorder            |
| F15.980| Other stimulant use, unspecified with stimulant-induced anxiety disorder      |
| F16.180| Hallucinogen abuse with hallucinogen-induced anxiety disorder                 |
| F16.280| Hallucinogen dependence with hallucinogen-induced anxiety disorder            |
| F16.980| Hallucinogen use, unspecified with hallucinogen-induced anxiety disorder      |
| F18.180| Inhalant abuse with inhalant-induced anxiety disorder                         |
| F18.280| Inhalant dependence with inhalant-induced anxiety disorder                    |
| F18.980| Inhalant use, unspecified with inhalant-induced anxiety disorder              |
| F19.180| Other psychoactive substance abuse with psychoactive substance-induced anxiety disorder |
| F19.280| Other psychoactive substance dependence with psychoactive substance-induced anxiety disorder |
| F19.980| Other psychoactive substance use, unspecified with psychoactive substance-induced anxiety disorder |
| F40.00 | Agoraphobia, unspecified                                                     |
| F40.01 | Agoraphobia with panic disorder                                              |
| F40.02 | Agoraphobia without panic disorder                                           |
| F40.10 | Social phobia, unspecified                                                  |
F40.11 Social phobia, generalized
F40.210 Arachnophobia
F40.218 Other animal type phobia
F40.220 Fear of thunderstorms
F40.228 Other natural environment type phobia
F40.230 Fear of blood
F40.231 Fear of injections and transfusions
F40.232 Fear of other medical care
F40.233 Fear of injury
F40.240 Claustrophobia
F40.241 Acrophobia
F40.242 Fear of bridges
F40.243 Fear of flying
F40.248 Other situational type phobia
F40.290 Androphobia
F40.291 Gynephobia
F40.298 Other specified phobia
F40.8 Other phobic anxiety disorders
F40.9 Phobic anxiety disorder, unspecified
F41.0 Panic disorder [episodic paroxysmal anxiety]
F41.1 Generalized anxiety disorder
F41.3 Other mixed anxiety disorders
F41.8 Other specified anxiety disorders
F41.9 Anxiety disorder, unspecified
### Depression codes [ICD-10 Code]

| Code   | Description                                                                 |
|--------|----------------------------------------------------------------------------|
| F06.31 | Mood disorder due to known physiological condition with depressive features |
| F06.32 | Mood disorder due to known physiological condition with major depressive-like episode |
| F32.0  | Major depressive disorder, single episode, mild                            |
| F32.1  | Major depressive disorder, single episode, moderate                         |
| F32.2  | Major depressive disorder, single episode, severe without psychotic features |
| F32.3  | Major depressive disorder, single episode, severe with psychotic features   |
| F32.4  | Major depressive disorder, single episode, in partial remission             |
| F32.5  | Major depressive disorder, single episode, in full remission                |
| F32.8  | Other depressive episodes                                                  |
| F32.89 | Other specified depressive episodes                                         |
| F32.9  | Major depressive disorder, single episode, unspecified                      |
| F33.0  | Major depressive disorder, recurrent, mild                                  |
| F33.1  | Major depressive disorder, recurrent, moderate                              |
| F33.2  | Major depressive disorder, recurrent severe without psychotic features      |
| F33.3  | Major depressive disorder, recurrent, severe with psychotic symptoms        |
| F33.40 | Major depressive disorder, recurrent, in remission, unspecified             |
| F33.41 | Major depressive disorder, recurrent, in partial remission                  |
| F33.42 | Major depressive disorder, recurrent, in full remission                     |
| F33.8  | Other recurrent depressive disorders                                        |
| F33.9  | Major depressive disorder, recurrent, unspecified                           |
| F34.1  | Dysthymic disorder                                                         |
| Code    | Description                                                                 |
|---------|-----------------------------------------------------------------------------|
| M05.00  | Felty's syndrome, unspecified site                                          |
| M05.011 | Felty's syndrome, right shoulder                                             |
| M05.012 | Felty's syndrome, left shoulder                                              |
| M05.019 | Felty's syndrome, unspecified shoulder                                       |
| M05.021 | Felty's syndrome, right elbow                                                |
| M05.022 | Felty's syndrome, left elbow                                                 |
| M05.029 | Felty's syndrome, unspecified elbow                                          |
| M05.031 | Felty's syndrome, right wrist                                                |
| M05.032 | Felty's syndrome, left wrist                                                 |
| M05.039 | Felty's syndrome, unspecified wrist                                          |
| M05.041 | Felty's syndrome, right hand                                                 |
| M05.042 | Felty's syndrome, left hand                                                  |
| M05.049 | Felty's syndrome, unspecified hand                                           |
| M05.051 | Felty's syndrome, right hip                                                  |
| M05.052 | Felty's syndrome, left hip                                                   |
| M05.059 | Felty's syndrome, unspecified hip                                            |
| M05.061 | Felty's syndrome, right knee                                                 |
| M05.062 | Felty's syndrome, left knee                                                  |
| M05.069 | Felty's syndrome, unspecified knee                                           |
| M05.071 | Felty's syndrome, right ankle and foot                                       |
| M05.072 | Felty's syndrome, left ankle and foot                                        |
| M05.079 | Felty's syndrome, unspecified ankle and foot                                 |
| M05.09  | Felty's syndrome, multiple sites                                             |
| M05.10  | Rheumatoid lung disease with rheumatoid arthritis of unspecified site        |
| M05.111 | Rheumatoid lung disease with rheumatoid arthritis of right shoulder          |
| M05.112 | Rheumatoid lung disease with rheumatoid arthritis of left shoulder           |
| M05.119 | Rheumatoid lung disease with rheumatoid arthritis of unspecified shoulder    |
| M05.121 | Rheumatoid lung disease with rheumatoid arthritis of right elbow            |
| M05.122 | Rheumatoid lung disease with rheumatoid arthritis of left elbow             |
M05.129 Rheumatoid lung disease with rheumatoid arthritis of unspecified elbow
M05.131 Rheumatoid lung disease with rheumatoid arthritis of right wrist
M05.132 Rheumatoid lung disease with rheumatoid arthritis of left wrist
M05.139 Rheumatoid lung disease with rheumatoid arthritis of unspecified wrist
M05.141 Rheumatoid lung disease with rheumatoid arthritis of right hand
M05.142 Rheumatoid lung disease with rheumatoid arthritis of left hand
M05.149 Rheumatoid lung disease with rheumatoid arthritis of unspecified hand
M05.151 Rheumatoid lung disease with rheumatoid arthritis of right hip
M05.152 Rheumatoid lung disease with rheumatoid arthritis of left hip
M05.159 Rheumatoid lung disease with rheumatoid arthritis of unspecified hip
M05.161 Rheumatoid lung disease with rheumatoid arthritis of right knee
M05.162 Rheumatoid lung disease with rheumatoid arthritis of left knee
M05.169 Rheumatoid lung disease with rheumatoid arthritis of unspecified knee
M05.171 Rheumatoid lung disease with rheumatoid arthritis of right ankle and foot
M05.172 Rheumatoid lung disease with rheumatoid arthritis of left ankle and foot
M05.179 Rheumatoid lung disease with rheumatoid arthritis of unspecified ankle and foot
M05.19 Rheumatoid lung disease with rheumatoid arthritis of multiple sites
M05.20 Rheumatoid vasculitis with rheumatoid arthritis of unspecified site
M05.211 Rheumatoid vasculitis with rheumatoid arthritis of right shoulder
M05.212 Rheumatoid vasculitis with rheumatoid arthritis of left shoulder
M05.219 Rheumatoid vasculitis with rheumatoid arthritis of unspecified shoulder
M05.221 Rheumatoid vasculitis with rheumatoid arthritis of right elbow
M05.222 Rheumatoid vasculitis with rheumatoid arthritis of left elbow
M05.229 Rheumatoid vasculitis with rheumatoid arthritis of unspecified elbow
M05.231 Rheumatoid vasculitis with rheumatoid arthritis of right wrist
M05.232 Rheumatoid vasculitis with rheumatoid arthritis of left wrist
M05.239 Rheumatoid vasculitis with rheumatoid arthritis of unspecified wrist
M05.241 Rheumatoid vasculitis with rheumatoid arthritis of right hand
M05.242 Rheumatoid vasculitis with rheumatoid arthritis of left hand
M05.249 Rheumatoid vasculitis with rheumatoid arthritis of unspecified hand
M05.251 Rheumatoid vasculitis with rheumatoid arthritis of right hip
M05.252  Rheumatoid vasculitis with rheumatoid arthritis of left hip
M05.259  Rheumatoid vasculitis with rheumatoid arthritis of unspecified hip
M05.261  Rheumatoid vasculitis with rheumatoid arthritis of right knee
M05.262  Rheumatoid vasculitis with rheumatoid arthritis of left knee
M05.269  Rheumatoid vasculitis with rheumatoid arthritis of unspecified knee
M05.271  Rheumatoid vasculitis with rheumatoid arthritis of right ankle and foot
M05.272  Rheumatoid vasculitis with rheumatoid arthritis of left ankle and foot
M05.279  Rheumatoid vasculitis with rheumatoid arthritis of unspecified ankle and foot
M05.29  Rheumatoid vasculitis with rheumatoid arthritis of multiple sites
M05.30  Rheumatoid vasculitis with rheumatoid arthritis of unspecified site
M05.311  Rheumatoid heart disease with rheumatoid arthritis of right shoulder
M05.312  Rheumatoid heart disease with rheumatoid arthritis of left shoulder
M05.319  Rheumatoid heart disease with rheumatoid arthritis of unspecified shoulder
M05.321  Rheumatoid heart disease with rheumatoid arthritis of right elbow
M05.322  Rheumatoid heart disease with rheumatoid arthritis of left elbow
M05.329  Rheumatoid heart disease with rheumatoid arthritis of unspecified elbow
M05.331  Rheumatoid heart disease with rheumatoid arthritis of right wrist
M05.332  Rheumatoid heart disease with rheumatoid arthritis of left wrist
M05.339  Rheumatoid heart disease with rheumatoid arthritis of unspecified wrist
M05.341  Rheumatoid heart disease with rheumatoid arthritis of right hand
M05.342  Rheumatoid heart disease with rheumatoid arthritis of left hand
M05.349  Rheumatoid heart disease with rheumatoid arthritis of unspecified hand
M05.351  Rheumatoid heart disease with rheumatoid arthritis of right hip
M05.352  Rheumatoid heart disease with rheumatoid arthritis of left hip
M05.359  Rheumatoid heart disease with rheumatoid arthritis of unspecified hip
M05.361  Rheumatoid heart disease with rheumatoid arthritis of right knee
M05.362  Rheumatoid heart disease with rheumatoid arthritis of left knee
M05.369  Rheumatoid heart disease with rheumatoid arthritis of unspecified knee
M05.371  Rheumatoid heart disease with rheumatoid arthritis of right ankle and foot
M05.372  Rheumatoid heart disease with rheumatoid arthritis of left ankle and foot
M05.379  Rheumatoid heart disease with rheumatoid arthritis of unspecified ankle and foot
M05.39  Rheumatoid heart disease with rheumatoid arthritis of multiple sites
M05.40  Rheumatoid myopathy with rheumatoid arthritis of unspecified site
M05.41  Rheumatoid myopathy with rheumatoid arthritis of right shoulder
M05.41  Rheumatoid myopathy with rheumatoid arthritis of left shoulder
M05.41  Rheumatoid myopathy with rheumatoid arthritis of unspecified shoulder
M05.42  Rheumatoid myopathy with rheumatoid arthritis of right elbow
M05.42  Rheumatoid myopathy with rheumatoid arthritis of left elbow
M05.42  Rheumatoid myopathy with rheumatoid arthritis of unspecified elbow
M05.43  Rheumatoid myopathy with rheumatoid arthritis of right wrist
M05.43  Rheumatoid myopathy with rheumatoid arthritis of left wrist
M05.43  Rheumatoid myopathy with rheumatoid arthritis of unspecified wrist
M05.44  Rheumatoid myopathy with rheumatoid arthritis of right hand
M05.44  Rheumatoid myopathy with rheumatoid arthritis of left hand
M05.44  Rheumatoid myopathy with rheumatoid arthritis of unspecified hand
M05.45  Rheumatoid myopathy with rheumatoid arthritis of right hip
M05.45  Rheumatoid myopathy with rheumatoid arthritis of left hip
M05.45  Rheumatoid myopathy with rheumatoid arthritis of unspecified hip
M05.46  Rheumatoid myopathy with rheumatoid arthritis of right knee
M05.46  Rheumatoid myopathy with rheumatoid arthritis of left knee
M05.46  Rheumatoid myopathy with rheumatoid arthritis of unspecified knee
M05.47  Rheumatoid myopathy with rheumatoid arthritis of right ankle and foot
M05.47  Rheumatoid myopathy with rheumatoid arthritis of left ankle and foot
M05.47  Rheumatoid myopathy with rheumatoid arthritis of unspecified ankle and foot
M05.49  Rheumatoid myopathy with rheumatoid arthritis of multiple sites
M05.50  Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified site
M05.51  Rheumatoid polyneuropathy with rheumatoid arthritis of right shoulder
M05.52  Rheumatoid polyneuropathy with rheumatoid arthritis of left shoulder
M05.52  Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified shoulder
M05.52  Rheumatoid polyneuropathy with rheumatoid arthritis of right elbow
M05.52  Rheumatoid polyneuropathy with rheumatoid arthritis of left elbow
M05.52  Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified elbow
| Code     | Description                                                      |
|----------|------------------------------------------------------------------|
| M05.531  | Rheumatoid polyneuropathy with rheumatoid arthritis of right wrist |
| M05.532  | Rheumatoid polyneuropathy with rheumatoid arthritis of left wrist |
| M05.539  | Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified wrist |
| M05.541  | Rheumatoid polyneuropathy with rheumatoid arthritis of right hand  |
| M05.542  | Rheumatoid polyneuropathy with rheumatoid arthritis of left hand  |
| M05.549  | Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified hand |
| M05.551  | Rheumatoid polyneuropathy with rheumatoid arthritis of right hip |
| M05.552  | Rheumatoid polyneuropathy with rheumatoid arthritis of left hip |
| M05.559  | Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified hip |
| M05.561  | Rheumatoid polyneuropathy with rheumatoid arthritis of right knee |
| M05.562  | Rheumatoid polyneuropathy with rheumatoid arthritis of left knee |
| M05.569  | Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified knee |
| M05.571  | Rheumatoid polyneuropathy with rheumatoid arthritis of right ankle and foot |
| M05.572  | Rheumatoid polyneuropathy with rheumatoid arthritis of left ankle and foot |
| M05.579  | Rheumatoid polyneuropathy with rheumatoid arthritis of unspecified ankle and foot |
| M05.59   | Rheumatoid polyneuropathy with rheumatoid arthritis of multiple sites |
| M05.60   | Rheumatoid arthritis of unspecified site with involvement of other organs and systems |
| M05.611  | Rheumatoid arthritis of right shoulder with involvement of other organs and systems |
| M05.612  | Rheumatoid arthritis of left shoulder with involvement of other organs and systems |
| M05.619  | Rheumatoid arthritis of unspecified shoulder with involvement of other organs and systems |
| M05.621  | Rheumatoid arthritis of right elbow with involvement of other organs and systems |
| M05.622  | Rheumatoid arthritis of left elbow with involvement of other organs and systems |
| M05.629  | Rheumatoid arthritis of unspecified elbow with involvement of other organs and systems |
| M05.631  | Rheumatoid arthritis of right wrist with involvement of other organs and systems |
| M05.632  | Rheumatoid arthritis of left wrist with involvement of other organs and systems |
| M05.639  | Rheumatoid arthritis of unspecified wrist with involvement of other organs and systems |
| M05.641  | Rheumatoid arthritis of right hand with involvement of other organs and systems |
| M05.642  | Rheumatoid arthritis of left hand with involvement of other organs and systems |
| M05.649  | Rheumatoid arthritis of unspecified hand with involvement of other organs and systems |
| M05.651  | Rheumatoid arthritis of right hip with involvement of other organs and systems |
| M05.652  | Rheumatoid arthritis of left hip with involvement of other organs and systems |
| Code   | Description                                                                 |
|--------|-----------------------------------------------------------------------------|
| M05.659 | Rheumatoid arthritis of unspecified hip with involvement of other organs and systems |
| M05.661 | Rheumatoid arthritis of right knee with involvement of other organs and systems |
| M05.662 | Rheumatoid arthritis of left knee with involvement of other organs and systems |
| M05.669 | Rheumatoid arthritis of unspecified knee with involvement of other organs and systems |
| M05.671 | Rheumatoid arthritis of right ankle and foot with involvement of other organs and systems |
| M05.672 | Rheumatoid arthritis of left ankle and foot with involvement of other organs and systems |
| M05.679 | Rheumatoid arthritis of unspecified ankle and foot with involvement of other organs and systems |
| M05.69  | Rheumatoid arthritis of multiple sites with involvement of other organs and systems |
| M05.70  | Rheumatoid arthritis with rheumatoid factor of unspecified site without organ or systems involvement |
| M05.711 | Rheumatoid arthritis with rheumatoid factor of right shoulder without organ or systems involvement |
| M05.712 | Rheumatoid arthritis with rheumatoid factor of left shoulder without organ or systems involvement |
| M05.719 | Rheumatoid arthritis with rheumatoid factor of unspecified shoulder without organ or systems involvement |
| M05.721 | Rheumatoid arthritis with rheumatoid factor of right elbow without organ or systems involvement |
| M05.722 | Rheumatoid arthritis with rheumatoid factor of left elbow without organ or systems involvement |
| M05.729 | Rheumatoid arthritis with rheumatoid factor of unspecified elbow without organ or systems involvement |
| M05.731 | Rheumatoid arthritis with rheumatoid factor of right wrist without organ or systems involvement |
| M05.732 | Rheumatoid arthritis with rheumatoid factor of left wrist without organ or systems involvement |
| M05.739 | Rheumatoid arthritis with rheumatoid factor of unspecified wrist without organ or systems involvement |
| M05.741 | Rheumatoid arthritis with rheumatoid factor of right hand without organ or systems involvement |
| M05.742 | Rheumatoid arthritis with rheumatoid factor of left hand without organ or systems involvement |
| M05.749 | Rheumatoid arthritis with rheumatoid factor of unspecified hand without organ or systems involvement |
| M05.751 | Rheumatoid arthritis with rheumatoid factor of right hip without organ or systems involvement |
| M05.752 | Rheumatoid arthritis with rheumatoid factor of left hip without organ or systems involvement |
| M05.759 | Rheumatoid arthritis with rheumatoid factor of unspecified hip without organ or systems involvement |
| M05.761 | Rheumatoid arthritis with rheumatoid factor of right knee without organ or systems involvement |
| M05.762 | Rheumatoid arthritis with rheumatoid factor of left knee without organ or systems involvement |
| M05.769 | Rheumatoid arthritis with rheumatoid factor of unspecified knee without organ or systems involvement |
| M05.771 | Rheumatoid arthritis with rheumatoid factor of right ankle and foot without organ or systems involvement |
| M05.772 | Rheumatoid arthritis with rheumatoid factor of left ankle and foot without organ or systems involvement |
| M05.779 | Rheumatoid arthritis with rheumatoid factor of unspecified ankle and foot without organ or systems involvement |
| M05.79  | Rheumatoid arthritis with rheumatoid factor of multiple sites without organ or systems involvement |
M05.80  Other rheumatoid arthritis with rheumatoid factor of unspecified site
M05.811 Other rheumatoid arthritis with rheumatoid factor of right shoulder
M05.812 Other rheumatoid arthritis with rheumatoid factor of left shoulder
M05.819 Other rheumatoid arthritis with rheumatoid factor of unspecified shoulder
M05.821 Other rheumatoid arthritis with rheumatoid factor of right elbow
M05.822 Other rheumatoid arthritis with rheumatoid factor of left elbow
M05.829 Other rheumatoid arthritis with rheumatoid factor of unspecified elbow
M05.831 Other rheumatoid arthritis with rheumatoid factor of right wrist
M05.832 Other rheumatoid arthritis with rheumatoid factor of left wrist
M05.839 Other rheumatoid arthritis with rheumatoid factor of unspecified wrist
M05.841 Other rheumatoid arthritis with rheumatoid factor of right hand
M05.842 Other rheumatoid arthritis with rheumatoid factor of left hand
M05.849 Other rheumatoid arthritis with rheumatoid factor of unspecified hand
M05.851 Other rheumatoid arthritis with rheumatoid factor of right hip
M05.852 Other rheumatoid arthritis with rheumatoid factor of left hip
M05.859 Other rheumatoid arthritis with rheumatoid factor of unspecified hip
M05.861 Other rheumatoid arthritis with rheumatoid factor of right knee
M05.862 Other rheumatoid arthritis with rheumatoid factor of left knee
M05.869 Other rheumatoid arthritis with rheumatoid factor of unspecified knee
M05.871 Other rheumatoid arthritis with rheumatoid factor of right ankle and foot
M05.872 Other rheumatoid arthritis with rheumatoid factor of left ankle and foot
M05.879 Other rheumatoid arthritis with rheumatoid factor of unspecified ankle and foot
M05.89  Other rheumatoid arthritis with rheumatoid factor of multiple sites
M05.9  Rheumatoid arthritis with rheumatoid factor, unspecified
M06.00  Rheumatoid arthritis without rheumatoid factor, unspecified site
M06.011 Rheumatoid arthritis without rheumatoid factor, right shoulder
M06.012 Rheumatoid arthritis without rheumatoid factor, left shoulder
M06.019 Rheumatoid arthritis without rheumatoid factor, unspecified shoulder
M06.021 Rheumatoid arthritis without rheumatoid factor, right elbow
M06.022 Rheumatoid arthritis without rheumatoid factor, left elbow
M06.029 Rheumatoid arthritis without rheumatoid factor, unspecified elbow
M06.031 Rheumatoid arthritis without rheumatoid factor, right wrist
M06.032 Rheumatoid arthritis without rheumatoid factor, left wrist
M06.039 Rheumatoid arthritis without rheumatoid factor, unspecified wrist
M06.041 Rheumatoid arthritis without rheumatoid factor, right hand
M06.042 Rheumatoid arthritis without rheumatoid factor, left hand
M06.049 Rheumatoid arthritis without rheumatoid factor, unspecified hand
M06.051 Rheumatoid arthritis without rheumatoid factor, right hip
M06.052 Rheumatoid arthritis without rheumatoid factor, left hip
M06.059 Rheumatoid arthritis without rheumatoid factor, unspecified hip
M06.061 Rheumatoid arthritis without rheumatoid factor, right knee
M06.062 Rheumatoid arthritis without rheumatoid factor, left knee
M06.069 Rheumatoid arthritis without rheumatoid factor, unspecified knee
M06.071 Rheumatoid arthritis without rheumatoid factor, right ankle and foot
M06.072 Rheumatoid arthritis without rheumatoid factor, left ankle and foot
M06.079 Rheumatoid arthritis without rheumatoid factor, unspecified ankle and foot
M06.08 Rheumatoid arthritis without rheumatoid factor, vertebrae
M06.09 Rheumatoid arthritis without rheumatoid factor, multiple sites
M06.1 Adult-onset Still's disease
M06.20 Rheumatoid bursitis, unspecified site
M06.211 Rheumatoid bursitis, right shoulder
M06.212 Rheumatoid bursitis, left shoulder
M06.219 Rheumatoid bursitis, unspecified shoulder
M06.221 Rheumatoid bursitis, right elbow
M06.222 Rheumatoid bursitis, left elbow
M06.229 Rheumatoid bursitis, unspecified elbow
M06.231 Rheumatoid bursitis, right wrist
M06.232 Rheumatoid bursitis, left wrist
M06.239 Rheumatoid bursitis, unspecified wrist
M06.241 Rheumatoid bursitis, right hand
M06.242 Rheumatoid bursitis, left hand
M06.249 Rheumatoid bursitis, unspecified hand
M06.251 Rheumatoid bursitis, right hip
M06.252 Rheumatoid bursitis, left hip
M06.259 Rheumatoid bursitis, unspecified hip
M06.261 Rheumatoid bursitis, right knee
M06.262 Rheumatoid bursitis, left knee
M06.269 Rheumatoid bursitis, unspecified knee
M06.271 Rheumatoid bursitis, right ankle and foot
M06.272 Rheumatoid bursitis, left ankle and foot
M06.279 Rheumatoid bursitis, unspecified ankle and foot
M06.28 Rheumatoid bursitis, vertebrae
M06.29 Rheumatoid bursitis, multiple sites
M06.30 Rheumatoid nodule, unspecified site
M06.311 Rheumatoid nodule, right shoulder
M06.312 Rheumatoid nodule, left shoulder
M06.319 Rheumatoid nodule, unspecified shoulder
M06.321 Rheumatoid nodule, right elbow
M06.322 Rheumatoid nodule, left elbow
M06.329 Rheumatoid nodule, unspecified elbow
M06.331 Rheumatoid nodule, right wrist
M06.332 Rheumatoid nodule, left wrist
M06.339 Rheumatoid nodule, unspecified wrist
M06.341 Rheumatoid nodule, right hand
M06.342 Rheumatoid nodule, left hand
M06.349 Rheumatoid nodule, unspecified hand
M06.351 Rheumatoid nodule, right hip
M06.352 Rheumatoid nodule, left hip
M06.359 Rheumatoid nodule, unspecified hip
M06.361 Rheumatoid nodule, right knee
M06.362 Rheumatoid nodule, left knee
M06.369 Rheumatoid nodule, unspecified knee
M06.371 Rheumatoid nodule, right ankle and foot
| Code       | Description                                           |
|------------|-------------------------------------------------------|
| M06.372    | Rheumatoid nodule, left ankle and foot                |
| M06.379    | Rheumatoid nodule, unspecified ankle and foot         |
| M06.38     | Rheumatoid nodule, vertebrae                          |
| M06.39     | Rheumatoid nodule, multiple sites                     |
| M06.4      | Inflammatory polyarthritis                            |
| M06.80     | Other specified rheumatoid arthritis, unspecified site|
| M06.811    | Other specified rheumatoid arthritis, right shoulder   |
| M06.812    | Other specified rheumatoid arthritis, left shoulder    |
| M06.819    | Other specified rheumatoid arthritis, unspecified shoulder |
| M06.821    | Other specified rheumatoid arthritis, right elbow     |
| M06.822    | Other specified rheumatoid arthritis, left elbow      |
| M06.829    | Other specified rheumatoid arthritis, unspecified elbow|
| M06.831    | Other specified rheumatoid arthritis, right wrist     |
| M06.832    | Other specified rheumatoid arthritis, left wrist       |
| M06.839    | Other specified rheumatoid arthritis, unspecified wrist|
| M06.841    | Other specified rheumatoid arthritis, right hand      |
| M06.842    | Other specified rheumatoid arthritis, left hand       |
| M06.849    | Other specified rheumatoid arthritis, unspecified hand|
| M06.851    | Other specified rheumatoid arthritis, right hip        |
| M06.852    | Other specified rheumatoid arthritis, left hip         |
| M06.859    | Other specified rheumatoid arthritis, unspecified hip  |
| M06.861    | Other specified rheumatoid arthritis, right knee       |
| M06.862    | Other specified rheumatoid arthritis, left knee        |
| M06.869    | Other specified rheumatoid arthritis, unspecified knee|
| M06.871    | Other specified rheumatoid arthritis, right ankle and foot|
| M06.872    | Other specified rheumatoid arthritis, left ankle and foot|
| M06.879    | Other specified rheumatoid arthritis, unspecified ankle and foot|
| M06.88     | Other specified rheumatoid arthritis, vertebrae        |
| M06.89     | Other specified rheumatoid arthritis, multiple sites   |
| M06.9      | Rheumatoid arthritis, unspecified                     |
| M08.00     | Unspecified juvenile rheumatoid arthritis of unspecified site |
M08.011 Unspecified juvenile rheumatoid arthritis, right shoulder
M08.012 Unspecified juvenile rheumatoid arthritis, left shoulder
M08.019 Unspecified juvenile rheumatoid arthritis, unspecified shoulder
M08.021 Unspecified juvenile rheumatoid arthritis, right elbow
M08.022 Unspecified juvenile rheumatoid arthritis, left elbow
M08.029 Unspecified juvenile rheumatoid arthritis, unspecified elbow
M08.031 Unspecified juvenile rheumatoid arthritis, right wrist
M08.032 Unspecified juvenile rheumatoid arthritis, left wrist
M08.039 Unspecified juvenile rheumatoid arthritis, unspecified wrist
M08.041 Unspecified juvenile rheumatoid arthritis, right hand
M08.042 Unspecified juvenile rheumatoid arthritis, left hand
M08.049 Unspecified juvenile rheumatoid arthritis, unspecified hand
M08.051 Unspecified juvenile rheumatoid arthritis, right hip
M08.052 Unspecified juvenile rheumatoid arthritis, left hip
M08.059 Unspecified juvenile rheumatoid arthritis, unspecified hip
M08.061 Unspecified juvenile rheumatoid arthritis, right knee
M08.062 Unspecified juvenile rheumatoid arthritis, left knee
M08.069 Unspecified juvenile rheumatoid arthritis, unspecified knee
M08.071 Unspecified juvenile rheumatoid arthritis, right ankle and foot
M08.072 Unspecified juvenile rheumatoid arthritis, left ankle and foot
M08.079 Unspecified juvenile rheumatoid arthritis, unspecified ankle and foot
M08.08 Unspecified juvenile rheumatoid arthritis, vertebrae
M08.09 Unspecified juvenile rheumatoid arthritis, multiple sites
M08.20 Juvenile rheumatoid arthritis with systemic onset, unspecified site
M08.211 Juvenile rheumatoid arthritis with systemic onset, right shoulder
M08.212 Juvenile rheumatoid arthritis with systemic onset, left shoulder
M08.219 Juvenile rheumatoid arthritis with systemic onset, unspecified shoulder
M08.221 Juvenile rheumatoid arthritis with systemic onset, right elbow
M08.222 Juvenile rheumatoid arthritis with systemic onset, left elbow
M08.229 Juvenile rheumatoid arthritis with systemic onset, unspecified elbow
M08.231 Juvenile rheumatoid arthritis with systemic onset, right wrist
| Code    | Description                                           |
|---------|-------------------------------------------------------|
| M08.232 | Juvenile rheumatoid arthritis with systemic onset, left wrist |
| M08.239 | Juvenile rheumatoid arthritis with systemic onset, unspecified wrist |
| M08.241 | Juvenile rheumatoid arthritis with systemic onset, right hand |
| M08.242 | Juvenile rheumatoid arthritis with systemic onset, left hand |
| M08.249 | Juvenile rheumatoid arthritis with systemic onset, unspecified hand |
| M08.251 | Juvenile rheumatoid arthritis with systemic onset, right hip |
| M08.252 | Juvenile rheumatoid arthritis with systemic onset, left hip |
| M08.259 | Juvenile rheumatoid arthritis with systemic onset, unspecified hip |
| M08.261 | Juvenile rheumatoid arthritis with systemic onset, right knee |
| M08.262 | Juvenile rheumatoid arthritis with systemic onset, left knee |
| M08.269 | Juvenile rheumatoid arthritis with systemic onset, unspecified knee |
| M08.271 | Juvenile rheumatoid arthritis with systemic onset, right ankle and foot |
| M08.272 | Juvenile rheumatoid arthritis with systemic onset, left ankle and foot |
| M08.279 | Juvenile rheumatoid arthritis with systemic onset, unspecified ankle and foot |
| M08.28  | Juvenile rheumatoid arthritis with systemic onset, vertebrae |
| M08.29  | Juvenile rheumatoid arthritis with systemic onset, multiple sites |
| M08.3   | Juvenile rheumatoid polyarthritis (seronegative) |
| M08.40  | Pauciarticular juvenile rheumatoid arthritis, unspecified site |
| M08.411 | Pauciarticular juvenile rheumatoid arthritis, right shoulder |
| M08.412 | Pauciarticular juvenile rheumatoid arthritis, left shoulder |
| M08.419 | Pauciarticular juvenile rheumatoid arthritis, unspecified shoulder |
| M08.421 | Pauciarticular juvenile rheumatoid arthritis, right elbow |
| M08.422 | Pauciarticular juvenile rheumatoid arthritis, left elbow |
| M08.429 | Pauciarticular juvenile rheumatoid arthritis, unspecified elbow |
| M08.431 | Pauciarticular juvenile rheumatoid arthritis, right wrist |
| M08.432 | Pauciarticular juvenile rheumatoid arthritis, left wrist |
| M08.439 | Pauciarticular juvenile rheumatoid arthritis, unspecified wrist |
| M08.441 | Pauciarticular juvenile rheumatoid arthritis, right hand |
| M08.442 | Pauciarticular juvenile rheumatoid arthritis, left hand |
| M08.449 | Pauciarticular juvenile rheumatoid arthritis, unspecified hand |
| M08.451 | Pauciarticular juvenile rheumatoid arthritis, right hip |
| Code   | Description                                      |
|--------|--------------------------------------------------|
| M08.452 | Pauciarticular juvenile rheumatoid arthritis, left hip |
| M08.459 | Pauciarticular juvenile rheumatoid arthritis, unspecified hip |
| M08.461 | Pauciarticular juvenile rheumatoid arthritis, right knee |
| M08.462 | Pauciarticular juvenile rheumatoid arthritis, left knee |
| M08.469 | Pauciarticular juvenile rheumatoid arthritis, unspecified knee |
| M08.471 | Pauciarticular juvenile rheumatoid arthritis, right ankle and foot |
| M08.472 | Pauciarticular juvenile rheumatoid arthritis, left ankle and foot |
| M08.479 | Pauciarticular juvenile rheumatoid arthritis, unspecified ankle and foot |
| M08.48  | Pauciarticular juvenile rheumatoid arthritis, vertebrae |
**UTI codes [ICD-10 Code]**
Excludes UTIs in pregnancy.

| Code    | Description                                                                 |
|---------|-----------------------------------------------------------------------------|
| A02.25  | Salmonella pyelonephritis                                                  |
| A06.81  | Amebic cystitis                                                            |
| A36.85  | Diphtheritic cystitis                                                      |
| A54.00  | Gonococcal infection of lower genitourinary tract, unspecified             |
| A54.01  | Gonococcal cystitis and urethritis, unspecified                            |
| A54.09  | Other gonococcal infection of lower genitourinary tract                    |
| A54.1   | Gonococcal infection of lower genitourinary tract with periurethral and accessory gland abscess |
| A56.00  | Chlamydial infection of lower genitourinary tract, unspecified             |
| A56.01  | Chlamydial cystitis and urethritis                                         |
| A56.09  | Other chlamydial infection of lower genitourinary tract                    |
| A56.2   | Chlamydial infection of genitourinary tract, unspecified                   |
| A59.03  | Trichomonal cystitis and urethritis                                       |
| A59.09  | Other urogenital trichomoniasis                                           |
| B37.41  | Candidal cystitis and urethritis                                           |
| B37.49  | Other urogenital candidiasis                                               |
| N10     | Acute pyelonephritis                                                      |
| N30.00  | Acute cystitis without hematuria                                           |
| N30.01  | Acute cystitis with hematuria                                              |
| N30.90  | Cystitis, unspecified without hematuria                                    |
| N30.91  | Cystitis, unspecified with hematuria                                       |
| N34.1   | Nonspecific urethritis                                                    |
| N34.2   | Other urethritis                                                          |
| N39.0   | Urinary tract infection, site not specified                               |
### Raynauds syndrome codes [ICD-10 Code]

| Code | Description                     |
|------|---------------------------------|
| I73.00 | Raynaud's syndrome without gangrene |
| I73.01 | Raynaud's syndrome with gangrene   |
**Sjogrens syndrome codes [ICD-10 Code]**

| Code   | Description                                           |
|--------|-------------------------------------------------------|
| M35.00 | Sjögren syndrome, unspecified                         |
| M35.01 | Sjögren syndrome with keratoconjunctivitis            |
| M35.02 | Sjögren syndrome with lung involvement                |
| M35.03 | Sjögren syndrome with myopathy                        |
| M35.04 | Sjögren syndrome with tubulo-interstitial nephropathy |
| M35.09 | Sjögren syndrome with other organ involvement         |
| Code  | Description                                      |
|-------|--------------------------------------------------|
| E05.00| Thyrotoxicosis with diffuse goiter without thyrotoxic crisis or storm |
| E05.01| Thyrotoxicosis with diffuse goiter with thyrotoxic crisis or storm |
| E06.3 | Autoimmune thyroiditis                           |
### Sleep-related issues codes [ICD-10 Code]

| Code   | Description                                                                 |
|--------|-----------------------------------------------------------------------------|
| F51.01 | Primary insomnia                                                            |
| F51.02 | Adjustment insomnia                                                          |
| F51.09 | Other insomnia not due to a substance or known physiological condition     |
| F51.12 | Insufficient sleep syndrome                                                  |
| G47.00 | Insomnia, unspecified                                                        |
| G47.01 | Insomnia due to medical condition                                            |
| G47.09 | Other insomnia                                                              |
| G47.27 | Circadian rhythm sleep disorder in conditions classified elsewhere          |
| G47.8  | Other sleep disorders                                                       |
| G47.9  | Sleep disorder, unspecified                                                 |
| Z72.820| Sleep deprivation                                                           |
## Cognitive impairment codes [ICD-10 Code]

| Code    | Description                                                                 |
|---------|------------------------------------------------------------------------------|
| F01.50  | Vascular dementia without behavioral disturbance                            |
| F01.51  | Vascular dementia with behavioral disturbance                               |
| F02.80  | Dementia in other diseases classified elsewhere without behavioral disturbance |
| F02.81  | Dementia in other diseases classified elsewhere with behavioral disturbance  |
| F03.90  | Unspecified dementia without behavioral disturbance                         |
| F03.91  | Unspecified dementia with behavioral disturbance                            |
| F04     | Amnestic disorder due to known physiological condition                      |
| F05     | Delirium due to known physiological condition                               |
| G30.0   | Alzheimer's disease with early onset                                         |
| G30.1   | Alzheimer's disease with late onset                                          |
| G30.8   | Other Alzheimer's disease                                                    |
| G30.9   | Alzheimer's disease, unspecified                                             |
| G31.01  | Pick's disease                                                              |
| G31.09  | Other frontotemporal dementia                                                |
| G31.83  | Dementia with Lewy bodies                                                    |
| G31.84  | Mild cognitive impairment, so stated                                         |
| I69.01  | Cognitive deficits following nontraumatic subarachnoid hemorrhage            |
| I69.010 | Attention and concentration deficit following nontraumatic subarachnoid hemorrhage |
| I69.011 | Memory deficit following nontraumatic subarachnoid hemorrhage               |
| I69.013 | Psychomotor deficit following nontraumatic subarachnoid hemorrhage           |
| I69.014 | Frontal lobe and executive function deficit following nontraumatic subarachnoid hemorrhage |
| I69.015 | Cognitive social or emotional deficit following nontraumatic subarachnoid hemorrhage |
| I69.018 | Other symptoms and signs involving cognitive functions following nontraumatic subarachnoid hemorrhage |
| I69.019 | Unspecified symptoms and signs involving cognitive functions following nontraumatic subarachnoid hemorrhage |
| I69.11  | Cognitive deficits following nontraumatic intracerebral hemorrhage           |
| I69.110 | Attention and concentration deficit following nontraumatic intracerebral hemorrhage |
| I69.111 | Memory deficit following nontraumatic intracerebral hemorrhage              |
| I69.113 | Psychomotor deficit following nontraumatic intracerebral hemorrhage         |
| I69.114 | Frontal lobe and executive function deficit following nontraumatic intracerebral hemorrhage |
I69.115 Cognitive social or emotional deficit following nontraumatic intracerebral hemorrhage
I69.118 Other symptoms and signs involving cognitive functions following nontraumatic intracerebral hemorrhage
I69.119 Unspecified symptoms and signs involving cognitive functions following nontraumatic intracerebral hemorrhage
I69.21 Cognitive deficits following other nontraumatic intracranial hemorrhage
I69.210 Attention and concentration deficit following other nontraumatic intracranial hemorrhage
I69.211 Memory deficit following other nontraumatic intracranial hemorrhage
I69.213 Psychomotor deficit following other nontraumatic intracranial hemorrhage
I69.214 Frontal lobe and executive function deficit following other nontraumatic intracranial hemorrhage
I69.215 Cognitive social or emotional deficit following other nontraumatic intracranial hemorrhage
I69.218 Other symptoms and signs involving cognitive functions following other nontraumatic intracranial hemorrhage
I69.219 Unspecified symptoms and signs involving cognitive functions following other nontraumatic intracranial hemorrhage
I69.31 Cognitive deficits following cerebral infarction
I69.310 Attention and concentration deficit following cerebral infarction
I69.311 Memory deficit following cerebral infarction
I69.313 Psychomotor deficit following cerebral infarction
I69.314 Frontal lobe and executive function deficit following cerebral infarction
I69.315 Cognitive social or emotional deficit following cerebral infarction
I69.318 Other symptoms and signs involving cognitive functions following cerebral infarction
I69.319 Unspecified symptoms and signs involving cognitive functions following cerebral infarction
I69.81 Cognitive deficits following other cerebrovascular disease
I69.810 Attention and concentration deficit following other cerebrovascular disease
I69.811 Memory deficit following other cerebrovascular disease
I69.813 Psychomotor deficit following other cerebrovascular disease
I69.814 Frontal lobe and executive function deficit following other cerebrovascular disease
I69.815 Cognitive social or emotional deficit following other cerebrovascular disease
I69.818 Other symptoms and signs involving cognitive functions following other cerebrovascular disease
I69.819 Unspecified symptoms and signs involving cognitive functions following other cerebrovascular disease
I69.91 Cognitive deficits following unspecified cerebrovascular disease
I69.913 Psychomotor deficit following unspecified cerebrovascular disease
| Code   | Description                                                                 |
|--------|-----------------------------------------------------------------------------|
| I69.914| Frontal lobe and executive function deficit following unspecified cerebrovascular disease |
| I69.915| Cognitive social or emotional deficit following unspecified cerebrovascular disease |
| I69.918| Other symptoms and signs involving cognitive functions following unspecified cerebrovascular disease |
| I69.919| Unspecified symptoms and signs involving cognitive functions following unspecified cerebrovascular disease |
| R41.1  | Anterograde amnesia                                                          |
| R41.2  | Retrograde amnesia                                                           |
| R41.3  | Other amnesia                                                               |
| R41.4  | Neurologic neglect syndrome                                                  |
| R41.81 | Age-related cognitive decline                                                |
| R41.83 | Borderline intellectual functioning                                          |
| R41.840| Attention and concentration deficit                                         |
| R41.841| Cognitive communication deficit                                              |
| R41.843| Psychomotor deficit                                                         |
| R41.844| Frontal lobe and executive function deficit                                 |
| R41.89 | Other symptoms and signs involving cognitive functions and awareness        |
| R41.9  | Unspecified symptoms and signs involving cognitive functions and awareness  |
### Itch or pruritus codes [ICD-10 Code]

| Code  | Description                      |
|-------|----------------------------------|
| L29.0 | Pruritus ani                     |
| L29.1 | Pruritus scroti                  |
| L29.2 | Pruritus vulvae                  |
| L29.3 | Anogenital pruritus, unspecified |
| L29.8 | Other pruritus                   |
| L29.9 | Pruritus, unspecified            |
## Diarrhoea codes [ICD-10 Code]

| Code     | Description                                           |
|----------|-------------------------------------------------------|
| K58.0    | Irritable bowel syndrome with diarrhea               |
| K59.1    | Functional diarrhea                                   |
| R19.7    | Diarrhea, unspecified                                |
| T47.6X5A | Adverse effect of antidiarrheal drugs, initial encounter |
| T47.6X5D | Adverse effect of antidiarrheal drugs, subsequent encounter |
| T47.6X5S | Adverse effect of antidiarrheal drugs, sequela       |
| T47.6X6A | Underdosing of antidiarrheal drugs, initial encounter |
| T47.6X6D | Underdosing of antidiarrheal drugs, subsequent encounter |
### Chronic hepatitis B codes [ICD-10 Code]

| Code | Description                          |
|------|--------------------------------------|
| B18.0| Chronic viral hepatitis B with delta-agent |
| B18.1| Chronic viral hepatitis B without delta-agent |
### Chronic hepatitis C codes [ICD-10 Code]

| Code  | Description                        |
|-------|------------------------------------|
| B18.2 | Chronic viral hepatitis C          |
SUPPLEMENTAL MATERIAL

Supplementary Methods

Mathematical approach for indirect standardisation

Indirect standardisation generates the expected rate/proportion in a study population if it was subject to the stratum-specific rates/proportions of the standard population. The number of observed events versus the number of expected events can be expressed as a ratio – the standardised rate (or proportion) ratio.

In the context of this study, the study population is defined as all eligible patients meeting the case definition of PBC, while the standard population is defined as all eligible patients who did not meet the case definition of PBC. Strata are defined as groupings based on the age and sex of individuals.

For a study population, the number of expected events \(d_e\) can be calculated as follows:

\[
d_e = \sum_{i=1}^{k} n_i R_i
\]

\(d_e\) = the number of expected events; \(n_i\) = the number of individuals in the \(i^{th}\) stratum of the study population; \(R_i\) = stratum-specific rate or proportion in the \(i^{th}\) stratum of the standard population; \(k\) = the number of strata.

The indirect standardised ratio (ISR) is the ratio of the number of observed events \(d_o\) to the number of expected events \(d_e\) in the study population:

\[
isR = \frac{d_o}{d_e} = \frac{d_o}{\sum_{i=1}^{k} n_i R_i}
\]

\(d_o\) = the number of observed events; \(d_e\) = the number of expected events; \(n_i\) = the number of individuals in the \(i^{th}\) stratum of the study population; \(R_i\) = stratum-specific rate or proportion in the \(i^{th}\) stratum of the standard population; \(k\) = the number of strata.
Confidence intervals for the ISR are calculated per Owen’s exact Poisson method:\(^{35}\)

\[
ISR_l = \chi^2_{1-\alpha/2,2d_0/2d_e}
\]

\[
ISR_u = \chi^2_{1-\alpha/2,2(d_0+1)/2d_e}
\]

ISR\(_l\) = the lower bound of the confidence interval; ISR\(_u\) = the upper bound of the confidence interval;

d\(_o\) = the number of observed events; d\(_e\) = the number of expected events.
Supplementary Results

Supplementary Figure 1. Prevalence of prespecified comorbidities among patients in the PBC population (N=1,963) or the PBC-pruritus subpopulation (N=139) relative to the respective non-case populations

\[ \text{Prevalence (\%)} \]

- **Diarrhoea**
- **UTI**
- **Anxiety**
- **Cognitive impairment**
- **Depression**
- **Depression or Anxiety**
- **Fatigue**
- **Sleep-related issues**
- **Autoimmune Hepatitis**
- **Autoimmune Thyroid Disease**
- **Raynaud’s Syndrome**
- **Rheumatoid Arthritis**
- **Sjögren’s Syndrome**

\[ \text{PBC symptoms of interest} \]

\[ \text{Prevalent psychiatric and other conditions affecting QoL} \]

\[ \text{Liver and autoimmune conditions} \]

\[^{\dagger}\text{N for the non-case population (N=10,245,592), relates to the comparison versus the PBC population not versus the PBC-pruritus population (N=9,984,009)}\]

PBC, primary biliary cholangitis; QoL, quality of life; UTI, urinary tract infection
**Supplementary Table 1.** The 30 most common comorbidities (ICD-10-CM diagnosis codes) in the PBC population and the PBC-pruritus subpopulation

| Condition                                           | PBC (N=1,963) | N (%)  | PBC-pruritus subpopulation (N=139) | N (%)  |
|-----------------------------------------------------|---------------|--------|-----------------------------------|--------|
| Essential (primary) hypertension                    | 896 (45.6)    |        | Essential (primary) hypertension   | 58 (41.7) |
| Hyperlipidaemia, unspecified                        | 555 (28.3)    |        | Hypothyroidism, unspecified        | 41 (29.5) |
| Gastro-esophageal reflux disease without esophagitis| 493 (25.1)    |        | Hyperlipidaemia, unspecified       | 39 (28.1) |
| Unspecified cirrhosis of liver                      | 473 (24.1)    |        | Vitamin D deficiency, unspecified  | 36 (25.9) |
| Hypothyroidism, unspecified                         | 470 (23.9)    |        | Gastro-esophageal reflux disease without esophagitis | 33 (23.7) |
| Biliary cirrhosis, unspecified                      | 433 (22.1)    |        | Biliary cirrhosis, unspecified     | 32 (23.0) |
| Vitamin D deficiency, unspecified                   | 407 (20.7)    |        | Cough                             | 27 (19.4) |
| Cough                                               | 335 (17.1)    |        | Anxiety disorder, unspecified      | 22 (15.8) |
| Type 2 diabetes mellitus without complications      | 299 (15.2)    |        | Fatty (change of) liver, not elsewhere classified | 22 (15.8) |
| Low back pain                                       | 278 (14.2)    |        | Cholangitis                        | 22 (15.8) |
| Other fatigue                                       | 268 (13.7)    |        | Anaemia, unspecified               | 22 (15.8) |
| Mixed hyperlipidaemia                               | 268 (13.7)    |        | Actinic keratosis                  | 20 (14.4) |
| Shortness of breath                                 | 244 (12.4)    |        | Portal hypertension                | 19 (13.7) |
| unspecified abdominal pain                          | 241 (12.3)    |        | Low back pain                      | 19 (13.7) |
| Age-related osteoporosis*                            | 239 (12.2)    |        | Abnormal levels of other serum enzymes | 19 (13.7) |
| Anaemia, unspecified                                | 234 (11.9)    |        | Abnormal results of liver function studies | 18 (12.9) |
| Other specified abnormal findings of blood chemistry| 232 (11.8)    |        | Type 2 diabetes mellitus without complications | 18 (12.9) |
| Abnormal results of liver function studies          | 226 (11.5)    |        | UTI, site not specified            | 18 (12.9) |
| UTI, site not specified                             | 224 (11.4)    |        | Autoimmune hepatitis               | 17 (12.2) |
| Abnormal levels of other serum enzymes              | 222 (11.3)    |        | Acute bronchitis, unspecified      | 16 (11.5) |
| Fatty (change of) liver, not elsewhere classified   | 219 (11.2)    |        | Neoplasm of uncertain or unknown behavior: Skin | 16 (11.5) |
| Other seborrhic keratosis                           | 215 (11.0)    |        | Depressive episode, unspecified    | 16 (11.5) |
| Acute upper respiratory infection, unspecified      | 207 (10.5)    |        | Postmenopausal osteoporosis        | 16 (11.5) |
| Chest pain, unspecified                             | 207 (10.5)    |        | Liver disease, unspecified         | 15 (10.8) |
| Age-related nuclear cataract, bilateral             | 202 (10.3)    |        | Mixed hyperlipidaemia              | 15 (10.8) |
| Dry eye syndrome of bilateral lacrimal glands       | 198 (10.1)    |        | Obesity, unspecified               | 14 (10.1) |
| Neoplasm of uncertain or unknown behavior: Skin     | 196 (10.0)    |        | Chronic obstructive pulmonary disease, unspecified | 12 (8.6) |
| Cholangitis                                         | 194 (9.9)     |        | Other specified disorders of bone density and structure | 12 (8.6) |
| Autoimmune hepatitis                                | 187 (9.5)     |        | Pure hypercholesterolaemia         | 12 (8.6) |
| Cervicalgia                                         | 186 (9.5)     |        | Headache                          | 12 (8.6) |
|                                                   |               |        | Hypokalaemia                       | 12 (8.6) |
|                                                   |               |        | Acute pharyngitis, unspecified     | 12 (8.6) |
|                                                   |               |        | Cervicalgia                        | 12 (8.6) |
|                                                   |               |        | Splenomegaly, not elsewhere classified | 12 (8.6) |
*Without current pathological fracture

ICD-10-CM, International Classification of Diseases, 10th Revision, Clinical Modification; PBC, primary biliary cholangitis; UTI, urinary tract infection
Supplementary Table 2. The 30 most commonly prescribed medications by category* in the PBC population and the PBC-pruritus subpopulation

| Category                                      | PBC (N=1,963) | N (%)  | PBC + coded pruritus (N=139) | N (%)  |
|-----------------------------------------------|---------------|--------|--------------------------------|--------|
| Gallstone solubilizing agents                 | 1,724 (87.8)  | 1,724  | Gallstone solubilizing agents  | 1,724  |
| Analgesics                                    | 858 (43.7)    | 858    | Analgesics                     | 858    |
| Dermatological agents†                        | 642 (32.7)    | 642    | Anxiolytics, sedatives, and hypnotics | 642 |
| Antihyperlipidemic agents‡                    | 621 (31.6)    | 621    | Dermatological agents†         | 621    |
| Proton pump inhibitors                        | 598 (30.5)    | 598    | Proton pump inhibitors          | 598    |
| Adrenal cortical steroids                      | 586 (29.9)    | 586    | Adrenal cortical steroids       | 586    |
| Antidepressants                               | 575 (29.3)    | 575    | Antidepressants                 | 575    |
| Thyroid hormones                              | 539 (27.5)    | 539    | Thyroid hormones                | 539    |
| Anxiolytics, sedatives, and hypnotics         | 510 (26.0)    | 510    | Antihistamines                  | 510    |
| Penicillins                                   | 494 (25.2)    | 494    | Penicillins                     | 494    |
| Beta-adrenergic blocking agents               | 431 (21.0)    | 431    | Diuretics                       | 431    |
| Macrolide derivatives                         | 412 (21.0)    | 412    | Antiemetic/antivertigo agents   | 412    |
| Diuretics                                     | 396 (20.2)    | 396    | Anticonvulsants                 | 396    |
| Anticonvulsants                               | 380 (19.4)    | 380    | Macrolide derivatives           | 380    |
| Ophthalmic preparations                       | 358 (18.2)    | 358    | Quinolones                      | 358    |
| Quinolones                                    | 352 (17.9)    | 352    | Beta-adrenergic blocking agents | 352    |
| Antimicrobial/antivertigo agents              | 339 (17.3)    | 339    | Antimicrobial agents            | 339    |
| Bronchodilators                               | 325 (16.6)    | 325    | Bronchodilators                 | 325    |
| Cephalosporins                                | 317 (16.1)    | 317    | Cephalosporins                  | 317    |
| Antimalarial agents                           | 310 (15.8)    | 310    | Sex hormones                    | 310    |
| Calcium channel blocking agents               | 288 (14.7)    | 288    | Calcium channel blocking agents | 288 |
| Nasal preparations                            | 272 (13.9)    | 272    | Nasal preparations              | 272    |
| Laxatives                                     | 268 (13.7)    | 268    | Laxatives                       | 268    |
| Antidiabetic agents                           | 267 (13.6)    | 267    | Ophthalmic preparations         | 267    |
| Antirheumatics                                | 266 (13.6)    | 266    | Antirheumatics                  | 266    |
| Sex hormones                                  | 266 (13.6)    | 266    | Sex hormones                    | 266    |
| Immunosuppressives                            | 259 (13.2)    | 259    | Immunosuppressives              | 259    |
| Immunosuppressive agents                      | 252 (12.8)    | 252    | Immunosuppressive agents        | 252    |
| ACE inhibitors                                | 247 (12.6)    | 247    | ACE inhibitors                  | 247    |
| Muscle relaxants                              | 239 (12.2)    | 239    | Muscle relaxants                | 239    |
*Medications are grouped according to NDC Multum Level 2 and listed from most to least frequently prescribed.

†Level 2 group ‘dermatological agents’ contains the following topical agents: anti-infectives, steroids, anaesthetics, miscellaneous agents, anti-infectives with steroids, acne agents, antipsoriatrics, emollients, antibiotics, antivirals, antifungals

†Including statins

ACE, angiotensin-converting enzyme; GI, gastrointestinal; NDC, national drug code; PBC, primary biliary cholangitis
**Supplementary Table 3. Age-specific estimates of prespecified comorbidities by PBC status**

| N (%)                  | Non-case population* |                         | PBC population |                         |
|------------------------|----------------------|--------------------------|----------------|--------------------------|
|                        | Age group (years)    | 18–34  35–54  55–64  65–74  ≥75 | Age group (years) | 18–34  35–54  55–64  65–74  ≥75 |
| Source population      | 2,693,650 (100)      | 4,071,602 (100) | 2,443,349 (100) | 568,235 (100) | 468,756 (100) | 40 (100) | 584 (100) | 808 (100) | 336 (100) | 195 (100) |
| UTI                    | 164,926 (6.1)        | 227,400 (5.6)  | 160,607 (6.6)   | 50,456 (8.9)   | 72,211 (15.4) | 3 (7.5)  | 80 (13.7) | 93 (11.5) | 58 (17.3) | 37 (19.0) |
| Rheumatoid arthritis   | 8,078 (0.3)          | 41,973 (1.0)   | 42,340 (1.7)    | 14,012 (2.5)   | 12,077 (2.6) | 0 (6.9)  | 40 (6.9)  | 56 (5.4)  | 18 (4.6)  | 9 (4.6)   |
| Raynaud’s syndrome     | 3,909 (0.2)          | 10,068 (0.3)   | 6,890 (0.4)     | 2,044 (0.3)    | 1,422 (0.3)   | 0 (2.6)  | 15 (2.6)  | 28 (2.7)  | 9 (2.6)   | 5 (2.6)   |
| Sjögren’s syndrome     | 1,764 (0.1)          | 9,290 (0.3)    | 8,804 (0.4)     | 2,694 (0.4)    | 1,875 (0.4)   | 2 (5.0)  | 42 (5.5)  | 44 (4.2)  | 14 (6.2)  | 12 (6.2)  |
| SLE                    | 4,411 (0.2)          | 13,880 (0.3)   | 8,422 (0.4)     | 2,051 (0.4)    | 1,132 (0.2)   | 0 (3.8)  | 22 (2.1)  | 17 (0.9)  | 3 (2.6)   | 5 (2.6)   |
| Autoimmune thyroid disease | 17,888 (0.7)    | 46,447 (1.1)   | 26,286 (1.1)    | 5,496 (1.0)    | 2,951 (0.6)   | 2 (5.0)  | 25 (4.3)  | 19 (2.4)  | 12 (3.6)  | 1 (0.5)   |
| Autoimmune hepatitis   | 431 (0.02)           | 1,208 (0.03)   | 1,217 (0.1)     | 381 (0.1)      | 239 (0.1)     | 10 (25.0) | 66 (11.3) | 80 (9.9)  | 22 (6.6)  | 9 (4.6)   |
| Depression or anxiety  | 404,669 (15.0)       | 653,326 (16.1)  | 379,403 (15.5)  | 98,712 (17.4)  | 88,704 (18.9) | 8 (20.0) | 119 (21.5) | 174 (25.3) | 85 (16.4) | 32 (16.4) |
| Depression              | 205,633 (7.6)        | 337,124 (8.3)   | 214,302 (8.8)   | 58,600 (10.3)  | 54,579 (11.6) | 6 (15.0) | 62 (10.6) | 112 (13.9) | 49 (14.6) | 22 (11.3) |
| Condition      | N (Cases) | N (%) | N (Non-cases) | N (%) | N (Cases) | N (%) | N (Non-cases) | N (%) | N (Cases) | N (%) | N (Non-cases) | N (%) | N (Cases) | N (%) |
|---------------|----------|-------|---------------|-------|----------|-------|---------------|-------|----------|-------|---------------|-------|----------|-------|
| Anxiety       | 316,553  | (11.8)| 475,887       | (11.7)| 252,219  | (10.3)| 63,239        | (11.1)| 54,917   | (11.7)| 7          | (17.5)| 82       | (14.0)|
| Sleep-related | 63,603    | (2.4)| 187,725       | (4.6)| 132,263  | (5.4)| 32,173        | (5.7)| 29,536   | (6.3)| 5          | (12.5)| 40       | (6.9)|
| Pruritus      | 35,244    | (1.3)| 57,802        | (1.4)| 39,861   | (1.6)| 13,010        | (2.3)| 12,231   | (2.6)| 6          | (15.0)| 48       | (8.2)|
| Diarrhoea     | 83,613    | (3.1)| 112,690       | (2.8)| 73,709   | (3.0)| 24,168        | (4.3)| 26,708   | (5.7)| 4          | (10.0)| 50       | (8.6)|
| Fatigue       | 194,643   | (7.2)| 440,621       | (10.8)| 266,746  | (10.9)| 69,335        | (12.2)| 96,564   | (20.6)| 10         | (25.0)| 127      | (21.8)|

†N for the non-case population (N=10,245,592), relates to the comparison versus the PBC population not versus the PBC-pruritus population (N=9,984,009)

Data shown reflects given conditions with ≥1 claim(s) during the 2017 calendar year

PBC, primary biliary cholangitis; SLE, systemic lupus erythematosus; UTI, urinary tract infection
Supplementary File 1. ICD-10 codes for prespecified comorbidities.