

Background rates of five thrombosis with thrombocytopenia syndromes of special interest for COVID-19 vaccine safety surveillance: incidence between 2017 and 2019 and patient profiles from 38.6 million people in six European countries

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Abstract

Background

Thrombosis with thrombocytopenia syndrome (TTS) has been reported among individuals vaccinated with adenovirus-vectored COVID-19 vaccines. In this study we describe the background incidence of non-vaccine induced TTS in 6 European countries.

Methods

Electronic medical records from France, the Netherlands, Italy, Germany, Spain, and the United Kingdom informed the study. Incidence rates of cerebral venous sinus thrombosis (CVST), splanchnic vein thrombosis (SVT), deep vein thrombosis (DVT), pulmonary embolism (PE), and myocardial infarction or ischemic stroke, all with concurrent thrombocytopenia, were estimated among the general population of persons in a database between 2017 to 2019. A range of additional potential adverse events of special interest for COVID-19 vaccinations were also studied in a similar manner.

Findings

A total of 38,611,617 individuals were included. Background rates ranged from 1.0 (95% CI: 0.7 to 1.4) to 8.5 (7.4 to 9.9) per 100,000 person-years for DVT with thrombocytopenia, from 0.5 (0.3 to 0.6) to 20.8 (18.9 to 22.8) for PE with thrombocytopenia, from 0.1 (0.0 to 0.1) to 2.5 (2.2 to 2.7) for SVT with thrombocytopenia, and from 1.0 (0.8 to 1.2) to 43.4 (40.7 to 46.3) for myocardial infarction or ischemic stroke with thrombocytopenia. CVST with thrombocytopenia was only identified in one database, with incidence rate of 0.1 (0.1 to 0.2) per 100,000 person-years. The incidence of non-vaccine induced TTS increased with age, and is typically greater among those with more comorbidities and greater medication use than the general population. It was also more often seen in men than women. A large proportion of those affected were seen to have been taking antithrombotic and anticoagulant therapies prior to their event.

Interpretation

Although rates vary across databases, non-vaccine induced TTS has consistently been seen to be a very rare event among the general population. While still remaining very rare, rates were typically higher among older individuals, and those affected were also seen to generally be male and have more comorbidities and greater medication use than the general population.

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Introduction

In little over a year since the beginning of the coronavirus disease 2019 (COVID-19) pandemic, numerous vaccines against SARS-CoV-2 were developed based on several platforms.¹ Some have demonstrated a high degree of efficacy in large phase 3 clinical trials,^{2–4} received conditional approvals from regulators, and together they have already been given to over a billion individuals.⁵ The benefits of these vaccines are demonstrable. For example, a large study on mass vaccination in Israel finding the estimated effectiveness of BNT162b2 mRNA vaccine to be 94% for symptomatic COVID-19, 87% for hospitalisation, and 92% for severe COVID-19 from seven days after the second dose.⁶ Similarly, the use of the BNT162b2 mRNA and ChAdOx1 in Scotland have been associated with substantial reductions in the risk of developing severe COVID-19 disease.⁷

There remains, however, a need to assess the safety of vaccines against SARS-CoV-2 and assess safety signals as and when they arise. While phase 3 clinical trials provided valuable information on the rates of relatively common, but mostly mild, adverse reactions following vaccination against SARS-CoV-2, they were not powered to study the occurrence of rare adverse events of special interest. Although the risks of rare but serious adverse events might be low, nationwide vaccination campaigns where millions of people are inoculated can lead to a considerable absolute number of any such events to occur.

A particular area of concern has arisen relating to the occurrence of thrombosis (often cerebral or abdominal) with concomitant thrombocytopenia among individuals who had received adenovirus-based vaccine against SARS-CoV-2. As of the 28th April 2021, 242 instances of thromboembolic events with thrombocytopenia among individuals who had recently received the ChAdOx1 vaccine in the UK had been identified on the basis of spontaneous reports. Of these, cerebral venous sinus thrombosis (CVST) was reported in 93 of the cases.⁸ Meanwhile, as of the 23rd April 2021, 15 confirmed reports of thrombosis with thrombocytopenia syndrome (TTS) had been identified for the Ad.26.COVS.S vaccine in the US.⁹ These spontaneous reports of TTS came at a time when 22.6 million first doses and 5.9 million second doses of the ChAdOx1 vaccine had been given in the UK and more than 8 million doses of the Ad.26.COVS.S had been given in the US.^{8,9}

Although our understanding of pathogenesis of TTS after vaccination against SARS-CoV-2 is still evolving, current evidence indicates its mechanism includes the formation of antibodies directed against the cationic platelet chemokine, platelet factor 4 (PF4), that act against platelet antigens which result in massive platelet activation, aggregation, and consumption, which reduces platelet count and results in thrombosis.¹⁰ In TTS, the location of thrombosis appears to often be atypical,

with CVST and splanchnic vein thrombosis (SVT) observed in many cases.¹¹ This clinical presentation of TTS after vaccination shares important similarities with immune heparin-induced thrombocytopenia (HIT) and other spontaneous HIT syndromes, but remains itself a novel disorder.¹² The degree to which the reported TTS events after vaccination against SARS-CoV-2 exceed the number of non-vaccine induced TTS otherwise expected to happen is not yet well-known, nor is how the profiles of the persons with such events after vaccination have differed from those who typically experience them. Establishing the rates of non-vaccine induced TTS events among the general population in previous years will help to provide context for the observed rates being seen among those vaccinated.¹³ Moreover, a description of the characteristics of the individuals who have had non-vaccine induced TTS events in the past will also help to inform a consideration of whether the profiles of individuals with TTS after a vaccination against COVID-19 differ to those who typically have such events.

In this study, we set out to estimate the background incidence rates of non-vaccine induced TTS and to describe the profiles of individuals who typically have these types of events. We did this using electronic medical records collected between 2017 to 2019 and covering over 38 million people across six European countries. In addition, we performed similar analyses for a range of other embolic and thrombotic events and coagulopathies of special interest for COVID-19 vaccinations.

Methods

Study Design

A cohort study using routinely-collected primary care data from across Europe. Data were mapped to the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM), which allowed for the study to be run in a distributed manner, with common analytic code run by each site and aggregated results returned, all without the need to share patient-level data.^{14–16}

Data sources

Data from seven electronic medical records databases from France, Netherlands, Italy, Germany, Spain, and the United Kingdom informed the analysis. The Clinical Practice Research Datalink (CPRD) GOLD and Aurum databases contains data contributed by general practitioners (GP) from the United Kingdom.^{17,18} The Health Informatics Centre at the University of Dundee (HIC Dundee) database

includes linked primary care and hospital data of persons from the Tayside region of Scotland, capturing around 20% of the Scottish population. The Integrated Primary Care Information (IPCI) database is collected from electronic healthcare records of patients registered with GPs throughout the Netherlands. IQVIA Longitudinal Patient Data (LPD) Italy includes anonymised patient records collected from software used by GPs during an office visit to document patients' clinical records. IQVIA LPD France is a computerised network of physicians including GPs who contribute to a centralised database of anonymised patient electronic medical records.¹⁹ IQVIA Disease Analyser (DA) Germany is collected from extracts of patient management software used by general medicine and specialists practicing in ambulatory care settings. The Information System for Research in Primary Care (SIDIAP; www.sidiap.org) is a primary care records database that covers approximately 80% of the population of Catalonia, North-East Spain. SIDIAP can be linked to the minimum basic set of hospital discharge data (CMBD- HA), which includes diagnosis and procedures registered during hospital admissions.²⁰ Results for SIDIAP CMBD-HA are presented in this manuscript, with results for SIDIAP alone reported in the supplementary materials for comparison.

In summary, all the included databases captured outpatient diagnoses and outpatient lab measurements. SIDIAP CMBD-HA and HIC Dundee also directly captured diagnoses from linked hospital data. HIC Dundee was the only database that, in addition, included hospital lab measurements (Table 1).

Study participants and time at risk

The primary study cohort consisted of individuals present in a database as of the 1st January 2017, with this date used as the index date for all study participants. These individuals were followed up to whichever came first: the outcome of interest, exit from the database, or the 31st December 2019 (the end of study period). A second study cohort which was made up of active patients was used for a sensitivity analysis, where individuals entered the cohort on the date of their first visit occurrence after 1st January 2017. As with the primary study cohorts these individuals were followed up to whichever came first: the outcome of interest, exit from the database, or 31st December 2019. As a further sensitivity analysis, study cohorts were also generated with the additional requirement that individuals had a minimum of one year of history available in the database prior to their index date.

Outcomes

Here we summarise results for five specific TTS events of interest: CVST with thrombocytopenia, DVT with thrombocytopenia, PE with thrombocytopenia, SVT with thrombocytopenia, and myocardial

infarction or ischemic stroke with thrombocytopenia. Occurrences of CVST, DVT, PE, SVT, myocardial infarction and stroke were identified on the basis of diagnostic codes. Thrombocytopenia was identified either by SNOMED CT codes (which are used as the standard codes for conditions in the OMOP CDM) or a measurement of between 10,000 to 150,000 platelets per microliter of blood and observed during a time window starting ten days prior to the event of interest up to ten days afterwards. For comparison, we also provide results for each of the above outcomes without thrombocytopenia. In addition, we provide background rates for coagulopathies that have been identified as potential causes for TTS: heparin-induced thrombocytopenia (HIT), disseminated intravascular coagulation (DIC), immune thrombocytopenia, and thrombotic thrombocytopenic purpura (TTP). Our definition of TTP included hemolytic uremic syndrome.

The outcomes described here are taken from a wider set of adverse events of special interest (AESI) for COVID-19 vaccinations. Three sets of outcome events were identified: 1) venous thromboembolic events, 2) arterial thromboembolic events, and 3) rare embolic, coagulopathies, and TTS events. For venous thromboembolic events, instances of DVT (with one broad definition and another narrow) and PE events were identified, with venous thromboembolism events defined as the occurrence of either DVT or PE. - In this manuscript, we describe results for the narrow definition of DVT. For arterial thromboembolic events, instances of myocardial infarction and ischemic stroke were identified, along with a composite outcome of either of these events. Instances of stroke, either ischemic or hemorrhagic, were also identified. A wide set of rare embolic and thrombotic events and thrombocytopenias and platelet disorders were considered: DIC, immune thrombocytopenia, TTP, HIT, thrombocytopenia, platelet disorders, CVST, splenic vein thrombosis, splenic artery thrombosis, splenic infarction, hepatic vein thrombosis, hepatic artery thrombosis, portal vein thrombosis, intestinal infarction, mesenteric vein thrombosis, celiac artery thrombosis, visceral vein thrombosis, and SVT.

All study outcome definitions were reviewed with the aid of the CohortDiagnostics R package,²¹ so as to identify additional codes of interest and to remove those highlighted as irrelevant based on feedback from regulators (e.g. puerperium and pregnancy-related disease) through an iterative process during the initial stages of analyses. A detailed description of the definitions used to identify the outcomes of the study is provided at <https://livedataoxford.shinyapps.io/CovCoagOutcomesCohorts/>. This application summarises the codes used to identify outcomes and their frequency in the databases, the overlap between cohorts in the databases as a whole, and a detailed summary of the profiles of all the individuals with a code of interest in each of the databases.

184 Patient profiles

185 The characteristics of the study population were extracted relative to their index date, as were those
186 of individuals with a particular outcome of interest relative to the date of their event. The age and
187 sex of individuals was identified, along with their history of conditions and medication use. Using all
188 of an individual's prior observation time, prior diagnosis of autoimmune disease, antiphospholipid
189 syndrome, thrombophilia, asthma, atrial fibrillation, malignant neoplastic disease, diabetes mellitus,
190 obesity, heart disease, hypertensive disorder, renal impairment, chronic obstructive pulmonary
191 disease (COPD), or dementia were identified on the basis of SNOMED CT codes and all their
192 hierarchical descendants. Prior medication use was identified using Anatomical Therapeutic
193 Chemical (ATC) codes using a time window of 183 to four days prior the index date. Any use of
194 antithrombotic and anticoagulant therapies, non-steroidal anti-inflammatory drugs, Cox-2 inhibitors,
195 systemic corticosteroids, lipid modifying agents, antineoplastic and immunomodulating agents,
196 hormonal contraceptives for systemic use, tamoxifen, and sex hormones and modulators of the
197 genital system overlapping with this time window were identified.

198 Statistical methods

199 The profiles of the study cohorts and those with an outcome of interest were summarised, with
200 median and interquartile range (IQR) used for continuous variables and counts and percentages used
201 for categorical variables. For each study outcome, the number of events, the observed time at risk,
202 and the incidence rate per 100,000 person-years are summarised along with 95% confidence
203 intervals. For a given outcome, any study participants with the outcome in the year prior were
204 excluded from the analysis of that outcome. These results are provided for the study cohorts and
205 stratified by data source as a whole and by age (≤ 44 , 45 to 64, or ≥ 65 years old) and sex. To aid in
206 comparison with rates being reported after vaccinations, the expected number of events per 36 days
207 for a population of 10 million were calculated based on the incidence rates calculated for the overall
208 study cohorts and age strata.

209 Code availability

210 All analytic code used for the study is available at [https://github.com/oxford-](https://github.com/oxford-pharmacoepi/CovCoagBackgroundIncidence)
211 [pharmacoepi/CovCoagBackgroundIncidence](https://github.com/oxford-pharmacoepi/CovCoagBackgroundIncidence). Code lists are provided in the appendix.

Role of funding source

This study was funded by the European Medicines Agency (EMA). The study outcomes were chosen in collaboration with the EMA so as to best reflect the events of interest. The study protocol was reviewed by the EMA and registered in the European Union electronic Register of Post-Authorisation Studies (EU PAS Register®): <http://www.encepp.eu/encepp/viewResource.htm?id=40415>

Results

A total of 38,611,617 individuals were included in the study (13,178,959 from CPRD Aurum, 3,913,071 from CPRD GOLD, 948,561 from HIC Dundee, 8,459,098 DA Germany, 3,951,633 LPD France, 1,299,288 IPCI, 1,066,230 LPD Italy, and 5,794,777 from SIDIAP CMBD-HA). The median age of the study populations ranged from 39 in CPRD Aurum to 52 in DA Germany and LPD Italy. More detailed characteristics of each of these populations are summarised in Table 2.

Incidence rates for the different outcomes of thrombosis and non-vaccine induced TTS across the databases are summarised in Table 3. The incidence rates for CVST ranged from 0.3 (95% CI: 0.2 to 0.5) to 1.2 (1.0 to 1.5) per 100,000 person-years; CVST with thrombocytopenia was only seen in SIDIAP CMBD-HA, where the incidence rate was 0.1 (0.1 to 0.2) per 100,000 person-years. The incidence rates for SVT ranged from 1.5 (1.2 to 1.8) to 10.3 (9.8 to 10.8), and from 0.1 (0.0 to 0.1) to 2.5 (2.2 to 2.7) per 100,000 person-years for SVT with thrombocytopenia. The incidence rates for DVT ranged from 85.9 (84.6 to 87.2) to 187.2 (182.6 to 191.8), and from 1.0 (0.7 to 1.4) to 8.5 (7.4 to 9.9) per 100,000 person-years for DVT with thrombocytopenia. The incidence rates for PE ranged from 66.1 (63.0 to 69.2) to 131.2 (126.4 to 136.2), and from 0.5 (0.3 to 0.6) to 20.8 (18.9 to 22.8) per 100,000 person-years for PE with thrombocytopenia. Lastly, the incidence rates for myocardial infarction or ischemic stroke ranged from 133.9 (131.4 to 136.4) to 449.6 (440.7 to 458.7), and from 1.0 (0.8 to 1.2) to 43.4 (40.7 to 46.3) per 100,000 person-years for myocardial infarction or ischemic stroke with thrombocytopenia. As with thrombosis in general, incidence rates for non-vaccine induced TTS were typically higher for older age groups, see Figure 2.

Based on the highest estimates for the overall study cohorts, one would expect approximately 1 case of CVST with thrombocytopenia, 24 of SVT with thrombocytopenia, 84 of DVT with thrombocytopenia, 205 of PE with thrombocytopenia, and 428 of myocardial infarction or ischemic stroke with thrombocytopenia among a general population of 10 million individuals per 36 days. For

a cohort of the same size aged 65 or over, this would rise to 59 of SVT with thrombocytopenia, 207 of DVT with thrombocytopenia, 553 of PE with thrombocytopenia, and 1,641 of myocardial infarction or ischemic stroke with thrombocytopenia, see Figure 3.

The age and sex profiles of those with non-vaccine induced TTS are summarised in Table 4 and the prevalence of comorbidities and prior medication are presented in Figure 4, along with those of the study populations. The median age of the 16 individuals with CVST with thrombocytopenia in SIDIAP CMBD-HA was 62 years old. The median age of those with DVT with thrombocytopenia ranged from 58 to 76 across the databases, from 68 to 78 for PE with thrombocytopenia, from 59 to 64 for SVT with thrombocytopenia, and from 73 to 78 for stroke with thrombocytopenia. Men generally predominated the affected cohorts, accounting for 50.0% to 71.6% of those with different TTS in the contributing databases. The prevalence of comorbidities and prior medication use was higher for patients with TTS than in the general population. In CPRD GOLD, for example, 1.8% of the study population had an autoimmune disease, 5.1% had a history of cancer, 5.5% had diabetes, 4.3% had renal impairment. These compared to 12.6%, 25.2%, 20.5%, and 26.8% for patients with DVT with thrombocytopenia. Similarly, while 2.9% of the study population were taking antithrombotic and anticoagulant therapies in the months preceding their index date, 18.1% of patients with DVT with thrombocytopenia were. Requiring a year of prior history for study participants to be included in the analysis and defining study populations based on their first visit after 2017 had only a small effect on the results, see Appendix Figure 1.

Incidence rates for DIC, HIT, immune thrombocytopenia, and TTP are summarised in Table 5. The incidence rate for DIC ranged from 0.1 (0.1 to 0.1) to 3.8 (3.3 to 4.1) per 100,000 person-years, from 0.2 (0.1 to 0.4) to 37.9 (37.0 to 38.) for HIT, from 2.1 (1.8 to 2.5) to 46.7 (45.7 to 47.7) for immune thrombocytopenia, and from 0.4 (0.2 to 0.8) to 2.8 (2.6 to 3.1) for thrombotic thrombocytopenic purpura.

The incidence rates for all study outcomes are summarised in the supplementary materials and in a web application: <https://livedataoxford.shinyapps.io/CovCoagBackgroundIncidence/>, where the characteristics of outcome cohorts are also described.

Discussion

Key results

In this study we have analysed data for over 38 million people from across 6 European countries to establish the background incidence of non-vaccine induced TTS. With incidence rates of less than 35 per 100,000 person-years, this condition can be considered as a very rare event. These events can generally be expected to occur in older persons, with the average age of those over 60 for most events in most of the databases studied. Moreover, those affected typically had a higher prevalence of comorbidities, such as autoimmune diseases, cancer, and diabetes. They also had a high prevalence of use of medications indicated for the prevention of thrombosis including antithrombotic and anticoagulant therapies, as well as some potentially associated with an increased risk of TTS such as systemic glucocorticoids.

Coagulopathies potentially associated with TTS were mostly rare: immune thrombocytopenia was the most common with rates up to almost 47 per 100,000 person-years, followed by HIT (up to 38 per 100,000), DIC (up to 4 per 100,000), and TTP (up to 3 per 100,000).

Findings in context

A number of previous studies have estimated the incidence of venous thromboembolism in the general population, with its incidence rate estimated to be around 100 cases per 100,000 person-years.²² Approximately two-thirds of venous thromboembolism can be expected to present as DVT, with the other third presenting as PE with or without DVT.²³ Meanwhile the incidence of myocardial infarction has been seen to be above 20 cases per 100,000 person-years,²⁴ while the incidence of stroke generally estimated to be more than 100 persons per 100,000 person-years.^{25,26} The incidence of each of these events is seen to be much higher among older persons. The incidence of SVT and CVST is far less well-known. Estimates for the incidence of CVST have ranged from 0.2 to 2 per 100,000 person-years.^{27–30} Meanwhile there is little research describing the incidence of SVT in the general population, although the incidence of portal vein thrombosis, the most commonly involved vein, has been estimated at around 3 per 100,000 person-years, while the incidence of Budd-Chiari syndrome was estimated at around 2 per 100,000 person-years in the same study.³¹

In one recent study, data from Denmark and Norway was used to assess 28-day rates of thromboembolic events and coagulation disorders among a cohort of people who had received the ChAdOx1 vaccine and in historical comparator cohorts.³² In the historical comparator population,

which covered 2016 to 2018 for Denmark and 2018 to 2019 for Norway, the incidence rate of CVST, PE, lower limb venous thrombosis, and SVT were estimated at 2, 57, 94, and 4 per 100,000 person-years, respectively. Meanwhile the incidence rate for idiopathic thrombocytopenia purpura and DIC were 7 and 1 per 100,000. These estimates all fall within the range of estimates seen across databases in our study.

Another recent European network study has also assessed the background incidence of thromboembolic events, coagulation disorders, and non-vaccine induced TTS.³³ There is some overlap in data sources used, with their study also including data from CPRD GOLD and SIDIAP CMBD-HA. Although in many instances our estimates are comparable to theirs, there are discrepancies. These seem to be driven primarily by differences in cohort definitions. For example, they estimated the incidence rate of CVST to be 0.6 (0.3 to 1.1) and 0.1 (0.0 to 0.3) per 100,000 person-years for SIDIAP CMBD-HA and CPRD GOLD respectively, which compared to our estimates of 0.7 (0.6 to 0.9) and 1.2 (1.0 to 1.5). While the estimates for SIDIAP CMBD-HA are similar, the difference between results for CPRD GOLD appears to be due to the code “Nonpyogenic venous sinus thrombosis”, which was included in our definition of CVST (and was the most common code that led to cohort entry in CPRD GOLD) but does not appear to have been included in their definition. Meanwhile, even greater differences were seen for estimates of non-vaccine induced TTS. Their estimate of venous thromboembolism with thrombocytopenia for SIDIAP CMBD-HA was 2.4 (1.7 to 3.4), which is less than both our estimates for DVT and PE with thrombocytopenia in SIDIAP CMBD-HA (estimated to be 6.2 [5.8 to 6.6] and 5.9 [5.5 to 6.3], respectively). This discrepancy appears to be due to their reliance on diagnostic codes to identify cases of thrombocytopenia, whereas in our study we used both diagnostic codes and platelet measurements. Indeed, as can be seen in our study diagnostics, the vast majority of cases of thrombocytopenia are identified by platelet measurement records rather than diagnostic codes in both SIDIAP CMBD-HA and CPRD GOLD. The impact of this can be seen with their estimates of the incidence rate of thrombocytopenia, which were 142.42 (136.47 to 148.56) and 21.63 (20.15-23.20) for SIDIAP CMBD-HA and CPRD GOLD respectively, far lower than our estimates of 1185.9 (1180.6 to 1191.2) and 523.1 (518.5 to 527.8).

Spontaneous reports identified 93 cases of CVST with thrombocytopenia among individuals who had recently received the ChAdOx1 vaccine in the UK.⁸ The profile of patients with TTS after vaccination also appears to differ to the typical profiles of those with TTS as seen in our data. While in this study we have seen those with TTS to typically be older than the general population of people in the database, more commonly male, and with more comorbidities and greater prior medication use,

initial studies describing the profiles of patients with vaccine-induced TTS have most often presented the cases of people who were aged under 60, more often female, and with relatively few comorbidities described.^{11,34–36} This dissimilarity in patient profiles of those with TTS in previous years and those for whom it has been reported following a vaccination is notable.

Substantial heterogeneity can though be seen in estimates of across databases, particularly where platelet measurements are required to identify an outcome. For PE, for example, a two-fold difference was seen between the databases with the highest and lowest incidence rates. This increased to a more than 20-fold difference between databases for PE with thrombocytopenia. This heterogeneity was observed even though we used data mapped to a common data model and applied the same analytic code across the databases. Given that the data sources used come from different countries some differences in estimates can be expected. However, the heterogeneity in results seen here can also be explained by substantial differences in data capture across databases and source coding systems. Two of the databases had patient-level linkage to hospital records and one of these also captured inpatient platelet measurements. Incidence rates were often higher for these two databases. Moreover, while the databases were mapped to a common data model the source data used different medical vocabularies. For example, while read codes were used to represent condition-related concepts in CPRD GOLD, ICD-9 was used in IQVIA LPD Italy and ICD-10CM in SIDIAP. These coding systems differ in the granularity by which they describe clinical events, and this can have a meaningful impact on research findings. This can be seen in the literature by the impact on research findings when databases switched from using ICD-9 to ICD-10 codes for instance.³⁷ This all further underlines the importance of using consistent data sources in vaccine safety research with a historical comparator design. In the case of TTS it can also be expected that full linkage capturing both outpatient and inpatient lab measurements is required for accurate outcome ascertainment.

Study limitations

This study relies on routinely-collected health care data and while this has allowed for the inclusion of a large study population, the recording of TTS has not previously been evaluated in the databases used. A degree of measurement error can thus be expected, and further research is required to validate the recording of TTS. This includes not only the identification of the constituent events themselves, but also the time period over which they can be considered concurrent. The findings from this study demonstrate that data sources that do not capture inpatient lab measurements can be expected to underestimate the true incidence of TTS. Studies that rely solely on records of

365 diagnoses can be expected to miss many of the cases of thrombocytopenia that can be observed
366 from available measurements of platelet counts.

367 The degree to which the TTS events being described after vaccinations against SARS-CoV-2 are
368 comparable to non-vaccine induced TTS events previously seen in the general population is as yet
369 unclear. TTS after vaccination appears to occur at unusual sites, with a large proportion of
370 spontaneous reports and case series describing cerebral or abdominal thromboses, and with high
371 levels of antibodies to platelet factor 4 often observed despite the absence of an exposure to
372 heparin.^{11,38} In this study we have focused on specific sites of thrombosis with concomitant
373 thrombocytopenia. We believe that this is more instructive than providing a singular background
374 incidence rate for venous thromboembolism with thrombocytopenia, which would be driven in large
375 part by commonly seen events (such as DVT and PE) and would not necessarily reflect the
376 presentation of TTS after vaccination. In particular, we do not have measurements of anti-PF4
377 antibodies and so could not use this for defining study outcomes. As the pathophysiology of TTS
378 after vaccination becomes better understood, definitions of the appropriate historical comparator
379 can also be expected to evolve so as to best match the condition being described among those who
380 have been recently vaccinated. In particular this may mean the exclusion of patients with history of
381 other rare disorders who may present with TTS without proximate heparin, such as patients with
382 antiphospholipid syndrome.

383 Conclusion

384 Based on data from over 38 million people from six European databases, non-vaccine induced TTS
385 has been seen to be very rare. While rates varied across databases, the highest incidence rates for
386 DVT, PE, and stroke with thrombocytopenia were 8.5, 20.8, and 30.9 per 100,000 person-years,
387 respectively. Meanwhile the highest incidence rates for CVST and SVT with thrombocytopenia were
388 0.1 and 2.5 per 100,000 person-years. Non-vaccine induced TTS was typically seen among individuals
389 older, more often male, and in worse health than the general population. While these findings help
390 to provide context for the rates of adverse events being reported by spontaneous reports following
391 vaccinations against SARS-CoV-2, a full assessment of the safety signal for TTS would benefit from
392 within-database comparisons which account for individual-level characteristics such as age and sex.

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Ethical approvals

The protocol for this research was approved by the Independent Scientific Advisory Committee (ISAC) for MHRA Database Research (protocol number 20_000211), the IDIAPJGol Clinical Research Ethics Committee (project code: 21/007-PCV), and the IPCI governance board (application number 3/2021). Some databases used (IQVIA LPD Italy, IQVIA LPD France, IQVIA DA Germany) in these analyses are commercially available, syndicated data assets that are licensed by contributing authors for observational research. These assets are de-identified commercially available data products that could be purchased and licensed by any researcher. As these data are deemed commercial assets, there is no Institutional Review Board applicable to the usage and dissemination of these result sets or required registration of the protocol with additional ethics oversight. Compliance with Data Use Agreement terms, which stipulate how these data can be used and for what purpose, is sufficient for

the licensing commercial entities. Further inquiry related to the governance oversight of these assets can be made with the respective commercial entity, IQVIA (iqvia.com). For HIC Dundee, institutional review board approval for the use of de-identified data for this project was granted by the Tayside Health Informatics Centre.

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Declarations of interest

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Author contributions

All authors were involved in the study conception and design, interpretation of the results, and the preparation of the manuscript. EB led the data analysis and wrote the initial draft of the manuscript with DPA. EB, TDS, CR, MA, and SFB had access to the SIDIAP data, EB, XL, AD, and DPA had access to the CPRD data, DM and SH had access to the HIC Dundee data, PR and KV had access to the IPCI data, and KK, HMS, CR, SS, had access to LPD France, LPD Italy, and DA Germany.

Tables and Figures

Table 1: Database descriptions

Country	Database	Primary care data	Hospital linkage	Outpatient platelet measurements	Inpatient platelet measurements
France	IQVIA Longitudinal Patient Data (LPD) France	Yes	No	Yes	No
Germany	IQVIA Disease Analyser (DA) Germany	Yes	No	Yes	No
Italy	IQVIA Longitudinal Patient Data (LPD) Italy	Yes	No	Yes	No
The Netherlands	Integrated Primary Care Information (IPCI)	Yes	No	Yes	No
Spain	Information System for Research in Primary Care (SIDIAP) with minimum basic set of hospital discharge data (CMBD- HA)	Yes	Yes	Yes	No
United Kingdom	Clinical Practice Research Datalink (CPRD) Aurum	Yes	No	Yes	No
United Kingdom	Clinical Practice Research Datalink (CPRD) GOLD	Yes	No	Yes	No
United Kingdom	Health Informatics Centre at the University of Dundee (HIC Dundee)	Yes	Yes	Yes	Yes

Table 2: Characteristics of study populations

	CPRD Aurum	CPRD GOLD	HIC Dundee	IPCI	IQVIA DA Germany	IQVIA LPD France	IQVIA LPD Italy	SIDIAP CMBD-HA
N	13,178,959	3,913,071	948,561	1,299,288	8,459,098	3,951,633	1,066,230	5,794,777
Age (Median [IQR])	39 [22 to 57]	41 [22 to 59]	41 [23 to 59]	44 [23 to 60]	52 [32 to 67]	48 [28 to 65]	52 [37 to 68]	42 [25 to 59]
Sex: Male (N [%])	6,593,514 (50.0%)	1,937,858 (49.5%)	469,725 (49.5%)	636,386 (49.0%)	3,589,506 (42.4%)	1,669,415 (42.2%)	426,758 (40.0%)	2,859,044 (49.3%)
Years of prior observation time (Median [IQR])	8.9 [3.0 to 19.4]	11.9 [4.7 to 15.1]	8.0 [6.6 to 12.0]	3.2 [1.8 to 5.7]	4.8 [1.9 to 8.9]	4.6 [2.0 to 6.2]	6.3 [5.0 to 6.5]	11.0 [11.0 to 11.0]
Comorbidities prior to index date								
Autoimmune disease (N [%])	223,241 (1.7%)	70,604 (1.8%)	8,040 (0.8%)	24,645 (1.9%)	238,985 (2.8%)	32,245 (0.8%)	45,567 (4.3%)	84,817 (1.5%)
Antiphospholipid syndrome (N [%])	4,428 (0.0%)	1,166 (0.0%)	<5	<5	<5	<5	<5	1,011 (0.0%)
Thrombophilia (N [%])	11,893 (0.1%)	3,039 (0.1%)	198 (0.0%)	0 (0.0%)	6,474 (0.1%)	313 (0.0%)	<5	2,796 (0.0%)

Asthma (N [%])	1,595,149 (12.1%)	484,991 (12.4%)	37,160 (3.9%)	138,777 (10.7%)	412,789 (4.9%)	222,161 (5.6%)	79,528 (7.5%)	353,485 (6.1%)
COPD (N [%])	243,501 (1.8%)	80,393 (2.1%)	14,225 (1.5%)	40,116 (3.1%)	358,047 (4.2%)	41,040 (1.0%)	27,119 (2.5%)	166,817 (2.9%)
Atrial fibrillation (N [%])	242,537 (1.8%)	76,091 (1.9%)	825 (0.1%)	31,801 (2.4%)	92,767 (1.1%)	13,412 (0.3%)	34,325 (3.2%)	137,843 (2.4%)
Diabetes mellitus (N [%])	728,420 (5.5%)	213,996 (5.5%)	25,891 (2.7%)	93,035 (7.2%)	597,233 (7.1%)	174,564 (4.4%)	95,611 (9.0%)	468,808 (8.1%)
Obesity (N [%])	372,593 (2.8%)	107,522 (2.7%)	9,843 (1.0%)	40,395 (3.1%)	530,958 (6.3%)	15,634 (0.4%)	46,101 (4.3%)	927,483 (16.0%)
Heart disease (N [%])	895,638 (6.8%)	278,323 (7.1%)	56,966 (6.0%)	129,562 (10.0%)	936,730 (11.1%)	194,630 (4.9%)	165,172 (15.5%)	592,122 (10.2%)
Hypertensive disorder (N [%])	1,839,796 (14.0%)	558,671 (14.3%)	71,703 (7.6%)	222,433 (17.1%)	1,425,782 (16.9%)	498,244 (12.6%)	322,776 (30.3%)	1,145,518 (19.8%)
Renal impairment (N [%])	535,073 (4.1%)	168,610 (4.3%)	17,311 (1.8%)	27,555 (2.1%)	169,166 (2.0%)	13,064 (0.3%)	31,853 (3.0%)	230,896 (4.0%)

Malignant neoplastic disease (N [%])	633,639 (4.8%)	198,275 (5.1%)	51,307 (5.4%)	106,223 (8.2%)	534,352 (6.3%)	66,962 (1.7%)	86,645 (8.1%)	342,511 (5.9%)
Dementia (N [%])	109,915 (0.8%)	33,537 (0.9%)	5,515 (0.6%)	7,873 (0.6%)	95,957 (1.1%)	9,217 (0.2%)	10,458 (1.0%)	72,696 (1.3%)
Medication use (183 days prior to four days prior)								
Non-steroidal anti-inflammatory drugs (N [%])	1,530,269 (11.6%)	900,092 (23.0%)	247,182 (26.1%)	211,464 (16.3%)	928,497 (11.0%)	1,056,021 (26.7%)	293,188 (27.5%)	1,617,103 (27.9%)
Cox-2 inhibitors (N [%])	6,223 (0.0%)	7,126 (0.2%)	2,469 (0.3%)	8,165 (0.6%)	33,006 (0.4%)	13,769 (0.3%)	21,899 (2.1%)	27,048 (0.5%)
Systemic corticosteroids (N [%])	701,368 (5.3%)	404,443 (10.3%)	95,032 (10.0%)	139,482 (10.7%)	269,020 (3.2%)	315,054 (8.0%)	84,587 (7.9%)	337,121 (5.8%)
Antithrombotic and anticoagulant therapies (N [%])	199,014 (1.5%)	114,246 (2.9%)	72,557 (7.6%)	44,985 (3.5%)	213,378 (2.5%)	175,535 (4.4%)	110,079 (10.3%)	112,901 (1.9%)
Lipid modifying agents (N [%])	304,903 (2.3%)	143,424 (3.7%)	103,695 (10.9%)	54,039 (4.2%)	191,407 (2.3%)	197,031 (5.0%)	83,234 (7.8%)	81,743 (1.4%)
Antineoplastic and immunomodulating agents (N [%])	207,230 (1.6%)	124,080 (3.2%)	44,853 (4.7%)	54,941 (4.2%)	210,390 (2.5%)	94,702 (2.4%)	36,792 (3.5%)	64,163 (1.1%)

Hormonal contraceptives for systemic use (N [%])	304,094 (2.3%)	173,708 (4.4%)	51,084 (5.4%)	47,983 (3.7%)	169,549 (2.0%)	98,852 (2.5%)	18,740 (1.8%)	46,834 (0.8%)
Tamoxifen (N [%])	2,904 (0.0%)	2,141 (0.1%)	1,666 (0.2%)	865 (0.1%)	3,761 (0.0%)	826 (0.0%)	684 (0.1%)	1,230 (0.0%)
Sex hormones and modulators of the genital system (N [%])	372,384 (2.8%)	213,023 (5.4%)	63,019 (6.6%)	55,810 (4.3%)	228,846 (2.7%)	141,501 (3.6%)	29,750 (2.8%)	58,987 (1.0%)

CPRD: Clinical Practice Research Datalink, IQVIA DA GERMANY: IQVIA Disease Analyser Germany, IQVIA LPD France: IQVIA Longitudinal Patient Data France, IPCI: Integrated Primary Care Information, IQVIA LPD Italy: IQVIA Longitudinal Patient Data Italy, SIDIAP CMBD-HA: Information System for Research in Primary Care with hospital linkage.

COPD: chronic obstructive pulmonary disease

Table 3. Incidence rates per 100,000 person-years for thrombosis and non-vaccine induced thrombosis with thrombocytopenia

	N	PYs	Number of events	Incidence rate (95% CI) per 100,000 PYs
<i>Cerebral venous sinus thrombosis (CVST)</i>				
CPRD Aurum	13,178,767	35,268,555	432	1.2 (1.1 to 1.3)
CPRD GOLD	3,913,025	9,676,085	118	1.2 (1.0 to 1.5)
IQVIA DA Germany	8,459,044	19,369,671	95	0.5 (0.4 to 0.6)
IQVIA LPD France	3,951,606	8,210,128	26	0.3 (0.2 to 0.5)
SIDIAP CMBD-HA	5,794,764	16,751,651	121	0.7 (0.6 to 0.9)
<i>Cerebral venous sinus thrombosis (CVST) with thrombocytopenia</i>				
SIDIAP CMBD-HA	5,794,777	16,751,791	16	0.1 (0.1 to 0.2)
<i>Deep vein thrombosis (DVT)</i>				

CPRD Aurum	13,164,316	35,185,059	35778	101.7 (100.6 to 102.7)
CPRD GOLD	3,909,649	9,656,721	9,071	93.9 (92.0 to 95.9)
HIC Dundee	948,184	2,153,442	1,186	55.1 (52.0 to 58.3)
IQVIA DA Germany	8,451,032	19,329,175	16,600	85.9 (84.6 to 87.2)
IPCI	1,296,310	3,402,027	6,367	187.2 (182.6 to 191.8)
IQVIA LPD Italy	1,063,587	2,639,975	3,891	147.4 (142.8 to 152.1)
SIDIAP CMBD-HA	5,790,802	16,722,842	14408	86.2 (84.8 to 87.6)
<i>Deep vein thrombosis (DVT) with thrombocytopenia</i>				
CPRD Aurum	13,178,808	35,268,706	537	1.5 (1.4 to 1.7)
CPRD GOLD	3,913,031	9,676,132	127	1.3 (1.1 to 1.6)
HIC Dundee	948,498	2,153,995	184	8.5 (7.4 to 9.9)
IQVIA DA Germany	8,458,995	19,369,390	225	1.2 (1.0 to 1.3)

IPCI	1,299,274	3,418,833	34	1.0 (0.7 to 1.4)
IQVIA LPD Italy	1,066,209	2,651,714	39	1.5 (1.0 to 2.0)
SIDIAP CMBD-HA	5,794,559	16,750,224	1037	6.2 (5.8 to 6.6)
<i>Myocardial infarction or ischemic stroke</i>				
CPRD Aurum	13,148,520	35,109,906	60805	173.2 (171.8 to 174.6)
CPRD GOLD	3,907,225	9,642,096	16143	167.4 (164.8 to 170.0)
IQVIA DA Germany	8,433,598	19,257,191	39468	205.0 (202.9 to 207.0)
IQVIA LPD France	3,933,628	8,154,546	10917	133.9 (131.4 to 136.4)
HIC Dundee	946,414	2,142,566	9633	449.6 (440.7 to 458.7)
IPCI	1,289,281	3,377,441	10684	316.3 (310.4 to 322.4)
IQVIA LPD Italy	1,058,436	2,626,927	3952	150.4 (145.8 to 155.2)
SIDIAP CMBD-HA	5,777,909	16,639,142	55854	335.7 (332.9 to 338.5)

<i>Myocardial infarction or ischemic stroke (with thrombocytopenia 10 days pre to 10 days post)</i>				
CPRD Aurum	13,178,584	35,267,614	847	2.4 (2.2 to 2.6)
CPRD GOLD	3,913,036	9,676,204	95	1.0 (0.8 to 1.2)
IQVIA DA Germany	8,458,789	19,368,273	696	3.6 (3.3 to 3.9)
IQVIA LPD France	3,951,515	8,209,629	229	2.8 (2.4 to 3.2)
HIC Dundee	948,362	2,153,011	935	43.4 (40.7 to 46.3)
IPCI	1,299,257	3,418,730	96	2.8 (2.3 to 3.4)
IQVIA LPD Italy	1,066,181	2,651,560	94	3.5 (2.9 to 4.3)
SIDIAP CMBD-HA	5,793,878	16,745,114	4205	25.1 (24.4 to 25.9)
<i>Pulmonary embolism (PE)</i>				
CPRD Aurum	13,167,997	35,208,213	28612	81.3 (80.3 to 82.2)
CPRD GOLD	3,910,531	9,662,585	7149	74.0 (72.3 to 75.7)

HIC Dundee	947,984	2,151,351	2823	131.2 (126.4 to 136.2)
IQVIA DA Germany	8,449,246	19,325,600	17204	89.0 (87.7 to 90.4)
IQVIA LPD France	3,947,450	8,195,137	4700	57.4 (55.7 to 59.0)
IPCI	1,297,807	3,410,984	3141	92.1 (88.9 to 95.4)
IQVIA LPD Italy	1,064,532	2,645,601	1748	66.1 (63.0 to 69.2)
SIDIAP CMBD-HA	5,792,195	16,734,624	9590	57.3 (56.2 to 58.5)
<i>Pulmonary embolism (PE) with thrombocytopenia</i>				
CPRD Aurum	13,178,867	35,269,146	344	1.0 (0.9 to 1.1)
CPRD GOLD	3,913,042	9,676,256	84	0.9 (0.7 to 1.1)
HIC Dundee	948,459	2,153,685	447	20.8 (18.9 to 22.8)
DA Germany	8,458,971	19,369,265	286	1.5 (1.3 to 1.7)
IQVIA LPD France	3,951,605	8,210,109	39	0.5 (0.3 to 0.6)

IPCI	1,299,282	3,418,860	21	0.6 (0.4 to 0.9)
IQVIA LPD Italy	1,066,222	2,651,761	17	0.6 (0.4 to 1.0)
SIDIAP CMBD-HA	5,794,594	16,750,449	985	5.9 (5.5 to 6.3)
<i>Splanchnic vein thrombosis (SVT)</i>				
CPRD Aurum	13,178,697	35,267,889	1040	2.9 (2.8 to 3.1)
CPRD GOLD	3,913,005	9,675,960	233	2.4 (2.1 to 2.7)
HIC Dundee	948,541	2,154,020	112	5.2 (4.3 to 6.3)
IQVIA DA Germany	8,458,941	19,369,177	398	2.1 (1.9 to 2.3)
IQVIA LPD France	3,951,594	8,210,016	122	1.5 (1.2 to 1.8)
IQVIA LPD Italy	1,066,207	2,651,684	58	2.2 (1.7 to 2.8)
SIDIAP CMBD-HA	5,794,483	16,749,703	1718	10.3 (9.8 to 10.8)
<i>Splanchnic vein thrombosis (SVT) with thrombocytopenia</i>				

CPRD Aurum	13,178,944	35,269,606	47	0.1 (0.1 to 0.2)
CPRD GOLD	3,913,070	9,676,375	5	0.1 (0.0 to 0.1)
HIC Dundee	948,553	2,154,098	40	1.9 (1.3 to 2.5)
IQVIA DA Germany	8,459,086	19,369,887	16	0.1 (0.0 to 0.1)
SIDIAP CMBD-HA	5,794,721	16,751,354	412	2.5 (2.2 to 2.7)

CPRD: Clinical Practice Research Datalink, IQVIA DA GERMANY: IQVIA Disease Analyser Germany, IQVIA LPD France: IQVIA Longitudinal Patient Data France, IPCI: Integrated Primary Care Information, IQVIA LPD Italy: IQVIA Longitudinal Patient Data Italy, SIDIAP CMBD-HA: Information System for Research in Primary Care with hospital linkage.

Table 4. Characteristics of patients with non-vaccine induced thrombosis with thrombocytopenia

	N	Age (Median [IQR])	Sex: Male (N [%])
<i>CPRD Aurum</i>			
Study population	13,178,959	39 [22 to 57]	6,593,514 (50.0%)
Deep vein thrombosis with thrombocytopenia	537	69 [58 to 78]	369 (68.7%)
Myocardial infarction or ischemic stroke with thrombocytopenia	847	74 [65 to 82]	672 (79.3%)
Pulmonary embolism with thrombocytopenia	344	70 [60 to 78]	217 (63.1%)
Splanchnic vein thrombosis with thrombocytopenia	47	61 [52 to 72]	26 (55.3%)
<i>CPRD GOLD</i>			
Study population	3,913,071	41 [22 to 59]	1,937,858 (49.5%)

Deep vein thrombosis with thrombocytopenia	127	70 [56 to 80]	70 (55.1%)
Myocardial infarction or ischemic stroke with thrombocytopenia	95	78 [68 to 86]	73 (76.8%)
Pulmonary embolism with thrombocytopenia	84	71 [62 to 79]	50 (59.5%)
Splanchnic vein thrombosis with thrombocytopenia	5	59 [52 to 59]	<5
<i>HIC Dundee</i>			
Study population	948,561	41 [23 to 59]	469,725 (49.5%)
Deep vein thrombosis with thrombocytopenia	184	58 [37 to 75]	99 (53.8%)
Myocardial infarction or ischemic stroke with thrombocytopenia	935	77 [67 to 83]	611 (65.3%)
Pulmonary embolism with thrombocytopenia	447	68 [53 to 78]	247 (55.3%)

Splanchnic vein thrombosis with thrombocytopenia	40	65 [52 to 72]	27 (67.5%)
<i>IQVIA DA Germany</i>			
Study population	8,459,098	52 [32 to 67]	3,589,506 (42.4%)
Deep vein thrombosis with thrombocytopenia	225	71 [60 to 80]	143 (63.6%)
Myocardial infarction or ischemic stroke with thrombocytopenia	696	76 [67 to 81]	520 (74.7%)
Pulmonary embolism with thrombocytopenia	286	72 [62 to 80]	183 (64.0%)
Splanchnic vein thrombosis with thrombocytopenia	16	64 [60 to 73]	11 (68.8%)
<i>IQVIA LPD France</i>			
Study population	3,951,633	48 [28 to 65]	1,669,415 (42.2%)

Myocardial infarction or ischemic stroke with thrombocytopenia	229	74 [65 to 80]	193 (84.3%)
Pulmonary embolism with thrombocytopenia	39	72 [57 to 83]	23 (59.0%)
<i>IPCI</i>			
Study population	1,299,288	44 [23 to 60]	636,386 (49.0%)
Deep vein thrombosis with thrombocytopenia	34	70 [54 to 81]	20 (58.8%)
Myocardial infarction or ischemic stroke with thrombocytopenia	96	77 [70 to 82]	76 (79.2%)
Pulmonary embolism with thrombocytopenia	21	70 [54 to 73]	12 (57.1%)
<i>IQVIA LPD Italy</i>			
Study population	1,066,230	52 [37 to 68]	426,758 (40.0%)

Deep vein thrombosis with thrombocytopenia	39	76 [62 to 82]	20 (51.3%)
Myocardial infarction or ischemic stroke with thrombocytopenia	94	76 [70 to 83]	67 (71.3%)
Pulmonary embolism with thrombocytopenia	17	78 [69 to 81]	9 (52.9%)
<i>SIDIAP CMBD-HA</i>			
Study population	5,794,777	42 [25 to 59]	2,859,044 (49.3%)
Cerebral venous sinus thrombosis with thrombocytopenia	16	62 [49 to 67]	8 (50.0%)
Deep vein thrombosis with thrombocytopenia	1,037	69 [58 to 79]	617 (59.5%)
Myocardial infarction or ischemic stroke with thrombocytopenia	4,205	75 [66 to 83]	2,964 (70.5%)
Pulmonary embolism with thrombocytopenia	985	70 [59 to 79]	584 (59.3%)

Splanchnic vein thrombosis with thrombocytopenia	412	62 [54 to 72]	295 (71.6%)
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CPRD: Clinical Practice Research Datalink, IQVIA DA GERMANY: IQVIA Disease Analyser Germany, IQVIA LPD France: IQVIA Longitudinal Patient Data France, IPCI: Integrated Primary Care Information, IQVIA LPD Italy: IQVIA Longitudinal Patient Data Italy, SIDIAP CMBD-HA: Information System for Research in Primary Care with hospital linkage. For complete set of characteristics of those with an event of interest during follow-up see <https://livedataoxford.shinyapps.io/CovCoagBackgroundIncidence/>

Table 5. Incidence rates per 100,000 person-years for coagulopathy

	N	PYs	Number of events	Incidence rate per 100, 000 PYs
<i>Disseminated intravascular coagulation</i>				
CPRD Aurum	13,178,947	35,269,622	36	0.1 (0.1 to 0.1)
CPRD GOLD	3,913,067	9,676,361	15	0.2 (0.1 to 0.3)
HIC Dundee	948,555	2,154,105	32	1.5 (1.0 to 2.1)
IQVIA DA Germany	8,459,041	19,369,706	79	0.4 (0.3 to 0.5)
IQVIA France LPD	3,951,611	8,210,148	34	0.4 (0.3 to 0.6)
IQVIA Italy LPD	1,066,206	2,651,697	37	1.4 (1.0 to 1.9)
SIDIAP CMBD-HA	5,794,596	16,750,823	641	3.8 (3.5 to 4.1)
<i>Heparin-induced thrombocytopenia</i>				
CPRD Aurum	13,178,819	35,269,050	299	0.8 (0.8 to 0.9)

CPRD GOLD	3,912,943	9,675,822	302	3.1 (2.8 to 3.5)
HIC Dundee	948,500	2,153,919	165	7.7 (6.5 to 8.9)
IQVIA DA Germany	8,458,456	19,366,573	1513	7.8 (7.4 to 8.2)
IQVIA France LPD	3,951,623	8,210,192	20	0.2 (0.1 to 0.4)
IQVIA Italy LPD	1,066,144	2,651,425	171	6.4 (5.5 to 7.5)
SIDIAP CMBD-HA	5,792,945	16,739,615	6351	37.9 (37.0 to 38.9)
<i>Immune thrombocytopenia</i>				
CPRD Aurum	13,177,523	35,262,293	2519	7.1 (6.9 to 7.4)
CPRD GOLD	3,912,708	9,674,616	759	7.8 (7.3 to 8.4)
HIC Dundee	948,447	2,153,668	333	15.5 (13.8 to 17.2)
IQVIA DA Germany	8,457,949	19,364,321	2264	11.7 (11.2 to 12.2)

IQVIA LPD France	3,951,527	8,209,807	175	2.1 (1.8 to 2.5)
IPCI	1,299,133	3,418,075	267	7.8 (6.9 to 8.8)
SIDIAP CMBD-HA	5,792,354	16,736,041	7816	46.7 (45.7 to 47.7)
<i>Thrombotic thrombocytopenic purpura</i>				
CPRD Aurum	13,178,867	35,269,192	175	0.5 (0.4 to 0.6)
CPRD GOLD	3,913,059	9,676,289	52	0.5 (0.4 to 0.7)
HIC Dundee	948,560	2,154,123	9	0.4 (0.2 to 0.8)
IQVIA DA Germany	8,458,805	19,368,465	552	2.8 (2.6 to 3.1)
IQVIA LPD France	3,951,599	8,210,086	52	0.6 (0.5 to 0.8)

IQVIA LPD Italy	1,066,176	2,651,585	45	1.7 (1.2 to 2.3)
SIDIAP CMBD-HA	5,794,674	16,751,190	272	1.6 (1.4 to 1.8)

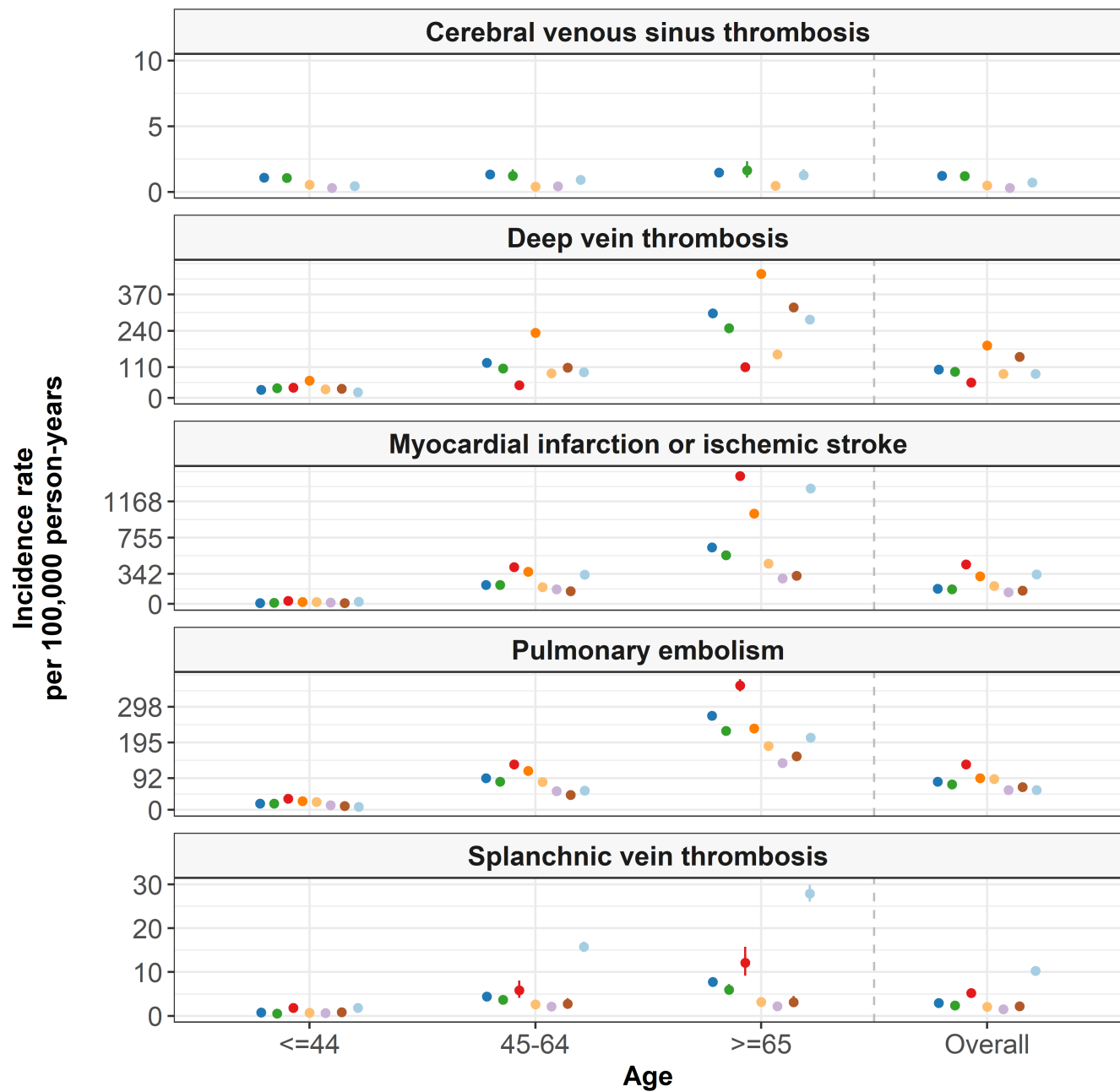
CPRD: Clinical Practice Research Datalink, IQVIA DA GERMANY: IQVIA Disease Analyser Germany, IQVIA LPD France: IQVIA Longitudinal Patient Data France, IPCI: Integrated Primary Care Information, IQVIA LPD Italy: IQVIA Longitudinal Patient Data Italy, SIDIAP CMBD-HA: Information System for Research in Primary Care with hospital linkage

Figure 1. Incidence rates (with 95% confidence intervals) per 100,000 of arterial and venous thromboembolism among the general population, stratified by age and sex

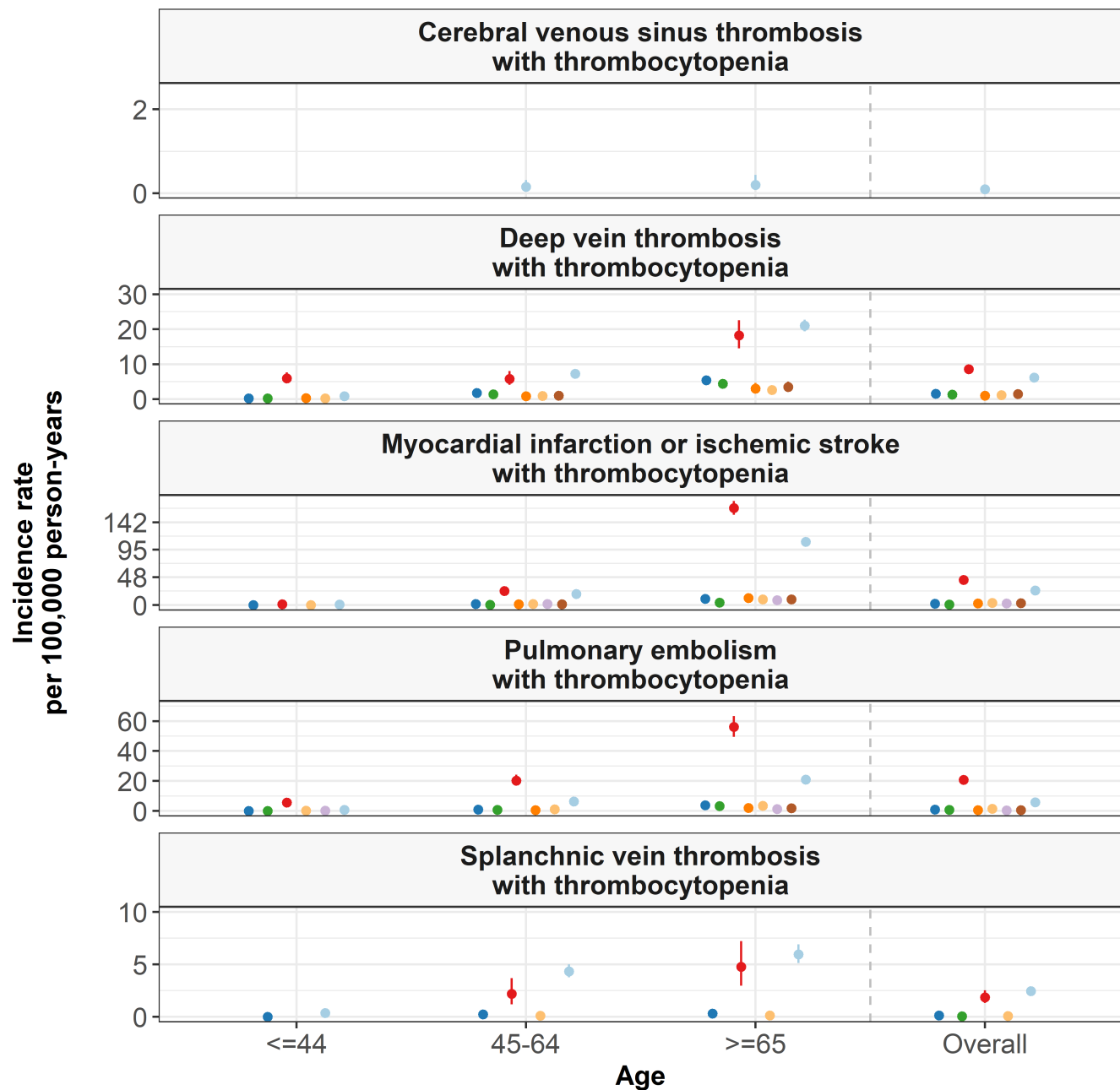
Figure 2. Incidence rates (with 95% confidence intervals) per 100,000 of non-vaccine induced TTS among the general population, stratified by age and sex

Figure 3. Expected cases (with 95% confidence intervals) of non-vaccine induced TTS per 36 days in a population of 10,000,000 people in a given age strata or overall. Blank cells are where there were fewer than five people with the event and incidence rates were not estimated.

Figure 4. Comorbidities and prior medication use among patients with non-vaccine induced TTS compared to the overall study population. Any characteristic seen in less than five people in a cohort is not reported

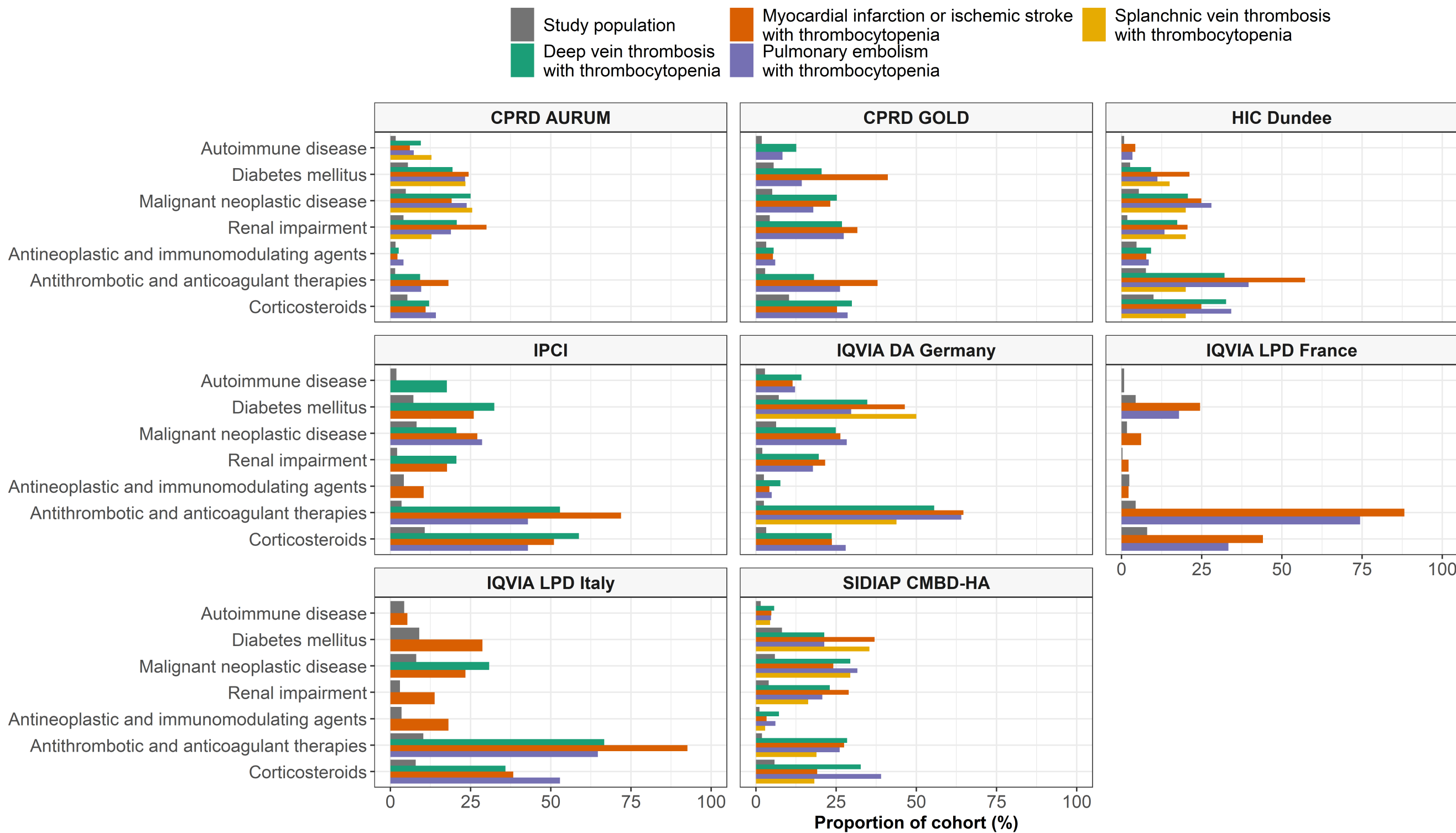


CPRD AURUM CPRD GOLD HIC Dundee
 IPCI IQVIA DA Germany IQVIA LPD France
 IQVIA LPD Italy SIDIAP CMBD-HA



	Age <=44	Age 45-64	Age >=65	Overall	
Cerebral venous sinus thrombosis with thrombocytopenia		2 (1 to 3)	2 (1 to 4)	1 (1 to 2)	SIDIAP CMBD-HA
Deep vein thrombosis with thrombocytopenia	2 (1 to 3)	18 (15 to 21)	53 (48 to 59)	15 (14 to 16)	CPRD AURUM
	2 (1 to 4)	14 (10 to 19)	43 (34 to 54)	13 (11 to 15)	CPRD GOLD
	59 (45 to 75)	58 (40 to 79)	179 (143 to 222)	84 (72 to 97)	HIC Dundee
	3 (1 to 7)	9 (4 to 16)	30 (18 to 46)	10 (7 to 14)	IPCI
	2 (1 to 3)	9 (7 to 12)	26 (22 to 31)	11 (10 to 13)	IQVIA DA Germany
		10 (4 to 18)	34 (23 to 49)	14 (10 to 20)	IQVIA LPD Italy
	8 (7 to 10)	72 (64 to 80)	207 (191 to 224)	61 (57 to 65)	SIDIAP CMBD-HA
Myocardial infarction or ischemic stroke with thrombocytopenia	1 (0 to 1)	20 (17 to 23)	105 (97 to 114)	24 (22 to 25)	CPRD AURUM
		5 (3 to 9)	43 (34 to 54)	10 (8 to 12)	CPRD GOLD
	14 (8 to 23)	238 (202 to 279)	1,641 (1,527 to 1,762)	428 (401 to 456)	HIC Dundee
		13 (7 to 21)	118 (94 to 147)	28 (22 to 34)	IPCI
	2 (1 to 3)	20 (16 to 23)	98 (90 to 106)	35 (33 to 38)	IQVIA DA Germany
		19 (14 to 25)	82 (70 to 95)	27 (24 to 31)	IQVIA LPD France
		14 (7 to 24)	99 (78 to 123)	35 (28 to 43)	IQVIA LPD Italy
	10 (8 to 12)	188 (176 to 201)	1,072 (1,036 to 1,110)	248 (240 to 255)	SIDIAP CMBD-HA
Pulmonary embolism with thrombocytopenia	1 (1 to 2)	10 (8 to 12)	37 (33 to 43)	10 (9 to 11)	CPRD AURUM
	1 (0 to 2)	8 (5 to 12)	32 (25 to 42)	9 (7 to 11)	CPRD GOLD
	55 (42 to 71)	201 (167 to 238)	553 (488 to 625)	205 (186 to 224)	HIC Dundee
		6 (2 to 13)	21 (11 to 35)	6 (4 to 9)	IPCI
	2 (1 to 3)	11 (9 to 14)	35 (30 to 40)	15 (13 to 16)	IQVIA DA Germany
	2 (1 to 4)		13 (9 to 19)	5 (3 to 6)	IQVIA LPD France
			18 (10 to 30)	6 (4 to 10)	IQVIA LPD Italy
	7 (6 to 9)	62 (55 to 70)	207 (191 to 224)	58 (54 to 62)	SIDIAP CMBD-HA
Splanchnic vein thrombosis with thrombocytopenia	0 (0 to 1)	2 (2 to 4)	3 (2 to 5)	1 (1 to 2)	CPRD AURUM
				1 (0 to 1)	CPRD GOLD
		22 (12 to 37)	47 (29 to 71)	18 (13 to 25)	HIC Dundee
		1 (0 to 2)	1 (1 to 3)	1 (0 to 1)	IQVIA DA Germany
	4 (3 to 5)	43 (37 to 49)	59 (51 to 68)	24 (22 to 27)	SIDIAP CMBD-HA





Appendix

Figure 1. Impact of requiring a year of prior history for study participants to be included in the analysis

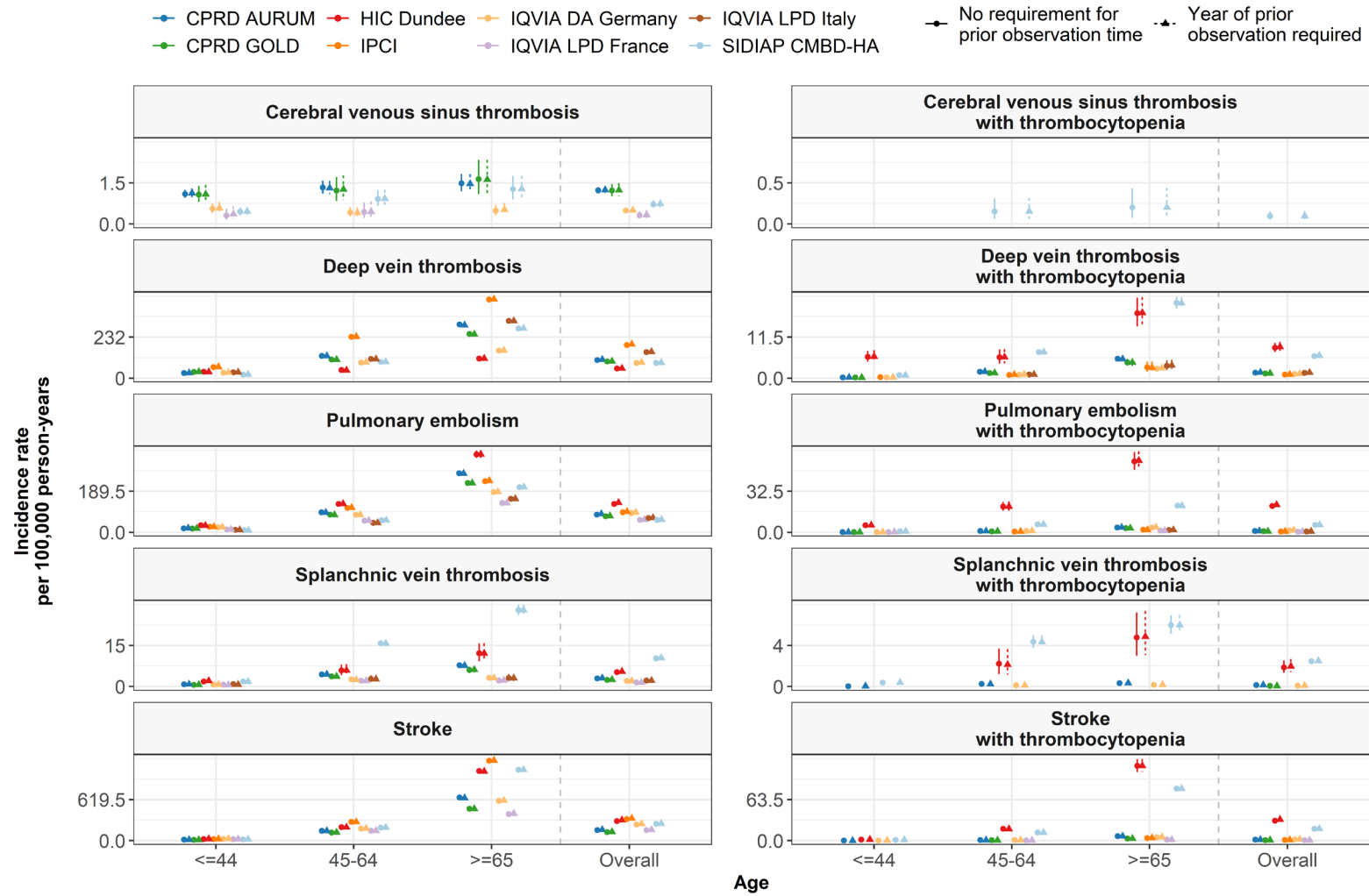
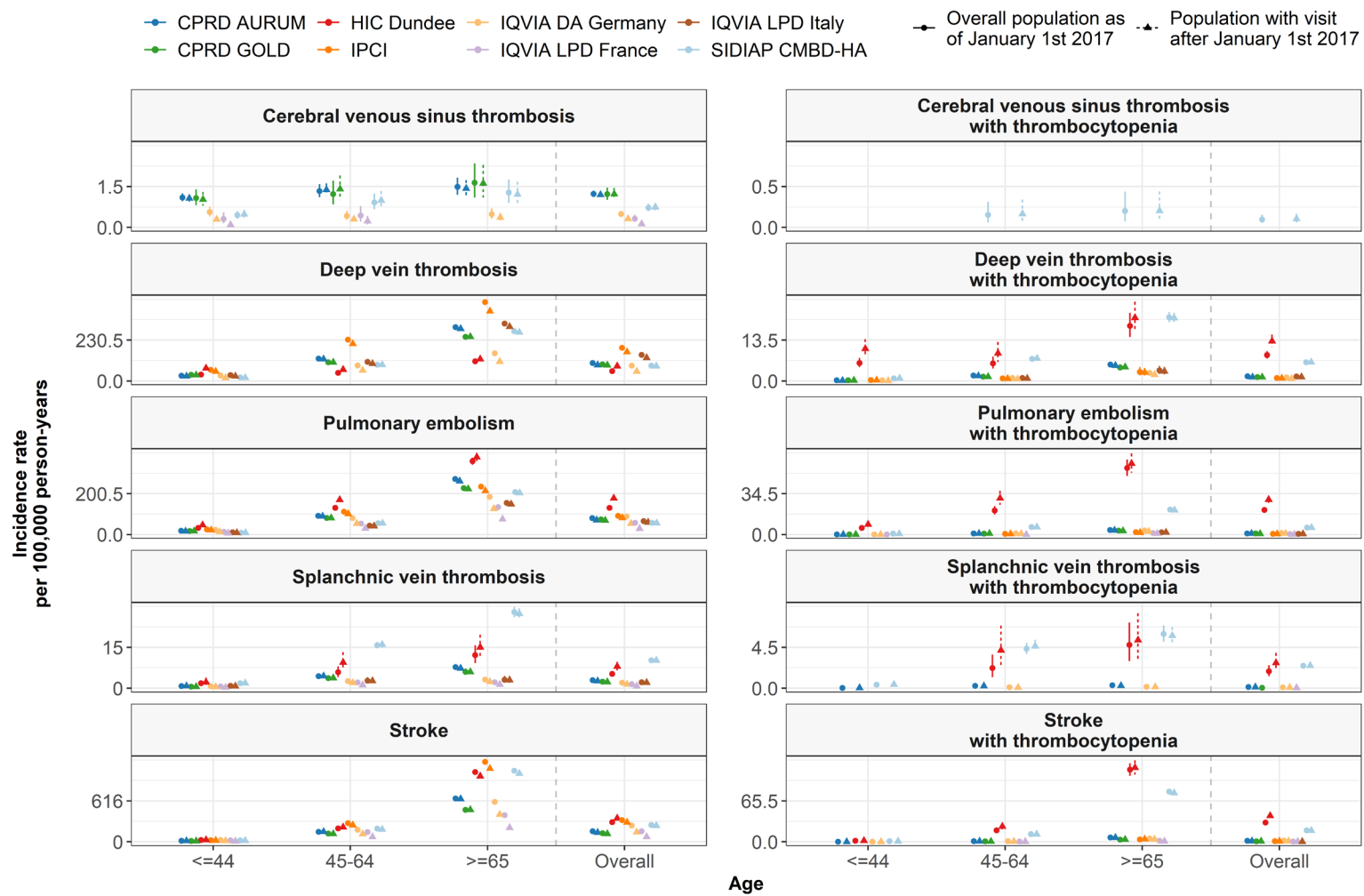


Figure 2. Impact of defining study populations based on a visit



Study definitions

Health conditions pre-index date

A range of other health conditions were identified using the same time windows on the basis of SNOMED CT codes (which are used as the standard codes in the OMOP CDM), with all descendent codes included. These included antiphospholipid syndrome (26843008), asthma (195967001), atrial fibrillation (49436004), cancer excluding non-melanoma skin cancers (363346000), thrombophilia (234467004), dementia (52448006), and obesity (414916001).

Medications pre-index date

Medications of interest were identified on the basis of Anatomical Therapeutic Chemical (ATC) codes, with use of the following medications identified: non-steroidal anti-inflammatory drugs (ATC group: M01A, with all descendant codes included), Cox2 inhibitors (M01AH), systemic corticosteroids (H02AB and H02BX), antithrombotic and anticoagulant therapies (B01A), lipid modifying agents (C10), agents acting on the renin-angiotensin system (C09), antineoplastic and immunomodulating agents (L), hormonal contraceptives for systemic use (G03A), tamoxifen (L02BA01), and sex hormones and modulators of the genital system (G03).

Included concepts for study outcomes

Excluded indicates that the related codes will not be used in the definition, while descendants indicates whether terms below the code in the hierarchy will be included in the definition. (Please see <https://ohdsi.github.io/TheBookOfOhdsi/Cohorts.html#conceptSets> for more details on how these concept sets are operationalised).

1. Cerebral venous sinus thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4102202	Cerebral venous sinus thrombosis	SNOMED	FALSE	FALSE
4048786	Cerebral venous thrombosis of sigmoid sinus	SNOMED	FALSE	FALSE
4043735	Cerebral venous thrombosis of straight sinus	SNOMED	FALSE	FALSE
4111713	Non-pyogenic venous sinus thrombosis	SNOMED	FALSE	FALSE
314667	Nonpyogenic thrombosis of intracranial venous sinus	SNOMED	FALSE	FALSE
4116206	Septic thrombophlebitis of cavernous sinus	SNOMED	FALSE	FALSE
4121335	Septic thrombophlebitis of lateral sinus	SNOMED	FALSE	FALSE
4119136	Septic thrombophlebitis of sagittal sinus	SNOMED	FALSE	FALSE
4041680	Septic thrombophlebitis of sigmoid sinus	SNOMED	FALSE	FALSE
4100225	Thrombophlebitis lateral venous sinus	SNOMED	FALSE	FALSE
4217471	Thrombophlebitis of basilar sinus	SNOMED	FALSE	FALSE
4104695	Thrombophlebitis of cavernous sinus	SNOMED	FALSE	FALSE
4167985	Thrombophlebitis of inferior sagittal sinus	SNOMED	FALSE	FALSE
764714	Thrombophlebitis of sigmoid sinus	SNOMED	FALSE	FALSE
4100224	Thrombophlebitis of superior longitudinal venous sinus	SNOMED	FALSE	FALSE
4098706	Thrombophlebitis of superior sagittal sinus	SNOMED	FALSE	FALSE

4277833	Thrombophlebitis of torcular Herophili	SNOMED	FALSE	FALSE
764710	Thrombophlebitis of transverse sinus	SNOMED	FALSE	FALSE
4228209	Thrombosis of basilar sinus	SNOMED	FALSE	FALSE
4234264	Thrombosis of cavernous venous sinus	SNOMED	FALSE	FALSE
4048890	Thrombosis of inferior sagittal sinus	SNOMED	FALSE	FALSE
4057329	Thrombosis of lateral venous sinus	SNOMED	FALSE	FALSE
4102203	Thrombosis of superior longitudinal sinus	SNOMED	FALSE	FALSE
4290940	Thrombosis of superior sagittal sinus	SNOMED	FALSE	FALSE
4079905	Thrombosis of torcular Herophili	SNOMED	FALSE	FALSE
4105338	Thrombosis transverse sinus	SNOMED	FALSE	FALSE

2 Disseminated intravascular coagulation

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
37117819	Acquired purpura fulminans	SNOMED	FALSE	FALSE
436093	Disseminated intravascular coagulation	SNOMED	FALSE	FALSE
45772129	Disseminated intravascular coagulation due to placental abruption	SNOMED	FALSE	FALSE
4028488	Purpura fulminans	SNOMED	FALSE	FALSE

3 Deep vein thrombosis- broad

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
762047	Acute bilateral thrombosis of subclavian veins	SNOMED	FALSE	FALSE
762148	Acute deep vein thrombosis of bilateral iliac veins	SNOMED	FALSE	FALSE
761444	Acute deep vein thrombosis of bilateral lower limbs following coronary artery bypass graft	SNOMED	FALSE	FALSE
35616028	Acute deep vein thrombosis of left iliac vein	SNOMED	FALSE	FALSE
35615035	Acute deep vein thrombosis of left lower limb following procedure	SNOMED	FALSE	FALSE
761416	Acute deep vein thrombosis of left upper limb following coronary artery bypass graft	SNOMED	FALSE	FALSE
35615031	Acute deep vein thrombosis of left upper limb following procedure	SNOMED	FALSE	FALSE
43531681	Acute deep vein thrombosis of lower limb	SNOMED	FALSE	FALSE
35616027	Acute deep vein thrombosis of right iliac vein	SNOMED	FALSE	FALSE
35615034	Acute deep vein thrombosis of right lower limb following procedure	SNOMED	FALSE	FALSE
761415	Acute deep vein thrombosis of right upper limb following coronary artery bypass graft	SNOMED	FALSE	FALSE
35615030	Acute deep vein thrombosis of right upper limb following procedure	SNOMED	FALSE	FALSE
44782746	Acute deep venous thrombosis	SNOMED	FALSE	FALSE
44782751	Acute deep venous thrombosis of axillary vein	SNOMED	FALSE	FALSE
762008	Acute deep venous thrombosis of bilateral axillary veins	SNOMED	FALSE	FALSE

760875	Acute deep venous thrombosis of bilateral calves	SNOMED	FALSE	FALSE
765155	Acute deep venous thrombosis of bilateral iliofemoral veins	SNOMED	FALSE	FALSE
762017	Acute deep venous thrombosis of bilateral internal jugular veins	SNOMED	FALSE	FALSE
762417	Acute deep venous thrombosis of bilateral legs	SNOMED	FALSE	FALSE
762020	Acute deep venous thrombosis of bilateral popliteal veins	SNOMED	FALSE	FALSE
765546	Acute deep venous thrombosis of bilateral tibial veins	SNOMED	FALSE	FALSE
762004	Acute deep venous thrombosis of both upper extremities	SNOMED	FALSE	FALSE
44782742	Acute deep venous thrombosis of calf	SNOMED	FALSE	FALSE
44782747	Acute deep venous thrombosis of femoral vein	SNOMED	FALSE	FALSE
762015	Acute deep venous thrombosis of iliofemoral vein of left leg	SNOMED	FALSE	FALSE
765541	Acute deep venous thrombosis of iliofemoral vein of right lower extremity	SNOMED	FALSE	FALSE
44782748	Acute deep venous thrombosis of iliofemoral vein	SNOMED	FALSE	FALSE
44782752	Acute deep venous thrombosis of internal jugular vein	SNOMED	FALSE	FALSE
762009	Acute deep venous thrombosis of left axillary vein	SNOMED	FALSE	FALSE
760876	Acute deep venous thrombosis of left calf	SNOMED	FALSE	FALSE
765540	Acute deep venous thrombosis of left femoral vein	SNOMED	FALSE	FALSE
765922	Acute deep venous thrombosis of left internal jugular vein	SNOMED	FALSE	FALSE
762418	Acute deep venous thrombosis of left lower extremity	SNOMED	FALSE	FALSE
765537	Acute deep venous thrombosis of left upper extremity	SNOMED	FALSE	FALSE
44782767	Acute deep venous thrombosis of lower extremity as complication of procedure	SNOMED	FALSE	FALSE

46270071	Acute deep venous thrombosis of lower limb due to coronary artery bypass grafting	SNOMED	FALSE	FALSE
762022	Acute deep venous thrombosis of popliteal vein of right leg	SNOMED	FALSE	FALSE
44782743	Acute deep venous thrombosis of popliteal vein	SNOMED	FALSE	FALSE
762021	Acute deep venous thrombosis of popliteal vein of left leg	SNOMED	FALSE	FALSE
762010	Acute deep venous thrombosis of right axillary vein	SNOMED	FALSE	FALSE
760877	Acute deep venous thrombosis of right calf	SNOMED	FALSE	FALSE
762013	Acute deep venous thrombosis of right femoral vein	SNOMED	FALSE	FALSE
762018	Acute deep venous thrombosis of right internal jugular vein	SNOMED	FALSE	FALSE
762419	Acute deep venous thrombosis of right lower extremity	SNOMED	FALSE	FALSE
762005	Acute deep venous thrombosis of right upper extremity	SNOMED	FALSE	FALSE
44782745	Acute deep venous thrombosis of thigh	SNOMED	FALSE	FALSE
44782744	Acute deep venous thrombosis of tibial vein	SNOMED	FALSE	FALSE
762026	Acute deep venous thrombosis of tibial vein of left leg	SNOMED	FALSE	FALSE
765156	Acute deep venous thrombosis of tibial vein of right leg	SNOMED	FALSE	FALSE
44782421	Acute deep venous thrombosis of upper extremity	SNOMED	FALSE	FALSE
764016	Acute deep venous thrombosis of upper extremity after coronary artery bypass graft	SNOMED	FALSE	FALSE
44782766	Acute deep venous thrombosis of upper extremity as complication of procedure	SNOMED	FALSE	FALSE
762048	Acute thrombosis of left subclavian vein	SNOMED	FALSE	FALSE
45757410	Acute thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
762049	Acute thrombosis of right subclavian vein	SNOMED	FALSE	FALSE

36712892	Acute thrombosis of splenic vein	SNOMED	FALSE	FALSE
44782762	Acute thrombosis of subclavian vein	SNOMED	FALSE	FALSE
37109253	Bilateral acute deep vein thrombosis of femoral veins	SNOMED	FALSE	FALSE
40478951	Bilateral deep vein thrombosis of lower extremities	SNOMED	FALSE	FALSE
4046884	Deep vein thrombosis of leg related to air travel	SNOMED	FALSE	FALSE
4133004	Deep venous thrombosis	SNOMED	FALSE	FALSE
4181315	Deep venous thrombosis associated with coronary artery bypass graft	SNOMED	FALSE	FALSE
45773536	Deep venous thrombosis of femoropopliteal vein	SNOMED	FALSE	FALSE
763942	Deep venous thrombosis of left lower extremity	SNOMED	FALSE	FALSE
761980	Deep venous thrombosis of left upper extremity	SNOMED	FALSE	FALSE
443537	Deep venous thrombosis of lower extremity	SNOMED	FALSE	FALSE
4133975	Deep venous thrombosis of pelvic vein	SNOMED	FALSE	FALSE
40480555	Deep venous thrombosis of peroneal vein	SNOMED	FALSE	FALSE
4322565	Deep venous thrombosis of profunda femoris vein	SNOMED	FALSE	FALSE
763941	Deep venous thrombosis of right lower extremity	SNOMED	FALSE	FALSE
761928	Deep venous thrombosis of right upper extremity	SNOMED	FALSE	FALSE
4207899	Deep venous thrombosis of tibial vein	SNOMED	FALSE	FALSE
4028057	Deep venous thrombosis of upper extremity	SNOMED	FALSE	FALSE
193512	Embolism and thrombosis of the renal vein	SNOMED	FALSE	FALSE
435565	Embolism and thrombosis of the vena cava	SNOMED	FALSE	FALSE
4119760	Iliofemoral deep vein thrombosis	SNOMED	FALSE	FALSE
4124856	Inferior mesenteric vein thrombosis	SNOMED	FALSE	FALSE

4281689	Phlegmasia alba dolens	SNOMED	FALSE	FALSE
4284538	Phlegmasia cerulea dolens	SNOMED	FALSE	FALSE
4309333	Postoperative deep vein thrombosis	SNOMED	FALSE	FALSE
46285905	Provoked deep vein thrombosis	SNOMED	FALSE	FALSE
4033521	Splenic vein thrombosis	SNOMED	FALSE	FALSE
4055089	Superior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
42538533	Thrombosis of iliac vein	SNOMED	FALSE	FALSE
44811347	Thrombosis of internal jugular vein	SNOMED	FALSE	FALSE
765049	Thrombosis of left peroneal vein	SNOMED	FALSE	FALSE
4317289	Thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4203836	Thrombosis of subclavian vein	SNOMED	FALSE	FALSE
4175649	Thrombosis of the popliteal vein	SNOMED	FALSE	FALSE
4149782	Thrombosis of vein of lower limb	SNOMED	FALSE	FALSE
4153353	Traumatic thrombosis of axillary vein	SNOMED	FALSE	FALSE
46285904	Unprovoked deep vein thrombosis	SNOMED	FALSE	FALSE
444247	Venous thrombosis	SNOMED	FALSE	FALSE
4327889	Thromboembolism of vein	SNOMED	FALSE	FALSE
4221821	Thrombophlebitis of deep veins of lower extremity	SNOMED	FALSE	FALSE
46271900	Recurrent deep vein thrombosis	SNOMED	FALSE	FALSE
4189004	Deep vein thrombosis of leg related to intravenous drug use	SNOMED	FALSE	FALSE

4 Deep vein thrombosis - narrow

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
762047	Acute bilateral thrombosis of subclavian veins	SNOMED	FALSE	FALSE
762148	Acute deep vein thrombosis of bilateral iliac veins	SNOMED	FALSE	FALSE
761444	Acute deep vein thrombosis of bilateral lower limbs following coronary artery bypass graft	SNOMED	FALSE	FALSE
35616028	Acute deep vein thrombosis of left iliac vein	SNOMED	FALSE	FALSE
35615035	Acute deep vein thrombosis of left lower limb following procedure	SNOMED	FALSE	FALSE
761416	Acute deep vein thrombosis of left upper limb following coronary artery bypass graft	SNOMED	FALSE	FALSE
35615031	Acute deep vein thrombosis of left upper limb following procedure	SNOMED	FALSE	FALSE
43531681	Acute deep vein thrombosis of lower limb	SNOMED	FALSE	FALSE
35616027	Acute deep vein thrombosis of right iliac vein	SNOMED	FALSE	FALSE
35615034	Acute deep vein thrombosis of right lower limb following procedure	SNOMED	FALSE	FALSE
761415	Acute deep vein thrombosis of right upper limb following coronary artery bypass graft	SNOMED	FALSE	FALSE
35615030	Acute deep vein thrombosis of right upper limb following procedure	SNOMED	FALSE	FALSE
44782746	Acute deep venous thrombosis	SNOMED	FALSE	FALSE
44782751	Acute deep venous thrombosis of axillary vein	SNOMED	FALSE	FALSE
762008	Acute deep venous thrombosis of bilateral axillary veins	SNOMED	FALSE	FALSE

760875	Acute deep venous thrombosis of bilateral calves	SNOMED	FALSE	FALSE
765155	Acute deep venous thrombosis of bilateral iliofemoral veins	SNOMED	FALSE	FALSE
762017	Acute deep venous thrombosis of bilateral internal jugular veins	SNOMED	FALSE	FALSE
762417	Acute deep venous thrombosis of bilateral legs	SNOMED	FALSE	FALSE
762020	Acute deep venous thrombosis of bilateral popliteal veins	SNOMED	FALSE	FALSE
765546	Acute deep venous thrombosis of bilateral tibial veins	SNOMED	FALSE	FALSE
762004	Acute deep venous thrombosis of both upper extremities	SNOMED	FALSE	FALSE
44782742	Acute deep venous thrombosis of calf	SNOMED	FALSE	FALSE
44782747	Acute deep venous thrombosis of femoral vein	SNOMED	FALSE	FALSE
762015	Acute deep venous thrombosis of iliofemoral vein of left leg	SNOMED	FALSE	FALSE
765541	Acute deep venous thrombosis of iliofemoral vein of right lower extremity	SNOMED	FALSE	FALSE
44782748	Acute deep venous thrombosis of iliofemoral vein	SNOMED	FALSE	FALSE
44782752	Acute deep venous thrombosis of internal jugular vein	SNOMED	FALSE	FALSE
762009	Acute deep venous thrombosis of left axillary vein	SNOMED	FALSE	FALSE
760876	Acute deep venous thrombosis of left calf	SNOMED	FALSE	FALSE
765540	Acute deep venous thrombosis of left femoral vein	SNOMED	FALSE	FALSE
765922	Acute deep venous thrombosis of left internal jugular vein	SNOMED	FALSE	FALSE
762418	Acute deep venous thrombosis of left lower extremity	SNOMED	FALSE	FALSE
765537	Acute deep venous thrombosis of left upper extremity	SNOMED	FALSE	FALSE

44782767	Acute deep venous thrombosis of lower extremity as complication of procedure	SNOMED	FALSE	FALSE
46270071	Acute deep venous thrombosis of lower limb due to coronary artery bypass grafting	SNOMED	FALSE	FALSE
762022	Acute deep venous thrombosis of popliteal vein of right leg	SNOMED	FALSE	FALSE
44782743	Acute deep venous thrombosis of popliteal vein	SNOMED	FALSE	FALSE
762021	Acute deep venous thrombosis of popliteal vein of left leg	SNOMED	FALSE	FALSE
762010	Acute deep venous thrombosis of right axillary vein	SNOMED	FALSE	FALSE
760877	Acute deep venous thrombosis of right calf	SNOMED	FALSE	FALSE
762013	Acute deep venous thrombosis of right femoral vein	SNOMED	FALSE	FALSE
762018	Acute deep venous thrombosis of right internal jugular vein	SNOMED	FALSE	FALSE
762419	Acute deep venous thrombosis of right lower extremity	SNOMED	FALSE	FALSE
762005	Acute deep venous thrombosis of right upper extremity	SNOMED	FALSE	FALSE
44782745	Acute deep venous thrombosis of thigh	SNOMED	FALSE	FALSE
44782744	Acute deep venous thrombosis of tibial vein	SNOMED	FALSE	FALSE
762026	Acute deep venous thrombosis of tibial vein of left leg	SNOMED	FALSE	FALSE
765156	Acute deep venous thrombosis of tibial vein of right leg	SNOMED	FALSE	FALSE
44782421	Acute deep venous thrombosis of upper extremity	SNOMED	FALSE	FALSE
764016	Acute deep venous thrombosis of upper extremity after coronary artery bypass graft	SNOMED	FALSE	FALSE
44782766	Acute deep venous thrombosis of upper extremity as complication of procedure	SNOMED	FALSE	FALSE
762048	Acute thrombosis of left subclavian vein	SNOMED	FALSE	FALSE
45757410	Acute thrombosis of mesenteric vein	SNOMED	FALSE	FALSE

762049	Acute thrombosis of right subclavian vein	SNOMED	FALSE	FALSE
36712892	Acute thrombosis of splenic vein	SNOMED	FALSE	FALSE
44782762	Acute thrombosis of subclavian vein	SNOMED	FALSE	FALSE
37109253	Bilateral acute deep vein thrombosis of femoral veins	SNOMED	FALSE	FALSE
40478951	Bilateral deep vein thrombosis of lower extremities	SNOMED	FALSE	FALSE
4046884	Deep vein thrombosis of leg related to air travel	SNOMED	FALSE	FALSE
4133004	Deep venous thrombosis	SNOMED	FALSE	FALSE
4181315	Deep venous thrombosis associated with coronary artery bypass graft	SNOMED	FALSE	FALSE
45773536	Deep venous thrombosis of femoropopliteal vein	SNOMED	FALSE	FALSE
763942	Deep venous thrombosis of left lower extremity	SNOMED	FALSE	FALSE
761980	Deep venous thrombosis of left upper extremity	SNOMED	FALSE	FALSE
443537	Deep venous thrombosis of lower extremity	SNOMED	FALSE	FALSE
4133975	Deep venous thrombosis of pelvic vein	SNOMED	FALSE	FALSE
40480555	Deep venous thrombosis of peroneal vein	SNOMED	FALSE	FALSE
4322565	Deep venous thrombosis of profunda femoris vein	SNOMED	FALSE	FALSE
763941	Deep venous thrombosis of right lower extremity	SNOMED	FALSE	FALSE
761928	Deep venous thrombosis of right upper extremity	SNOMED	FALSE	FALSE
4207899	Deep venous thrombosis of tibial vein	SNOMED	FALSE	FALSE
4028057	Deep venous thrombosis of upper extremity	SNOMED	FALSE	FALSE
193512	Embolism and thrombosis of the renal vein	SNOMED	FALSE	FALSE
435565	Embolism and thrombosis of the vena cava	SNOMED	FALSE	FALSE
4119760	Iliofemoral deep vein thrombosis	SNOMED	FALSE	FALSE

4124856	Inferior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
4281689	Phlegmasia alba dolens	SNOMED	FALSE	FALSE
4284538	Phlegmasia cerulea dolens	SNOMED	FALSE	FALSE
4309333	Postoperative deep vein thrombosis	SNOMED	FALSE	FALSE
46285905	Provoked deep vein thrombosis	SNOMED	FALSE	FALSE
4033521	Splenic vein thrombosis	SNOMED	FALSE	FALSE
4055089	Superior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
42538533	Thrombosis of iliac vein	SNOMED	FALSE	FALSE
44811347	Thrombosis of internal jugular vein	SNOMED	FALSE	FALSE
765049	Thrombosis of left peroneal vein	SNOMED	FALSE	FALSE
4317289	Thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4203836	Thrombosis of subclavian vein	SNOMED	FALSE	FALSE
4175649	Thrombosis of the popliteal vein	SNOMED	FALSE	FALSE
4153353	Traumatic thrombosis of axillary vein	SNOMED	FALSE	FALSE
46285904	Unprovoked deep vein thrombosis	SNOMED	FALSE	FALSE
4221821	Thrombophlebitis of deep veins of lower extremity	SNOMED	FALSE	FALSE
46271900	Recurrent deep vein thrombosis	SNOMED	FALSE	FALSE
4189004	Deep vein thrombosis of leg related to intravenous drug use	SNOMED	FALSE	FALSE

5 Hemorrhagic stroke

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
42535426	Acute nontraumatic subdural hemorrhage	SNOMED	FALSE	FALSE
35609033	Haemorrhagic stroke	SNOMED	FALSE	FALSE
439847	Intracranial hemorrhage	SNOMED	FALSE	FALSE
4144154	Non-traumatic intracerebral ventricular hemorrhage	SNOMED	FALSE	FALSE
4111709	Non-traumatic subdural hemorrhage	SNOMED	FALSE	FALSE
43530727	Spontaneous cerebral hemorrhage	SNOMED	FALSE	FALSE
4148906	Spontaneous subarachnoid hemorrhage	SNOMED	FALSE	FALSE
43530728	Subacute non-traumatic intracranial subdural hemorrhage	SNOMED	FALSE	FALSE
432923	Subarachnoid hemorrhage	SNOMED	FALSE	FALSE
4108952	Subarachnoid hemorrhage from carotid siphon and bifurcation	SNOMED	FALSE	FALSE
4111708	Subarachnoid hemorrhage from vertebral artery	SNOMED	FALSE	FALSE

6 Immune thrombocytopenia

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4103532	Immune thrombocytopenia	SNOMED	FALSE	FALSE
4137430	Idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4133984	Alloimmune thrombocytopenia	SNOMED	FALSE	FALSE
4133983	Secondary autoimmune thrombocytopenia	SNOMED	FALSE	FALSE
4102469	Acute idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4028065	Autoimmune thrombocytopenia	SNOMED	FALSE	FALSE
4027374	Alloimmune platelet transfusion refractoriness	SNOMED	FALSE	FALSE
4009307	Heparin-induced thrombocytopenia with thrombosis	SNOMED	FALSE	FALSE
4000065	Drug-induced immune thrombocytopenia	SNOMED	FALSE	FALSE
436956	Evans syndrome	SNOMED	FALSE	FALSE
433749	Heparin-induced thrombocytopenia	SNOMED	FALSE	FALSE
318397	Chronic idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE

7 Ischemic stroke

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4045735	Anterior cerebral circulation infarction	SNOMED	FALSE	FALSE
4031045	Anterior choroidal artery syndrome	SNOMED	FALSE	FALSE
761110	Bilateral cerebral infarction due to precerebral arterial occlusion	SNOMED	FALSE	FALSE
4110189	Cerebral infarct due to thrombosis of precerebral arteries	SNOMED	FALSE	FALSE
443454	Cerebral infarction	SNOMED	FALSE	FALSE
762951	Cerebral infarction due to anterior cerebral artery occlusion	SNOMED	FALSE	FALSE
765515	Cerebral infarction due to basilar artery stenosis	SNOMED	FALSE	FALSE
43530683	Cerebral infarction due to carotid artery occlusion	SNOMED	FALSE	FALSE
762933	Cerebral infarction due to cerebral artery occlusion	SNOMED	FALSE	FALSE
762937	Cerebral infarction due to cerebral venous thrombosis	SNOMED	FALSE	FALSE
4111714	Cerebral infarction due to cerebral venous thrombosis, non-pyogenic	SNOMED	FALSE	FALSE
4108356	Cerebral infarction due to embolism of cerebral arteries	SNOMED	FALSE	FALSE
45772786	Cerebral infarction due to embolism of middle cerebral artery	SNOMED	FALSE	FALSE
4110190	Cerebral infarction due to embolism of precerebral arteries	SNOMED	FALSE	FALSE
762935	Cerebral infarction due to internal carotid artery occlusion	SNOMED	FALSE	FALSE
763015	Cerebral infarction due to middle cerebral artery occlusion	SNOMED	FALSE	FALSE
46273649	Cerebral infarction due to occlusion of basilar artery	SNOMED	FALSE	FALSE

35610084	Cerebral infarction due to occlusion of cerebral artery	SNOMED	FALSE	FALSE
46270031	Cerebral infarction due to occlusion of precerebral artery	SNOMED	FALSE	FALSE
762934	Cerebral infarction due to posterior cerebral artery occlusion	SNOMED	FALSE	FALSE
43531607	Cerebral infarction due to stenosis of carotid artery	SNOMED	FALSE	FALSE
35610085	Cerebral infarction due to stenosis of cerebral artery	SNOMED	FALSE	FALSE
46270381	Cerebral infarction due to stenosis of precerebral artery	SNOMED	FALSE	FALSE
4110192	Cerebral infarction due to thrombosis of cerebral arteries	SNOMED	FALSE	FALSE
45767658	Cerebral infarction due to thrombosis of middle cerebral artery	SNOMED	FALSE	FALSE
44782773	Cerebral infarction due to vertebral artery occlusion	SNOMED	FALSE	FALSE
46270380	Cerebral infarction due to vertebral artery stenosis	SNOMED	FALSE	FALSE
37110678	Cerebral ischemic stroke due to occlusion of extracranial large artery	SNOMED	FALSE	FALSE
37110679	Cerebral ischemic stroke due to stenosis of extracranial large artery	SNOMED	FALSE	FALSE
4043731	Infarction - precerebral	SNOMED	FALSE	FALSE
4131383	Infarction of basal ganglia	SNOMED	FALSE	FALSE
4046237	Infarction of optic radiation	SNOMED	FALSE	FALSE
4119140	Infarction of visual cortex	SNOMED	FALSE	FALSE
4141405	Left sided cerebral infarction	SNOMED	FALSE	FALSE
37116473	Multifocal cerebral infarction due to and following procedure on cardiovascular system	SNOMED	FALSE	FALSE
4077086	Occipital cerebral infarction	SNOMED	FALSE	FALSE

4046359	Partial anterior cerebral circulation infarction	SNOMED	FALSE	FALSE
4319146	Pituitary infarction	SNOMED	FALSE	FALSE
4146185	Right sided cerebral infarction	SNOMED	FALSE	FALSE
36717605	Silent cerebral infarct	SNOMED	FALSE	FALSE
4142739	Thalamic infarction	SNOMED	FALSE	FALSE
4046358	Total anterior cerebral circulation infarction	SNOMED	FALSE	FALSE
372924	Cerebral artery occlusion	SNOMED	FALSE	FALSE

8 Pulmonary embolism

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4120091	Acute massive pulmonary embolism	SNOMED	FALSE	FALSE
45768439	Acute pulmonary embolism	SNOMED	FALSE	FALSE
45768888	Acute pulmonary thromboembolism	SNOMED	FALSE	FALSE
4309039	Hemorrhagic pulmonary infarction	SNOMED	FALSE	FALSE
762808	Infarction of lung due to embolus	SNOMED	FALSE	FALSE
40480461	Infarction of lung due to iatrogenic pulmonary embolism	SNOMED	FALSE	FALSE
4108681	Postoperative pulmonary embolus	SNOMED	FALSE	FALSE
4091708	Pulmonary air embolism	SNOMED	FALSE	FALSE
440417	Pulmonary embolism	SNOMED	FALSE	FALSE
37109911	Pulmonary embolism due to and following acute myocardial infarction	SNOMED	FALSE	FALSE
37016922	Pulmonary embolism on long-term anticoagulation therapy	SNOMED	FALSE	FALSE
43530605	Pulmonary embolism with pulmonary infarction	SNOMED	FALSE	FALSE
4119608	Pulmonary fat embolism	SNOMED	FALSE	FALSE
254662	Pulmonary infarction	SNOMED	FALSE	FALSE
4253796	Pulmonary microemboli	SNOMED	FALSE	FALSE
45766471	Pulmonary oil microembolism	SNOMED	FALSE	FALSE
4121618	Pulmonary thromboembolism	SNOMED	FALSE	FALSE
4119610	Pulmonary tumor embolism	SNOMED	FALSE	FALSE

4119607	Subacute massive pulmonary embolism	SNOMED	FALSE	FALSE
4119609	Subacute pulmonary fat embolism	SNOMED	FALSE	FALSE
4236271	Recurrent pulmonary embolism	SNOMED	FALSE	FALSE

9 Thrombotic thrombocytopenic purpura

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4301602	Thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
313800	Thrombotic microangiopathy	SNOMED	FALSE	FALSE
4258261	Drug induced thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4230266	Autoimmune thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4204900	Acquired thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4159966	Upshaw-Schulman syndrome	SNOMED	FALSE	FALSE
37312165	Atypical hemolytic uremic syndrome	SNOMED	FALSE	FALSE
4190190	Diarrhea-associated hemolytic uremic syndrome	SNOMED	FALSE	FALSE
4159967	Diarrhea-negative hemolytic uremic syndrome	SNOMED	FALSE	FALSE
197253	Hemolytic uremic syndrome	SNOMED	FALSE	FALSE
4302298	Hemolytic uremic syndrome, adult type	SNOMED	FALSE	FALSE

10 Celiac artery thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4179906	Celiac artery embolus	SNOMED	FALSE	FALSE
4174016	Celiac artery thrombosis	SNOMED	FALSE	FALSE
4111852	Embolism and thrombosis of the celiac artery	SNOMED	FALSE	FALSE

11 Deep vein thrombosis - broad (additional ICD codes)

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
44834756	Acute venous embolism and thrombosis of other specified veins	ICD9CM	FALSE	FALSE
45586638	Embolism and thrombosis of other specified veins	ICD10	FALSE	FALSE
45572145	Embolism and thrombosis of unspecified vein	ICD10	FALSE	FALSE

12 Hepatic vein thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
196715	Budd-Chiari syndrome	SNOMED	FALSE	FALSE
4301208	Hepatic vein thrombosis	SNOMED	FALSE	FALSE

13 Intestinal infarction

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4195665	Gastrointestinal tract vascular insufficiency	SNOMED	FALSE	FALSE
4148299	Ischemic colitis	SNOMED	FALSE	FALSE
4173167	Mesenteric embolus	SNOMED	FALSE	FALSE
4317289	Thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4319280	Acute bowel infarction	SNOMED	FALSE	FALSE
4144032	Mesenteric thrombus and/or embolus	SNOMED	FALSE	FALSE
45757410	Acute thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
45757409	Chronic thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
44811741	Acute ischaemia of large intestine	SNOMED	FALSE	FALSE
44811740	Acute ischaemia of small intestine	SNOMED	FALSE	FALSE
37117790	Insufficiency of mesenteric artery	SNOMED	FALSE	FALSE
37016198	Epiploic appendagitis	SNOMED	FALSE	FALSE
35622081	Nongangrenous ischemic colitis	SNOMED	FALSE	FALSE
35622080	Gangrenous ischemic colitis	SNOMED	FALSE	FALSE
4345926	Abdominal angina	SNOMED	FALSE	FALSE
4342767	Transient ischemic colitis	SNOMED	FALSE	FALSE
4341648	Hemorrhagic infarction of intestine	SNOMED	FALSE	FALSE
4341646	Occlusive mesenteric ischemia	SNOMED	FALSE	FALSE
4340939	Non-occlusive mesenteric ischemia	SNOMED	FALSE	FALSE
4340378	Transmural infarction of intestine	SNOMED	FALSE	FALSE

4340375	Focal segmental ischemia of small intestine	SNOMED	FALSE	FALSE
4318537	Large bowel gangrene	SNOMED	FALSE	FALSE
4318407	Thrombophlebitis of mesenteric vein	SNOMED	FALSE	FALSE
4240850	Acute ischemic enterocolitis	SNOMED	FALSE	FALSE
4239942	Embolic mesenteric infarction	SNOMED	FALSE	FALSE
4237654	Ischemic enterocolitis	SNOMED	FALSE	FALSE
4215949	Nonocclusive intestinal infarction	SNOMED	FALSE	FALSE
4214720	Thrombotic mesenteric infarction	SNOMED	FALSE	FALSE
4192856	Acute ischemic colitis	SNOMED	FALSE	FALSE
4188336	Chronic ischemic enterocolitis	SNOMED	FALSE	FALSE
4174014	Inferior mesenteric artery embolus	SNOMED	FALSE	FALSE
4149013	Mesenteric infarction	SNOMED	FALSE	FALSE
4148257	Chronic gastrointestinal tract vascular insufficiency	SNOMED	FALSE	FALSE
4148256	Acute GIT vascular insufficiency	SNOMED	FALSE	FALSE
4124856	Inferior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
4055089	Superior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
4055025	Superior mesenteric artery embolus	SNOMED	FALSE	FALSE
4045408	Ischemic stricture of intestine	SNOMED	FALSE	FALSE
201894	Acute vascular insufficiency of intestine	SNOMED	FALSE	FALSE
192673	Vascular insufficiency of intestine	SNOMED	FALSE	FALSE

14 Heparin

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
21600972	Heparin group	ATC	FALSE	TRUE
4207626	Subcutaneous injection of heparin	SNOMED	FALSE	FALSE
45768801	Bridging anticoagulant therapy with low molecular weight heparin	SNOMED	FALSE	FALSE
4150546	Continuous infusion of heparin	SNOMED	FALSE	FALSE
4213991	Low dose heparin prophylaxis	SNOMED	FALSE	FALSE
40481876	Low molecular weight heparin therapy	SNOMED	FALSE	FALSE
41404759	0.2 ML heparin 25000 UNT/ML Prefilled Syringe Box of 10 by Ratiopharm	RxNorm Extension	FALSE	FALSE
41405132	0.2 ML heparin 25000 UNT/ML Prefilled Syringe Box of 25 by Ratiopharm	RxNorm Extension	FALSE	FALSE
41405875	0.3 ML heparin 25000 UNT/ML Prefilled Syringe Box of 10 by Ratiopharm	RxNorm Extension	FALSE	FALSE
41405544	0.3 ML heparin 25000 UNT/ML Prefilled Syringe Box of 25 by Ratiopharm	RxNorm Extension	FALSE	FALSE

15 Hepatic artery thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4111853	Embolism and thrombosis of hepatic artery	SNOMED	FALSE	FALSE
4223098	Hepatic artery thrombosis	SNOMED	FALSE	FALSE

16 Intracranial venous thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4111714	Cerebral infarction due to cerebral venous thrombosis, non-pyogenic	SNOMED	FALSE	FALSE
4102202	Cerebral venous sinus thrombosis	SNOMED	FALSE	FALSE
4046443	Cerebral venous thrombosis of cortical vein	SNOMED	FALSE	FALSE
762938	Cerebral venous thrombosis of cortical vein with infarction	SNOMED	FALSE	FALSE
762811	Cerebral venous thrombosis of cortical vein without infarction	SNOMED	FALSE	FALSE
4048787	Cerebral venous thrombosis of great cerebral vein	SNOMED	FALSE	FALSE
4048786	Cerebral venous thrombosis of sigmoid sinus	SNOMED	FALSE	FALSE
4043735	Cerebral venous thrombosis of straight sinus	SNOMED	FALSE	FALSE
4120316	Intracranial septic thrombophlebitis	SNOMED	FALSE	FALSE
4194609	Intracranial thrombophlebitis	SNOMED	FALSE	FALSE
4179912	Intracranial venous thrombosis	SNOMED	FALSE	FALSE
4111713	Non-pyogenic venous sinus thrombosis	SNOMED	FALSE	FALSE
314667	Nonpyogenic thrombosis of intracranial venous sinus	SNOMED	FALSE	FALSE
764503	Occlusion of cerebral vein by nonpyogenic thrombus	SNOMED	FALSE	FALSE
4047634	Septic thrombophlebitis of cortical vein	SNOMED	FALSE	FALSE
4043901	Septic thrombophlebitis of great cerebral vein	SNOMED	FALSE	FALSE
4100225	Thrombophlebitis lateral venous sinus	SNOMED	FALSE	FALSE

764716	Thrombophlebitis of basal vein of Rosenthal	SNOMED	FALSE	FALSE
4217471	Thrombophlebitis of basilar sinus	SNOMED	FALSE	FALSE
4104695	Thrombophlebitis of cavernous sinus	SNOMED	FALSE	FALSE
4319332	Thrombophlebitis of cerebral vein	SNOMED	FALSE	FALSE
4167985	Thrombophlebitis of inferior sagittal sinus	SNOMED	FALSE	FALSE
764712	Thrombophlebitis of internal cerebral vein	SNOMED	FALSE	FALSE
764708	Thrombophlebitis of straight sinus	SNOMED	FALSE	FALSE
763149	Thrombophlebitis of superior anastomotic vein	SNOMED	FALSE	FALSE
4100224	Thrombophlebitis of superior longitudinal venous sinus	SNOMED	FALSE	FALSE
4098706	Thrombophlebitis of superior sagittal sinus	SNOMED	FALSE	FALSE
4277833	Thrombophlebitis of torcular Herophili	SNOMED	FALSE	FALSE
764710	Thrombophlebitis of transverse sinus	SNOMED	FALSE	FALSE
764726	Thrombosis of basal vein	SNOMED	FALSE	FALSE
4228209	Thrombosis of basilar sinus	SNOMED	FALSE	FALSE
4234264	Thrombosis of cavernous venous sinus	SNOMED	FALSE	FALSE
762828	Thrombosis of cerebral medullary veins	SNOMED	FALSE	FALSE
4319329	Thrombosis of cerebral veins	SNOMED	FALSE	FALSE
4048890	Thrombosis of inferior sagittal sinus	SNOMED	FALSE	FALSE
4057329	Thrombosis of lateral venous sinus	SNOMED	FALSE	FALSE
764723	Thrombosis of superior anastomotic vein	SNOMED	FALSE	FALSE
4102203	Thrombosis of superior longitudinal sinus	SNOMED	FALSE	FALSE
4290940	Thrombosis of superior sagittal sinus	SNOMED	FALSE	FALSE

4079905	Thrombosis of torcular Herophili	SNOMED	FALSE	FALSE
4105338	Thrombosis transverse sinus	SNOMED	FALSE	FALSE

17 Mesenteric vein thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
36717492	Acute occlusion of mesenteric vein	SNOMED	FALSE	FALSE
45757410	Acute thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4124856	Inferior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
4055089	Superior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
4317289	Thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
45757409	Chronic thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4318407	Thrombophlebitis of mesenteric vein	SNOMED	FALSE	FALSE
4173167	Mesenteric embolus	SNOMED	FALSE	FALSE
4144032	Mesenteric thrombus and/or embolus	SNOMED	FALSE	FALSE

18 Platelet disorder

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4332151	Platelet disorder	SNOMED	FALSE	FALSE
46272950	Thrombocytopathy, asplenia and miosis	SNOMED	FALSE	FALSE
46271357	Periodontitis co-occurrent with Chédiak-Higashi syndrome	SNOMED	FALSE	FALSE
44782445	Thrombocytopenia due to alcohol	SNOMED	FALSE	FALSE
42536958	Pancytopenia caused by medication	SNOMED	FALSE	FALSE
40321716	Secondary thrombocytopenia	SNOMED	FALSE	FALSE
37312165	Atypical hemolytic uremic syndrome	SNOMED	FALSE	FALSE
37209558	Pancytopenia caused by immunosuppressant	SNOMED	FALSE	FALSE
37204551	Hereditary isolated aplastic anemia	SNOMED	FALSE	FALSE
37204548	Hereditary thrombocytopenia with normal platelets	SNOMED	FALSE	FALSE
37204520	Bleeding diathesis due to thromboxane synthesis deficiency	SNOMED	FALSE	FALSE
37204478	Pancytopenia due to IKZF1 mutations	SNOMED	FALSE	FALSE
37204236	X-linked dyserythropoietic anemia with abnormal platelets and neutropenia	SNOMED	FALSE	FALSE
37203819	Bleeding diathesis due to collagen receptor defect	SNOMED	FALSE	FALSE
37117164	Revesz syndrome	SNOMED	FALSE	FALSE
37116398	Thyrocerebrorenal syndrome	SNOMED	FALSE	FALSE
37110834	Defect of purinergic receptor p2y G protein-coupled 12	SNOMED	FALSE	FALSE
37110748	Bleeding disorder due to calcium and DAG-regulated guanine exchange factor-1 deficiency	SNOMED	FALSE	FALSE

37110713	Familial platelet syndrome with predisposition to acute myelogenous leukemia	SNOMED	FALSE	FALSE
37110394	Isolated thrombocytopenia	SNOMED	FALSE	FALSE
37019055	Aplastic anemia co-occurrent with human immunodeficiency virus infection	SNOMED	FALSE	FALSE
37018663	Thrombocytopenia co-occurrent and due to alcoholism	SNOMED	FALSE	FALSE
37017607	Antibody mediated acquired pure red cell aplasia caused by erythropoiesis stimulating agent	SNOMED	FALSE	FALSE
37017165	GATA binding protein 1 related thrombocytopenia with dyserythropoiesis	SNOMED	FALSE	FALSE
37016797	MYH9 related disease	SNOMED	FALSE	FALSE
37016151	Aplastic anemia caused by antineoplastic agent	SNOMED	FALSE	FALSE
36717326	DK phocomelia syndrome	SNOMED	FALSE	FALSE
36716406	Severe fever with thrombocytopenia syndrome virus	SNOMED	FALSE	FALSE
36716047	Radioulnar synostosis with amegakaryocytic thrombocytopenia syndrome	SNOMED	FALSE	FALSE
36715586	Refractory thrombocytopenia	SNOMED	FALSE	FALSE
36715327	Familial thrombocytosis	SNOMED	FALSE	FALSE
36715053	Autosomal dominant macrothrombocytopenia	SNOMED	FALSE	FALSE
36715052	Attenuated Chédiak-Higashi syndrome	SNOMED	FALSE	FALSE
36713970	WT limb blood syndrome	SNOMED	FALSE	FALSE
36713636	Medich giant platelet syndrome	SNOMED	FALSE	FALSE
36713635	White platelet syndrome	SNOMED	FALSE	FALSE
36713443	MYH9 macrothrombocytopenia syndrome	SNOMED	FALSE	FALSE

36713112	Pancytopenia due to antineoplastic chemotherapy	SNOMED	FALSE	FALSE
36675176	Thrombocythemia with distal limb defect	SNOMED	FALSE	FALSE
36674972	Macrothrombocytopenia with mitral valve insufficiency	SNOMED	FALSE	FALSE
36674474	Pancytopenia with developmental delay syndrome	SNOMED	FALSE	FALSE
35625536	Ataxia pancytopenia syndrome	SNOMED	FALSE	FALSE
35623565	Glycoprotein VI deficiency	SNOMED	FALSE	FALSE
35623407	Adult pure red cell aplasia	SNOMED	FALSE	FALSE
4345236	Parvoviral aplastic crisis	SNOMED	FALSE	FALSE
4338386	Thrombocytopenia due to non-immune destruction	SNOMED	FALSE	FALSE
4316372	HELLP syndrome	SNOMED	FALSE	FALSE
4314802	Kasabach-Merritt syndrome	SNOMED	FALSE	FALSE
4311682	Radial aplasia-thrombocytopenia syndrome	SNOMED	FALSE	FALSE
4305588	Doan-Wright syndrome	SNOMED	FALSE	FALSE
4301602	Thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4301128	Thrombocytopenia due to diminished platelet production	SNOMED	FALSE	FALSE
4300464	Wiskott-Aldrich autosomal dominant variant syndrome	SNOMED	FALSE	FALSE
4299560	Thrombocytopenic purpura due to defective platelet production	SNOMED	FALSE	FALSE
4298690	Immunologic aplastic anemia	SNOMED	FALSE	FALSE
4292531	Thrombocytopenic purpura due to platelet consumption	SNOMED	FALSE	FALSE
4292425	Sex-linked thrombocytopenia	SNOMED	FALSE	FALSE
4280071	Thrombocytosis	SNOMED	FALSE	FALSE
4272928	Thrombocytopenia due to hypersplenism	SNOMED	FALSE	FALSE

4264464	Mediterranean macrothrombocytopenia	SNOMED	FALSE	FALSE
4258261	Drug induced thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4247776	Posttransfusion purpura	SNOMED	FALSE	FALSE
4246348	Platelet dense granule deficiency	SNOMED	FALSE	FALSE
4245912	Hermansky-Pudlak syndrome	SNOMED	FALSE	FALSE
4239484	Acquired pancytopenia	SNOMED	FALSE	FALSE
4235220	Hereditary thrombocytopenic disorder	SNOMED	FALSE	FALSE
4234973	Chronic acquired pure red cell aplasia	SNOMED	FALSE	FALSE
4233407	Megakaryocytic aplasia	SNOMED	FALSE	FALSE
4230266	Autoimmune thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4226905	Thrombocytopenia associated with AIDS	SNOMED	FALSE	FALSE
4225810	Aplastic anemia associated with AIDS	SNOMED	FALSE	FALSE
4222080	Platelet dysfunction associated with uremia	SNOMED	FALSE	FALSE
4219476	Thrombocytopenia due to defective platelet production	SNOMED	FALSE	FALSE
4218171	Uremic thrombocytopenia	SNOMED	FALSE	FALSE
4214947	Thrombocytopenic purpura associated with metabolic disorder	SNOMED	FALSE	FALSE
4211348	Aplastic anemia associated with pancreatitis	SNOMED	FALSE	FALSE
4204900	Acquired thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4201288	Platelet secretory disorder	SNOMED	FALSE	FALSE
4197685	Gray platelet syndrome	SNOMED	FALSE	FALSE
4197574	Dilutional thrombocytopenia	SNOMED	FALSE	FALSE
4189319	Platelet dysfunction due to drugs	SNOMED	FALSE	FALSE

4188208	Estren-Dameshek anemia	SNOMED	FALSE	FALSE
4186108	Aplastic anemia associated with metabolic alteration	SNOMED	FALSE	FALSE
4185078	Bernard Soulier syndrome	SNOMED	FALSE	FALSE
4184758	Acquired aplastic anemia	SNOMED	FALSE	FALSE
4184200	Secondary aplastic anemia	SNOMED	FALSE	FALSE
4184188	Platelet procoagulant activity deficiency	SNOMED	FALSE	FALSE
4182351	Exhausted platelets	SNOMED	FALSE	FALSE
4178859	Acquired storage pool deficiency	SNOMED	FALSE	FALSE
4177177	Cellular immunologic aplastic anemia	SNOMED	FALSE	FALSE
4173278	Thrombocytopenia due to blood loss	SNOMED	FALSE	FALSE
4172008	Cyclic thrombocytopenia	SNOMED	FALSE	FALSE
4166754	Perinatal thrombocytopenia	SNOMED	FALSE	FALSE
4159966	Upshaw-Schulman syndrome	SNOMED	FALSE	FALSE
4159749	Idiopathic maternal thrombocytopenia	SNOMED	FALSE	FALSE
4159736	Radiation thrombocytopenia	SNOMED	FALSE	FALSE
4156233	Thrombocytopenia due to sequestration	SNOMED	FALSE	FALSE
4155386	Platelet type pseudo-von Willebrand disease	SNOMED	FALSE	FALSE
4155128	Platelet sequestration	SNOMED	FALSE	FALSE
4148471	Fanconi's anemia	SNOMED	FALSE	FALSE
4147049	Thrombocytopenia due to extracorporeal circulation	SNOMED	FALSE	FALSE
4146088	Aplastic anemia due to drugs	SNOMED	FALSE	FALSE
4146086	Constitutional aplastic anemia with malformation	SNOMED	FALSE	FALSE

4145458	Thrombocytopenia due to hypothermia	SNOMED	FALSE	FALSE
4140545	Post infectious thrombocytopenic purpura	SNOMED	FALSE	FALSE
4139942	Glanzmann's thrombasthenia	SNOMED	FALSE	FALSE
4139555	Thrombocytopenia due to massive blood transfusion	SNOMED	FALSE	FALSE
4137430	Idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4134438	Familial alpha β adrenergic receptor defect in platelets	SNOMED	FALSE	FALSE
4134437	Mixed alpha granule and dense body deficiency	SNOMED	FALSE	FALSE
4134436	Hereditary platelet function disorder	SNOMED	FALSE	FALSE
4133985	Isolated collagen aggregation defect	SNOMED	FALSE	FALSE
4133984	Alloimmune thrombocytopenia	SNOMED	FALSE	FALSE
4133983	Secondary autoimmune thrombocytopenia	SNOMED	FALSE	FALSE
4133981	Benign gestational thrombocytopenia	SNOMED	FALSE	FALSE
4125652	Acquired platelet disorder	SNOMED	FALSE	FALSE
4125651	Glycoprotein Ib defect	SNOMED	FALSE	FALSE
4125496	Pure red cell aplasia, acquired	SNOMED	FALSE	FALSE
4125494	Pancytopenia with pancreatitis	SNOMED	FALSE	FALSE
4123079	Post-splenectomy thrombocytosis	SNOMED	FALSE	FALSE
4123076	Montreal platelet syndrome	SNOMED	FALSE	FALSE
4123075	May-Hegglin anomaly	SNOMED	FALSE	FALSE
4123074	Megakaryocytic thrombocytopenia	SNOMED	FALSE	FALSE
4123073	Platelet type von Willebrand's disease	SNOMED	FALSE	FALSE
4121265	Mediterranean thrombocytopenia	SNOMED	FALSE	FALSE

4121264	Epstein syndrome	SNOMED	FALSE	FALSE
4121133	Giant platelet syndrome	SNOMED	FALSE	FALSE
4121132	Dense body defect	SNOMED	FALSE	FALSE
4121131	Inherited platelet disorder	SNOMED	FALSE	FALSE
4120622	Reactive thrombocytosis	SNOMED	FALSE	FALSE
4120620	Amegakaryocytic thrombocytopenia	SNOMED	FALSE	FALSE
4120619	Thromboxane synthetase deficiency	SNOMED	FALSE	FALSE
4120618	Cyclooxygenase deficiency	SNOMED	FALSE	FALSE
4120617	Thromboxane generation defect	SNOMED	FALSE	FALSE
4120616	Glycoprotein Ia defect	SNOMED	FALSE	FALSE
4120615	Platelet membrane defect	SNOMED	FALSE	FALSE
4119134	Thrombocytopenic purpura	SNOMED	FALSE	FALSE
4103532	Immune thrombocytopenia	SNOMED	FALSE	FALSE
4102469	Acute idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4101603	Thrombocytopenia due to extracorporeal circulation of blood	SNOMED	FALSE	FALSE
4101583	Aplastic anemia due to infection	SNOMED	FALSE	FALSE
4101582	Aplastic anemia due to chronic disease	SNOMED	FALSE	FALSE
4100998	Aplastic anemia due to toxic cause	SNOMED	FALSE	FALSE
4098148	Thrombocytopenia due to drugs	SNOMED	FALSE	FALSE
4098145	Idiopathic aplastic anemia	SNOMED	FALSE	FALSE
4098028	Transient acquired pure red cell aplasia	SNOMED	FALSE	FALSE
4098027	Aplastic anemia due to radiation	SNOMED	FALSE	FALSE

4082738	Autoimmune pancytopenia	SNOMED	FALSE	FALSE
4077348	Pancytopenia-dysmelia	SNOMED	FALSE	FALSE
4069584	Platelet dysfunction due to aspirin	SNOMED	FALSE	FALSE
4031699	Humoral immunologic aplastic anemia	SNOMED	FALSE	FALSE
4030445	Acquired PF-3 disease	SNOMED	FALSE	FALSE
4028066	Acquired platelet function disorder	SNOMED	FALSE	FALSE
4028065	Autoimmune thrombocytopenia	SNOMED	FALSE	FALSE
4027378	Platelet factor V deficiency	SNOMED	FALSE	FALSE
4027376	Platelet storage pool defect	SNOMED	FALSE	FALSE
4027375	Scott syndrome	SNOMED	FALSE	FALSE
4027374	Alloimmune platelet transfusion refractoriness	SNOMED	FALSE	FALSE
4009307	Heparin-induced thrombocytopenia with thrombosis	SNOMED	FALSE	FALSE
4006317	Chédiak-Higashi syndrome	SNOMED	FALSE	FALSE
4000065	Drug-induced immune thrombocytopenia	SNOMED	FALSE	FALSE
441264	Primary thrombocytopenia	SNOMED	FALSE	FALSE
440982	Wiskott-Aldrich syndrome	SNOMED	FALSE	FALSE
440372	Acquired thrombocytopenia	SNOMED	FALSE	FALSE
438383	Essential thrombocythemia	SNOMED	FALSE	FALSE
437241	Qualitative platelet disorder	SNOMED	FALSE	FALSE
436956	Evans syndrome	SNOMED	FALSE	FALSE
433749	Heparin-induced thrombocytopenia	SNOMED	FALSE	FALSE
432881	Pancytopenia	SNOMED	FALSE	FALSE

432870	Thrombocytopenic disorder	SNOMED	FALSE	FALSE
318397	Chronic idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
140681	Constitutional aplastic anemia	SNOMED	FALSE	FALSE
138723	Acquired red cell aplasia	SNOMED	FALSE	FALSE
137829	Aplastic anemia	SNOMED	FALSE	FALSE
37397537	Beta thalassemia X-linked thrombocytopenia syndrome	SNOMED	FALSE	FALSE
4230228	Amegakaryocytic thrombocytopenia with congenital malformation	SNOMED	FALSE	FALSE

19 Platelet measurement

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
3007461	Platelets [# /volume] in Blood	LOINC	FALSE	TRUE
3031586	Platelets [# /volume] in Blood by Estimate	LOINC	FALSE	TRUE
3024929	Platelets [# /volume] in Blood by Automated count	LOINC	FALSE	TRUE
3039827	Platelets [# /volume] in Body fluid by Automated count	LOINC	FALSE	TRUE
3024386	Platelet mean volume [Entitic volume] in Blood by Rees-Ecker	LOINC	FALSE	TRUE
4267147	Platelet count	SNOMED	FALSE	TRUE
37393863	Platelet count	SNOMED	FALSE	TRUE

20 Portal vein thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
199837	Portal vein thrombosis	SNOMED	FALSE	FALSE

21 Splenic artery thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4112165	Embolism and thrombosis of the splenic artery	SNOMED	FALSE	FALSE
35615064	Thrombosis of splenic artery	SNOMED	FALSE	FALSE

22 Splenic infarction

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4048527	Fleckmilz	SNOMED	FALSE	FALSE
4044745	Splenic infarction	SNOMED	FALSE	FALSE

23 Splenic vein thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4033521	Splenic vein thrombosis	SNOMED	FALSE	FALSE
36712892	Acute thrombosis of splenic vein	SNOMED	FALSE	FALSE

24 Stroke, general

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
36684840	Acute stroke	SNOMED	FALSE	FALSE
381316	Cerebrovascular accident	SNOMED	FALSE	FALSE

25 Splanchnic Vein Thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4033521	Splenic vein thrombosis	SNOMED	FALSE	FALSE
196715	Budd-Chiari syndrome	SNOMED	FALSE	FALSE
199837	Portal vein thrombosis	SNOMED	FALSE	FALSE
4317289	Thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4092406	Portal thrombophlebitis	SNOMED	FALSE	FALSE
36712892	Acute thrombosis of splenic vein	SNOMED	FALSE	FALSE
4173167	Mesenteric embolus	SNOMED	FALSE	FALSE
4144032	Mesenteric thrombus and/or embolus	SNOMED	FALSE	FALSE
45757410	Acute thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
45757409	Chronic thrombosis of mesenteric vein	SNOMED	FALSE	FALSE
4318407	Thrombophlebitis of mesenteric vein	SNOMED	FALSE	FALSE
4124856	Inferior mesenteric vein thrombosis	SNOMED	FALSE	FALSE
4055089	Superior mesenteric vein thrombosis	SNOMED	FALSE	FALSE

26 Thrombocytopenia

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
37397537	Beta thalassemia X-linked thrombocytopenia syndrome	SNOMED	FALSE	FALSE
432870	Thrombocytopenic disorder	SNOMED	FALSE	FALSE
46272950	Thrombocytopathy, asplenia and miosis	SNOMED	FALSE	FALSE
44782445	Thrombocytopenia due to alcohol	SNOMED	FALSE	FALSE
42536958	Pancytopenia caused by medication	SNOMED	FALSE	FALSE
40321716	Secondary thrombocytopenia	SNOMED	FALSE	FALSE
37312165	Atypical hemolytic uremic syndrome	SNOMED	FALSE	FALSE
37209558	Pancytopenia caused by immunosuppressant	SNOMED	FALSE	FALSE
37204551	Hereditary isolated aplastic anemia	SNOMED	FALSE	FALSE
37204548	Hereditary thrombocytopenia with normal platelets	SNOMED	FALSE	FALSE
37204520	Bleeding diathesis due to thromboxane synthesis deficiency	SNOMED	FALSE	FALSE
37204478	Pancytopenia due to IKZF1 mutations	SNOMED	FALSE	FALSE
37117164	Revesz syndrome	SNOMED	FALSE	FALSE
37116398	Thyrocerebrorenal syndrome	SNOMED	FALSE	FALSE
37110394	Isolated thrombocytopenia	SNOMED	FALSE	FALSE
37019055	Aplastic anemia co-occurrent with human immunodeficiency virus infection	SNOMED	FALSE	FALSE
37018663	Thrombocytopenia co-occurrent and due to alcoholism	SNOMED	FALSE	FALSE
37017607	Antibody mediated acquired pure red cell aplasia caused by erythropoiesis stimulating agent	SNOMED	FALSE	FALSE

37017165	GATA binding protein 1 related thrombocytopenia with dyserythropoiesis	SNOMED	FALSE	FALSE
37016797	MYH9 related disease	SNOMED	FALSE	FALSE
37016151	Aplastic anemia caused by antineoplastic agent	SNOMED	FALSE	FALSE
36717326	DK phocomelia syndrome	SNOMED	FALSE	FALSE
36716406	Severe fever with thrombocytopenia syndrome virus	SNOMED	FALSE	FALSE
36716047	Radioulnar synostosis with amegakaryocytic thrombocytopenia syndrome	SNOMED	FALSE	FALSE
36715586	Refractory thrombocytopenia	SNOMED	FALSE	FALSE
36715053	Autosomal dominant macrothrombocytopenia	SNOMED	FALSE	FALSE
36713970	WT limb blood syndrome	SNOMED	FALSE	FALSE
36713443	MYH9 macrothrombocytopenia syndrome	SNOMED	FALSE	FALSE
36713112	Pancytopenia due to antineoplastic chemotherapy	SNOMED	FALSE	FALSE
36674972	Macrothrombocytopenia with mitral valve insufficiency	SNOMED	FALSE	FALSE
36674474	Pancytopenia with developmental delay syndrome	SNOMED	FALSE	FALSE
35625536	Ataxia pancytopenia syndrome	SNOMED	FALSE	FALSE
35623407	Adult pure red cell aplasia	SNOMED	FALSE	FALSE
4345236	Parvoviral aplastic crisis	SNOMED	FALSE	FALSE
4338386	Thrombocytopenia due to non-immune destruction	SNOMED	FALSE	FALSE
4316372	HELLP syndrome	SNOMED	FALSE	FALSE
4314802	Kasabach-Merritt syndrome	SNOMED	FALSE	FALSE
4311682	Radial aplasia-thrombocytopenia syndrome	SNOMED	FALSE	FALSE
4305588	Doan-Wright syndrome	SNOMED	FALSE	FALSE

4301602	Thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4301128	Thrombocytopenia due to diminished platelet production	SNOMED	FALSE	FALSE
4300464	Wiskott-Aldrich autosomal dominant variant syndrome	SNOMED	FALSE	FALSE
4299560	Thrombocytopenic purpura due to defective platelet production	SNOMED	FALSE	FALSE
4298690	Immunologic aplastic anemia	SNOMED	FALSE	FALSE
4292531	Thrombocytopenic purpura due to platelet consumption	SNOMED	FALSE	FALSE
4292425	Sex-linked thrombocytopenia	SNOMED	FALSE	FALSE
4272928	Thrombocytopenia due to hypersplenism	SNOMED	FALSE	FALSE
4264464	Mediterranean macrothrombocytopenia	SNOMED	FALSE	FALSE
4258261	Drug induced thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4247776	Posttransfusion purpura	SNOMED	FALSE	FALSE
4239484	Acquired pancytopenia	SNOMED	FALSE	FALSE
4235220	Hereditary thrombocytopenic disorder	SNOMED	FALSE	FALSE
4234973	Chronic acquired pure red cell aplasia	SNOMED	FALSE	FALSE
4233407	Megakaryocytic aplasia	SNOMED	FALSE	FALSE
4230266	Autoimmune thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4226905	Thrombocytopenia associated with AIDS	SNOMED	FALSE	FALSE
4225810	Aplastic anemia associated with AIDS	SNOMED	FALSE	FALSE
4219476	Thrombocytopenia due to defective platelet production	SNOMED	FALSE	FALSE
4218171	Uremic thrombocytopenia	SNOMED	FALSE	FALSE
4214947	Thrombocytopenic purpura associated with metabolic disorder	SNOMED	FALSE	FALSE

4211348	Aplastic anemia associated with pancreatitis	SNOMED	FALSE	FALSE
4204900	Acquired thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4197574	Dilutional thrombocytopenia	SNOMED	FALSE	FALSE
4188208	Estren-Dameshek anemia	SNOMED	FALSE	FALSE
4186108	Aplastic anemia associated with metabolic alteration	SNOMED	FALSE	FALSE
4185078	Bernard Soulier syndrome	SNOMED	FALSE	FALSE
4184758	Acquired aplastic anemia	SNOMED	FALSE	FALSE
4184200	Secondary aplastic anemia	SNOMED	FALSE	FALSE
4177177	Cellular immunologic aplastic anemia	SNOMED	FALSE	FALSE
4173278	Thrombocytopenia due to blood loss	SNOMED	FALSE	FALSE
4172008	Cyclic thrombocytopenia	SNOMED	FALSE	FALSE
4166754	Perinatal thrombocytopenia	SNOMED	FALSE	FALSE
4159966	Upshaw-Schulman syndrome	SNOMED	FALSE	FALSE
4159749	Idiopathic maternal thrombocytopenia	SNOMED	FALSE	FALSE
4159736	Radiation thrombocytopenia	SNOMED	FALSE	FALSE
4156233	Thrombocytopenia due to sequestration	SNOMED	FALSE	FALSE
4148471	Fanconi's anemia	SNOMED	FALSE	FALSE
4147049	Thrombocytopenia due to extracorporeal circulation	SNOMED	FALSE	FALSE
4146088	Aplastic anemia due to drugs	SNOMED	FALSE	FALSE
4146086	Constitutional aplastic anemia with malformation	SNOMED	FALSE	FALSE
4145458	Thrombocytopenia due to hypothermia	SNOMED	FALSE	FALSE
4140545	Post infectious thrombocytopenic purpura	SNOMED	FALSE	FALSE

4139555	Thrombocytopenia due to massive blood transfusion	SNOMED	FALSE	FALSE
4137430	Idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4133984	Alloimmune thrombocytopenia	SNOMED	FALSE	FALSE
4133983	Secondary autoimmune thrombocytopenia	SNOMED	FALSE	FALSE
4133981	Benign gestational thrombocytopenia	SNOMED	FALSE	FALSE
4125496	Pure red cell aplasia, acquired	SNOMED	FALSE	FALSE
4125494	Pancytopenia with pancreatitis	SNOMED	FALSE	FALSE
4123076	Montreal platelet syndrome	SNOMED	FALSE	FALSE
4123075	May-Hegglin anomaly	SNOMED	FALSE	FALSE
4123074	Megakaryocytic thrombocytopenia	SNOMED	FALSE	FALSE
4121265	Mediterranean thrombocytopenia	SNOMED	FALSE	FALSE
4121264	Epstein syndrome	SNOMED	FALSE	FALSE
4120620	Amegakaryocytic thrombocytopenia	SNOMED	FALSE	FALSE
4119134	Thrombocytopenic purpura	SNOMED	FALSE	FALSE
4103532	Immune thrombocytopenia	SNOMED	FALSE	FALSE
4102469	Acute idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4101603	Thrombocytopenia due to extracorporeal circulation of blood	SNOMED	FALSE	FALSE
4101583	Aplastic anemia due to infection	SNOMED	FALSE	FALSE
4101582	Aplastic anemia due to chronic disease	SNOMED	FALSE	FALSE
4100998	Aplastic anemia due to toxic cause	SNOMED	FALSE	FALSE
4098148	Thrombocytopenia due to drugs	SNOMED	FALSE	FALSE
4098145	Idiopathic aplastic anemia	SNOMED	FALSE	FALSE

4098028	Transient acquired pure red cell aplasia	SNOMED	FALSE	FALSE
4098027	Aplastic anemia due to radiation	SNOMED	FALSE	FALSE
4082738	Autoimmune pancytopenia	SNOMED	FALSE	FALSE
4077348	Pancytopenia-dysmelia	SNOMED	FALSE	FALSE
4031699	Humoral immunologic aplastic anemia	SNOMED	FALSE	FALSE
4028065	Autoimmune thrombocytopenia	SNOMED	FALSE	FALSE
4027374	Alloimmune platelet transfusion refractoriness	SNOMED	FALSE	FALSE
4009307	Heparin-induced thrombocytopenia with thrombosis	SNOMED	FALSE	FALSE
4000065	Drug-induced immune thrombocytopenia	SNOMED	FALSE	FALSE
441264	Primary thrombocytopenia	SNOMED	FALSE	FALSE
440982	Wiskott-Aldrich syndrome	SNOMED	FALSE	FALSE
440372	Acquired thrombocytopenia	SNOMED	FALSE	FALSE
436956	Evans syndrome	SNOMED	FALSE	FALSE
433749	Heparin-induced thrombocytopenia	SNOMED	FALSE	FALSE
432881	Pancytopenia	SNOMED	FALSE	FALSE
318397	Chronic idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
140681	Constitutional aplastic anemia	SNOMED	FALSE	FALSE
138723	Acquired red cell aplasia	SNOMED	FALSE	FALSE
137829	Aplastic anemia	SNOMED	FALSE	FALSE

27 Thrombocytopenic purpura

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
4119134	Thrombocytopenic purpura	SNOMED	FALSE	FALSE
4301602	Thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4299560	Thrombocytopenic purpura due to defective platelet production	SNOMED	FALSE	FALSE
4292531	Thrombocytopenic purpura due to platelet consumption	SNOMED	FALSE	FALSE
4258261	Drug induced thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4247776	Posttransfusion purpura	SNOMED	FALSE	FALSE
4230266	Autoimmune thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4214947	Thrombocytopenic purpura associated with metabolic disorder	SNOMED	FALSE	FALSE
4204900	Acquired thrombotic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4159966	Upshaw-Schulman syndrome	SNOMED	FALSE	FALSE
4140545	Post infectious thrombocytopenic purpura	SNOMED	FALSE	FALSE
4137430	Idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
4102469	Acute idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
318397	Chronic idiopathic thrombocytopenic purpura	SNOMED	FALSE	FALSE
313800	Thrombotic microangiopathy	SNOMED	FALSE	FALSE

28 Visceral venous thrombosis

Concept ID	Concept name	Vocabulary	Is excluded?	Include descendants?
36717492	Acute occlusion of mesenteric vein	SNOMED	FALSE	FALSE
36712892	Acute thrombosis of splenic vein	SNOMED	FALSE	FALSE
196715	Budd-Chiari syndrome	SNOMED	FALSE	FALSE
35624285	Complete obstruction of hepatic portal vein	SNOMED	FALSE	FALSE
4301208	Hepatic vein thrombosis	SNOMED	FALSE	FALSE
37110194	Hepatic veno-occlusive disease with immunodeficiency syndrome	SNOMED	FALSE	FALSE
37109927	Obstruction of visceral vein	SNOMED	FALSE	FALSE
4238060	Portal vein obstruction	SNOMED	FALSE	FALSE
4033521	Splenic vein thrombosis	SNOMED	FALSE	FALSE
4277276	Veno-occlusive disease of the liver	SNOMED	FALSE	FALSE
37111372	Visceral venous thrombosis	SNOMED	FALSE	FALSE
36712891	Chronic thrombosis of splenic vein	SNOMED	FALSE	FALSE

