Suppl. table 1: Codebook of diagnostic codes (ICD) and ATC codes applied in the study of associations between RVO and CVD and mortality

### ICD-8 and ICD-10 codes for RVO exposure group

| Exposure group | ICD8 | ICD10 | ATC | Additional criteria |
|---------------|------|-------|-----|---------------------|
| RVO           | 37703| DH348*| Not applied | Only if registered at ophthalmology associated department |
| BRVO          |      | DH348C| Not applied | Only if registered at ophthalmology associated department |
| CRVO          |      | DH348D, DH348F| Not applied | Only if registered at ophthalmology associated department |

### ICD-8 and ICD-10 codes for CVD outcome group

| Outcome group          | Diagnosis                  | ICD8 | ICD10 | ATC | Additional criteria |
|------------------------|----------------------------|------|-------|-----|---------------------|
| CVD                    | All below                  | All below | All below | Not applied | None |
| Ischemic CVD           | Acute myocardial infarction | 410* | I21*-I22*, I23*, I240*-I241*, I248, I249* | Not applied | None |
|                        | Atherosclerotic heart disease | 411*, 413* | I20*, I251, I258, I259 | Not applied | None |
|                        | Coronary artery bypass graft | N/A | KFNA*-KFNF*, KFNH*, KFNJ*-KFNK*, KFNW* | Not applied | None |
|                        | Ischemic stroke            | 433*-436* | I63*-I64*, G458, G459 | Not applied | None |
|                        | Peripheral arterial disease | 445* | I702, I702A, I739A, I739C | Not applied | Only as primary diagnosis |
|                        | Other arterial occlusion    | 444* | I74* | Not applied | None |
| Non-ischemic CVD       | Non-ischemic heart failure  | 42709, 42710, 42711, 42719, 42899, 78249 | I110, I130, I132, I420, I429, I500*-I501*, I509* | Not applied | Only as primary diagnosis AND EXCLUDED if any prior diagnosis of acute myocardial infarction, atherosclerotic heart disease or coronary artery bypass graft. |
|                        | Pulmonary hypertension - idiopathic | 426* | I270 | Not applied | None |
|                        | Atrial fibrillation / atrial flutter | 42793, 42794 | I48* | Not applied | None |
|                        | Non-ischemic stroke         | 430*, 431* | I60*-I62* | Not applied | None |
|                        | Aortic dissection           | 44109 | I710* | Not applied | None |
|                        | Aortic dilation/aneurysm     | 44110, 44111, 44119, 44120, 44121, 44129, 44199 | I711*-I716*, I718*-I719* | Not applied | None |
|                        | Aortic stenosis             | 39980, 39992, 39603, 39604, 39690, 39693, 39694 | I060, I062, I350, I352 | Not applied | None |
### ICD-8 and ICD-10 codes for CVD outcome group

| Outcome group | Diagnosis                                    | ICD8     | ICD10    | ATC       | Additional criteria                      |
|---------------|----------------------------------------------|----------|----------|-----------|-----------------------------------------|
| Venous occlusion | Pulmonary hypertension (chronic thromboembolic) | 426*     | I272     | Not applied | None                                    |
|                | Cerebral venous thrombosis                   | N/A      | I676*    | Not applied | None                                    |
|                | Deep venous thrombosis                       | 45100, 45108, 45109 | I801*-I803* | Not applied | None                                    |
|                | Pulmonary embolism                            | 45099    | I26, I260, I269* | Not applied | None                                    |

### ICD-8 and ICD-10 codes for covariates

| Covariate                    | ICD8          | ICD10        | ATC       | Additional criteria                                                                 |
|------------------------------|---------------|--------------|-----------|------------------------------------------------------------------------------------|
| Diabetes mellitus            | 249*, 250*    | E10*-E14*    | A10A*, A10B* | Patients with a minimum of 2 medicine prescriptions of A10A or A10B within 12 months OR ICD10 E10* OR ICD8 249* or 250* AND age <30 yrs at time of diagnosis AND at least one A10A ATC prescription OR at least two registrations of ICD10 E11* OR At least one registration of ICD10 E12*-E14* EXCLUDED if ICD diagnosis or ATC prescription is within 12 months after a registration of ICD10 DO244/ICD8 63747 (Gestational diabetes) OR ever diagnosed with PCOS: ICD10 DE28.2 |
| Dyslipidemia                 | 27900-27901, 27200-27201 | E78*         | C10*      | Any registration of ICD E78* AND/OR Two prescriptions of ATC C10 within 12 months, WITHOUT a previous registration of ICD E21*-E22*, E240*-E241*, E248 eller E249* |
| Chronic obstructive pulmonary disease | J44*, J96*, J13*-18* | Not applied | | J44 only as A-diagnosis and if patient is >30 years at diagnosis AND/OR J96 as A-diagnosis AND ONLY in combination with J44 as B-diagnosis AND/OR J13-18 as A-diagnosis AND ONLY in combination with J44 as B-diagnosis |
| Arterial hypertension       | 400*-404*     |              |           | ICD code AND/OR Combination treatment (prescribed within 6 months) with at least two different groups of antihypertensive medication, each prescribed at least twice within 12 months |

*: subgroups included. HR= Hazard ratio, ICD= International Classification of Diseases, ATC= Anatomical Therapeutic Chemical code, RVO= Retinal vein occlusion, BRVO= Branch retinal vein occlusion, CRVO= Central retinal vein occlusion, CVD= Cardiovascular diseases
Suppl. table 2: Hazard ratios of CVDs and all-cause mortality of patients with RVO, BRVO and CRVO compared to individuals without RVO

|                         | RVO              | BRVO             | CRVO             |
|-------------------------|------------------|------------------|------------------|
| **CVD**                 |                  |                  |                  |
| Crude HR (95% CI)       | 1.29 (1.24;1.33) | 1.22 (1.10;1.34) | 1.23 (1.10;1.37) |
| Adjusted HR (95% CI)*   | 1.29 (1.25;1.34) | 1.26 (1.14;1.39) | 1.22 (1.10;1.36) |
| Adjusted HR (95% CI)**  | 1.13 (1.09;1.17) | 1.14 (1.03;1.25) | 1.12 (1.00;1.25) |
| **Ischemic CVD**        |                  |                  |                  |
| Crude HR (95% CI)       | 1.26 (1.21;1.32) | 1.14 (1.02;1.29) | 1.12 (0.99;1.28) |
| Adjusted HR (95% CI)*   | 1.36 (1.30;1.42) | 1.36 (1.20;1.52) | 1.27 (1.11;1.44) |
| Adjusted HR (95% CI)**  | 1.16 (1.11;1.21) | 1.18 (1.05;1.33) | 1.12 (0.99;1.28) |
| **Non-ischemic CVD**    |                  |                  |                  |
| Crude HR (95% CI)       | 1.44 (1.33;1.55) | 1.40 (1.23;1.59) | 1.38 (1.18;1.60) |
| Adjusted HR (95% CI)*   | 1.32 (1.23;1.42) | 1.29 (1.13;1.46) | 1.24 (1.07;1.44) |
| Adjusted HR (95% CI)**  | 1.23 (1.15;1.33) | 1.22 (1.07;1.38) | 1.16 (1.00;1.35) |
| **Venous disease**      |                  |                  |                  |
| Crude HR (95% CI)       | 1.17 (1.06;1.28) | 1.21 (0.95;1.56) | 1.15 (0.87;1.51) |
| Adjusted HR (95% CI)*   | 1.07 (0.97;1.17) | 1.02 (0.79;1.31) | 0.97 (0.74;1.28) |
| Adjusted HR (95% CI)**  | 0.99 (0.90;1.09) | 0.99 (0.78;1.28) | 0.91 (0.69;1.20) |
| **All-cause mortality** |                  |                  |                  |
| Crude HR (95% CI)       | 1.03 (1.00;1.06) | 0.84 (0.78;0.92) | 1.10 (1.02;1.19) |
| Adjusted HR (95% CI)*   | 1.09 (1.06;1.12) | 0.97 (0.89;1.05) | 1.20 (1.12;1.30) |
| Adjusted HR (95% CI)**  | 1.00 (0.97;1.03) | 0.95 (0.87;1.03) | 1.12 (1.04;1.21) |

*: adjusted for sex, age at entry. **: adjusted for sex, age at entry, index year, marital status at entry, diabetes, hypertension, chronic obstructive pulmonary disorders, dyslipidemia and Charlson comorbidity index conditions. RVO= Retinal vein occlusion, BRVO= Branch retinal vein occlusion, CRVO= Central retinal vein occlusion, CVD= Cardiovascular diseases
Suppl. table 3: Hazard ratios of CVDs and all-cause mortality of individuals with RVO, BRVO and CRVO prior to and after March 17th 2011 compared to individuals without RVO

|                | RVO prior to 2011 | RVO after 2011 | BRVO prior to 2011 | BRVO after 2011 | CRVO prior to 2011 | CRVO after 2011 |
|----------------|-------------------|----------------|-------------------|-----------------|-------------------|-----------------|
| **CVD**        |                   |                |                   |                 |                   |                 |
| Crude HR (95% CI) | 1.29 (1.24;1.35) | 1.26 (1.18;1.35) | 1.25 (1.04;1.50) | 1.21 (1.07;1.35) | 1.22 (1.03;1.46) | 1.23 (1.07;1.41) |
| Adjusted HR (95% CI)* | 1.29 (1.23;1.34) | 1.30 (1.21;1.39) | 1.28 (1.06;1.54) | 1.25 (1.11;1.40) | 1.20 (1.01;1.43) | 1.24 (1.08;1.42) |
| Adjusted HR (95% CI)** | 1.10 (1.06;1.15) | 1.19 (1.11;1.28) | 1.10 (0.92;1.32) | 1.15 (1.02;1.29) | 1.08 (0.91;1.29) | 1.14 (0.99;1.31) |
| **Ischemic CVD** |                   |                |                   |                 |                   |                 |
| Crude HR (95% CI) | 1.33 (1.27;1.40) | 1.10 (1.01;1.19) | 1.25 (1.00;1.55) | 1.11 (0.96;1.27) | 1.17 (0.95;1.44) | 1.10 (0.93;1.30) |
| Adjusted HR (95% CI)* | 1.38 (1.31;1.45) | 1.31 (1.21;1.43) | 1.41 (1.13;1.75) | 1.33 (1.16;1.53) | 1.24 (1.01;1.53) | 1.28 (1.09;1.51) |
| Adjusted HR (95% CI)** | 1.15 (1.10;1.21) | 1.17 (1.07;1.27) | 1.19 (0.96;1.48) | 1.18 (1.02;1.35) | 1.08 (0.88;1.33) | 1.15 (0.98;1.36) |
| **Non-ischemic CVD** |                   |                |                   |                 |                   |                 |
| Crude HR (95% CI) | 1.30 (1.24;1.36) | 1.44 (1.33;1.55) | 1.30 (1.05;1.61) | 1.40 (1.23;1.59) | 1.22 (1.00;1.48) | 1.38 (1.18;1.60) |
| Adjusted HR (95% CI)* | 1.25 (1.19;1.31) | 1.32 (1.23;1.42) | 1.25 (1.01;1.54) | 1.29 (1.13;1.46) | 1.13 (0.93;1.38) | 1.24 (1.07;1.44) |
| Adjusted HR (95% CI)** | 1.06 (1.01;1.12) | 1.24 (1.15;1.33) | 1.06 (0.86;1.31) | 1.22 (1.07;1.38) | 1.00 (0.82;1.21) | 1.16 (1.00;1.35) |
| **Venous disease** |                   |                |                   |                 |                   |                 |
| Crude HR (95% CI) | 1.13 (1.01;1.27) | 1.26 (1.06;1.50) | 1.59 (1.04;2.41) | 1.08 (0.79;1.47) | 1.13 (0.72;1.77) | 1.16 (0.81;1.64) |
| Adjusted HR (95% CI)* | 1.08 (0.97;1.21) | 1.04 (0.87;1.23) | 1.41 (0.93;2.14) | 0.88 (0.65;1.21) | 1.03 (0.65;1.61) | 0.94 (0.66;1.34) |
| Adjusted HR (95% CI)** | 0.99 (0.89;1.11) | 0.98 (0.83;1.17) | 1.38 (0.91;2.10) | 0.86 (0.63;1.18) | 0.98 (0.62;1.53) | 0.87 (0.61;1.24) |
| **All-cause mortality** |                   |                |                   |                 |                   |                 |
| Crude HR (95% CI) | 1.07 (1.04;1.11) | 0.91 (0.86;0.96) | 0.96 (0.82;1.12) | 0.80 (0.73;0.89) | 1.21 (1.08;1.35) | 1.03 (0.93;1.14) |
| Adjusted HR (95% CI)* | 1.10 (1.07;1.13) | 1.04 (0.99;1.10) | 1.06 (0.91;1.24) | 0.93 (0.84;1.03) | 1.26 (1.12;1.41) | 1.16 (1.05;1.29) |
| Adjusted HR (95% CI)** | 1.01 (0.98;1.04) | 0.97 (0.91;1.02) | 0.96 (0.82;1.13) | 0.94 (0.85;1.04) | 1.41 (1.25;1.58) | 0.97 (0.87;1.07) |

*: adjusted for sex, age at entry. **: adjusted for sex, age at entry, index year, marital status at entry, diabetes, hypertension, chronic obstructive pulmonary disorders, dyslipidemia and Charlson comorbidity index conditions. RVO= Retinal vein occlusion, BRVO= Branch retinal vein occlusion, CRVO= Central retinal vein occlusion, CVD= Cardiovascular diseases.
Suppl. table 4: Number of events, time to event, age at event, total risk time and event rates for all RVO, BRVO, CRVO and not RVO exposed

|                      | RVO   | BRVO  | CRVO  | Not RVO exposed |
|----------------------|-------|-------|-------|-----------------|
| **CVD**              |       |       |       |                 |
| No. of CVD events    | 2,983 | 398   | 329   | 912,702         |
| Time to CVD (yrs)    | 3.7(1.5;7.2) | 2.5(1.2;4.3) | 2.5(0.9;4.6) | 9.5(4.7;14.8)  |
| Age at CVD diagnosis (yrs) | 77.3(69.8;83.9) | 74.7(67.1;82.0) | 77.2(70.0;83.5) | 69.1(58.9;78.5) |
| Total risk time (person-years at risk) | 59,743 | 9,071 | 7,145 | 49,569,145 |
| Rate of CVD per 1000 person-years at risk | 49.9 | 43.9 | 46.0 | 18.4 |
| **Ischemic CVD**     |       |       |       |                 |
| No. of ischemic CVD events | 2,152 | 278   | 228   | 631,619         |
| Time to ischemic CVD (yrs) | 3.7(1.5;7.2) | 2.2(1.0;4.1) | 2.3(0.8;4.7) | 8.8(4.4;14.1)  |
| Age at ischemic CVD diagnosis (yrs) | 77.3(69.2;83.8) | 75.0(67.0;81.8) | 77.8(71.1;83.5) | 69.0(58.9;78.6) |
| Total risk time (person-years at risk) | 69,842 | 10,595 | 8,517 | 52,159,479 |
| Rate of ischemic CVD per 1000 person-years at risk | 30.8 | 26.2 | 26.8 | 12.1 |
| **Non-ischemic CVD** |       |       |       |                 |
| No. of non-ischemic CVD events | 2,396 | 322   | 270   | 533,272         |
| Time to non-ischemic CVD (yrs) | 4.2(1.8;7.9) | 2.5(1.2;4.2) | 2.5(0.9;4.6) | 10.9(5.6;16.0) |
| Age at non-ischemic CVD diagnosis (yrs) | 79.3(72.2;85.1) | 76.7(69.0;83.5) | 79.0(71.0;85.4) | 73.9(64.7;81.8) |
| Total risk time (person-years at risk) | 79,326 | 11,442 | 9,327 | 55,265,430 |
| Rate of non-ischemic CVD per 1000 person-years at risk | 30.2 | 28.1 | 28.9 | 9.6 |
| **Venous disease**   |       |       |       |                 |
| No. of venous disease events | 438   | 62    | 50    | 126,579         |
| Time to venous disease (yrs) | 3.8(1.6;7.6) | 2.9(1.6;5.0) | 2.3(1.4;4.0) | 11.1(5.9;16.1) |
| Age at venous disease diagnosis (yrs) | 77.1(71.1;84.0) | 74.2(70.1;82.8) | 77.8(70.0;85.1) | 69.4(58.4;78.8) |
| Total risk time (person-years at risk) | 93,748 | 13,508 | 11,128 | 57,658,861 |
| Rate of venous disease per 1000 person-years at risk | 4.7  | 4.6   | 4.5   | 2.2  |
| **All-cause mortality** |       |       |       |                 |
| No. of deaths        | 5216  | 537   | 662   | 1,128,488       |
| Time to death (yrs)  | 4.9(2.3;8.7) | 3.1(1.3;4.8) | 2.9(1.3;5.1) | 9.9(4.8;15.2)  |
| Age at death (yrs)   | 83.8(77.1;89.4) | 82.2(75.4;88.8) | 83.9(77.2;89.4) | 79.7(69.6;87.2) |
| Total risk time (person-years at risk) | 97,889 | 14,060 | 11,657 | 58,809,748 |
| Mortality rate (deaths/1000 person-years) | 53.3 | 38.2 | 56.8 | 19.2 |

Time and age presented as median (25%;75% percentile). RVO= Retinal vein occlusion, BRVO= Branch retinal vein occlusion, CRVO= Central retinal vein occlusion, CVD= Cardiovascular diseases, yrs= years
**Suppl. table 5: Hazard ratios of CVDs and all-cause mortality of individuals with RVO, BRVO and CRVO compared to individuals without RVO in women and men**

|                     | RVO       |        | BRVO       |        | CRVO       |        |
|---------------------|-----------|--------|-----------|--------|-----------|--------|
|                     | Women     | Men    | Women     | Men    | Women     | Men    |
| **CVD**             |           |        |           |        |           |        |
| Crude HR (95% CI)   | 1.30 (1.23;1.36) | 1.30 (1.24;1.35) | 1.19 (1.03;1.37) | 1.26 (1.05;1.52) | 1.29 (1.10;1.50) | 1.21 (1.02;1.44) |
| Adjusted HR (95% CI) | 1.33 (1.27;1.40) | 1.29 (1.24;1.35) | 1.26 (1.09;1.45) | 1.29 (1.08;1.55) | 1.35 (1.16;1.58) | 1.19 (1.00;1.42) |
| Adjusted HR (95% CI)** | 1.15 (1.09;1.21) | 1.10 (1.06;1.15) | 1.13 (0.98;1.33) | 1.11 (0.92;1.33) | 1.18 (1.01;1.38) | 1.06 (0.89;1.26) |
| Ischemic CVD        |           |        |           |        |           |        |
| Crude HR (95% CI)   | 1.27 (1.20;1.35) | 1.33 (1.27;1.40) | 1.12 (0.94;1.32) | 1.25 (1.00;1.55) | 1.19 (0.98;1.44) | 1.15 (0.94;1.42) |
| Adjusted HR (95% CI) | 1.41 (1.33;1.50) | 1.38 (1.31;1.45) | 1.38 (1.16;1.63) | 1.41 (1.14;1.76) | 1.43 (1.18;1.73) | 1.23 (1.00;1.51) |
| Adjusted HR (95% CI)** | 1.18 (1.11;1.25) | 1.15 (1.09;1.20) | 1.20 (1.01;1.43) | 1.18 (0.95;1.46) | 1.21 (1.00;1.46) | 1.05 (0.85;1.30) |
| Non-ischemic CVD    |           |        |           |        |           |        |
| Crude HR (95% CI)   | 1.33 (1.26;1.41) | 1.30 (1.24;1.37) | 1.36 (1.16;1.60) | 1.32 (1.07;1.63) | 1.27 (1.06;1.52) | 1.21 (0.99;1.47) |
| Adjusted HR (95% CI) | 1.30 (1.23;1.38) | 1.26 (1.20;1.32) | 1.29 (1.10;1.52) | 1.27 (1.02;1.56) | 1.21 (1.01;1.45) | 1.13 (0.93;1.37) |
| Adjusted HR (95% CI)** | 1.13 (1.06;1.19) | 1.07 (1.02;1.12) | 1.20 (1.02;1.41) | 1.08 (0.87;1.33) | 1.06 (0.88;1.27) | 0.98 (0.81;1.20) |
| Venous disease      |           |        |           |        |           |        |
| Crude HR (95% CI)   | 1.12 (0.98;1.28) | 1.14 (1.02;1.27) | 1.26 (0.90;1.77) | 1.59 (1.05;2.42) | 1.17 (0.79;1.74) | 1.13 (0.72;1.77) |
| Adjusted HR (95% CI) | 1.03 (0.91;1.18) | 1.08 (0.97;1.21) | 1.07 (0.77;1.50) | 1.42 (0.93;2.15) | 1.01 (0.69;1.50) | 1.03 (0.66;1.61) |
| Adjusted HR (95% CI)** | 0.94 (0.83;1.08) | 0.99 (0.88;1.11) | 1.03 (0.74;1.44) | 1.36 (0.90;2.07) | 0.93 (0.63;1.38) | 0.97 (0.62;1.52) |
| All-cause mortality |           |        |           |        |           |        |
| Crude HR (95% CI)   | 1.03 (0.99;1.07) | 0.99 (0.95;1.03) | 0.90 (0.81;1.01) | 0.76 (0.67;0.87) | 1.03 (0.92;1.15) | 1.10 (0.99;1.22) |
| Adjusted HR (95% CI) | 1.10 (1.06;1.14) | 1.07 (1.03;1.12) | 1.03 (0.92;1.15) | 0.89 (0.79;1.02) | 1.15 (1.03;1.29) | 1.26 (1.14;1.39) |
| Adjusted HR (95% CI)** | 1.01 (0.97;1.05) | 0.99 (0.95;1.03) | 1.00 (0.90;1.12) | 0.89 (0.78;1.01) | 1.15 (1.02;1.29) | 1.11 (1.00;1.23) |

*: adjusted for age at entry. **: adjusted for age at entry, index year, marital status at entry, diabetes, hypertension, chronic obstructive pulmonary disorders, dyslipidemia and Charlson comorbidity index conditions.

RVO= Retinal vein occlusion, BRVO= Branch retinal vein occlusion, CRVO= Central retinal vein occlusion, CVD= Cardiovascular diseases
eFigure 1: No. of retinal vein occlusion diagnoses per year

- Year
- No. of diagnoses