

Table S1. Independent genome-wide significant lead SNPs associated with pulmonary embolism (PE) in the discovery stage and replication stage

| Chromosome Position | rsID        | EA/OA | Nearest Gene        | Discovery stage   |                 |                       | Replication stage |                 |                        | Meta            |                        |                |
|---------------------|-------------|-------|---------------------|-------------------|-----------------|-----------------------|-------------------|-----------------|------------------------|-----------------|------------------------|----------------|
|                     |             |       |                     | EAF(case/control) | OR(95%CI)       | P-value               | EAF(case/control) | OR(95%CI)       | P-value                | OR(95%CI)       | P-value                | I <sup>2</sup> |
| 4:120241902         | rs1799883   | T/C   | <i>FABP2</i>        | 0.31(0.39/0.31)   | 1.41(1.25-1.59) | 1.05×10 <sup>-8</sup> | 0.31(0.39/0.30)   | 1.43(1.28-1.61) | 1.25×10 <sup>-9</sup>  | 1.42(1.31-1.54) | 7.59×10 <sup>-17</sup> | 0              |
| 4:155525276         | rs2066865   | A/G   | <i>FGG</i>          | 0.51(0.57/0.52)   | 1.41(1.25-1.58) | 9.85×10 <sup>-9</sup> | 0.52(0.55/0.52)   | 1.34(1.20-1.50) | 6.19×10 <sup>-7</sup>  | 1.37(1.26-1.49) | 3.81×10 <sup>-14</sup> | 0              |
| 14:21116815         | rs77175619  | A/G   | <i>OR6S1</i>        | 0.06(0.09/0.06)   | 1.53(1.25-1.88) | 4.28×10 <sup>-5</sup> | 0.06(0.10/0.06)   | 1.82(1.51-2.19) | 3.15×10 <sup>-10</sup> | 1.68(1.47-1.93) | 1.31×10 <sup>-13</sup> | 32.71          |
| 8:29671268          | rs35801946  | T/G   | <i>LOC101929470</i> | 0.06(0.02/0.06)   | 0.33(0.22-0.49) | 7.98×10 <sup>-8</sup> | 0.06(0.03/0.06)   | 0.41(0.29-0.59) | 1.75×10 <sup>-6</sup>  | 0.37(0.28-0.49) | 9.55×10 <sup>-13</sup> | 0              |
| 16:88156187         | rs4843804   | A/G   | <i>ZNF469</i>       | 0.05(0.02/0.05)   | 0.34(0.22-0.51) | 4.27×10 <sup>-7</sup> | 0.05(0.02/0.06)   | 0.37(0.25-0.55) | 1.02×10 <sup>-6</sup>  | 0.35(0.26-0.47) | 2.12×10 <sup>-12</sup> | 0              |
| 17:45930539         | rs4794202   | T/G   | <i>SP6</i>          | 0.04(0.01/0.04)   | 0.19(0.10-0.36) | 6.20×10 <sup>-7</sup> | 0.04(0.01/0.04)   | 0.26(0.15-0.45) | 1.42×10 <sup>-6</sup>  | 0.22(0.15-0.34) | 5.31×10 <sup>-12</sup> | 0              |
| 12:130405860        | rs708362    | T/G   | <i>TMEM132D</i>     | 0.05(0.02/0.05)   | 0.34(0.22-0.52) | 4.79×10 <sup>-7</sup> | 0.05(0.02/0.06)   | 0.41(0.28-0.60) | 3.63×10 <sup>-6</sup>  | 0.38(0.29-0.50) | 9.94×10 <sup>-12</sup> | 0              |
| 16:7050441          | rs17141995  | G/T   | <i>RBFOX1</i>       | 0.04(0.01/0.04)   | 0.23(0.12-0.43) | 3.83×10 <sup>-6</sup> | 0.03(0.01/0.04)   | 0.20(0.10-0.39) | 2.01×10 <sup>-6</sup>  | 0.21(0.14-0.34) | 3.53×10 <sup>-11</sup> | 0              |
| 9:136145484         | rs582094    | T/A   | <i>ABO</i>          | 0.43(0.50/0.43)   | 1.29(1.15-1.45) | 2.25×10 <sup>-5</sup> | 0.44(0.49/0.43)   | 1.33(1.19-1.49) | 1.18×10 <sup>-6</sup>  | 1.31(1.21-1.42) | 1.16×10 <sup>-10</sup> | 0              |
| 17:76559574         | rs77645935  | C/A   | <i>DNAH17</i>       | 0.03(0.01/0.03)   | 0.26(0.14-0.49) | 3.12×10 <sup>-5</sup> | 0.03(0.01/0.03)   | 0.14(0.06-0.32) | 2.12×10 <sup>-6</sup>  | 0.21(0.13-0.34) | 5.70×10 <sup>-10</sup> | 28.67          |
| 3:65809842          | rs1874320   | C/A   | <i>MAG11</i>        | 0.06(0.03/0.06)   | 0.41(0.28-0.59) | 1.93×10 <sup>-6</sup> | 0.06(0.03/0.06)   | 0.54(0.39-0.74) | 1.46×10 <sup>-4</sup>  | 0.48(0.38-0.61) | 2.19×10 <sup>-9</sup>  | 22.38          |
| 7:65173823          | rs117490078 | T/G   | <i>VKORC1L1</i>     | 0.10(0.07/0.10)   | 0.67(0.54-0.84) | 6.01×10 <sup>-4</sup> | 0.10(0.06/0.11)   | 0.57(0.45-0.72) | 1.92×10 <sup>-6</sup>  | 0.62(0.53-0.73) | 7.78×10 <sup>-9</sup>  | 10.55          |
| 19:53066857         | rs12327639  | A/G   | <i>ZNF808</i>       | 0.07(0.04/0.07)   | 0.56(0.42-0.75) | 1.08×10 <sup>-4</sup> | 0.06(0.04/0.07)   | 0.52(0.38-0.70) | 2.56×10 <sup>-5</sup>  | 0.54(0.44-0.67) | 1.12×10 <sup>-8</sup>  | 0              |
| 13:95787496         | rs4148515   | T/G   | <i>ABCC4</i>        | 0.06(0.04/0.06)   | 0.61(0.45-0.81) | 8.93×10 <sup>-4</sup> | 0.07(0.03/0.06)   | 0.49(0.36-0.67) | 6.48×10 <sup>-6</sup>  | 0.55(0.44-0.68) | 3.56×10 <sup>-8</sup>  | 0              |
| 13:62785070         | rs79753408  | T/G   | <i>LINC01075</i>    | 0.03(0.01/0.03)   | 0.22(0.10-0.46) | 6.71×10 <sup>-5</sup> | 0.03(0.01/0.03)   | 0.28(0.14-0.54) | 1.39×10 <sup>-4</sup>  | 0.25(0.14-0.41) | 3.92×10 <sup>-8</sup>  | 0              |
| 1:213538530         | rs7543981   | G/A   | <i>RPS6KCI</i>      | 0.03(0.02/0.04)   | 0.43(0.27-0.68) | 3.55×10 <sup>-4</sup> | 0.03(0.01/0.04)   | 0.33(0.20-0.55) | 2.44×10 <sup>-5</sup>  | 0.38(0.27-0.54) | 4.39×10 <sup>-8</sup>  | 0              |

Chromosome Position: Based on hg19/GRCh37 build. rsID: rs number. EA: effect allele. OA: other allele. EAF: effect allele frequency. OR: odds ratio. CI: confidence interval.

Table S2. The allele frequency of identified loci in 1000Genomes

| Chromosome Position | rsID        | EA/OA | Nearest Gene        | Global | African | East Asian | Europe | South Asian | American |
|---------------------|-------------|-------|---------------------|--------|---------|------------|--------|-------------|----------|
| 4:120241902         | rs1799883   | T/C   | <i>FABP2</i>        | 0.25   | 0.22    | 0.25       | 0.27   | 0.31        | 0.23     |
| 4:155525276         | rs2066865   | A/G   | <i>FGG</i>          | 0.70   | 0.65    | 0.56       | 0.78   | 0.76        | 0.79     |
| 14:21116815         | rs77175619  | A/G   | <i>OR6S1</i>        | 0.03   | 0.00    | 0.06       | 0.04   | 0.01        | 0.03     |
| 8:29671268          | rs35801946  | T/G   | <i>LOC101929470</i> | 0.16   | 0.33    | 0.05       | 0.14   | 0.08        | 0.10     |
| 16:88156187         | rs4843804   | A/G   | <i>ZNF469</i>       | 0.13   | 0.25    | 0.06       | 0.05   | 0.11        | 0.18     |
| 17:45930539         | rs4794202   | T/G   | <i>SP6</i>          | 0.12   | 0.07    | 0.05       | 0.16   | 0.19        | 0.16     |
| 12:130405860        | rs708362    | T/G   | <i>TMEM132D</i>     | 0.04   | 0.08    | 0.04       | 0.02   | 0.03        | 0.01     |
| 16:7050441          | rs17141995  | G/T   | <i>RBFOX1</i>       | 0.05   | 0.07    | 0.04       | 0.05   | 0.02        | 0.09     |
| 9:136145484         | rs582094*   | T/A   | <i>ABO</i>          | 0.37   | 0.43    | 0.37       | 0.36   | 0.42        | 0.28     |
| 17:76559574         | rs77645935  | C/A   | <i>DNAH17</i>       | 0.06   | 0.16    | 0.04       | 0.00   | 0.01        | 0.06     |
| 3:65809842          | rs1874320   | C/A   | <i>MAG11</i>        | 0.31   | 0.48    | 0.08       | 0.42   | 0.18        | 0.33     |
| 7:65173823          | rs117490078 | T/G   | <i>VKORC1L1</i>     | 0.03   | 0.00    | 0.11       | 0.01   | 0.01        | 0.04     |
| 19:53066857         | rs12327639  | A/G   | <i>ZNF808</i>       | 0.27   | 0.43    | 0.04       | 0.31   | 0.18        | 0.34     |
| 13:95787496         | rs4148515   | T/G   | <i>ABCC4</i>        | 0.20   | 0.41    | 0.07       | 0.15   | 0.12        | 0.16     |
| 13:62785070         | rs79753408  | T/G   | <i>LINC01075</i>    | 0.01   | 0.00    | 0.03       | 0.00   | 0.00        | 0.00     |
| 1:213538530         | rs7543981   | G/A   | <i>RPS6KCI</i>      | 0.04   | 0.08    | 0.03       | 0.03   | 0.02        | 0.03     |

Chromosome Position: Based on hg19/GRCh37 build. rsID: rs number. EA: effect allele. OA: other allele.

\*:data from gnomAD

Table S3. Replication of associations for the known loci in our cohort

| Chromosome Position | rsID       | Prior           | Nearest Gene        | Discovery stage  |                       | Replication stage |                       | Meta            |                        |
|---------------------|------------|-----------------|---------------------|------------------|-----------------------|-------------------|-----------------------|-----------------|------------------------|
|                     |            |                 |                     | OR (95% CI)      | P-value               | OR (95% CI)       | P-value               | OR (95% CI)     | P-value                |
| 9:136139265         | rs657152   | Ref. 38.39      | <i>ABO</i>          | 1.23(1.10-1.39)  | $4.39 \times 10^{-4}$ | 1.31(1.17-1.47)   | $3.00 \times 10^{-6}$ | 1.28(1.18-1.38) | $6.83 \times 10^{-9}$  |
| 9:136149229         | rs505922   | Ref. 38.39      | <i>ABO</i>          | 1.29(1.15-1.45)  | $2.39 \times 10^{-5}$ | 1.32(1.18-1.48)   | $1.74 \times 10^{-6}$ | 1.31(1.20-1.42) | $3.81 \times 10^{-14}$ |
| 9:136149722         | rs630014   | Ref. 38.39      | <i>ABO</i>          | 0.82(0.73-0.93)  | $1.88 \times 10^{-3}$ | 0.80(0.71-0.90)   | $3.44 \times 10^{-4}$ | 0.81(0.74-0.88) | $1.31 \times 10^{-13}$ |
| 9:136154867         | rs495828   | Ref. 39         | <i>ABO</i>          | 1.13(0.98-1.29)  | 0.08747               | 1.27(1.12-1.45)   | $2.55 \times 10^{-4}$ | 1.09(0.89-1.34) | 0.4146                 |
| 9:136137065         | rs687621   | Ref. 40         | <i>ABO</i>          | 1.25(1.11-1.40)  | $2.52 \times 10^{-4}$ | 1.33(1.19-1.49)   | $1.06 \times 10^{-6}$ | 0.80(0.55-1.16) | 0.2353                 |
| 9:136137106         | rs687289   | Ref. 41         | <i>ABO</i>          | 1.27(1.13-1.42)  | $7.15 \times 10^{-5}$ | 1.33(1.18-1.49)   | $1.27 \times 10^{-6}$ | 1.30(1.20-1.41) | $4.40 \times 10^{-10}$ |
| 4:155501188         | rs6825454  | Ref. 39         | <i>FGA</i>          | 1.37(1.22-1.54)  | $1.29 \times 10^{-7}$ | 0.26(0.15-0.45)   | $1.42 \times 10^{-6}$ | 0.22(0.15-0.34) | $5.31 \times 10^{-12}$ |
| 4:155511897         | rs2070011  | Ref. 41         | <i>FGA</i>          | 0.75(0.67-0.84)  | $1.86 \times 10^{-6}$ | 0.75(0.66-0.84)   | $8.42 \times 10^{-7}$ | 0.75(0.69-0.81) | $7.17 \times 10^{-12}$ |
| 4:155525276         | rs2066865  | Ref. 3.39.42.43 | <i>FGG</i>          | 1.41(1.25-1.58)  | $9.85 \times 10^{-9}$ | 1.34(1.20-1.50)   | $6.19 \times 10^{-7}$ | 1.37(1.26-1.49) | $3.81 \times 10^{-14}$ |
| 4:155543369         | rs6536024  | Ref. 40         | <i>FGG</i>          | 0.73(0.64-0.82)  | $6.76 \times 10^{-7}$ | 0.80(0.71-0.90)   | $2.87 \times 10^{-4}$ | 0.76(0.70-0.83) | $1.40 \times 10^{-9}$  |
| 11:46760756         | rs3136516  | Ref. 42         | <i>F2</i>           | 0.82(0.70-0.96)  | 0.01383               | 1.03(0.89-1.19)   | 0.6869                | 0.93(0.83-1.03) | 0.169                  |
| 1:169511755         | rs4524     | Ref. 3          | <i>F5</i>           | 0.84 (0.73-0.98) | 0.02159               | 0.90(0.78-1.03)   | 0.1382                | 0.87(0.79-0.96) | $7.82 \times 10^{-3}$  |
| 4:187188094         | rs4253399  | Ref. 40         | <i>F11</i>          | 1.21(1.07-1.37)  | $2.62 \times 10^{-3}$ | 1.30(1.16-1.47)   | $1.49 \times 10^{-5}$ | 1.26(1.15-1.37) | $2.03 \times 10^{-7}$  |
| 3:93650604          | rs6795524  | Ref. 44         | <i>PROS1</i>        | 1.52(1.12-2.05)  | $6.53 \times 10^{-3}$ | 1.21(0.89-1.65)   | 0.2186                | 1.35(1.09-1.68) | $5.07 \times 10^{-3}$  |
| 20:33777612         | rs6087685  | Ref. 3          | <i>PROCR</i>        | 1.30(1.08-1.55)  | $4.92 \times 10^{-3}$ | 1.13(0.93-1.36)   | 0.2146                | 1.21(1.06-1.38) | $3.94 \times 10^{-3}$  |
| 1:169135127         | rs16861990 | Ref. 39.41      | <i>NME7</i>         | 0.72(0.52-1.00)  | 0.04731               | 1.03(0.79-1.35)   | 0.8149                | 0.88(0.72-1.08) | 0.2825                 |
| 19:10742170         | rs2288904  | Ref. 3.44       | <i>SLC44A2</i>      | 0.88(0.78-1.00)  | 0.05002               | 0.92(0.82-1.04)   | 0.1729                | 0.90(0.83-0.98) | 0.01932                |
| 20:23050806         | rs2144940  | Ref. 16         | <i>THBD</i>         | 1.06(0.82-1.37)  | $1.08 \times 10^{-4}$ | 1.22(0.95-1.56)   | 0.1121                | 1.14(0.95-1.36) | 0.1497                 |
| 6:71623253          | rs1304029  | Ref. 45         | <i>SMAP1/B3GAT2</i> | 0.98(0.87-1.10)  | 0.6848                | 1.02(0.91-1.15)   | 0.6904                | 1.00(0.92-1.09) | 0.9977                 |
| 19:33899065         | rs731839   | Ref. 44         | <i>PEPD</i>         | 1.11(0.99-1.25)  | 0.07309               | 1.06(0.95-1.19)   | 0.3029                | 1.08(1.00-1.18) | 0.04665                |
| 19:55538980         | rs1654425  | Ref. 44         | <i>GP6</i>          | 0.51(0.27-0.97)  | 0.03919               | 1.00(0.62-1.60)   | 0.9967                | 0.75(0.52-1.10) | 0.2182                 |
| 3:39188182          | rs13084580 | Ref. 44         | <i>CSRNP1</i>       | 1.23(1.04-1.44)  | 0.0157                | 1.22(1.04-1.43)   | 0.01653               | 1.22(1.09-1.37) | $6.61 \times 10^{-4}$  |

Chromosome Position: Based on hg19/GRCh37 build. rsID: rs number.

OR and P value: odds ratio and P value in the current study. CI: confidence interval.

Table S4. Association results for genes that were significant in FUMA gene-based analysis

| <b>Gene</b>   | <b>Chromosome Position</b>   | <b>Description</b>           | <b>P-value</b>         |
|---------------|------------------------------|------------------------------|------------------------|
| <i>F11</i>    | chr4:187,187,099-187,210,835 | Coagulation Factor XI        | $6.72 \times 10^{-10}$ |
| <i>FGA</i>    | chr4:155,504,278-155,511,918 | Fibrinogen Alpha Chain       | $1.20 \times 10^{-9}$  |
| <i>FABP2</i>  | chr4:120,238,405-120,243,545 | Fatty Acid Binding Protein 2 | $1.07 \times 10^{-8}$  |
| <i>SP6</i>    | chr17:45,922,279-45,933,240  | Sp6 Transcription Factor     | $4.12 \times 10^{-7}$  |
| <i>ZNF808</i> | chr19:53,030,905-53,067,717  | Zinc Finger Protein 808      | $9.13 \times 10^{-7}$  |
| <i>FGG</i>    | chr4:155,525,286-155,534,119 | Fibrinogen Gamma Chain       | $1.45 \times 10^{-6}$  |

Chromosome Position: Based on hg19/GRCh37 build.

Table S5. Polygenic risk score variants

| Chromosome Position | rsID        | EA/OA | P-value               | beta     |
|---------------------|-------------|-------|-----------------------|----------|
| 4:155525276         | rs2066865   | A/G   | $9.85 \times 10^{-9}$ | 0.34146  |
| 4:120241902         | rs1799883   | T/C   | $1.05 \times 10^{-8}$ | 0.34359  |
| 6:49646509          | rs1321615   | A/C   | $7.42 \times 10^{-8}$ | 0.719789 |
| 8:29671268          | rs35801946  | T/G   | $7.98 \times 10^{-8}$ | -1.12024 |
| 16:88156187         | rs4843804   | A/G   | $4.27 \times 10^{-7}$ | -1.08412 |
| 12:130405860        | rs708362    | T/G   | $4.79 \times 10^{-7}$ | -1.07734 |
| 17:45930539         | rs4794202   | T/G   | $6.2 \times 10^{-7}$  | -1.68147 |
| 3:65809842          | rs1874320   | C/A   | $1.93 \times 10^{-6}$ | -0.89551 |
| 14:93049931         | rs2402170   | C/A   | $2.37 \times 10^{-6}$ | -0.31485 |
| 13:31696502         | rs9315112   | T/C   | $2.94 \times 10^{-6}$ | 0.377751 |
| 16:7050441          | rs17141995  | G/T   | $3.83 \times 10^{-6}$ | -1.48192 |
| 6:155727925         | rs78281438  | G/T   | $5.58 \times 10^{-6}$ | 0.337186 |
| 1:115437986         | rs6661511   | A/G   | $7.94 \times 10^{-6}$ | 0.502592 |
| 2:215635794         | rs3768716   | C/T   | $8.02 \times 10^{-6}$ | 0.333611 |
| 22:30745204         | rs117237368 | T/G   | $8.4 \times 10^{-6}$  | -0.77914 |
| 22:24227246         | rs6003939   | C/A   | $9.48 \times 10^{-6}$ | 0.414755 |
| 14:88375104         | rs393691    | T/G   | $1.02 \times 10^{-5}$ | 0.572673 |
| 2:128169899         | rs6753288   | A/G   | $1.07 \times 10^{-5}$ | 0.347836 |
| 8:42195975          | rs2307155   | A/C   | $1.12 \times 10^{-5}$ | -1.28772 |
| 3:16928027          | rs114766804 | C/T   | $1.48 \times 10^{-5}$ | 0.443403 |
| 15:51684980         | rs8032460   | C/T   | $1.73 \times 10^{-5}$ | 0.468753 |
| 11:116603677        | rs1893460   | A/G   | $2.33 \times 10^{-5}$ | 0.257738 |
| 9:136149229         | rs505922    | C/T   | $2.39 \times 10^{-5}$ | 0.252314 |
| 1:175813319         | rs12082852  | T/G   | $2.44 \times 10^{-5}$ | -1.08058 |
| 13:50389401         | rs75787368  | C/T   | $2.83 \times 10^{-5}$ | 0.703592 |
| 14:95586685         | rs117875424 | A/G   | $2.84 \times 10^{-5}$ | 0.655964 |
| 20:2166427          | rs6082335   | T/C   | $2.95 \times 10^{-5}$ | 0.276874 |
| 17:76559574         | rs77645935  | C/A   | $3.12 \times 10^{-5}$ | -1.33522 |
| 12:86749652         | rs117500272 | T/C   | $3.24 \times 10^{-5}$ | 0.632335 |
| 11:11699795         | rs12364962  | C/T   | $3.29 \times 10^{-5}$ | 0.492254 |
| 2:15930012          | rs10929389  | C/T   | $3.57 \times 10^{-5}$ | -0.29773 |
| 16:63461511         | rs150740    | G/A   | $3.83 \times 10^{-5}$ | -0.39943 |
| 22:30504207         | rs718772    | G/A   | $4.19 \times 10^{-5}$ | 0.330742 |
| 7:149445407         | rs1622470   | G/A   | $4.28 \times 10^{-5}$ | 0.334327 |
| 14:21116815         | rs77175619  | A/G   | $4.28 \times 10^{-5}$ | 0.425921 |
| 4:114926752         | rs78077609  | C/T   | $4.49 \times 10^{-5}$ | 0.599935 |
| 10:29370141         | rs17760681  | T/C   | $4.62 \times 10^{-5}$ | 0.276115 |
| 16:66398525         | rs3809648   | G/A   | $4.7 \times 10^{-5}$  | 0.294906 |
| 10:90502350         | rs376264    | G/A   | $4.73 \times 10^{-5}$ | -0.25438 |
| 2:136879693         | rs75238552  | A/C   | $4.81 \times 10^{-5}$ | -0.91105 |
| 11:114186645        | rs10891647  | C/T   | $5.01 \times 10^{-5}$ | 0.3257   |
| 2:135165813         | rs4954144   | T/G   | $5.35 \times 10^{-5}$ | 0.362558 |
| 3:58512375          | rs1127743   | C/T   | $5.39 \times 10^{-5}$ | 0.271553 |
| 1:225375468         | rs12729289  | T/C   | $5.43 \times 10^{-5}$ | 0.246079 |
| 4:4813322           | rs1907991   | T/C   | $5.51 \times 10^{-5}$ | 0.249201 |
| 4:98240984          | rs182314917 | C/T   | $5.69 \times 10^{-5}$ | 0.860355 |
| 13:62917158         | rs17061254  | G/T   | $5.75 \times 10^{-5}$ | 0.458058 |
| 4:4780454           | rs75721280  | T/C   | $5.86 \times 10^{-5}$ | -0.28768 |
| 16:12630422         | rs12924885  | G/A   | $6.26 \times 10^{-5}$ | -0.30246 |
| 13:67542554         | rs7987478   | A/G   | $6.38 \times 10^{-5}$ | -2.83651 |
| 8:93696238          | rs72677411  | C/T   | $6.48 \times 10^{-5}$ | -1.05326 |
| 13:62785070         | rs79753408  | T/G   | $6.71 \times 10^{-5}$ | -1.52602 |
| 7:139763419         | rs6943771   | T/C   | $6.85 \times 10^{-5}$ | 0.314081 |
| 6:69237704          | rs118048568 | A/G   | $6.86 \times 10^{-5}$ | -1.01805 |
| 18:67286855         | rs8097743   | A/G   | $6.89 \times 10^{-5}$ | 0.241376 |
| 5:37087250          | rs76653927  | G/A   | $6.96 \times 10^{-5}$ | 0.639746 |
| 1:9339467           | rs9442580   | T/C   | $7.22 \times 10^{-5}$ | 0.587787 |

|              |             |     |                       |          |
|--------------|-------------|-----|-----------------------|----------|
| 8:63237280   | rs13260909  | C/T | $7.55 \times 10^{-5}$ | 0.24059  |
| 3:141275436  | rs16851483  | T/G | $7.74 \times 10^{-5}$ | 0.256965 |
| 15:37383688  | rs2701524   | C/T | $8.15 \times 10^{-5}$ | 0.245296 |
| 3:181502982  | rs17540800  | T/C | $8.44 \times 10^{-5}$ | 0.521172 |
| 3:25706277   | rs10433573  | C/A | $8.92 \times 10^{-5}$ | -0.28489 |
| 8:17300360   | rs140242583 | T/C | $8.97 \times 10^{-5}$ | 0.678034 |
| 9:17875698   | rs79627944  | G/A | $9.31 \times 10^{-5}$ | 0.652846 |
| 14:36725611  | rs77223023  | G/T | $9.82 \times 10^{-5}$ | 0.427879 |
| 3:12916106   | rs6808492   | C/T | 0.000103              | 0.590006 |
| 12:83808150  | rs76144234  | G/T | 0.000107              | -1.24584 |
| 19:53066857  | rs12327639  | A/G | 0.000108              | -0.58304 |
| 1:69685100   | rs4650137   | C/T | 0.00011               | 0.242946 |
| 6:72530409   | rs12525765  | C/A | 0.000112              | 0.528273 |
| 16:7946087   | rs73502833  | A/G | 0.000123              | 0.328584 |
| 9:31236422   | rs1360665   | C/A | 0.000125              | 0.366724 |
| 3:43156535   | rs76876334  | T/G | 0.000125              | 0.33146  |
| 16:11016593  | rs116882824 | T/G | 0.000127              | -0.94649 |
| 2:237678052  | rs719649    | C/T | 0.00013               | 0.330023 |
| 12:94959873  | rs79368348  | T/C | 0.000131              | 0.812263 |
| 2:219553468  | rs16859180  | T/C | 0.000135              | 0.37363  |
| 4:5711368    | rs3774854   | G/A | 0.000138              | 0.227136 |
| 10:34323378  | rs1705013   | G/A | 0.00014               | -0.26605 |
| 11:115035485 | rs7131142   | C/T | 0.000143              | -0.24501 |
| 10:85568009  | rs10887157  | A/C | 0.000144              | 0.479335 |
| 19:7411780   | rs6603095   | G/A | 0.000145              | 0.300105 |
| 4:39457430   | rs2687956   | T/C | 0.000149              | 0.247641 |
| 4:180517056  | rs68158635  | T/C | 0.000149              | -0.27998 |
| 3:147866462  | rs67416703  | T/C | 0.00015               | -0.47321 |
| 15:47509599  | rs8040414   | A/C | 0.00015               | 0.372253 |
| 3:114530679  | rs9289004   | G/A | 0.000154              | 0.53004  |
| 12:106672618 | rs7308143   | A/G | 0.000157              | 0.298622 |
| 22:47530307  | rs144351340 | A/G | 0.000162              | 0.551584 |
| 15:31665443  | rs4779520   | C/T | 0.000163              | -0.24692 |
| 11:133170270 | rs2186826   | C/A | 0.000163              | -0.35753 |
| 19:3171565   | rs10421389  | G/A | 0.000165              | -0.32117 |
| 13:35252882  | rs9572094   | T/C | 0.000168              | 0.223943 |
| 6:109049607  | rs6910666   | G/A | 0.00017               | -0.22377 |
| 5:42745904   | rs190782568 | A/G | 0.000171              | 0.235862 |
| 9:73574860   | rs945688    | T/C | 0.000179              | -0.22302 |
| 16:81905504  | rs12447917  | G/A | 0.000181              | 0.222343 |
| 10:116347162 | rs2483579   | A/G | 0.000188              | -0.22652 |
| 20:56776961  | rs6123776   | C/T | 0.000188              | -0.278   |
| 2:100145818  | rs116854723 | G/T | 0.0002                | -0.71009 |
| 4:158727739  | rs1448439   | G/T | 0.000206              | 0.34288  |
| 13:52318012  | rs150363035 | G/A | 0.000206              | -1.33067 |
| 21:46960895  | rs13050920  | C/T | 0.000206              | -0.22289 |
| 18:62526264  | rs138232306 | G/A | 0.000211              | 0.410121 |
| 15:88060128  | rs372071390 | T/G | 0.000211              | -1.26054 |
| 17:78992409  | rs7225916   | G/T | 0.000214              | 0.219938 |
| 4:131018512  | rs71613297  | G/A | 0.000214              | 0.226338 |
| 6:1606384    | rs62390610  | T/G | 0.000221              | -1.13227 |
| 1:21757665   | rs114453875 | C/T | 0.000224              | -1.41223 |
| 4:132948418  | rs6812658   | G/A | 0.000227              | -0.3169  |
| 6:143058357  | rs17071973  | T/C | 0.000229              | -0.35639 |
| 5:37909501   | rs62360405  | A/C | 0.000231              | -0.32739 |
| 8:106573578  | rs3735953   | C/T | 0.000234              | 0.217528 |
| 8:64198963   | rs57808486  | G/A | 0.000235              | 0.239804 |
| 7:150526345  | rs76036237  | G/T | 0.000236              | 0.368801 |

|              |             |     |          |          |
|--------------|-------------|-----|----------|----------|
| 15:34158266  | rs1044129   | G/A | 0.000244 | -0.22377 |
| 21:38308911  | rs1065758   | A/G | 0.000249 | 0.429182 |
| 2:237811515  | rs4663236   | A/G | 0.000255 | 0.241376 |
| 2:181803749  | rs10210356  | G/A | 0.000258 | -0.62923 |
| 19:32483186  | rs17717716  | C/T | 0.000261 | 0.217528 |
| 14:53151109  | rs7150290   | C/T | 0.000271 | 0.241376 |
| 6:164647755  | rs9459032   | C/T | 0.000272 | 0.216723 |
| 6:67132658   | rs2670358   | C/A | 0.000273 | 0.214305 |
| 12:119362496 | rs79902143  | T/C | 0.000273 | -0.56793 |
| 13:106202606 | rs77481115  | A/G | 0.000276 | 0.785726 |
| 8:70834061   | rs56299958  | T/C | 0.000276 | -0.75099 |
| 1:230687711  | rs853452    | T/C | 0.000278 | 0.219136 |
| 18:2082393   | rs532950    | T/C | 0.00028  | 0.244514 |
| 10:21311248  | rs10828176  | T/G | 0.000281 | 0.215918 |
| 4:38760100   | rs77778664  | T/C | 0.000281 | 0.411447 |
| 14:22241710  | rs11157216  | T/C | 0.000282 | 0.251537 |
| 17:69794912  | rs11654836  | C/T | 0.000282 | -0.61897 |
| 12:48399612  | rs1859443   | A/G | 0.000285 | 0.264669 |
| 2:42517516   | rs7569544   | A/C | 0.000291 | 0.246079 |
| 7:147918464  | rs6947963   | T/G | 0.000293 | -0.25644 |
| 15:73274669  | rs28424084  | G/A | 0.000296 | 0.214305 |
| 17:18077175  | rs854800    | T/C | 0.000296 | 0.219136 |
| 5:24456465   | rs59451037  | A/C | 0.000298 | -0.72093 |
| 6:97123214   | rs76503183  | T/G | 0.000299 | -1.22248 |
| 2:218174378  | rs116547900 | T/C | 0.000299 | -0.85402 |
| 11:17835042  | rs1548528   | A/C | 0.000302 | 0.279146 |
| 16:21729214  | rs215902    | T/C | 0.000303 | -0.21716 |
| 11:17861074  | rs59143224  | A/G | 0.000306 | 0.3257   |
| 8:142730519  | rs10111342  | T/C | 0.000309 | -0.22803 |
| 1:210836847  | rs1890843   | C/T | 0.000309 | 0.263902 |
| 16:1151323   | rs197075    | A/G | 0.000311 | 0.263902 |
| 22:28025519  | rs117623535 | G/A | 0.000311 | -0.50999 |
| 6:116032524  | rs961319    | G/A | 0.000312 | 0.552159 |
| 20:30643595  | rs6121328   | T/C | 0.000315 | 0.765933 |
| 9:24985660   | rs1461340   | A/G | 0.000315 | 0.225541 |
| 8:143599594  | rs75573695  | T/C | 0.000322 | 0.720762 |
| 11:44723896  | rs140972488 | T/G | 0.000324 | -1.2888  |
| 7:50436476   | rs117963681 | T/C | 0.000327 | 0.328584 |
| 2:67935402   | rs12465679  | G/A | 0.000334 | 0.214305 |
| 16:63460173  | rs76843065  | G/A | 0.000342 | 0.241376 |
| 1:95068347   | rs1772895   | A/G | 0.00035  | -0.24067 |
| 8:63817743   | rs16929812  | G/A | 0.00035  | -0.31759 |
| 14:40975244  | rs2150522   | G/A | 0.000353 | 0.227136 |
| 1:213538530  | rs7543981   | G/A | 0.000355 | -0.8391  |
| 9:137777132  | rs12684476  | A/G | 0.000358 | -1.20564 |
| 6:91783441   | rs16883972  | G/A | 0.000361 | 0.297137 |
| 3:121759644  | rs6762289   | C/A | 0.000362 | -0.67315 |
| 7:14423100   | rs7785682   | G/A | 0.000366 | -0.28942 |
| 19:36583234  | rs7250473   | T/G | 0.000369 | 0.611395 |
| 9:11073873   | rs10959509  | C/T | 0.000371 | -0.26253 |
| 10:13534851  | rs2251555   | G/A | 0.000376 | 0.220741 |
| 5:31059476   | rs13167643  | A/C | 0.000377 | -0.32642 |
| 10:118522665 | rs1665672   | G/T | 0.000377 | 0.230318 |
| 16:65801698  | rs1966503   | A/G | 0.000379 | 0.599386 |
| 6:57127760   | rs9475804   | A/G | 0.000384 | -0.31677 |
| 19:52836147  | rs55952017  | T/C | 0.000385 | 0.630207 |
| 10:72991385  | rs7893421   | T/C | 0.000395 | 0.21188  |
| 6:93494267   | rs9452114   | A/C | 0.000398 | -1.60147 |

|              |             |     |          |          |
|--------------|-------------|-----|----------|----------|
| 2:68515530   | rs6740317   | G/A | 0.000409 | 0.20945  |
| 6:34439749   | rs9469791   | A/G | 0.000409 | 0.220741 |
| 6:136099892  | rs12198880  | C/A | 0.00041  | -0.65489 |
| 8:128428581  | rs188813106 | T/G | 0.00041  | -1.20331 |
| 15:59855226  | rs12902622  | T/C | 0.000413 | 0.211071 |
| 8:25816376   | rs4872381   | T/C | 0.000416 | 0.291923 |
| 5:178748645  | rs456356    | T/C | 0.000417 | 0.303801 |
| 4:20100285   | rs4697140   | C/A | 0.000419 | -0.57554 |
| 4:113779891  | rs1448221   | G/T | 0.000424 | 0.261595 |
| 8:17419299   | rs2705062   | A/G | 0.000424 | 0.221542 |
| 9:92853543   | rs12115490  | T/C | 0.000425 | 0.263133 |
| 3:42368008   | rs11715412  | G/A | 0.00043  | 0.234281 |
| 5:104596665  | rs2431976   | C/T | 0.000431 | 0.324255 |
| 19:42053554  | rs758768    | T/C | 0.000431 | 0.658556 |
| 4:172448151  | rs11728304  | A/G | 0.000435 | 0.207014 |
| 5:57787376   | rs2307117   | G/A | 0.000437 | 0.253867 |
| 1:182168885  | rs1689800   | G/A | 0.000441 | 0.216723 |
| 11:71016690  | rs190623923 | T/C | 0.000447 | 0.615186 |
| 12:125608492 | rs1080910   | C/T | 0.000447 | -0.21084 |
| 14:81192479  | rs2619676   | G/A | 0.00045  | -0.23636 |
| 14:70883029  | rs375840470 | C/A | 0.000455 | -1.58523 |
| 13:107801656 | rs147567900 | A/G | 0.000455 | 0.652846 |
| 19:29080584  | rs929440    | T/C | 0.000458 | 0.208639 |
| 1:220319007  | rs75519000  | G/A | 0.000463 | -0.52138 |
| 16:14430532  | rs2867417   | A/C | 0.000464 | 0.207014 |
| 3:157675069  | rs9290009   | A/G | 0.000465 | -0.32076 |
| 1:162062596  | rs12069128  | T/G | 0.000468 | 0.251537 |
| 14:66242314  | rs10132765  | G/A | 0.000468 | -0.23813 |
| 9:7780039    | rs10976571  | T/C | 0.000471 | 0.280657 |
| 12:46222529  | rs147424196 | G/A | 0.000473 | 0.441476 |
| 5:134824264  | rs17168440  | T/G | 0.000474 | -0.24731 |
| 5:40859489   | rs77581485  | A/C | 0.000474 | 0.215918 |
| 2:10577645   | rs74457099  | T/C | 0.000476 | 0.51641  |
| 20:56705287  | rs6015200   | C/T | 0.000481 | 0.212689 |
| 9:11018077   | rs12346562  | A/C | 0.000481 | -0.65991 |
| 3:170359696  | rs189032268 | C/A | 0.000483 | -1.57697 |
| 14:39426108  | rs1022713   | G/A | 0.000486 | -0.21183 |
| 4:63401079   | rs6826037   | A/G | 0.000489 | 0.248421 |
| 12:129394746 | rs11060010  | A/G | 0.000491 | -0.27892 |
| 4:25085481   | rs16876768  | T/C | 0.000492 | 0.366724 |
| 16:54493354  | rs55654587  | A/G | 0.000497 | -0.36169 |
| 6:54086108   | rs3957360   | C/T | 0.000501 | 0.532391 |
| 12:94126925  | rs10859567  | T/G | 0.000504 | -0.21109 |
| 16:82203758  | rs2303262   | C/T | 0.000505 | -0.29397 |
| 21:47362573  | rs439180    | A/G | 0.000507 | 0.263133 |
| 12:71879943  | rs12297272  | T/G | 0.000507 | 0.521172 |
| 18:57388538  | rs10163697  | A/G | 0.000508 | 0.242946 |
| 13:110404191 | rs117415218 | C/T | 0.000512 | 0.515813 |
| 19:19293192  | rs2238671   | T/C | 0.000512 | 0.319181 |
| 1:11862214   | rs9651118   | C/T | 0.000515 | -0.23307 |
| 13:100579166 | rs7324649   | G/A | 0.000523 | -0.2189  |
| 8:70859624   | rs7836791   | C/T | 0.000524 | -0.25877 |
| 1:221819994  | rs7525746   | T/C | 0.000524 | 0.217528 |
| 12:93732312  | rs11106986  | C/A | 0.000527 | 0.716375 |
| 7:66811313   | rs7804537   | A/G | 0.000529 | -0.26318 |
| 7:157195623  | rs118124567 | T/C | 0.000531 | -0.492   |
| 3:112469992  | rs820554    | C/T | 0.000541 | 0.231905 |
| 3:93842702   | rs13094371  | G/A | 0.000542 | 0.559616 |



|              |             |     |          |          |
|--------------|-------------|-----|----------|----------|
| 2:239103574  | rs35393292  | A/G | 0.000545 | 0.24373  |
| 2:68886057   | rs6735917   | A/G | 0.000549 | -0.22164 |
| 8:15623609   | rs34145513  | T/C | 0.000556 | 0.502592 |
| 8:98394419   | rs2853292   | G/A | 0.000556 | 0.207014 |
| 19:3872565   | rs35288732  | T/C | 0.000561 | 0.206201 |
| 14:77357411  | rs140059140 | A/C | 0.000563 | -0.59167 |
| 8:106231172  | rs1350723   | A/G | 0.00057  | -0.20973 |
| 8:73821889   | rs1482019   | A/G | 0.00057  | -0.31718 |
| 1:63231401   | rs11807368  | G/T | 0.000571 | -0.21791 |
| 5:76455453   | rs10044684  | A/G | 0.000572 | -0.23965 |
| 6:156972117  | rs1926930   | A/G | 0.000576 | 0.583332 |
| 4:137539102  | rs62309592  | G/A | 0.000576 | -0.21208 |
| 9:120114228  | rs10818029  | C/T | 0.000582 | -0.48809 |
| 4:77392092   | rs6843293   | G/A | 0.000585 | 0.212689 |
| 11:12596007  | rs11022423  | C/A | 0.000586 | -1.05527 |
| 17:13643413  | rs78102228  | A/G | 0.000587 | -0.65952 |
| 19:29414631  | rs4805303   | T/C | 0.00059  | 0.202941 |
| 9:73615652   | rs138455065 | G/A | 0.00059  | 0.427879 |
| 18:53918924  | rs2538025   | C/T | 0.000591 | 0.383219 |
| 12:123837291 | rs77866843  | A/C | 0.000591 | 0.43761  |
| 18:29424289  | rs9966530   | A/G | 0.000592 | -0.20702 |
| 5:65300102   | rs74290406  | T/C | 0.000593 | 0.476234 |
| 22:37462926  | rs2235321   | A/G | 0.000595 | -0.20825 |
| 3:43428108   | rs145068762 | T/C | 0.000599 | 0.448525 |
| 2:115196802  | rs72949839  | G/A | 0.000601 | -0.31993 |
| 7:65173823   | rs117490078 | T/G | 0.000601 | -0.39319 |
| 3:158628954  | rs75245476  | A/G | 0.000602 | 0.567017 |
| 4:182142593  | rs10002947  | G/T | 0.000604 | 0.460584 |
| 7:83715504   | rs2527035   | C/T | 0.000604 | 0.290428 |
| 10:112543615 | rs2146545   | C/T | 0.00061  | 0.241376 |
| 9:3801316    | rs2124210   | A/C | 0.000611 | 0.254642 |
| 12:70101900  | rs118138993 | A/G | 0.000613 | 0.627007 |
| 11:69665620  | rs7481423   | C/A | 0.000616 | -0.60039 |
| 19:50492291  | rs6509451   | A/G | 0.000617 | 0.215111 |
| 6:38779140   | rs1738225   | C/T | 0.000617 | 0.202941 |
| 13:63946948  | rs75416701  | T/C | 0.000624 | 0.374318 |
| 13:47341682  | rs9595530   | A/G | 0.000625 | -0.27391 |
| 9:2227217    | rs7024071   | T/G | 0.000628 | 0.220741 |
| 7:150827104  | rs78061884  | A/G | 0.000629 | 0.408128 |
| 4:155976058  | rs72967365  | G/T | 0.000633 | 0.290428 |
| 3:19972827   | rs71316238  | A/G | 0.000645 | -0.96233 |
| 4:43879438   | rs77179346  | A/G | 0.000654 | 0.337186 |
| 20:59605562  | rs6101198   | C/A | 0.000656 | -0.2101  |
| 4:187205929  | rs4253425   | T/C | 0.000657 | -0.47177 |
| 12:130003842 | rs3853782   | A/G | 0.000659 | 0.304539 |
| 15:42271067  | rs1614300   | G/T | 0.000666 | 0.200489 |
| 2:2227894    | rs12052817  | A/C | 0.000669 | -2.41631 |
| 20:18633244  | rs77487090  | T/G | 0.000671 | -1.15233 |
| 7:155904974  | rs73482924  | A/C | 0.000673 | -1.30748 |
| 2:133040424  | rs4954289   | C/T | 0.000678 | -0.34588 |
| 18:74308179  | rs77791992  | G/A | 0.000678 | 0.588897 |
| 11:788007    | rs6597982   | G/A | 0.000683 | 0.208639 |
| 14:101224922 | rs2400940   | G/A | 0.000688 | -0.26514 |
| 1:30885210   | rs650676    | C/T | 0.00069  | 0.228728 |
| 1:243332619  | rs12039211  | A/G | 0.000696 | -0.5704  |
| 2:241333141  | rs1317565   | T/C | 0.000697 | -0.35041 |
| 8:104187968  | rs954782    | A/G | 0.000697 | 0.19967  |

Table S6. Polygenic risk score (PRS) quantile and odds ratio (OR)

| <b>Quantile</b> | <b>OR</b> | <b>95%CI</b> |
|-----------------|-----------|--------------|
| < 10th          | 0.14      | 0.065-0.296  |
| 10-20th         | 0.12      | 0.053-0.268  |
| 20-30th         | 0.36      | 0.222-0.588  |
| 30-70th         | 1         | 1            |
| 70-80th         | 2.15      | 1.666-2.772  |
| 80-90th         | 2.73      | 2.149-3.470  |
| < 90th          | 5.08      | 4.109-6.282  |

Estimate of OR and 95% CI when taking the 30-70th quantile of individuals as reference group. OR: odds ratio. CI: confidence interval