**Supplementary Table S1:** Non-cancer diseases and traits included in the analysis and source of summary statistics

|  |  |  |  |
| --- | --- | --- | --- |
| **Trait** | **Reference** | **PMID** | **Sample size** |
| Bipolar disorder | PGC Bipolar Working Group, Nat Genet, 2011 | 21926972 | 16,731 |
| Body Mass Index | Speliotes, et al, Nat Genet | 20935630 | 123,912 |
| Coronary Artery Disease | Schunkert, et al., Nat Genet, 2011 | 21378990 | 86,995 |
| Crohn’s Disease | Jostins, et al., Nature, 2012 | 23128233 | 20,883 |
| Ever/Never Smoked | TAG Consortium, 2010 Nat Genet | 20418890 | 74,035 |
| Fasting Glucose | Manning, et al., Nat Genet, 2012 | 22581228 | 46,186 |
| HDL Cholesterol | Teslovich, et al., Nature, 2010 | 20686565 | 99,900 |
| Height | Lango Allen, et al., Nature 2010 | 20881960 | 133,858 |
| LDL Cholesterol | Teslovich, et al., Nature, 2010 | 20686565 | 95,454 |
| Rheumatoid Arthritis | Stahl, et al., Nat Genet, 2010 | 20453842 | 25,708 |
| Schizophrenia | PGC Schizophrenia Working Group, Nature, 2014 | 25056061 | 70,100 |
| Triglycerides | Teslovich, et al., Nature, 2010 | 20686565 | 96,598 |
| Type-2 Diabetes | Morris, et al., Nat Genet, 2012 | 22885922 | 69,033 |
| Ulcerative Colitis | Jostins, et al., Nature, 2012 | 23128233 | 27,432 |

**Supplementary Table S2.** Cancer-specific cumulative risks from SEER.

|  |  |
| --- | --- |
| **Cancer Type** | **Cumulative risk** |
| **Breast** | 12.68% |
| **Colorectal** | 4.23% |
| **Lung** | 6.50% |
| **Ovarian** | 1.33% |
| **Pancreatic** | 1.55% |
| **Prostate** | 10.82% |

**Supplementary Table S3:** Genetic correlations between cancers and 14 non-cancer traits

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cancer** | **Non-cancer trait** | **rg** | **se** | **p** |
| Breast cancer | Ulcerative Colitis | 0.243 | 0.08 | 0.002 |
| Schizophrenia | 0.142 | 0.049 | 0.004 |
| Height | 0.143 | 0.055 | 0.01 |
| Triglycerides | -0.13 | 0.061 | 0.033 |
| BMI | -0.112 | 0.053 | 0.035 |
| Type-2 Diabetes | 0.171 | 0.09 | 0.056 |
| RA | 0.136 | 0.082 | 0.097 |
| Crohn’s Disease | 0.105 | 0.07 | 0.137 |
| LDL | 0.061 | 0.07 | 0.383 |
| Bipolar disorder | 0.069 | 0.087 | 0.43 |
| Fasting Glucose | -0.058 | 0.104 | 0.575 |
| Ever/Never Smoked | 0.039 | 0.089 | 0.663 |
| Coronary Artery Disease | -0.013 | 0.086 | 0.879 |
| HDL | 0.007 | 0.071 | 0.924 |
| Colorectal cancer | BMI | 0.157 | 0.046 | 6.22E-04 |
| Triglycerides | 0.126 | 0.058 | 0.029 |
| Schizophrenia | -0.091 | 0.046 | 0.048 |
| LDL | 0.137 | 0.073 | 0.060 |
| HDL | -0.108 | 0.062 | 0.082 |
| Crohn’s Disease | -0.104 | 0.067 | 0.121 |
| Ever/Never Smoked | 0.097 | 0.068 | 0.154 |
| Bipolar disorder | -0.09 | 0.085 | 0.289 |
| RA | -0.053 | 0.066 | 0.423 |
| Type-2 Diabetes | 0.051 | 0.081 | 0.524 |
| Height | 0.023 | 0.038 | 0.555 |
| Ulcerative Colitis | -0.035 | 0.076 | 0.646 |
| Coronary Artery Disease | 0.035 | 0.089 | 0.695 |
| Fasting Glucose | 0.025 | 0.083 | 0.766 |
| Lung cancer | Ever/Never Smoked | 0.412 | 0.084 | 1.03E-06 |
| HDL | -0.151 | 0.063 | 0.017 |
| BMI | 0.116 | 0.054 | 0.032 |
| Fasting Glucose | 0.186 | 0.097 | 0.056 |
| Type-2 Diabetes | 0.129 | 0.078 | 0.098 |
| Crohn’s Disease | 0.11 | 0.078 | 0.160 |
| Height | 0.058 | 0.043 | 0.182 |
| RA | 0.08 | 0.072 | 0.264 |
| Triglycerides | 0.061 | 0.06 | 0.312 |
| LDL | 0.036 | 0.064 | 0.568 |
| Schizophrenia | 0.035 | 0.069 | 0.610 |
| Bipolar disorder | -0.04 | 0.087 | 0.648 |
| Ulcerative Colitis | 0.025 | 0.081 | 0.757 |
| Coronary Artery Disease | 0.012 | 0.091 | 0.891 |
| Ovarian cancer | Type-2 Diabetes | 0.469 | 0.191 | 0.014 |
| Ulcerative Colitis | 0.291 | 0.137 | 0.034 |
| Triglycerides | -0.111 | 0.109 | 0.309 |
| Crohn’s Disease | 0.091 | 0.121 | 0.451 |
| Fasting Glucose | 0.104 | 0.164 | 0.525 |
| Coronary Artery Disease | 0.061 | 0.149 | 0.683 |
| Ever/Never Smoked | 0.056 | 0.139 | 0.689 |
| BMI | -0.036 | 0.091 | 0.693 |
| Bipolar disorder | 0.059 | 0.157 | 0.709 |
| LDL | -0.037 | 0.139 | 0.791 |
| HDL | 0.03 | 0.123 | 0.806 |
| RA | -0.025 | 0.13 | 0.85 |
| Height | 0.008 | 0.071 | 0.909 |
| Schizophrenia | 0.004 | 0.081 | 0.961 |
| Pancreatic cancer | HDL | -0.405 | 0.167 | 0.015 |
| BMI | 0.243 | 0.117 | 0.038 |
| Coronary Artery Disease | 0.278 | 0.182 | 0.125 |
| Fasting Glucose | 0.303 | 0.201 | 0.131 |
| Triglycerides | 0.153 | 0.106 | 0.15 |
| Bipolar disorder | -0.187 | 0.161 | 0.244 |
| Ever/Never Smoked | 0.114 | 0.145 | 0.433 |
| Ulcerative Colitis | -0.122 | 0.162 | 0.453 |
| LDL | -0.085 | 0.141 | 0.547 |
| Type-2 Diabetes | 0.079 | 0.16 | 0.619 |
| RA | -0.041 | 0.127 | 0.749 |
| Schizophrenia | 0.02 | 0.089 | 0.822 |
| Height | 0.007 | 0.084 | 0.934 |
| Crohn’s Disease | 0.006 | 0.135 | 0.962 |
| Prostate cancer | BMI | -0.083 | 0.04 | 0.039 |
| Crohn’s Disease | 0.104 | 0.055 | 0.06 |
| HDL | 0.076 | 0.051 | 0.133 |
| Bipolar disorder | 0.082 | 0.061 | 0.179 |
| Fasting Glucose | -0.102 | 0.079 | 0.197 |
| Coronary Artery Disease | 0.085 | 0.075 | 0.258 |
| LDL | 0.055 | 0.061 | 0.366 |
| Height | 0.025 | 0.042 | 0.558 |
| Type-2 Diabetes | 0.027 | 0.064 | 0.673 |
| Schizophrenia | -0.016 | 0.039 | 0.686 |
| Ulcerative Colitis | -0.02 | 0.063 | 0.745 |
| Triglycerides | -0.013 | 0.047 | 0.787 |
| Ever/Never Smoked | 0.016 | 0.067 | 0.812 |
| RA | 0.004 | 0.058 | 0.947 |