**Supplemental Material for**

Association of Family History of Schizophrenia and Clinical Outcomes in Individuals with Eating Disorders

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| Table S1. Diagnostic codes used to define psychiatric conditions in the national patient register, the cause of death register, and the national eating disorder quality register |
| Diagnoses | **ICD-8 (1973-1986)** | **ICD-9 (1987-1996)** | **ICD-10 (1997 to present)** | **ED quality registersa (Riksät since 1999, Stepwise since 2005)** |
| AN | - | 307B | F50.0, F50.1 | DSM-IV-TR criteria 307.1; 307.50, criteria 1 and 2 |
| OED | - | 307F | F50.2, F50.3, F50.9 | DSM-IV-TR criteria 307.51; 307.50, criteria 3; or eating disorders not otherwise specified |
| Schizophrenia | 295.0-295.9 (except 295.5) | 295A-295H (except 295F), 295W, 295X, V11A | F200–F209 (except F207), F231, F232, F250–F252, F258, F259 | - |
| MDD | 300.4 | 296B, 300E, 311 | F32.0, F32.1, F32.2, F32.3, F32.8, F32.9, F33.0, F33.1, F33.2, F33.3, F33.4, F33.8, F33.9, F34.8, F34.9, F38.0, F38.1, F38.8, F39 | - |
| OCD | 300.3 | 300D | F42.0, F42.1, F42.2, F42.8, F42.9 | - |
| Any anxiety disorder | 300.0, 300.2 | 300A, 300C | F40.0, F40.1, F40.2, F40.8, F40.9, F41.0, F41.1, F41.2, F41.3, F41.8, F41.9 | - |
| ASD | - | 299A | F84.0, F84.1, F84.5 | - |
| ADHD | - | 314 | F90.0, F90.1, F90.8, F90.9 | - |
| SUD | 303, 304 | 303A, 303X, 304A-304H, 304W, 304X, 305A, 305B, 305X,  | F10-F19 | - |
| Suicide attempts | E950-E959, E980-E989 | E950-E959, E980-E989 | X60-X84, Y10-Y34 | - |
| Abbreviations: ED=eating disorder; AN=anorexia nervosa; OED=other eating disorders; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention-deficit/hyperactivity disorder; SUD= substance abuse disorders.a Diagnoses in the ED quality registers were additionally validated by structured clinical interviews (de Man Lapidoth & Birgegård, 2010).  |

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| **Table S2. Descriptive characteristics of individuals with comorbid schizophrenia and EDs** |
|  | AN (*N*=70) | OED (*N*=133) |
| Sex |
| *Female (%)* | 60 (85.7) | 111 (83.5) |
| *Male (%)* | 10 (14.3) | 22 (16.5) |
| Birth year (mean±*SD*) | 1983.0±4.4 | 1984.4±4.5 |
| Family history of schizophrenia (%)  |  |  |
| *1st degree relatives* | <5 | 12 (9.0) |
| *Any relative* | 8 (11.4) | 25 (18.8) |
| Age at first AN/OED diagnosis (mean±*SD*)  | 19.4±4.7 | 20.88±4.7 |
| Age at first schizophrenia diagnosis | 23.26±4.10 | 22.97±4.47 |
| ED diagnosis preceding that of schizophrenia (%) | 57 (81.4) | 93 (69.9) |
| BMI (mean±*SD*) a | 18.1±3.14 | 20.21±6.07 |
| GAF score (mean±*SD*) b | 42.78±8.97 | 43.59±9.17 |
| EDE-Q scores (mean±*SD*) c |
| Restraint | 2.32±1.94 | 2.53±1.57 |
| Eating concern | 1.96±1.60 | 2.33±1.37 |
| Weight concern | 2.24±2.57 | 3.13±2.24 |
| Shape concern | 2.58±2.77 | 3.62±2.39 |
| Global score | 2.24±2.05 | 2.88±1.72 |
| Psychiatric comorbidities (%) |  |  |
| Anxiety | 46 (65.7) | 86 (64.7) |
| OCD | 10 (14.3) | 26 (19.5) |
| MDD | 46 (65.7) | 97 (72.9) |
| ASD | 18 (25.7) | 32 (24.1) |
| ADHD | 9 (12.9) | 23 (17.3) |
| SUD | 39 (55.7) | 60 (45.1) |
| Total follow-up years | 1703.5 | 3034.9 |
| Total diagnoses | 10 410 | 18 299 |
| Total unique diagnoses | 3158 | 5816 |
| Total suicide attempts | 659 | 1040 |
| a There were 19 individuals with AN with BMI information, and 24 individuals with OED with BMI information.b There were 18 individuals with AN with GAF score information, and 22 individuals with OED with GAF score information.c There were 5 individuals with AN with EDEQ information, and 9 individuals with OED with EDE-Q information.Abbreviations: ED=eating disorder; AN=anorexia nervosa; OED=other eating disorders; SD=standard deviation; BMI=body mass index; GAF scores= global assessment of functioning scores; EDE-Q scores=eating disorders examination questionnaire scores; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention deficit hyperactivity disorder; SUD= substance abuse disorders. |

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| **Table S3. The prevalence (%) of psychiatric comorbidities among individuals with EDs** |
|  |  | 1st degree relatives with schizophrenia | Any relative with schizophrenia |
|  |  | Yes (*N*=94) | No (*N*=12 330) | Yes (*N*=599) | No (*N*=11 825) |
| AN | Anxiety | 41.5 | 27.6 | 31.9 | 27.5 |
| MDD | 45.7 | 35.5 | 40.1 | 35.4 |
| OCD | 8.5 | 7.4 | 7.2 | 7.4 |
| ASD | 6.4 | 3.4 | 4.0 | 3.4 |
| ADHD | 12.8 | 5.5 | 6.0 | 5.5 |
| SUD | 23.4 | 11.5 | 15.7 | 11.3 |
|  |  | Yes (*N*=199) | No (*N*=20 517) | Yes (*N*=1118) | No (*N*=19 598) |
| OED | Anxiety | 48.2 | 36.2 | 40.9 | 36.0 |
| MDD | 49.7 | 42.9 | 46.5 | 42.7 |
| OCD | 12.6 | 7.4 | 7.5 | 7.4 |
| ASD | 6.0 | 4.0 | 4.9 | 4.0 |
| ADHD | 13.6 | 8.8 | 10.2 | 8.7 |
| SUD | 23.1 | 15.1 | 17.2 | 15.1 |
| Abbreviations: ED=eating disorder; AN=anorexia nervosa; OED=other eating disorders; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention-deficit/hyperactivity disorder; SUD= substance abuse disorders. |

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| **Table S4. The order of first diagnosis between ED and psychiatric comorbidities** |
|  |  | No. of individuals-before ED (%) | No. of individuals-after ED (%) |
| AN | SCZ | 13 (18.57) | 57 (81.43) |
| Anxiety | 1139 (33.06) | 2306 (66.94) |
| MDD | 1631(36.85) | 2795 (63.15) |
| OCD | 271 (29.36) | 652 (70.64) |
| ASD | 128 (29.77) | 302 (70.23) |
| ADHD | 187 (27.30) | 498 (72.70) |
| SUD | 507 (35.33) | 928 (64.67) |
| OED | SCZ | 40 (30.07) | 93 (69.92) |
| Anxiety | 3792 (50.46) | 3723 (49.54) |
| MDD | 4945 (55.59) | 3950 (44.41) |
| OCD | 729 (47.31) | 812 (52.69) |
| ASD | 327 (39.02) | 511 (60.98) |
| ADHD | 647 (35.43) | 1179 (64.57) |
| SUD | 1514 (48.16) | 1630 (51.84) |
| Abbreviations: ED=eating disorder; AN=anorexia nervosa; OED=other eating disorders; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention-deficit/hyperactivity disorder; SUD= substance abuse disorders. |

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| **Table S5. The hazard ratios (HRs) of psychiatric comorbidities among individuals with EDs with schizophrenia family history according to degree of relatedness.** |
|  |  | 1st degree relatives with schizophrenia |  2nd degree relatives with schizophrenia |  3rd degree relatives with schizophrenia |
| ED types |  | HR | 95%CI | HR | 95%CI | HR | 95%CI |
| AN | Anxiety | **1.47** | **[1.08, 2.01]** | 1.14 | [0.95,1.37] | 0.96 | [0.70, 1.31] |
| MDD | 1.29 | [0.95, 1.75] | 1.03 | [0.88,1.22] | 1.08 | [0.83, 1.41] |
| OCD | 1.01 | [0.51, 2.01] | 0.93 | [0.63, 1.35] | 0.71 | [0.35, 1.43] |
| ASD | 1.67 | [0.75, 3.71] | 1.31 | [0.82, 2.10] | 1.73 | [0.18, 1.82] |
| ADHD | **2.25** | **[1.27, 3.98]** | 1.09 | [0.72, 1.63] | 0.50 | [0.18, 1.34] |
| SUD | **1.93** | **[1.26, 2.98]** | 1.26 | [0.97, 1.63] | 0.98 | [0.62, 1.55] |
| OED | Anxiety | **1.36** | **[1.11, 1.67]** | 1.11 | [0.98, 1.25] | 1.06 | [0.87, 1.29] |
| MDD | 1.18 | [0.96, 1.44] | 1.10 | [0.98, 1.23] | 1.06 | [0.88, 1.27] |
| OCD | **1.59** | **[1.08, 2.36]** | 0.88 | [0.66, 1.17] | 0.76 | [0.44, 1.30] |
| ASD | 1.48 | [0.83, 2.63] | 1.37 | [0.99, 1.88] | 0.85 | [0.42, 1.73] |
| ADHD | **1.59** | **[1.09, 2.31]** | 1.15 | [0.91, 1.46] | 0.99 | [0.64, 1.53] |
| SUD | **1.45** | **[1.08, 1.96]** | 1.08 | [0.90, 1.30] | 0.91 | [0.66, 1.25] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention-deficit/hyperactivity disorder; SUD= substance abuse disorders.**Bold font** indicates statistical significance, p<0.05. |

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| **Table S6. The incidence rate ratios (IRRs) of cumulative somatic and mental health burden among individuals with EDs with schizophrenia family history according to degree of relatedness.** |
|  |  | 1st degree relatives with schizophrenia | 2nd degree relatives with schizophrenia | 3rd degree relatives with schizophrenia |
| ED types |  | IRR | 95%CI | IRR | 95%CI | IRR | 95%CI |
| AN | Total diagnoses | 1.11 | [0.88, 1.42] | 1.14 | [0.98,1.34] | 1.15 | [0.87, 1.53] |
| Total unique diagnoses | 1.18 | [0.96, 1.46] | **1.13** | **[1.00,1.27]** | 1.00 | [0.84, 1.19] |
| Suicide attempts | 1.61 | [0.83, 3.14] | 1.32 | [0.77, 2.24] | 1.08 | [0.41, 2.81] |
| OED | Total diagnoses | **1.26** | **[1.07, 1.48]** | 1.10 | [0.98,1.22] | 1.01 | [0.84, 1.21] |
| Total unique diagnoses | **1.24** | **[1.08, 1.41]** | 1.08 | [1.00,1.16] | 0.96 | [0.85, 1.09] |
| Suicide attempts | **1.70** | **[1.05, 2.76]** | 1.08 | [0.71, 1.66] | 1.09 | [0.84, 1.19] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders.**Bold font** indicates statistical significance, p<0.05. |

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| **Table S7. The hazard ratios (HRs) of psychiatric comorbidities among individuals with EDs with schizophrenia family history (before ED diagnosis).** |
|  |  | 1st degree relatives with schizophrenia | Any relative with schizophrenia |
| ED types |  | HR | 95%CI | HR | 95%CI |
| AN | Anxiety | 1.14 | [0.64, 2.02] | 1.10 | [0.84, 1.45] |
| MDD | **1.60** | **[1.02, 2.51]** | 1.15 | [0.92, 1.43] |
| OCD | NAa | NAa | 0.84 | [0.46, 1.54] |
| ASD | 0.75 | [0.11, 5.36] | 1.20 | [0.55, 2.58] |
| ADHD | 2.32 | [0.75, 7.20] | 1.05 | [0.54, 2.04] |
| SUD | **2.07** | **[1.05, 4.05]** | 1.39 | [0.99, 1.96] |
| OED | Anxiety | **1.47** | **[1.11, 1.94]** | 1.14 | [1.00, 1.30] |
| MDD | **1.36** | **[1.06, 1.75]** | 1.12 | [1.00, 1.26] |
| OCD | 1.37 | [0.74, 2.52] | 0.92 | [0.66, 1.27] |
| ASD | 1.34 | [0.49, 3.66] | 1.34 | [0.87, 2.06] |
| ADHD | **2.19** | **[1.20, 4.02]** | 1.15 | [0.83, 1.60] |
| SUD | **1.74** | **[1.17, 2.58]** | 1.10 | [0.89, 1.36] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention deficit hyperactivity disorder; SUD= substance abuse disorders.**Bold font** indicates statistical significance, p<0.05.a: There was no outcome in the exposed group. |

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| **Table S8. The hazard ratios (HRs) of psychiatric comorbidities among individuals with eating disorders with schizophrenia family history (after ED diagnosis).** |
|  |  | 1st degree relatives with schizophrenia | Any relative with schizophrenia |
| ED types |  | HR | 95%CI | HR | 95%CI |
| AN | Anxiety | **1.66** | **[1.14, 2.40]** | 1.14 | [0.96, 1.36] |
| MDD | 1.16 | [0.76, 1.76] | 1.11 | [0.95, 1.31] |
| OCD | 1.50 | [0.75, 2.99] | 0.94 | [0.66, 1.34] |
| ASD | 2.18 | [0.92, 5.16] | 1.09 | [0.67, 1.77] |
| ADHD | **2.07** | **[1.42, 3.03]** | 1.04 | [0.71, 1.54] |
| SUD | **1.82** | **[1.03, 3.23]** | 1.24 | [0.95, 1.62] |
| OED | Anxiety | 1.24 | [0.92, 1.67] | 1.10 | [0.96, 1.26] |
| MDD | 0.98 | [0.72, 1.34] | 1.06 | [0.93, 1.21] |
| OCD | **1.82** | **[1.09, 3.03]** | 1.02 | [0.75, 1.37] |
| ASD | 1.57 | [0.77, 3.20] | 1.19 | [0.83, 1.70] |
| ADHD | 1.35 | [0.83, 2.20] | 1.19 | [0.95, 1.50] |
| SUD | 1.23 | [0.79, 1.92] | 1.08 | [0.88, 1.32] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders; OCD=obsessive-compulsive disorder; MDD=major depressive disorder; ASD=autism spectrum disorder; ADHD=attention deficit hyperactivity disorder; SUD= substance abuse disorders.**Bold font** indicates statistical significance, p<0.05. |

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| **Table S9. The incidence rate ratios (IRRs) of cumulative somatic and mental health burden among individuals with eating disorders with schizophrenia family history (before ED diagnosis).** |
|  |  | 1st degree relatives with schizophrenia | Any relative with schizophrenia |
| ED types |  | IRR | 95%CI | IRR | 95%CI |
| AN | Total diagnoses | 1.05 | [0.80, 1.40] | 1.04 | [0.91,1.20] |
| Total unique diagnoses | 1.19 | [0.96, 1.47] | **1.12** | **[1.00,1.25]** |
| Total suicide attempts | 1.04 | [0.33, 3.25] | 1.01 | [0.57, 1.78] |
| OED | Total diagnoses | 1.15 | [0.88, 1.51] | 1.06 | [0.95, 1.19] |
| Total unique diagnoses | 1.12 | [0.86, 1.45] | 1.02 | [0.94, 1.12] |
| Total suicide attempts | **2.14** | **[1.04, 4.43]** | 1.24 | [0.84, 1.83] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders.**Bold font** indicates statistical significance, p<0.05. |

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| **Table S10. The incidence rate ratios (IRRs) of cumulative somatic and mental health burden among individuals with eating disorders with schizophrenia family history (after ED diagnosis).** |
|  |  | 1st degree relatives with schizophrenia | Any relative with schizophrenia |
| ED types |  | IRR | 95%CI | IRR | 95%CI |
| AN | Total diagnoses | 1.12 | [0.82, 1.53] | 1.11 | [0.95,1.30] |
| Total unique diagnoses | 1.17 | [0.87, 1.56] | 1.05 | [0.93,1.20] |
| Total suicide attempts | 1.75 | [0.90, 3.40] | 1.42 | [0.92, 2.20] |
| OED | Total diagnoses | 1.14 | [0.92, 1.42] | 1.06 | [0.94, 1.20] |
| Total unique diagnoses | 1.12 | [0.93, 1.36] | 1.05 | [0.96, 1.16] |
| Total suicide attempts | 1.22 | [0.69, 2.17] | 0.99 | [0.68, 1.43] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders. |

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| **Table S11. The incidence rate ratios (IRRs) of cumulative somatic and mental health burden among individuals with eating disorders with schizophrenia family history (comorbid diagnoses observed together with ED diagnoses).** |
|  |  | 1st degree relatives with schizophrenia | Any relative with schizophrenia |
| ED types |  | IRR | 95%CI | IRR | 95%CI |
| AN | Total diagnoses | 0.85 | [0.52, 1.42] | 1.32 | [0.99, 1.76] |
| Total unique diagnoses | 1.14 | [0.78, 1.67] | **1.28** | **[1.07, 1.53]** |
| OED | Total diagnoses | 1.01 | [0.75, 1.36] | 1.09 | [0.92, 1.28] |
| Total unique diagnoses | 1.22 | [0.98, 1.51] | 1.06 | [0.96, 1.17] |
| Abbreviations: ED=eating disorder; CI= confidence interval; AN=anorexia nervosa; OED=other eating disorders.**Bold font** indicates statistical significance, p<0.05. |

**Reference**

de Man Lapidoth, J., & Birgegård, A. (2010). Validation of the structured eating disorder interview (SEDI) against the eating disorder examination (EDE). *Stockholm: Karolinska Institutet*.