

**Supplementary Table S1.** Risk of all fractures in cholecystectomy group according to the presence or absence of comorbidities.

|                   |                 | n      | Event | Person-years | Incidence rate <sup>†</sup> | All adjusted HR (95% CI) <sup>‡</sup> | Interaction P |
|-------------------|-----------------|--------|-------|--------------|-----------------------------|---------------------------------------|---------------|
| Diabetes mellitus |                 |        |       |              |                             |                                       | 0.6323        |
| No                | Control         | 218883 | 7698  | 583102.4     | 13.2018                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 117135 | 4218  | 309794.81    | 13.6155                     | <b>1.090(1.050,1.132)</b>             |               |
| Yes               | Control         | 36639  | 1676  | 93158.99     | 17.9907                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 26532  | 1308  | 66395.96     | 19.7                        | <b>1.113(1.035,1.197)</b>             |               |
| Hypertension      |                 |        |       |              |                             |                                       | 0.4859        |
| No                | Control         | 157367 | 4822  | 418220.92    | 11.5298                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 82979  | 2584  | 219612.56    | 11.7662                     | <b>1.081(1.030,1.134)</b>             |               |
| Yes               | Control         | 98155  | 4552  | 258040.47    | 17.6406                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 60688  | 2942  | 156578.21    | 18.7893                     | <b>1.109(1.059,1.162)</b>             |               |
| Dyslipidemia      |                 |        |       |              |                             |                                       | 0.6730        |
| No                | Control         | 183201 | 6339  | 493707.4     | 12.8396                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 98900  | 3580  | 264560.24    | 13.5319                     | <b>1.103(1.058,1.149)</b>             |               |
| Yes               | Control         | 72321  | 3035  | 182553.99    | 16.6252                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 44767  | 1946  | 111630.53    | 17.4325                     | <b>1.080(1.020,1.143)</b>             |               |
| BMI               |                 |        |       |              |                             |                                       | 0.7594        |
| <25               | Control         | 167536 | 6194  | 442741.74    | 13.9901                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 81798  | 3210  | 213831.48    | 15.0118                     | <b>1.085(1.040,1.132)</b>             |               |
| ≥25               | Control         | 87986  | 3180  | 233519.65    | 13.6177                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 61869  | 2316  | 162359.28    | 14.2647                     | <b>1.091(1.034,1.151)</b>             |               |
| Regular exercise  |                 |        |       |              |                             |                                       | 0.1266        |
| No                | Control         | 199649 | 7616  | 529481.67    | 14.3839                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 114159 | 4480  | 299287.63    | 14.9689                     | <b>1.081(1.042,1.122)</b>             |               |
| Yes               | Control         | 55873  | 1758  | 146779.72    | 11.9771                     | 1(Ref.)                               |               |
|                   | Cholecystectomy | 29508  | 1046  | 76903.14     | 13.6015                     | <b>1.156(1.071,1.249)</b>             |               |

<sup>†</sup>Fracture incidence per 1,000 person-years, <sup>‡</sup>adjusted for age, sex, income, place of residence, diabetes mellitus, hypertension, dyslipidemia, smoking, alcohol drinking, exercise, and BMI; diabetes mellitus defined as using insulin or oral hypoglycemic agents, or a fasting plasma glucose level  $\geq 126$  mg/dL; hypertension defined as systolic pressure was  $\geq 140$  mmHg, or the diastolic pressure was  $\geq 90$  mmHg, or if current antihypertensive medication was used; dyslipidemia defined as serum total cholesterol was  $\geq 240$ mg/dL or as using lipid-lowering drugs. HR, hazard ratio; CI, confidence interval; Ref, reference; BMI, body mass index. Bold style indicated statistical significance.