```
┌─────────────────────────────┐        ┌──────────────────────────────────────────┐
│ Initial primary lung cancer │────────│ Inclusion criterion:                       │
│ patients were involved      │        │ 1) Initial diagnosed age between 20 and 79 │
└─────────────────────────────┘        │ 2) Initial diagnosed year between 1998 and 2011 │
                                        │ 3) Not reported from death certificate or autopsy │
                                        │ 4) Second primary cancers (SPCs) occurred more │
                                        │ than 2 months after initial diagnosis)     │
                                        └──────────────────────────────────────────┘

┌─────────────────────────────┐        ┌──────────────────────────────────────────┐
│ n=356,840                   │────────│ Exclusion criterion:                       │
└─────────────────────────────┘        │ 1) Missing values on important covariates (e.g. │
                                        │ tumor size, stage, grade, histology, laterality) │
                                        │ 2) Surgery was either missing or the type of │
                                        │ surgery was not provided.                  │
                                        └──────────────────────────────────────────┘

┌─────────────────────────────┐
│ n= 142,491                  │
└─────────────────────────────┘

┌──────────────────────┐        ┌──────────────────────┐
│ Cohort without SPCs  │        │ Cohort without SPCs  │
│ n=128,117            │        │ n=14,374             │
└──────────────────────┘        └──────────────────────┘
```

Figure S1 The flowchart of the qualified study patients.

Table S1: Risk scores of each factor listed in the Nomogram

| Characteristics | Score |
| --- | --- |
| Sex | |
|    Female | 0 |
|    Male | 0.5 |
| Age at diagnosis, years | |
|    20~54 | 0 |
|    55~70 | 2.8 |
|    71~79 | 1.7 |
| Race | |
|    Black | 1.8 |
|    White | 1.6 |
|    Other | 0 |
| Tumor size, cm | |
|    <=2 | 2.3 |
|    2~4 | 1.6 |
|    4~6 | 0.6 |
|    >6 | 0 |
| SEER summary stage | |
|    Localized | 9.9 |
|    Regional | 6.9 |
|    Distant | 0 |
| Histology | |
|    AD | 0.7 |
|    LC | 1.7 |
|    SC | 0 |
|    SQ | 1.5 |
|    Other | 0.5 |
| Surgery | |
|    No surgery | 0 |
|    Lobectomy | 10 |
|    Pneumonectomy | 7.8 |
|    Sublobectomy | 8.6 |
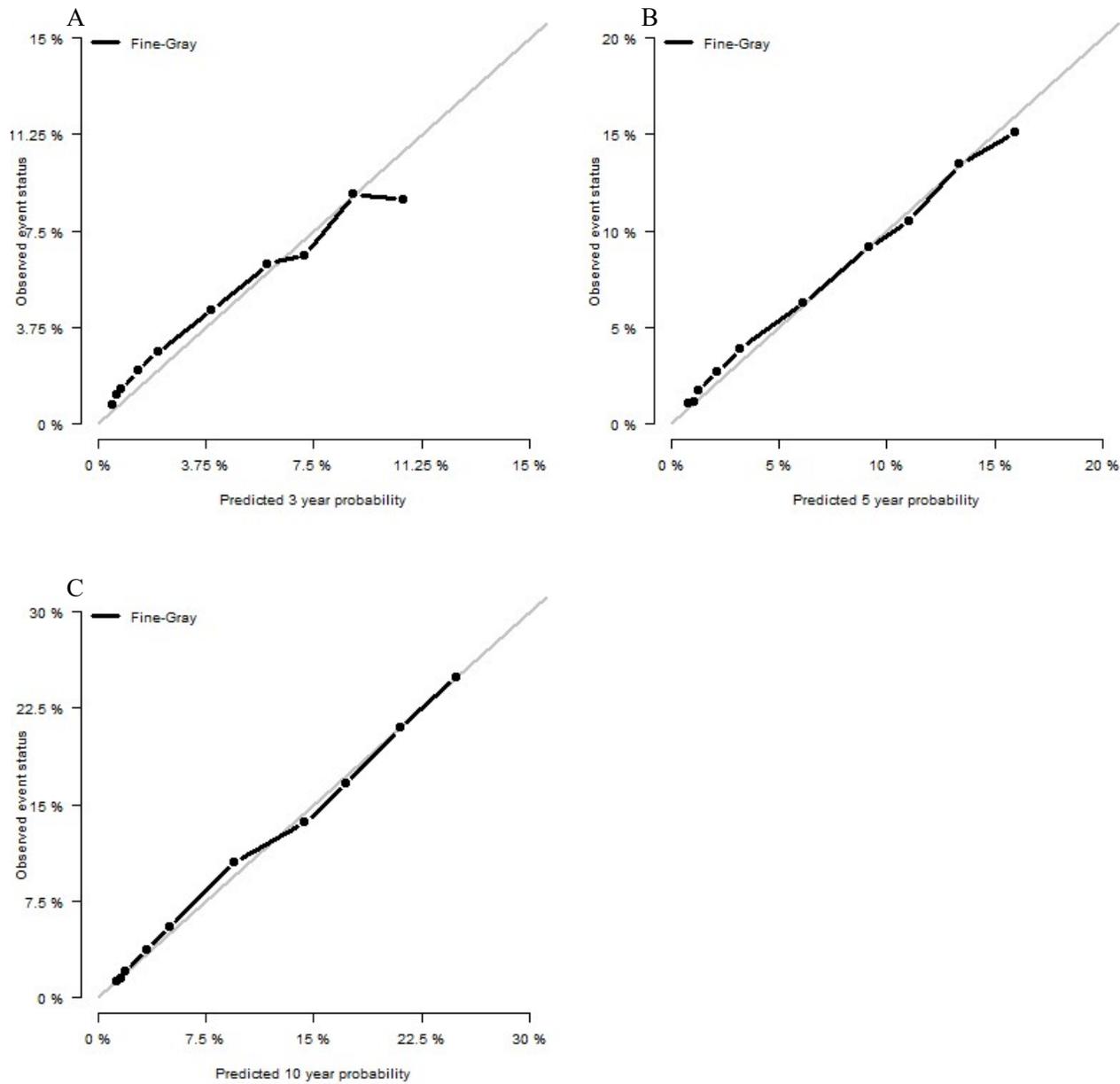
Figure S2. Calibration plots. The x-axis shows the predicted probability of the cumulative incidence model. The y-axis shows the observed cumulative incidences.