

**Supplementary Table 1** Competing-risks proportional hazards models exploring associations between hormonal parameters (categorised at the quintiles) and incident prostate cancer.

| Variable                           | Cases/men<br>at risk (n) | Univariate |            |                | Multivariate |            |                |
|------------------------------------|--------------------------|------------|------------|----------------|--------------|------------|----------------|
|                                    |                          | SHR        | 95% CI     | <i>p</i> value | SHR          | 95% CI     | <i>p</i> value |
| <b>Total testosterone (nmol/L)</b> |                          |            |            | 0.133          |              |            | 0.266          |
| ≤10.9                              | 50/715                   | 1          |            |                | 1            |            |                |
| 11.0 - 13.5                        | 50/725                   | 0.99       | 0.67, 1.47 |                | 0.94         | 0.64, 1.40 |                |
| 13.6 - 15.9                        | 73/737                   | 1.45       | 1.01, 2.08 |                | 1.36         | 0.95, 1.96 |                |
| 16.0 - 19.3                        | 57/723                   | 1.15       | 0.78, 1.68 |                | 1.07         | 0.72, 1.59 |                |
| ≥19.4                              | 67/735                   | 1.34       | 0.93, 1.93 |                | 1.23         | 0.83, 1.81 |                |
| <b>Free testosterone (pmol/L)</b>  |                          |            |            | 0.334          |              |            | 0.401          |
| ≤209                               | 45/721                   | 1          |            |                | 1            |            |                |
| 210 - 251                          | 58/718                   | 1.28       | 0.87, 1.90 |                | 1.30         | 0.88, 1.93 |                |
| 252 - 289                          | 64/730                   | 1.41       | 0.96, 2.06 |                | 1.38         | 0.93, 2.03 |                |
| 290 - 341                          | 69/730                   | 1.47       | 1.01, 2.15 |                | 1.46         | 0.99, 2.15 |                |
| ≥342                               | 61/733                   | 1.30       | 0.88, 1.91 |                | 1.27         | 0.85, 1.89 |                |
| <b>SHBG (nmol/L)</b>               |                          |            |            | 0.106          |              |            | 0.100          |
| ≤29.4                              | 48/722                   | 1          |            |                | 1            |            |                |
| 29.5 - 36.4                        | 73/728                   | 1.57       | 1.09, 2.27 |                | 1.53         | 1.07, 2.20 |                |
| 36.5 - 43.3                        | 67/727                   | 1.46       | 1.01, 2.12 |                | 1.33         | 0.92, 1.94 |                |
| 43.4 - 53.1                        | 57/726                   | 1.25       | 0.85, 1.84 |                | 1.13         | 0.76, 1.69 |                |
| ≥53.2                              | 52/729                   | 1.16       | 0.78, 1.71 |                | 1.03         | 0.69, 1.54 |                |
| <b>LH (IU/L)</b>                   |                          |            |            | 0.259          |              |            | 0.315          |
| ≤2.7                               | 70/724                   | 1          |            |                | 1            |            |                |
| 2.8 - 3.7                          | 51/729                   | 0.73       | 0.51, 1.05 |                | 0.75         | 0.52, 1.08 |                |
| 3.8 - 5.0                          | 63/728                   | 0.90       | 0.64, 1.27 |                | 0.92         | 0.65, 1.30 |                |
| 5.1 - 7.2                          | 65/726                   | 0.95       | 0.68, 1.34 |                | 0.99         | 0.70, 1.39 |                |
| ≥7.3                               | 48/728                   | 0.72       | 0.49, 1.04 |                | 0.74         | 0.51, 1.08 |                |

CI=confidence interval; SHR=sub-hazard ratio. Sex hormones entered into the models as a categorical variable split at the quintiles. Multivariate models adjusted for age, waist to hip ratio, smoking status (never/ex-/current smoker), smoking exposure (maximum quantity of tobacco smoked and years of smoking), diabetes, alcohol use, and previous diagnosis of cancer (other than prostate) prior to blood sampling. *p* values are for Wald test.

**Supplementary Table 2** Competing-risks proportional hazards models exploring associations between hormonal parameters (categorised at the quintiles) and incident colorectal cancer.

| Variable                           | Cases/men<br>at risk (n) | Univariate |            |                | Multivariate |            |                |
|------------------------------------|--------------------------|------------|------------|----------------|--------------|------------|----------------|
|                                    |                          | SHR        | 95% CI     | <i>p</i> value | SHR          | 95% CI     | <i>p</i> value |
| <b>Total testosterone (nmol/L)</b> |                          |            |            | 0.378          |              |            | 0.327          |
| ≤10.9                              | 18/691                   | 1.12       | 0.57, 2.18 |                | 1.04         | 0.53, 2.01 |                |
| 11.0 - 13.5                        | 25/699                   | 1.54       | 0.83, 2.86 |                | 1.51         | 0.81, 2.79 |                |
| 13.6 - 15.9                        | 17/716                   | 1          |            |                | 1            |            |                |
| 16.0 - 19.3                        | 26/702                   | 1.58       | 0.86, 2.93 |                | 1.63         | 0.88, 3.01 |                |
| ≥19.4                              | 18/712                   | 1.03       | 0.53, 2.00 |                | 1.05         | 0.54, 2.06 |                |
| <b>Free testosterone (pmol/L)</b>  |                          |            |            | 0.164          |              |            | 0.123          |
| ≤209                               | 20/697                   | 0.79       | 0.44, 1.43 |                | 0.73         | 0.41, 1.31 |                |
| 210 - 251                          | 23/694                   | 0.96       | 0.55, 1.70 |                | 0.93         | 0.53, 1.65 |                |
| 252 - 289                          | 25/714                   | 1          |            |                | 1            |            |                |
| 290 - 341                          | 25/704                   | 1.08       | 0.62, 1.88 |                | 1.18         | 0.67, 2.06 |                |
| ≥342                               | 11/708                   | 0.46       | 0.22, 0.93 |                | 0.49         | 0.24, 1.00 |                |
| <b>SHBG (nmol/L)</b>               |                          |            |            | 0.959          |              |            | 0.954          |
| ≤29.6                              | 17/703                   | 0.79       | 0.42, 1.49 |                | 0.83         | 0.44, 1.57 |                |
| 29.7 - 36.4                        | 21/695                   | 0.96       | 0.53, 1.74 |                | 0.97         | 0.53, 1.76 |                |
| 36.5 - 43.3                        | 23/708                   | 1          |            |                | 1            |            |                |
| 43.4 - 53.2                        | 21/706                   | 0.88       | 0.49, 1.59 |                | 0.85         | 0.47, 1.56 |                |
| ≥53.3                              | 22/705                   | 0.88       | 0.49, 1.58 |                | 0.82         | 0.45, 1.51 |                |
| <b>LH (IU/L)</b>                   |                          |            |            | 0.177          |              |            | 0.261          |
| ≤2.7                               | 11/703                   | 0.54       | 0.26, 1.12 |                | 0.61         | 0.29, 1.28 |                |
| 2.8 - 3.7                          | 22/703                   | 1.09       | 0.59, 1.97 |                | 1.18         | 0.64, 2.15 |                |
| 3.8 - 5.0                          | 21/702                   | 1          |            |                | 1            |            |                |
| 5.1 - 7.2                          | 28/705                   | 1.30       | 0.74, 2.28 |                | 1.32         | 0.75, 2.33 |                |
| ≥7.3                               | 22/707                   | 0.96       | 0.53, 1.74 |                | 0.94         | 0.52, 1.72 |                |

CI=confidence interval; SHR=sub-hazard ratio. Sex hormones entered into the models as a categorical variable split at the quintiles. Multivariate models adjusted for age, waist to hip ratio, smoking status (never/ex-/current smoker), smoking exposure (maximum quantity of tobacco smoked and years of smoking), diabetes, alcohol use, and previous diagnosis of cancer (other than colorectal) prior to blood sampling. *p* values are for Wald test.

**Supplementary Table 3** Competing-risks proportional hazards models exploring associations between hormonal parameters (categorised at the quintiles) and incident lung cancer.

| Variable                           | Cases/men<br>at risk (n) | Univariate |            |                | Multivariate |            |                |
|------------------------------------|--------------------------|------------|------------|----------------|--------------|------------|----------------|
|                                    |                          | SHR        | 95% CI     | <i>p</i> value | SHR          | 95% CI     | <i>p</i> value |
| <b>Total testosterone (nmol/L)</b> |                          |            |            | 0.006          |              |            | 0.002          |
| ≤10.9                              | 16/710                   | 2.11       | 0.90, 4.92 |                | 1.80         | 0.74, 4.38 |                |
| 11.0 - 13.5                        | 13/717                   | 1.69       | 0.70, 4.07 |                | 1.63         | 0.67, 3.93 |                |
| 13.6 - 15.9                        | 8/733                    | 1          |            |                | 1            |            |                |
| 16.0 - 19.3                        | 15/718                   | 1.94       | 0.82, 4.58 |                | 1.81         | 0.75, 4.33 |                |
| ≥19.4                              | 30/733                   | 3.75       | 1.72, 8.16 |                | 3.90         | 1.78, 8.54 |                |
| <b>Free testosterone (pmol/L)</b>  |                          |            |            | 0.037          |              |            | 0.016          |
| ≤209                               | 20/712                   | 1.85       | 0.89, 3.86 |                | 1.68         | 0.78, 3.60 |                |
| 210 - 251                          | 9/713                    | 0.85       | 0.35, 2.04 |                | 0.86         | 0.36, 2.06 |                |
| 252 - 289                          | 11/726                   | 1          |            |                | 1            |            |                |
| 290 - 342                          | 17/732                   | 1.60       | 0.75, 3.42 |                | 1.62         | 0.76, 3.47 |                |
| ≥343                               | 25/725                   | 2.37       | 1.17, 4.83 |                | 2.67         | 1.32, 5.41 |                |
| <b>SHBG (nmol/L)</b>               |                          |            |            | 0.020          |              |            | 0.036          |
| ≤29.4                              | 14/716                   | 1.64       | 0.71, 3.77 |                | 1.56         | 0.67, 3.65 |                |
| 29.5 - 36.4                        | 23/724                   | 2.66       | 1.24, 5.71 |                | 2.38         | 1.12, 5.08 |                |
| 36.5 - 43.3                        | 9/724                    | 1          |            |                | 1            |            |                |
| 43.4 - 53.1                        | 11/720                   | 1.21       | 0.50, 2.92 |                | 1.09         | 0.45, 2.63 |                |
| ≥53.2                              | 25/724                   | 2.69       | 1.25, 5.80 |                | 2.45         | 1.15, 5.24 |                |
| <b>LH (IU/L)</b>                   |                          |            |            | 0.006          |              |            | 0.009          |
| ≤2.7                               | 18/718                   | 1.59       | 0.77, 3.29 |                | 1.61         | 0.77, 3.33 |                |
| 2.8 - 3.7                          | 6/723                    | 0.51       | 0.19, 1.36 |                | 0.51         | 0.19, 1.37 |                |
| 3.8 - 5.0                          | 12/722                   | 1          |            |                | 1            |            |                |
| 5.1 - 7.2                          | 28/725                   | 2.35       | 1.19, 4.64 |                | 2.14         | 1.08, 4.23 |                |
| ≥7.3                               | 18/723                   | 1.47       | 0.70, 3.08 |                | 1.19         | 0.57, 2.49 |                |

CI=confidence interval; SHR=sub-hazard ratio. Sex hormones entered into the models as a categorical variable split at the quintiles. Multivariate models adjusted for age, waist to hip ratio, smoking status (never/ex-/current smoker), smoking exposure (maximum quantity of tobacco smoked and years of smoking), diabetes, alcohol use, and previous diagnosis of cancer (other than lung) prior to blood sampling. *p* values are for Wald test.

**Supplementary Table 4** Competing-risks proportional hazards models exploring associations between testosterone levels and incident lung cancer in men who have never smoked or are ex-smokers, after exclusion of cases diagnosed within two years of blood sampling.

| Variable                           | Univariate |            |                | Multivariate |            |                |
|------------------------------------|------------|------------|----------------|--------------|------------|----------------|
|                                    | SHR        | 95% CI     | <i>p</i> value | SHR          | 95% CI     | <i>p</i> value |
| <b>Total testosterone (nmol/L)</b> |            |            | 0.004          |              |            | 0.002          |
| 5                                  | 2.65       | 1.07, 6.59 |                | 2.03         | 0.78, 5.24 |                |
| 10                                 | 1.50       | 1.00, 2.25 |                | 1.32         | 0.86, 2.01 |                |
| 15                                 | 1          |            |                | 1            |            |                |
| 20                                 | 1.12       | 0.96, 1.31 |                | 1.27         | 1.04, 1.55 |                |
| 30                                 | 2.19       | 1.29, 3.72 |                | 3.16         | 1.60, 6.24 |                |
| <b>Free testosterone (pmol/L)</b>  |            |            | 0.003          |              |            | 0.011          |
| 100                                | 1.98       | 0.80, 4.92 |                | 1.62         | 0.63, 4.18 |                |
| 200                                | 1.27       | 0.90, 1.79 |                | 1.17         | 0.81, 1.67 |                |
| 280                                | 1          |            |                | 1            |            |                |
| 300                                | 0.99       | 0.95, 1.04 |                | 1.01         | 0.96, 1.06 |                |
| 400                                | 1.16       | 1.00, 1.34 |                | 1.23         | 1.01, 1.50 |                |

CI=confidence interval; SHR=sub-hazard ratio. Sex hormones entered into the models as restricted cubic splines. Multivariate models adjusted for age, waist to hip ratio, smoking status (never/ex-smoker), smoking exposure (maximum quantity of tobacco smoked and years of smoking), diabetes, alcohol use, and previous diagnosis of cancer (other than lung) prior to blood sampling. *p* values are for Wald test.