“package”{mylongevity}

# Calculation of life expectancies

## Description

The three functions entitled mylongevity_method1 to mylongevity_method3 calculate life expectancy for a set of individuals with certain characteristics provided in a user-supplied dataset. Gompertz distribution with prespecified intercept a and slope b is assumed for baseline hazards of the form λ0(t) = a + bt.
The four functions entitled mylongevity_double_cox_method1 to mylongevity_double_cox_method4 fit the Double Cox regression to the provided data and calculate life expectancies for patients with type 2 diabetes mellitus, on Hormone Replacement therapy, with ischemic stroke and with TIA, respectively, using the log-hazard ratio estimates from the fitted model.

## Usage

mylongevity_method1 (data, indexes_of_variables, working_directory)

mylongevity_method2 (data, indexes_of_variables, list_of_variables, age, a, b, working_directory)

mylongevity_method3 (data, indexes_of_variables, list_of_variables, age, a, b, T_start_indicator, T_stop_indicator, status_indicator, working_directory)

double_cox_longevity1(data, dist, cluster, formula.shape, formula.scale, age_of_diagnosis, time_past_from_diagnosis,working_directory,name_for_age_factor=NULL)

double_cox_longevity2(data, dist, cluster,formula.shape,formula.scale, age_of_diagnosis, time_past_from_diagnosis,working_directory,name_for_age_factor=NULL)

mylongevity_double_cox_method1(data,indexes_of_variables,age_of_diagnosis,time_past_from_diagnosis)

mylongevity_double_cox_method2(data,indexes_of_variables,age_of_diagnosis,time_past_from_diagnosis)

mylongevity_double_cox_method3(data,indexes_of_variables,age_of_diagnosis,time_past_from_diagnosis)

mylongevity_double_cox_method4(data,indexes_of_variables,age_of_diagnosis,time_past_from_diagnosis)

## Arguments

- For mylongevity_method1, user has to input arguments: data, and indexes_of_variables.
- For mylongevity_method2, user has to input arguments: data, indexes_of_variables, list_of_variables, age, a, b and working_directory.

- For mylongevity_method3, user has to input arguments: data, indexes_of_variables, list_of_variables, age, a, b, T_start_indicator, T_stop_indicator, status_indicator, working_directory.
- For double_cox_longevity1, user has to input arguments: data, dist, cluster, formula.shape, formula.scale, age_of_diagnosis, time_past_from_diagnosis, working_directory
- For double_cox_longevity2, user has to input arguments: data, dist, cluster, formula.shape, formula.scale, age_of_diagnosis, time_past_from_diagnosis, working_directory.
- mylongevity_double_cox_method1, user must input arguments: data, indexes_of_variables, age_of_diagnosis,time_past_from_diagnosis
- mylongevity_double_cox_method2, user must input arguments: data, indexes_of_variables, age_of_diagnosis, time_past_from_diagnosis
- mylongevity_double_cox_method3, user must input arguments: data, indexes_of_variables, age_of_diagnosis, time_past_from_diagnosis
- mylongevity_double_cox_method4, user must input arguments: data, indexes_of_variables, age_of_diagnosis, time_past_from_diagnosis

User must also input an argument name_for_age_factor if age is being used as a continuous variable in the model. Otherwise, an argument name_for_age_factor should not be specified.

## Details

**Description of mylongevity_method1**

This method matches the attributes of inputted data with results of life expectancies from the landmark analysis described in Kulinskaya et al. (2020b). For a set of given attributes, this method produces a table with life expectancies similar to those provided on the website https://mylongevity.org/.

**Description of mylongevity_method2**

This method calculates life expectancies using the log-hazard ratio estimates from the landmark analysis Kulinskaya et al. (2020b) and the weights of the risk groups estimated from the given dataset.

**Description of mylongevity_method3**

This method fits the Cox regression to the provided data, eliminates non-significant terms, calculates weights for each combination of risk factors in the final Cox regression model and computes life expectancies based on a paper Kulinskaya et al. (2020a). At the moment, we can only include additive terms to the model without interactions. Also, in this method we can only include categorical risk factors because we need to split the population into different risk subgroups. If there is any continuous variable, then it should be factored into a categorical one. If none of the variables in the model are significant, this method does not produce any output.

For mylongevity_method2 and mylongevity_method3, user should specify the directory where all the temporary files will be stored. The directory should be specified as working_directory=" E:/myproject". A folder called "temp" will be created in the specified directory. This is the folder

where all necessary/temporary files will be stored. Also for method 2 and method 3, two functions are required: - function_for_table_of_combination() and a function calculate_life_expectancy() which are separate functions within this R package.

For mylongevity_method1, user has to specify the data and columns using the argument "indexes_of_variables" in following order:
"age","gender","townsend","smokerCategory","htn","diabetesCategory","hcl","bmiCategory","qRiskCategory","statins",

The definition of columns are:

- age is a variable with numeric value which stands for number of years from the date of birth. age should only take values between 60 and 85
- Gender is a string variable which stands for gender of individual with possible values "M" for males and "F" for females
- Townsend is a deprivation index which takes values 1, 2, 3, 4, 5. The Townsend variable measures the prosperity of area where individual lives.
- smokerCategory is a categorical variable with numeric value which defines if individual is smoker or not: (1 - no smoker, 2 - ex smoker, 3 – smoker)
- htn is a categorical variable with numeric value for treated hypertension status. 1 – no--hypertension, 2 - treated hypertension, 3 – untreated hypertension
- diabetesCategory is a categorical variable with numeric value for diabetes status. 0 – no diabetes, 1 – diabetes
- hcl is a categorical variable with numeric value for hypercholesteromia. 0 – no hypercholesteromia, 1 – hypercholesteromia
- bmiCategory is a categorical variable with numeric value for Body Mass Index categories [1 – Healthy weight (BMI<25), 2 – Overweight (BMI≥25 and BMI<30), 3 – Obese (BMI≥30)]
- qRiskCategory is a categorical variable with numeric value for cardiovascular disease risk measured by QRISK2 https://qrisk.org/2017/ [2 – for low risk (QRISK2<20), 0 – for moderate risk (QRISK2≥20 and QRISK2<40), 1 - for high risk (QRISK2≥40 or diagnosis of CVD)]
- statins is a categorical variable with numeric value for statin prescription status (0 - no statin intake, 1 – on statin/prescribed statin)

mylongevity_method2 uses log-hazard ratio coefficients from website "mylongevity.org" with inputted data. mylongevity_method2 takes the log-hazard ratio coefficients and calculates the weights from data.

For mylongevity_method2, user has to input the data with columns of interest using the argument "indexes_of_variables". Also, user has to specify the particular age of interest for a given data to select the corresponding log-hazard ratio coefficients from landmark model for a particular age. User also has to specify values for a and b from $\lambda 0(t) = a + bt$ assumption for Gompertz distribution. User has to specify the names of variables which will be used in calculation with the same names as in inputted data using the variable "list_of_variables"
For mylongevity_method2, user can only input columns for variables ("statins","cvd_risk","diabetes","HTN_diag_treat","hypercholesterolaemia","BMI","Smoking")
User has to specify the variables of interest using the argument "list_of_variables".
The order of specified columns using the argument "indexes_of_variables" should match the variables of interest "list_of_variables" by names.

mylongevity_method3 fits the proportional hazards Cox regression from the package "survival" and seeks the best model using the backward elimination with the AIC criterion.

User has to input the data and specify the columns for independent variables to put in cox regression using the argument “indexes_of_variables” and state the list of variables “list_of_variables”. In the argument “indexes_of_variables”, the column indices for “T_start_indicator”,” T_stop_indicator” and "status _indicator” should be specified.
Since we are fitting the cox regression to time to event data, user has to include either time to death and status using the variables T_start_indicator and status _indicator to fit models with non-interval data as "Surv(time=", T_start_indicator,",event=", status _indicator,")~" or using the variables T_start_indicator, T_stop_indicator and status _indicator for interval censored or counting process data as "Surv(time=",T_start_indicator,",time2=", T_stop_indicator,",event=", status _indicator,")~". T_start_indicator, T_stop_indicator and status _indicator are the names of columns in inputted data. The columns for T_start_indicator, T_stop_indicator and status _indicator also should be specified.

**Description of double_cox_method1**

This method fits the Double Cox regression model introduced in Begun et al. (2019) to the provided dataset and calculates life expectancies using the log-hazard ratio estimates from fitted model. This method returns a data frame with all possible combinations of categorical variables from double-Cox regression model and resulting life expectancies.

**Description of double_cox_method2**

This method fits the Double Cox regression model to the provided data and calculates life expectancies using the log-hazard ratio estimates from fitted model. This method returns a data frame with all the patients in the given data and their life expectancies.

In functions double_cox_method1 and double_cox_method2, the definition of arguments to specify are:

data: Data set

dist: distribution of the time-to-failure (’Weibull’ or ’Gompertz’):

cluster: The name of the covariate defining the random effect/frailty (equal to NULL for the fixed-effect model);

formula.shape: The object defining the fields for covariates influencing the shape;

cluster: The name of the covariate defining the random effect (is equal to NULL for the fixed-effect model);

formula.scale: The formula object defining the fields for time-to-failure (or time-of-start and time-to-failure) and for covariates influencing the scale proportional hazard terms;

age_of_diagnosis: Age of diagnosis for a condition/disease of interest

time_past_from_diagnosis: The time from diagnosis of a condition/disease of interest, i.e. how long ago this happened

working_directory: A working directory for temporary files to be saved.

**Description of mylongevity_double_cox_method1**

This method matches the attributes of inputted data with our results of life expectancies from the double Cox regression analysis on type 2 diabetes mellitus study. For a set of given attributes, this method produces a table with life expectancies.

In functions mylongevity_double_cox_method1, the definition of parameters to specify are:

data: data set of clients

indexes_of_variables: columns of interest in data

age_of_diagnosis: Age of diagnosis for a type 2 diabetes mellitus

time_past_from_diagnosis: The time past from diagnosis of a type 2 diabetes mellitus

**Description of mylongevity_double_cox_method2**

This method matches the attributes of inputted data with our results of life expectancies from the double Cox regression analysis on hormone replacement therapy study. For a set of given attributes, this method produces a table with relative life expectancies for cases compared to controls with the same attributes.

In functions mylongevity_double_cox_method2, the definition of parameters to specify are:

data: data set of clients

indexes_of_variables: columns of interest in data

age_of_diagnosis: Age of initiation of hormone replacement therapy

time_past_from_diagnosis: The time past from initiation of hormone replacement therapy

**Description of mylongevity_double_cox_method3**

This method matches the attributes of inputted data with our results of life expectancies from the double cox regression analysis on ischaemic stroke study. For a set of given attributes, this method produces a table with life expectancies.

In functions mylongevity_double_cox_method3, the definition of parameters to specify are:

data: data set of clients

indexes_of_variables: columns of interest in data

age_of_diagnosis: Age of diagnosis for ischaemic stroke

time_past_from_diagnosis: The time past from diagnosis of an ischaemic stroke

**Description of mylongevity_double_cox_method4**

This method matches the attributes of inputted data with our results of life expectancies from the double cox regression analysis on transient ischaemic stroke study. For a set of given attributes, this method produces a table with life expectancies.

In functions mylongevity_double_cox_method4, the definition of parameters to specify are:

data: data set of clients

age_of_diagnosis: Age of diagnosis for transient ischaemic stroke

time_past_from_diagnosis: The time past from diagnosis of a transient ischaemic stroke

**Details and methodology for calculation of life expectancy using Double Cox regression**

The life expectancies within these functions are calculated using formula

$$\text{Life expectancy} = \frac{\int_{time}^{\infty} S(t)dt}{S_{total}},$$

where the univariate survival function is given by

$S(a, b, \beta_{shape}, \beta_{scale}, \sigma^2, u) = E\exp(-ZH(a, b, \beta_{shape}, \beta_{scale}, u)) = (1+ \sigma^2 H(a, b, \beta_{shape}, \beta_{scale}, u))^{-1/\sigma 2}$

and parameters**:** time is the time past from diagnosis, u is the covariate vector, a and b are slope and shape parameters defining the hazard functions (Weibull or Gompertz), βshape and βscale are the Cox-regression parameters for shape and scale, respectively, and $\sigma^2$ is the variance of frailty.

When including the age as a continuous variable in the model, the formula for life expectancy slightly changes. In particular, the coefficient for scale becomes

$$\beta_{\text{scale}} = \beta_{\text{birth\_cohort}} + age_{at\ diagnosis}\beta_{\text{at age of diagnosis}} + \beta_{\text{cases}}$$

and shape parameter becomes

$$\beta_{\text{shape}} = \beta_{\text{birth\_cohort}}$$

In denominator, $S_{total}$ will consist of three components

$$S_{total} = \exp(-(H_{control} + (H_{case\ at\ time\ from\ diagnosis} - H_{case\ at\ diagnosis})))$$

where

$$H_{control} = \exp(\beta_{\text{scale}}u)t/a^{bexp(\beta_{\text{shape}}u)}$$

With t=0, a and b from the model output shape and scale parameters as

$$\beta_{\text{shape}} = \beta_{\text{birth\_cohort}}$$

$$\beta_{\text{scale}} = \beta_{\text{birth\_cohort}} + age_{at\ diagnosis}\beta_{\text{at age of diagnosis}}$$

The difference in hazards term for cases consist of $H_{case\ at\ time\ from\ diagnosis}$ and $H_{case\ at\ diagnosis}$ which are

$$H_{case\ at\ time\ from\ diagnosis} = \exp(\beta_{\text{scale}} u) t / a^{bexp(\beta_{\text{shape}} u)}$$

With t the number of years from diagnosis and

$$\beta_{\text{scale}} = \beta_{\text{birth\_cohort}}$$

$$\beta_{\text{scale}} = \beta_{\text{birth\_cohort}} + age_{at\ diagnosis} \beta_{\text{at age of diagnosis}} + \beta_{\text{cases}}$$

And

$$H_{case\ at\ diagnosis} = \exp(\beta_{\text{scale}} u) t / a^{bexp(\beta_{\text{shape}} u)}$$

With t=0 and

$$\beta_{\text{shape}} = \beta_{\text{birth\_cohort}}$$

$$\beta_{\text{scale}} = \beta_{\text{birth\_cohort}} + age_{at\ diagnosis} \beta_{\text{at age of diagnosis}} + \beta_{\text{cases}}$$

**Structure of the data for double_cox_method1 and double_cox_method2**

The data set includes the following fields:

- In the case without left truncation: Time-to-failure and censoring
- In the case with left truncation at the start time, time-of start, time-of-failure, and censoring. Censoring must be either 0 (no event) or 1 (event);
- Covariates (continuous or categorical) used in a study (can be empty set).

a and b are slope and shape parameters defining the hazard functions (Weibull or Gompertz, see details below), βshape and βscale are the Cox-regression parameters for shape and scale, respectively, and σ 2 is the variance of frailty

Main effects and interactions can be specified in scale and shape formulas inside formula.scale and formula.shape, respectively. It is not possible to include interaction effect without specifying main effects of the variables involved in this interaction. For a model with interactions without the main effects of variables involved in these interactions, these interactions must be reformatted as categorical variables with correct number of categories.

## References

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Elena Kulinskaya, Ilyas Bakbergenuly and Lisanne Gitsels. A fine scale. The Actuary, May 2020, 24-27

### Required packages

dplyr, survival, sqldf, MASS, stringr, ucminf, xtable

## See Also

coxph, survfit, survreg

## Examples

```
#example for mylongevity_method1
set.seed(1234)
n<-1000
age <-round(runif(n, min = 60, max = 85))
gender <- c(rep('M',times=n/2),rep('F',times=n/2))
townsend <- round(runif(n, min = 1, max = 5))
smokerCategory <- round(runif(n, min = 1, max = 3))
```

```
htn  <- round(runif(n, min = 1, max = 3))
diabetesCategory  <- round(runif(n, min = 0, max = 1))
hcl <- round(runif(n, min = 0, max = 1))
bmiCategory <- round(runif(n, min = 1, max = 3))
qRiskCategory <- round(runif(n, min = 0, max = 2))
statins <- round(runif(n, min = 0, max = 1))
data_of_clients <-
data.frame(age,gender,townsend,smokerCategory,htn,diabetesCategory,hcl,bmiCategory,qRiskCategory,statins)
indexes_for_columns <- c(1,2,3,4,5,6,7,8,9,10)
life_expectancy_table=mylongevity_method1(data=data_of_clients,indexes_of_variables=indexes_for_columns)


#dummy data example for mylongevity_method2
set.seed(1234)
n<-1000
gender <- c(rep('M',times=n/2),rep('F',times=n/2))
townsend <- round(runif(n, min = 1, max = 5))
smokerCategory <- round(runif(n, min = 1, max = 3))
HTN_diag_treat  <- round(runif(n, min = 1, max = 3))
diabetes  <- round(runif(n, min = 0, max = 1))
hypercholesterolaemia <- round(runif(n, min = 0, max = 1))
bmiCategory <- round(runif(n, min = 1, max = 3))
cvd_risk <- round(runif(n, min = 0, max = 2))
statins <- round(runif(n, min = 0, max = 1))
age <-61
a=-12.459132
b=0.11764571
list_of_variables<-c("statins","cvd_risk","diabetes","HTN_diag_treat","hypercholesterolaemia")
data<-data.frame(statins,cvd_risk,diabetes,HTN_diag_treat,hypercholesterolaemia)
indexes_of_variables <- c(1,2,3,4,5)
working_directory<-"E:/myproject/" #please edit this to your working directory
life_expectancy_table_method2<-
mylongevity_method2(data=data,indexes_of_variables=indexes_of_variables,list_of_variables,age,a,b,working_directory)

#dummy data example for mylongevity_method3
set.seed(1)
n<-10000
gender <- c(rep('M',times=n/2),rep('F',times=n/2))
townsend <- as.factor(round(runif(n, min = 1, max = 5)))
smokerCategory <- as.factor(round(runif(n, min = 1, max = 3)))
HTN_diag_treat  <- as.factor(round(runif(n, min = 1, max = 3)))
diabetes  <- as.factor(round(runif(n, min = 0, max = 1)))
hypercholesterolaemia <- as.factor(round(runif(n, min = 0, max = 1)))
bmiCategory <- as.factor(round(runif(n, min = 1, max = 3)))
cvd_risk <- as.factor(round(runif(n, min = 0, max = 2)))
statins <- as.factor(round(runif(n, min = 0, max = 1)))
aspirin<-as.factor(round(runif(n, min = 0, max = 1)))
Tstart<-rep(1,times=n)
```

```
Tstop<-abs(rnorm(n,mean=26,sd= 6))
death<-sample(c(0,1), replace=TRUE, size=n)
T_start_indicator <- "Tstart"
T_stop_indicator <-  "Tstop"
status_indicator <-  "death"
age <-70
a=-12.459132
b=0.11764571
indexes_of_variables<-c(1,2,3,4,5,6,7,8,9,10,11,12)
list_of_variables<-
c("statins","cvd_risk","diabetes","HTN_diag_treat","hypercholesterolaemia","bmiCategory","smoker
Category","townsend","aspirin")
data<-
data.frame(statins,cvd_risk,diabetes,HTN_diag_treat,hypercholesterolaemia,bmiCategory,smokerCa
tegory,townsend,aspirin,Tstart,Tstop,death)
working_directory<-"E:/myproject/"
life_expectancy_table_method3<-
mylongevity_method3(data=data,indexes_of_variables=indexes_of_variables,list_of_variables,age,a
,b,
T_start_indicator,T_stop_indicator,status_indicator,working_directory)

#example for mylongevity_double_cox_method1
set.seed(1234)
n<-1000
atrial<-round(runif(n, min = 0, max = 1)) #indicator for atrial fibrillation  (0 - absence of atrial
fibrillation or 1 - presence of atrial fibrillation)
birth_year<-round(runif(n, min = 0, max = 2))  #indicator for year of birth   (0 - born in 1930-1939, 1 -
born in 1950-1960, 2 - born in  1940-1949)
bmi_regrp <-round(runif(n, min = 0, max = 2)) #indicator for body mass index (0 - Healthy, 1 -
Overweight, 2 - Obese)
diabetes<-round(runif(n, min = 0, max = 1))  #indicator of cases control group (0 - absence type 2
diabetes mellitus, 1 - presence type 2 diabetes mellitus)
hf<-round(runif(n, min = 0, max = 1))  #indicator for heart failure (0 - absence of heart failure, 1 -
presence of heart failure)
hyperchol<-round(runif(n, min = 0, max = 2)) #indicator for hypercholesterolemia (0 - absence of
hypercholesterolemia, 1 - presence of hypercholesterolemia)
hypert<-round(runif(n, min = 0, max = 2)) #indicator for hypertension (0 - absence of Hypertension, 1
- Treated Hypertension 2 - Untreated Hypertension)
miocarInfarct<-round(runif(n, min = 0, max = 1)) #indicator for myocardial infarction (0 - absence of
myocardial infarction, 1 - presence of myocardial infarction)
pvd<-round(runif(n, min = 0, max = 1)) #indicator for peripheral vascular disease (0 - absence of
peripheral vascular disease, 1 - presence of peripheral vascular disease)
sex<-round(runif(n, min = 0, max = 1)) #indicator for gender (0 - Female, 1 - Male)
smokes<-round(runif(n, min = 0, max = 2)) #indicator of smoking status (0 non-smoker, 1 - former
smoker, 2 - current smoker)
townsend<-round(runif(n, min = 0, max = 4)) #- deprivation index (0 - (Townsend 3),  1 - (Townsend
1)  2 - (Townsend 2) , 3 - (Townsend 4), 4 - (Townsend 5))

data<-
data.frame(atrial,birth_year,bmi_regrp,diabetes,hf,hyperchol,hypert,miocarInfarct,pvd,sex,smokes,t
ownsend)
```

```
indexes_of_variables <- c(1,2,3,4,5,6,7,8,9,10,11,12)
age_of_diagnosis=60
time_past_from_diagnosis=1

life_expectancy_mylongevity_double_cox_method1<-mylongevity_double_cox_method1(data, indexes_of_variables, age_of_diagnosis, time_past_from_diagnosis)


#example for mylongevity_double_cox_method2
set.seed(1234)
n<-1000
B_cohort<-round(runif(n, min = 0, max = 3)) # indicator for year of birth  (0 - born in 1921-1930 , 1 - born in 1931-1940,  2 - born in  1941-1950, 3 - born in 1951-1960)
BMIsmoke<-round(runif(n, min = 0, max = 5)) # indicator for interaction for body mass index and smoking (0 - Healthy or Overweight and Non Smoker, 1 - healthy weight and current smoker, 2 - healthy weight and ex smoker, 3, Obese and current smoker, 4 - Obese and ex-smoker, 5 - Obese and non-smoker)
CHD<-round(runif(n, min = 0, max = 1)) # indicator for heart failure (0 - absence of coronary heart disease , 1 - presence of coronary heart disease)
hrtcat<-round(runif(n, min = 0, max = 2)) # indicator for type of hormone replacement therapy (0 - non users of hormone replacement therapy, 1  - Combined Oestrogen and Progesteron , 2 - Oestrogen-only)
DMIIsmoke<-round(runif(n, min = 0, max = 5)) # interaction of diabetes and smoking variables (0 - non diabetic and non smoker,1 - non diabetic  and current smoker ,2 - non diabetic and ex-smoker,3 - diabetic and current smoker,4 - diabetic  and ex smoker ,5 - diabetic and non-smoker)
opho<-round(runif(n, min = 1, max = 2)) # indicator of cases control group (0 - both uteras and ovarian not removed,  1 - both uteras and ovarian removed, 2 - ovaries removed but not uteras)
hypertension<-round(runif(n, min = 0, max = 1)) # indicator for hypertension (0 - absence of Hypertension, 1 - Treated Hypertension 2 - Untreated Hypertension)
deprivation <-round(runif(n, min = 0, max = 2))# deprivation index (0 - Low (Townsend 1 and Townsend 2), 1 - High (Townsend 4 and Townsend 5), 2 - Medium (Townsend 3))

data<-data.frame(B_cohort,BMIsmoke,CHD,deprivation,DMIIsmoke,hrtcat,hypertension,opho)
indexes_of_variables <- c(1,2,3,4,5,6,7,8)
age_of_diagnosis=45
time_past_from_diagnosis=1

life_expectancy_mylongevity_double_cox_method2<-mylongevity_double_cox_method2(data, indexes_of_variables, age_of_diagnosis, time_past_from_diagnosis)

#example for mylongevity_double_cox_method3
set.seed(1234)
n<-1000
birth_cohort<-round(runif(n, min = 0, max = 3)) #: indicator for year of birth (0 - born in 1908-1920, 1 - born in 1921-1930, 2 - born in  1931-1940, 3 - born in 1941 - 1960)
IMD_Quintile<-round(runif(n, min = 1, max = 5)) #: deprivation index (1 (least deprived), 2, 3, 4, 5 (most deprived))
BMI_category<-round(runif(n, min = 0, max = 1)) #: categorical variable with numeric value for Body Mass Index  categories (0 - Healthy weight (BMI<25), 1 - Overweight (BMI>=25 and BMI<30) and Obese (BMI>=30))
antiplatelet_drugs<-round(runif(n, min = 0, max = 1)) #: indicator for antiplatelet drugs (0 - no antiplatelet drugs or 1 - no antiplatelet drugs)
```

```
COPD<-round(runif(n, min = 0, max = 1)) #:  indicator for chronic obstructive pulmonary disease (0 - absense of chronic obstructive pulmonary disease or 1 - presence of chronic obstructive pulmonary disease)
heart_failure<-round(runif(n, min = 0, max = 1)) #:  indicator for heart failure (0 - absence of heart failure or 1 - presence of heart failure)
myocardial_infarction<-round(runif(n, min = 0, max = 1)) #:  indicator for myocardial infarction (0 - absense of myocardial infarction or 1 - presence of myocardial infarction)
PVD_PAD<-round(runif(n, min = 0, max = 1)) #: indicator for peripheral vascular disease (0 - absence of peripheral vascular disease or 1 - presence of peripheral vascular disease )
SMOKING<-round(runif(n, min = 0, max = 2)) #: indicator of smoking status (0 non-smoker, 1 - current smoker, 2 - former smoker)
anticoagulant_agents<-round(runif(n, min = 0, max = 1)) #: indicator for anticoagulant agents (0 - no anticoagulant agents, 1 - yes anticoagulant agents )
Diabetes_factor<-round(runif(n, min = 0, max = 2)) #: is a categorical variable with numeric value for diabetes status (0 - absence of diabetes or 1 - presence of diabetes and treated, 2 - absence of diabetes and untreated)
sex<-round(runif(n, min = 0, max = 1)) #: indicator for gender (0 - Female , 1 - Male)
groupscases<-round(runif(n, min = 0, max = 1)) #: indicator of cases control group (0 – group without ischemic stroke  or 1 – group with ischemic stroke)
antihypertensive_agents<-round(runif(n, min = 0, max = 1))#: indicator for antihypertensive agents (0 - no  antihypertensive agents, 1 - yes antihypertensive agents)

data<-data.frame(birth_cohort,IMD_Quintile,BMI_category, antiplatelet_drugs, COPD, heart_failure, myocardial_infarction,PVD_PAD,SMOKING,anticoagulant_agents,Diabetes_factor,sex,groupscases,antihypertensive_agents)
indexes_of_variables <- c(1,2,3,4,5,6,7,8,9,10,11,12,13,14)
age_of_diagnosis=65
time_past_from_diagnosis=1

life_expectancy_mylongevity_double_cox_method3<-mylongevity_double_cox_method3(data, indexes_of_variables,age_of_diagnosis,time_past_from_diagnosis)

#example for mylongevity_double_cox_method4

set.seed(1234)
n<-1000
birth_cohort<-round(runif(n, min = 0, max = 3)) #: indicator for year of birth (0 - born in 1908-1920, 1 - born in 1921-1930, 2 - born in  1931-1940, 3 - born in 1941 - 1960)
sex<-round(runif(n, min = 1, max = 2)) #: indicator for gender (0 - Female , 1 - Male)
IMD_Quintile<-round(runif(n, min = 1, max = 5)) #: deprivation index (1 (least deprived), 2, 3, 4, 5 (most deprived))
BMI_category<-round(runif(n, min = 0, max = 1)) #: categorical variable with numeric value for Body Mass Index  categories (0 - Healthy weight (BMI<25), 1 - Overweight (BMI>=25 and BMI<30) and Obese (BMI>=30))
asthma<-round(runif(n, min = 0, max = 1)) #: indicator for asthma (0 - absence of asthma, 1 - presence of asthma)
COPD<-round(runif(n, min = 0, max = 1)) #: indicator for chronic obstructive pulmonary disease (0 - absense of chronic obstructive pulmonary disease, 1 - presence of chronic obstructive pulmonary disease)
CKD<-round(runif(n, min = 0, max = 1)) #: indicator for chronic kidney disease (0 - absence of chronic kidney disease , 1 - presence of chronic kidney disease)
```

```
myocardial_infarction<-round(runif(n, min = 0, max = 1)) #:  indicator for myocardial infarction (0 - absense of myocardial infarction, 1 - presence of myocardial infarction)
PVD_PAD<-round(runif(n, min = 0, max = 1)) #: indicator for peripheral vascular disease (0 - absence of peripheral vascular disease, 1 - presence of peripheral vascular disease)
SMOKING<-round(runif(n, min = 0, max = 2)) #: indicator of smoking status (0 non-smoker, 1 - current smoker, 2 - former smoker)
alcohol_cat<-round(runif(n, min = 0, max = 1)) #: indicator for alcohol intake variable (0 – non - drinker, 1 - drinker)
atrial_fibrillation<-round(runif(n, min = 0, max = 1)) #: indicator for atrial fibrillation  (0 - absence of atrial fibrillation, 1 - presence of atrial fibrillation)
Diabetes_factor<-round(runif(n, min = 0, max = 2)) #: indicator for diabetes (0 – absence of diabetes or 1 - presence of diabetes and treated, 2 - absence of diabetes and untreated)
anticoagulant_agents<-round(runif(n, min = 0, max = 1)) #: indicator for anticoagulant agents (0 - no anticoagulant agents, 1 - yes anticoagulant agents)
groupscases<-round(runif(n, min = 0, max = 1)) #: indicator of cases control group (0 - without transient ischemic attack, 1 - with transient ischemic attack)
antihypertensive_agents<-round(runif(n, min = 0, max = 1)) #: indicator for antihypertensive agents (0 - no  antihypertensive agents, 1 - yes antihypertensive agents)
APL<-round(runif(n, min = 0, max = 1)) #: indicator for antiplatelet therapy (0 - no antiplatelet therapy, 1 - yes antiplatelet therapy)
heart_failure<-round(runif(n, min = 0, max = 1)) #: indicator for heart failure (0 - absence of heart failure or 1 - presence of heart failure)

data<-
data.frame(birth_cohort,sex,IMD_Quintile,BMI_category,asthma,COPD,CKD,myocardial_infarction,PVD_PAD,SMOKING,alcohol_cat,atrial_fibrillation,Diabetes_factor,anticoagulant_agents,groupscases,antihypertensive_agents,APL,heart_failure)
indexes_of_variables <- c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18)
age_of_diagnosis=65
time_past_from_diagnosis=1

res4<-mylongevity_double_cox_method4(data, indexes_of_variables, age_of_diagnosis, time_past_from_diagnosis)


#####################################################################
#######example for double_cox_longevity1 and double_cox_longevity2####
#####################################################################
set.seed(1)
###working example for double cox regression model
n<-10000
clinic<-as.factor(round(runif(n, min = 1, max = 1000)))###suppose we have 200 clinic
gender <- c(rep('M',times=n/2),rep('F',times=n/2))
townsend <- as.factor(round(runif(n, min = 1, max = 5)))
smokerCategory <- as.factor(round(runif(n, min = 1, max = 3)))
HTN_diag_treat <- as.factor(round(runif(n, min = 1, max = 3)))
diabetes <- as.factor(round(runif(n, min = 0, max = 1)))
hypercholesterolaemia <- as.factor(round(runif(n, min = 0, max = 1)))
bmiCategory <- as.factor(round(runif(n, min = 1, max = 3)))
age_cat<- as.factor(round(runif(n, min = 1, max = 3)))
birth_cohort<- as.factor(round(runif(n, min = 0, max = 3)))
```

```
cvd_risk <- as.factor(round(runif(n, min = 0, max = 2)))
statins <- as.factor(round(runif(n, min = 0, max = 1)))
aspirin<-as.factor(round(runif(n, min = 0, max = 1)))
age_c<-rnorm(n,mean=70, sd=10)
Tstart<-rep(60,times=n)
Tstop<-abs(rnorm(n,mean=70,sd= 6))
death<-sample(c(0,1), replace=TRUE, size=n)
T_start_indicator <- "Tstart"
T_stop_indicator <-  "Tstop"
status_indicator <-  "death"
working_directory<-"E:/myproject/"
data<-
data.frame(clinic,statins,age_c,birth_cohort,cvd_risk,diabetes,HTN_diag_treat,hypercholesterolaemi
a,bmiCategory,age_cat,smokerCategory,townsend,aspirin,Tstart,Tstop,death)
data<-data[data$Tstop>data$Tstart,] #removing all the observatiobs where Tstop happened before
T start

age_of_diagnosis<-60 ##age at diagnosis
time_past_from_diagnosis<-5 ## time from diagnosis
name_for_age_factor=NULL
cluster="clinic"
dist="Weibull"

formula.scale=as.formula("survival::Surv(Tstart,Tstop,death)~birth_cohort+age_c+HTN_diag_treat+s
mokerCategory")
formula.shape=as.formula("survival::Surv(Tstart,Tstop, death) ~birth_cohort")

life_expectancy_double_cox_longevity1<-
double_cox_longevity1(data,dist,cluster,formula.shape,formula.scale,age_of_diagnosis,time_past_fr
om_diagnosis,working_directory,name_for_age_factor=NULL)

life_expectancy_double_cox_longevity2<-
double_cox_longevity2(data,dist,cluster,formula.shape,formula.scale,age_of_diagnosis,time_past_fr
om_diagnosis,working_directory,name_for_age_factor="age_c")
```

**Appendix**

1. **Parameters with 95% confidence intervals from landmark analysis model used in functions mylongevity_method1 and mylongevity_method2**
   The years are counted from age 60 to 85 every 6 month.

| | Statin | | | QRISK>40 or CVD | | | QRISK<20 | | |
|---|---|---|---|---|---|---|---|---|---|
| Years | logHR | L | U | logHR | L | U | logHR | L | U |
| 0 | -0.091 | -0.273 | 0.092 | 0.095 | -0.035 | 0.224 | -0.062 | -0.145 | 0.021 |
| 0.5 | -0.109 | -0.268 | 0.050 | 0.113 | -0.001 | 0.228 | -0.067 | -0.141 | 0.007 |
| 1 | -0.127 | -0.265 | 0.011 | 0.131 | 0.030 | 0.233 | -0.072 | -0.137 | -0.006 |
| 1.5 | -0.144 | -0.264 | -0.024 | 0.149 | 0.058 | 0.240 | -0.077 | -0.135 | -0.018 |
| 2 | -0.159 | -0.264 | -0.055 | 0.166 | 0.085 | 0.247 | -0.081 | -0.133 | -0.029 |
| 2.5 | -0.174 | -0.266 | -0.083 | 0.182 | 0.109 | 0.256 | -0.085 | -0.132 | -0.038 |
| 3 | -0.188 | -0.269 | -0.108 | 0.198 | 0.132 | 0.265 | -0.089 | -0.132 | -0.047 |
| 3.5 | -0.202 | -0.274 | -0.129 | 0.213 | 0.152 | 0.275 | -0.093 | -0.133 | -0.053 |
| 4 | -0.214 | -0.280 | -0.148 | 0.228 | 0.171 | 0.285 | -0.096 | -0.134 | -0.059 |
| 4.5 | -0.226 | -0.287 | -0.165 | 0.242 | 0.188 | 0.296 | -0.099 | -0.135 | -0.064 |
| 5 | -0.237 | -0.295 | -0.179 | 0.255 | 0.203 | 0.307 | -0.102 | -0.137 | -0.067 |
| 5.5 | -0.247 | -0.302 | -0.192 | 0.268 | 0.218 | 0.317 | -0.104 | -0.138 | -0.070 |
| 6 | -0.257 | -0.310 | -0.204 | 0.280 | 0.231 | 0.328 | -0.106 | -0.139 | -0.072 |
| 6.5 | -0.266 | -0.318 | -0.215 | 0.291 | 0.244 | 0.338 | -0.107 | -0.140 | -0.073 |
| 7 | -0.275 | -0.325 | -0.225 | 0.301 | 0.255 | 0.347 | -0.107 | -0.140 | -0.074 |
| 7.5 | -0.283 | -0.332 | -0.234 | 0.311 | 0.266 | 0.355 | -0.107 | -0.140 | -0.074 |
| 8 | -0.291 | -0.339 | -0.243 | 0.320 | 0.276 | 0.363 | -0.106 | -0.139 | -0.074 |
| 8.5 | -0.298 | -0.345 | -0.251 | 0.328 | 0.286 | 0.370 | -0.105 | -0.137 | -0.073 |
| 9 | -0.305 | -0.351 | -0.259 | 0.335 | 0.294 | 0.377 | -0.103 | -0.134 | -0.071 |
| 9.5 | -0.312 | -0.357 | -0.266 | 0.342 | 0.302 | 0.382 | -0.100 | -0.131 | -0.069 |
| 10 | -0.318 | -0.363 | -0.272 | 0.348 | 0.308 | 0.387 | -0.097 | -0.127 | -0.066 |
| 10.5 | -0.324 | -0.369 | -0.278 | 0.353 | 0.314 | 0.392 | -0.092 | -0.122 | -0.062 |
| 11 | -0.329 | -0.375 | -0.283 | 0.357 | 0.319 | 0.395 | -0.087 | -0.117 | -0.057 |
| 11.5 | -0.335 | -0.381 | -0.288 | 0.360 | 0.323 | 0.398 | -0.081 | -0.111 | -0.051 |
| 12 | -0.340 | -0.387 | -0.293 | 0.363 | 0.325 | 0.401 | -0.074 | -0.105 | -0.042 |
| 12.5 | -0.345 | -0.393 | -0.297 | 0.365 | 0.327 | 0.402 | -0.066 | -0.099 | -0.032 |
| 13 | -0.351 | -0.400 | -0.301 | 0.365 | 0.327 | 0.404 | -0.057 | -0.093 | -0.020 |
| 13.5 | -0.356 | -0.406 | -0.305 | 0.365 | 0.326 | 0.404 | -0.047 | -0.088 | -0.005 |
| 14 | -0.361 | -0.412 | -0.309 | 0.364 | 0.325 | 0.404 | -0.036 | -0.083 | 0.011 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 14.5 | -0.366 | -0.419 | -0.313 | 0.362 | 0.322 | 0.403 | -0.024 | -0.078 | 0.031 |
| 15 | -0.371 | -0.426 | -0.316 | 0.359 | 0.318 | 0.401 | -0.010 | -0.073 | 0.052 |
| 15.5 | -0.376 | -0.434 | -0.318 | 0.355 | 0.313 | 0.398 | 0.004 | -0.068 | 0.076 |
| 16 | -0.382 | -0.443 | -0.321 | 0.350 | 0.307 | 0.394 | 0.020 | -0.063 | 0.103 |
| 16.5 | -0.387 | -0.453 | -0.322 | 0.345 | 0.299 | 0.390 | 0.037 | -0.058 | 0.132 |
| 17 | -0.393 | -0.465 | -0.321 | 0.338 | 0.291 | 0.384 | 0.055 | -0.054 | 0.163 |
| 17.5 | -0.399 | -0.479 | -0.320 | 0.330 | 0.282 | 0.378 | 0.074 | -0.049 | 0.197 |
| 18 | -0.406 | -0.495 | -0.316 | 0.321 | 0.272 | 0.371 | 0.095 | -0.044 | 0.234 |
| 18.5 | -0.412 | -0.514 | -0.311 | 0.311 | 0.260 | 0.363 | 0.117 | -0.039 | 0.273 |
| 19 | -0.420 | -0.536 | -0.303 | 0.300 | 0.247 | 0.354 | 0.141 | -0.034 | 0.315 |
| 19.5 | -0.427 | -0.560 | -0.294 | 0.288 | 0.232 | 0.345 | 0.166 | -0.029 | 0.360 |
| 20 | -0.435 | -0.588 | -0.282 | 0.275 | 0.215 | 0.335 | 0.192 | -0.024 | 0.408 |
| 20.5 | -0.444 | -0.619 | -0.268 | 0.261 | 0.196 | 0.326 | 0.220 | -0.019 | 0.459 |
| 21 | -0.453 | -0.654 | -0.251 | 0.246 | 0.175 | 0.317 | 0.250 | -0.014 | 0.514 |
| 21.5 | -0.462 | -0.692 | -0.232 | 0.229 | 0.151 | 0.307 | 0.281 | -0.009 | 0.571 |
| 22 | -0.472 | -0.734 | -0.211 | 0.212 | 0.125 | 0.298 | 0.314 | -0.005 | 0.632 |
| 22.5 | -0.483 | -0.780 | -0.187 | 0.193 | 0.096 | 0.290 | 0.348 | 0.000 | 0.696 |
| 23 | -0.495 | -0.829 | -0.160 | 0.173 | 0.065 | 0.281 | 0.384 | 0.005 | 0.763 |
| 23.5 | -0.507 | -0.883 | -0.131 | 0.152 | 0.030 | 0.274 | 0.422 | 0.009 | 0.835 |
| 24 | -0.520 | -0.941 | -0.098 | 0.130 | -0.007 | 0.267 | 0.461 | 0.013 | 0.910 |
| 24.5 | -0.534 | -1.004 | -0.063 | 0.106 | -0.047 | 0.260 | 0.503 | 0.017 | 0.988 |
| 25 | -0.548 | -1.071 | -0.026 | 0.082 | -0.091 | 0.254 | 0.546 | 0.021 | 1.071 |

| | Overweight | | | Obese | | | Diabetes | | |
|---|---|---|---|---|---|---|---|---|---|
| Years | logHR | L | U | logHR | L | U | logHR | L | U |
| 0 | -0.045 | -0.083 | -0.006 | 0.098 | 0.047 | 0.149 | 0.604 | 0.525 | 0.684 |
| 0.5 | -0.044 | -0.082 | -0.006 | 0.097 | 0.047 | 0.147 | 0.588 | 0.515 | 0.660 |
| 1 | -0.044 | -0.082 | -0.006 | 0.095 | 0.046 | 0.144 | 0.571 | 0.504 | 0.638 |
| 1.5 | -0.045 | -0.083 | -0.006 | 0.093 | 0.044 | 0.142 | 0.555 | 0.492 | 0.618 |
| 2 | -0.046 | -0.084 | -0.007 | 0.091 | 0.042 | 0.140 | 0.540 | 0.480 | 0.599 |
| 2.5 | -0.047 | -0.086 | -0.008 | 0.088 | 0.039 | 0.137 | 0.525 | 0.468 | 0.582 |
| 3 | -0.049 | -0.088 | -0.010 | 0.085 | 0.036 | 0.134 | 0.510 | 0.455 | 0.565 |
| 3.5 | -0.051 | -0.091 | -0.012 | 0.082 | 0.033 | 0.131 | 0.496 | 0.443 | 0.550 |
| 4 | -0.054 | -0.094 | -0.015 | 0.079 | 0.030 | 0.127 | 0.483 | 0.431 | 0.535 |
| 4.5 | -0.057 | -0.097 | -0.018 | 0.075 | 0.026 | 0.123 | 0.469 | 0.418 | 0.520 |
| 5 | -0.061 | -0.100 | -0.021 | 0.071 | 0.023 | 0.119 | 0.457 | 0.407 | 0.507 |
| 5.5 | -0.064 | -0.104 | -0.025 | 0.067 | 0.019 | 0.114 | 0.444 | 0.395 | 0.494 |
| 6 | -0.068 | -0.107 | -0.030 | 0.062 | 0.015 | 0.109 | 0.433 | 0.384 | 0.481 |
| 6.5 | -0.073 | -0.111 | -0.034 | 0.057 | 0.011 | 0.104 | 0.421 | 0.373 | 0.469 |
| 7 | -0.077 | -0.115 | -0.039 | 0.053 | 0.006 | 0.099 | 0.410 | 0.363 | 0.457 |
| 7.5 | -0.082 | -0.119 | -0.044 | 0.047 | 0.002 | 0.093 | 0.399 | 0.353 | 0.445 |
| 8 | -0.086 | -0.124 | -0.049 | 0.042 | -0.003 | 0.088 | 0.389 | 0.343 | 0.434 |
| 8.5 | -0.091 | -0.128 | -0.054 | 0.037 | -0.008 | 0.082 | 0.379 | 0.334 | 0.423 |
| 9 | -0.096 | -0.133 | -0.059 | 0.031 | -0.014 | 0.076 | 0.369 | 0.325 | 0.413 |
| 9.5 | -0.101 | -0.137 | -0.064 | 0.026 | -0.019 | 0.070 | 0.360 | 0.316 | 0.403 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10 | -0.105 | -0.142 | -0.069 | 0.020 | -0.025 | 0.065 | 0.351 | 0.307 | 0.394 |
| 10.5 | -0.110 | -0.147 | -0.073 | 0.014 | -0.031 | 0.059 | 0.342 | 0.299 | 0.385 |
| 11 | -0.115 | -0.152 | -0.078 | 0.008 | -0.038 | 0.053 | 0.334 | 0.290 | 0.377 |
| 11.5 | -0.120 | -0.157 | -0.082 | 0.002 | -0.045 | 0.048 | 0.325 | 0.282 | 0.369 |
| 12 | -0.124 | -0.162 | -0.086 | -0.005 | -0.052 | 0.042 | 0.318 | 0.273 | 0.362 |
| 12.5 | -0.128 | -0.167 | -0.089 | -0.011 | -0.059 | 0.037 | 0.310 | 0.265 | 0.355 |
| 13 | -0.132 | -0.172 | -0.093 | -0.017 | -0.066 | 0.031 | 0.303 | 0.257 | 0.348 |
| 13.5 | -0.136 | -0.176 | -0.096 | -0.024 | -0.074 | 0.026 | 0.296 | 0.249 | 0.342 |
| 14 | -0.140 | -0.181 | -0.098 | -0.030 | -0.081 | 0.021 | 0.289 | 0.242 | 0.336 |
| 14.5 | -0.143 | -0.185 | -0.101 | -0.037 | -0.089 | 0.015 | 0.282 | 0.234 | 0.331 |
| 15 | -0.146 | -0.189 | -0.103 | -0.043 | -0.097 | 0.010 | 0.276 | 0.227 | 0.325 |
| 15.5 | -0.148 | -0.193 | -0.104 | -0.050 | -0.104 | 0.005 | 0.270 | 0.219 | 0.321 |
| 16 | -0.150 | -0.196 | -0.105 | -0.056 | -0.112 | 0.000 | 0.264 | 0.212 | 0.316 |
| 16.5 | -0.152 | -0.199 | -0.105 | -0.062 | -0.121 | -0.004 | 0.258 | 0.205 | 0.312 |
| 17 | -0.153 | -0.202 | -0.104 | -0.069 | -0.129 | -0.009 | 0.253 | 0.198 | 0.308 |
| 17.5 | -0.154 | -0.205 | -0.103 | -0.075 | -0.138 | -0.013 | 0.247 | 0.190 | 0.304 |
| 18 | -0.154 | -0.207 | -0.101 | -0.081 | -0.147 | -0.016 | 0.242 | 0.183 | 0.301 |
| 18.5 | -0.154 | -0.209 | -0.098 | -0.088 | -0.156 | -0.019 | 0.237 | 0.175 | 0.299 |
| 19 | -0.152 | -0.211 | -0.093 | -0.094 | -0.167 | -0.021 | 0.232 | 0.167 | 0.297 |
| 19.5 | -0.151 | -0.214 | -0.088 | -0.100 | -0.178 | -0.022 | 0.227 | 0.158 | 0.296 |
| 20 | -0.148 | -0.216 | -0.081 | -0.106 | -0.189 | -0.022 | 0.222 | 0.149 | 0.296 |
| 20.5 | -0.145 | -0.218 | -0.072 | -0.111 | -0.202 | -0.021 | 0.218 | 0.138 | 0.297 |
| 21 | -0.141 | -0.221 | -0.062 | -0.117 | -0.216 | -0.018 | 0.213 | 0.127 | 0.299 |
| 21.5 | -0.137 | -0.223 | -0.050 | -0.122 | -0.230 | -0.015 | 0.209 | 0.115 | 0.303 |
| 22 | -0.131 | -0.226 | -0.037 | -0.128 | -0.246 | -0.009 | 0.204 | 0.101 | 0.307 |
| 22.5 | -0.125 | -0.229 | -0.022 | -0.133 | -0.263 | -0.003 | 0.200 | 0.087 | 0.314 |
| 23 | -0.118 | -0.232 | -0.004 | -0.138 | -0.281 | 0.005 | 0.196 | 0.071 | 0.321 |
| 23.5 | -0.110 | -0.235 | 0.015 | -0.143 | -0.300 | 0.015 | 0.192 | 0.053 | 0.330 |
| 24 | -0.101 | -0.238 | 0.036 | -0.147 | -0.320 | 0.026 | 0.188 | 0.034 | 0.341 |
| 24.5 | -0.091 | -0.242 | 0.060 | -0.152 | -0.342 | 0.039 | 0.183 | 0.014 | 0.353 |
| 25 | -0.080 | -0.245 | 0.085 | -0.156 | -0.365 | 0.054 | 0.179 | -0.008 | 0.366 |

| | Hypercholesterolemia | | | Ex-Smoker | | | Current Smoker | | |
|---|---|---|---|---|---|---|---|---|---|
| Years | logHR | L | U | logHR | L | U | logHR | L | U |
| 0 | -0.226 | -0.298 | -0.155 | 0.387 | 0.331 | 0.444 | 0.891 | 0.853 | 0.929 |
| 0.5 | -0.221 | -0.288 | -0.153 | 0.385 | 0.334 | 0.437 | 0.885 | 0.850 | 0.921 |
| 1 | -0.216 | -0.280 | -0.151 | 0.384 | 0.336 | 0.432 | 0.880 | 0.846 | 0.914 |
| 1.5 | -0.210 | -0.272 | -0.148 | 0.382 | 0.337 | 0.428 | 0.875 | 0.841 | 0.909 |
| 2 | -0.205 | -0.265 | -0.145 | 0.381 | 0.338 | 0.424 | 0.871 | 0.837 | 0.904 |
| 2.5 | -0.200 | -0.259 | -0.141 | 0.380 | 0.338 | 0.422 | 0.867 | 0.833 | 0.901 |
| 3 | -0.195 | -0.252 | -0.137 | 0.379 | 0.338 | 0.420 | 0.863 | 0.828 | 0.897 |
| 3.5 | -0.190 | -0.247 | -0.133 | 0.378 | 0.339 | 0.418 | 0.859 | 0.825 | 0.894 |
| 4 | -0.185 | -0.241 | -0.129 | 0.378 | 0.339 | 0.417 | 0.856 | 0.821 | 0.891 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4.5 | -0.180 | -0.235 | -0.125 | 0.377 | 0.339 | 0.416 | 0.853 | 0.817 | 0.888 |
| 5 | -0.175 | -0.230 | -0.121 | 0.377 | 0.339 | 0.415 | 0.850 | 0.814 | 0.886 |
| 5.5 | -0.171 | -0.224 | -0.117 | 0.377 | 0.339 | 0.414 | 0.847 | 0.811 | 0.883 |
| 6 | -0.166 | -0.219 | -0.113 | 0.376 | 0.340 | 0.413 | 0.844 | 0.808 | 0.880 |
| 6.5 | -0.161 | -0.213 | -0.109 | 0.376 | 0.340 | 0.412 | 0.841 | 0.805 | 0.877 |
| 7 | -0.157 | -0.208 | -0.105 | 0.376 | 0.340 | 0.411 | 0.838 | 0.802 | 0.874 |
| 7.5 | -0.152 | -0.203 | -0.102 | 0.376 | 0.340 | 0.411 | 0.835 | 0.799 | 0.872 |
| 8 | -0.148 | -0.197 | -0.098 | 0.375 | 0.341 | 0.410 | 0.832 | 0.796 | 0.869 |
| 8.5 | -0.143 | -0.192 | -0.094 | 0.375 | 0.341 | 0.409 | 0.829 | 0.792 | 0.866 |
| 9 | -0.139 | -0.187 | -0.090 | 0.375 | 0.341 | 0.409 | 0.825 | 0.788 | 0.862 |
| 9.5 | -0.134 | -0.183 | -0.086 | 0.374 | 0.340 | 0.408 | 0.822 | 0.784 | 0.859 |
| 10 | -0.130 | -0.178 | -0.082 | 0.374 | 0.340 | 0.407 | 0.817 | 0.779 | 0.855 |
| 10.5 | -0.126 | -0.174 | -0.078 | 0.373 | 0.339 | 0.407 | 0.813 | 0.774 | 0.852 |
| 11 | -0.121 | -0.170 | -0.073 | 0.372 | 0.338 | 0.406 | 0.808 | 0.768 | 0.848 |
| 11.5 | -0.117 | -0.166 | -0.069 | 0.371 | 0.337 | 0.405 | 0.803 | 0.762 | 0.843 |
| 12 | -0.113 | -0.162 | -0.064 | 0.370 | 0.335 | 0.404 | 0.797 | 0.755 | 0.838 |
| 12.5 | -0.109 | -0.158 | -0.060 | 0.368 | 0.333 | 0.404 | 0.790 | 0.748 | 0.833 |
| 13 | -0.105 | -0.155 | -0.055 | 0.367 | 0.331 | 0.403 | 0.783 | 0.740 | 0.827 |
| 13.5 | -0.101 | -0.151 | -0.050 | 0.365 | 0.328 | 0.401 | 0.776 | 0.731 | 0.820 |
| 14 | -0.096 | -0.148 | -0.045 | 0.362 | 0.325 | 0.400 | 0.767 | 0.721 | 0.813 |
| 14.5 | -0.092 | -0.145 | -0.040 | 0.360 | 0.322 | 0.398 | 0.758 | 0.710 | 0.806 |
| 15 | -0.088 | -0.142 | -0.035 | 0.357 | 0.318 | 0.397 | 0.748 | 0.699 | 0.798 |
| 15.5 | -0.084 | -0.139 | -0.029 | 0.354 | 0.314 | 0.394 | 0.737 | 0.686 | 0.789 |
| 16 | -0.080 | -0.136 | -0.024 | 0.351 | 0.309 | 0.392 | 0.726 | 0.672 | 0.779 |
| 16.5 | -0.076 | -0.134 | -0.018 | 0.347 | 0.304 | 0.389 | 0.713 | 0.657 | 0.769 |
| 17 | -0.072 | -0.132 | -0.013 | 0.343 | 0.299 | 0.386 | 0.700 | 0.641 | 0.759 |
| 17.5 | -0.068 | -0.130 | -0.006 | 0.338 | 0.292 | 0.383 | 0.685 | 0.623 | 0.748 |
| 18 | -0.064 | -0.128 | 0.000 | 0.333 | 0.285 | 0.380 | 0.670 | 0.603 | 0.737 |
| 18.5 | -0.060 | -0.128 | 0.007 | 0.327 | 0.278 | 0.377 | 0.653 | 0.581 | 0.726 |
| 19 | -0.056 | -0.127 | 0.015 | 0.321 | 0.269 | 0.373 | 0.636 | 0.557 | 0.714 |
| 19.5 | -0.052 | -0.128 | 0.024 | 0.315 | 0.259 | 0.370 | 0.617 | 0.531 | 0.703 |
| 20 | -0.048 | -0.130 | 0.034 | 0.308 | 0.248 | 0.367 | 0.597 | 0.502 | 0.691 |
| 20.5 | -0.044 | -0.132 | 0.044 | 0.300 | 0.236 | 0.365 | 0.575 | 0.471 | 0.679 |
| 21 | -0.040 | -0.136 | 0.056 | 0.292 | 0.222 | 0.362 | 0.552 | 0.438 | 0.666 |
| 21.5 | -0.036 | -0.141 | 0.069 | 0.283 | 0.206 | 0.360 | 0.528 | 0.402 | 0.654 |
| 22 | -0.032 | -0.147 | 0.083 | 0.274 | 0.190 | 0.358 | 0.503 | 0.363 | 0.642 |
| 22.5 | -0.028 | -0.154 | 0.098 | 0.264 | 0.171 | 0.357 | 0.476 | 0.322 | 0.629 |
| 23 | -0.024 | -0.163 | 0.115 | 0.253 | 0.151 | 0.356 | 0.447 | 0.278 | 0.616 |
| 23.5 | -0.020 | -0.173 | 0.133 | 0.242 | 0.129 | 0.356 | 0.417 | 0.230 | 0.604 |
| 24 | -0.016 | -0.184 | 0.153 | 0.230 | 0.105 | 0.356 | 0.385 | 0.180 | 0.591 |
| 24.5 | -0.012 | -0.197 | 0.174 | 0.218 | 0.079 | 0.357 | 0.352 | 0.126 | 0.577 |
| 25 | -0.007 | -0.211 | 0.196 | 0.205 | 0.051 | 0.358 | 0.317 | 0.070 | 0.564 |

| | Treated Hypertension | | | Untreated Hypertension | | |
|---|---|---|---|---|---|---|
| Years | logHR | L | U | logHR | L | U |
| 0 | 0.224 | 0.173 | 0.275 | 0.057 | 0.016 | 0.097 |
| 0.5 | 0.213 | 0.166 | 0.260 | 0.058 | 0.020 | 0.096 |
| 1 | 0.203 | 0.159 | 0.247 | 0.059 | 0.022 | 0.096 |
| 1.5 | 0.193 | 0.152 | 0.234 | 0.059 | 0.023 | 0.096 |
| 2 | 0.183 | 0.144 | 0.223 | 0.060 | 0.023 | 0.096 |
| 2.5 | 0.174 | 0.136 | 0.212 | 0.060 | 0.023 | 0.096 |
| 3 | 0.164 | 0.127 | 0.202 | 0.059 | 0.023 | 0.096 |
| 3.5 | 0.155 | 0.119 | 0.192 | 0.059 | 0.022 | 0.096 |
| 4 | 0.146 | 0.110 | 0.182 | 0.058 | 0.021 | 0.096 |
| 4.5 | 0.137 | 0.102 | 0.173 | 0.058 | 0.020 | 0.096 |
| 5 | 0.129 | 0.093 | 0.164 | 0.057 | 0.019 | 0.095 |
| 5.5 | 0.120 | 0.085 | 0.156 | 0.056 | 0.018 | 0.095 |
| 6 | 0.112 | 0.077 | 0.147 | 0.056 | 0.017 | 0.094 |
| 6.5 | 0.104 | 0.069 | 0.138 | 0.055 | 0.016 | 0.094 |
| 7 | 0.096 | 0.062 | 0.130 | 0.055 | 0.016 | 0.093 |
| 7.5 | 0.088 | 0.054 | 0.122 | 0.054 | 0.015 | 0.093 |
| 8 | 0.080 | 0.046 | 0.113 | 0.054 | 0.015 | 0.093 |
| 8.5 | 0.072 | 0.039 | 0.105 | 0.054 | 0.014 | 0.094 |
| 9 | 0.064 | 0.031 | 0.097 | 0.054 | 0.014 | 0.095 |
| 9.5 | 0.056 | 0.023 | 0.090 | 0.055 | 0.014 | 0.096 |
| 10 | 0.049 | 0.015 | 0.082 | 0.056 | 0.014 | 0.098 |
| 10.5 | 0.041 | 0.008 | 0.075 | 0.057 | 0.015 | 0.100 |
| 11 | 0.033 | 0.000 | 0.067 | 0.059 | 0.015 | 0.103 |
| 11.5 | 0.026 | -0.008 | 0.060 | 0.061 | 0.016 | 0.106 |
| 12 | 0.018 | -0.017 | 0.053 | 0.064 | 0.018 | 0.110 |
| 12.5 | 0.011 | -0.025 | 0.046 | 0.067 | 0.020 | 0.115 |
| 13 | 0.003 | -0.033 | 0.039 | 0.071 | 0.022 | 0.120 |
| 13.5 | -0.005 | -0.042 | 0.032 | 0.076 | 0.025 | 0.126 |
| 14 | -0.013 | -0.051 | 0.026 | 0.081 | 0.029 | 0.133 |
| 14.5 | -0.020 | -0.060 | 0.019 | 0.087 | 0.033 | 0.140 |
| 15 | -0.028 | -0.069 | 0.012 | 0.093 | 0.038 | 0.148 |
| 15.5 | -0.036 | -0.078 | 0.005 | 0.101 | 0.044 | 0.158 |
| 16 | -0.044 | -0.087 | -0.002 | 0.109 | 0.050 | 0.168 |
| 16.5 | -0.053 | -0.097 | -0.009 | 0.118 | 0.058 | 0.179 |
| 17 | -0.061 | -0.107 | -0.015 | 0.128 | 0.065 | 0.191 |
| 17.5 | -0.070 | -0.117 | -0.022 | 0.139 | 0.074 | 0.204 |
| 18 | -0.078 | -0.128 | -0.029 | 0.151 | 0.083 | 0.219 |
| 18.5 | -0.087 | -0.139 | -0.035 | 0.164 | 0.092 | 0.235 |
| 19 | -0.096 | -0.151 | -0.041 | 0.178 | 0.102 | 0.254 |
| 19.5 | -0.105 | -0.164 | -0.046 | 0.193 | 0.112 | 0.274 |
| 20 | -0.114 | -0.178 | -0.051 | 0.209 | 0.123 | 0.296 |
| 20.5 | -0.124 | -0.193 | -0.055 | 0.227 | 0.133 | 0.320 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 21 | -0.134 | -0.209 | -0.058 | 0.246 | 0.144 | 0.347 |
| 21.5 | -0.144 | -0.226 | -0.061 | 0.266 | 0.155 | 0.377 |
| 22 | -0.154 | -0.245 | -0.063 | 0.287 | 0.165 | 0.408 |
| 22.5 | -0.165 | -0.265 | -0.065 | 0.309 | 0.176 | 0.443 |
| 23 | -0.175 | -0.286 | -0.065 | 0.333 | 0.187 | 0.480 |
| 23.5 | -0.187 | -0.308 | -0.065 | 0.359 | 0.197 | 0.520 |
| 24 | -0.198 | -0.332 | -0.063 | 0.386 | 0.208 | 0.563 |
| 24.5 | -0.210 | -0.358 | -0.061 | 0.414 | 0.219 | 0.609 |
| 25 | -0.222 | -0.385 | -0.058 | 0.444 | 0.230 | 0.659 |

**2. Type 2 Diabetes results used in mylongevity_double_cox_method1. Gompertz distribution is used for baseline hazards.**

| Definition of parameter | Parameter | Estimates | CI | p-value |
|---|---|---|---|---|
| 1000a | Scale | 1.202 | 1.09-1.325 | 0 |
| 100b | Shape | 10.301 | 9.717-10.92 | 0 |
| born in 1950+ | Shape | 0.937 | 0.854-1.027 | 0.1653 |
| born in 1940-1949 | Shape | 0.828 | 0.782-0.878 | 0 |
| Atrial fibrillation - Present | Shape | 1.333 | 1.252-1.419 | 0 |
| Treated Hypertension | Shape | 1.295 | 1.221-1.373 | 0 |
| Untreated Hypertension | Shape | 0.893 | 0.821-0.972 | 0.0095 |
| born in 1950+ | Scale | 1.754 | 1.614-1.905 | 0 |
| born in 1940-1949 | Scale | 1.454 | 1.379-1.533 | 0 |
| Cases group | Scale | 1.417 | 1.356-1.481 | 0 |
| (Age -50) as continuous | Scale | 1.095 | 1.092-1.099 | 0 |
| Gender - Males | Scale | 1.399 | 1.365-1.434 | 0 |
| Former Smoker | Scale | 1.615 | 1.526-1.71 | 0 |
| Current Smoker | Scale | 2.868 | 2.736-3.006 | 0 |
| Townsend Score 1 | Scale | 0.841 | 0.81 - 0.872 | 0 |
| Townsend Score 2 | Scale | 0.917 | 0.885 - 0.95 | 0 |
| Townsend Score 4 | Scale | 1.061 | 1.024-1.101 | 0.0012 |
| Townsend Score 5 | Scale | 1.181 | 1.134-1.231 | 0 |
| Atrial fibrillation - Present | Scale | 0.736 | 0.683-0.794 | 0 |
| Heart failure - Present | Scale | 1.145 | 1.097-1.195 | 0 |
| Treated hypercholesterolemia | Scale | 0.908 | 0.878-0.939 | 0 |
| Untreated hypercholesterolemia | Scale | 1.222 | 1.154-1.293 | 0 |
| Treated Hypertension | Scale | 0.744 | 0.707-0.783 | 0 |
| Untreated Hypertension | Scale | 1.411 | 1.335-1.491 | 0 |
| Myocardial infarction - Present | Scale | 1.322 | 1.264-1.382 | 0 |
| Peripheral vascular disease - Present | Scale | 1.052 | 1.017-1.089 | 0.0034 |
| Body Mass Index – Overweight (25<=BMI<30) | Scale | 0.998 | 0.953-1.046 | 0.9357 |
| Body Mass Index - Obese (BMI>30) | Scale | 1.168 | 1.109-1.23 | 0 |
| Interaction of Cases and Myocardial infarction | Scale | 0.749 | 0.699-0.803 | 0 |

| | | | | |
|---|---|---|---|---|
| Interaction of Cases and Former Smoker | Scale | 0.759 | 0.711-0.809 | 0 |
| Interaction of Cases and Current Smoker | Scale | 0.423 | 0.394-0.454 | 0 |
| Interaction of Former Smoker and BMI Overweight | Scale | 0.881 | 0.82 - 0.947 | 7.00E-04 |
| Interaction of Current Smoker and BMI Overweight | Scale | 0.83 | 0.777-0.885 | 0 |
| Interaction of Former Smoker and BMI Obese | Scale | 0.849 | 0.784-0.918 | 1.00E-04 |
| Interaction of Current Smoker and BMI Obese | Scale | 0.832 | 0.771-0.898 | 0 |
| Variance (sigma2) | | 0.15 | 0.13 - 0.172 | 0 |

Baseline is born in 1930-1939, absence of atrial fibrillation, absence of hypertension, Female group, non-smoker, Townsend deprivation score 3, absence of heart failure, absence of hypercholesterolemia, absence of hypertension, absence of myocardial infarction, absence of peripheral vascular disease, Normal Body Mass Index (BMI<25)

3. **Hormone replacement therapy results mylongevity_double_cox_method2. Weibull distribution is used for baseline hazards.**

| Definition of parameter | Parameter | Estimates | Lower bound | Upper bound |
|---|---|---|---|---|
| a | Scale | 79.896 | 71.27 | 89.566 |
| b | Shape | 3.256 | 3.026 | 3.504 |
| Born in 1931 - 1940 | Shape | 0.884 | 0.817 | 0.957 |
| Born in 1941 - 1950 | Shape | 0.79 | 0.729 | 0.857 |
| Born in 1951 - 1960 | Shape | 0.713 | 0.644 | 0.79 |
| Age as continuous | Scale | 1.107 | 1.099 | 1.116 |
| Born in 1931 - 1940 | Scale | 0.569 | 0.415 | 0.78 |
| Born in 1941 - 1950 | Scale | 0.38 | 0.282 | 0.514 |
| Born in 1951 - 1960 | Scale | 0.266 | 0.178 | 0.397 |
| Oestrogen + progesterone | Scale | 0.932 | 0.883 | 0.985 |
| Oestrogen | Scale | 1.077 | 0.955 | 1.214 |
| Townsend 4 - 5 | Scale | 1.462 | 1.377 | 1.553 |
| Townsend 3 | Scale | 1.222 | 1.144 | 1.305 |
| Hypertension Present | Scale | 1.453 | 1.379 | 1.53 |
| Coronary heart disease | Scale | 1.605 | 1.433 | 1.797 |
| Removed uterus and ovaries | Scale | 0.767 | 0.681 | 0.864 |
| Removed ovaries without hysterectomy | Scale | 0.872 | 0.8 | 0.95 |
| Interaction of BMI Overweight & Current Smoker | Scale | 2.129 | 1.992 | 2.275 |
| Interaction of BMI Overweight & Ex-Smoker | Scale | 1.425 | 1.305 | 1.557 |
| Interaction of BMI Obese & Current Smoker | Scale | 2.198 | 2.034 | 2.375 |
| Interaction of BMI Obese & Ex-smoker | Scale | 1.636 | 1.49 | 1.796 |
| Interaction of BMI Obese & Non-smoker | Scale | 1.31 | 1.213 | 1.415 |
| Interaction of Type 2 diabetes & Current Smoker | Scale | 1.442 | 1.353 | 1.536 |
| Interaction of Type 2 diabetes & Ex-Smoker | Scale | 1.078 | 0.995 | 1.168 |
| Interaction of Type 2 diabetes & Current Smoker | Scale | 3.282 | 2.845 | 3.786 |
| Interaction of Type 2 diabetes & Ex-Smoker | Scale | 2.146 | 1.785 | 2.579 |
| Interaction of Type 2 diabetes & Non-Smoker | Scale | 3.104 | 2.722 | 3.538 |
| Variance (sigma2) | | 0.098 | 0.076 | 0.127 |

Baseline is born in 1921-1930, no hormone replacement therapy, deprivation 1-2 classed as Low, absence of hypertension, absence of coronary heart disease, presence of both uterus and ovaries

4. **Ischemic stroke results mylongevity_double_cox_method3. Weibull distribution is used for baseline hazards.**

| Definition of parameter | Parameter | Estimates | Lower | Upper | p-value |
|---|---|---|---|---|---|
| a | Scale | 338.339 | 266.075 | 430.23 | 0 |
| b | Shape | 2.254 | 2.157 | 2.355 | 0 |
| Born in 1921-1930 | Shape | 0.903 | 0.86 | 0.949 | 0 |
| Born in 1931-1940 | Shape | 0.885 | 0.837 | 0.935 | 0 |
| Born in 1941-1960 | Shape | 0.782 | 0.723 | 0.845 | 0 |
| Antiplatelet drugs | Shape | 0.866 | 0.835 | 0.898 | 0 |
| Born in 1921-1930 | Scale | 0.476 | 0.341 | 0.664 | 0 |
| Born in 1931-1940 | Scale | 0.351 | 0.242 | 0.509 | 0 |
| Born in 1941-1960 | Scale | 0.162 | 0.1 | 0.262 | 0 |
| IMD Quintile 2 | Scale | 0.951 | 0.871 | 1.037 | 0.253 |
| IMD Quintile 3 | Scale | 0.96 | 0.879 | 1.047 | 0.3549 |
| IMD Quintile 4 | Scale | 0.825 | 0.754 | 0.903 | 0 |
| IMD Quintile 5 | Scale | 0.827 | 0.752 | 0.909 | 1.00E-04 |
| BMI (Overweight + Obese) | Scale | 0.797 | 0.756 | 0.84 | 0 |
| Antiplatelet drugs | Scale | 0.409 | 0.318 | 0.528 | 0 |
| Chronic obstructive pulmonary disease | Scale | 1.884 | 1.715 | 2.07 | 0 |
| Heart failure Present | Scale | 1.639 | 1.489 | 1.803 | 0 |
| Myocardial infarction Present | Scale | 1.238 | 1.14 | 1.344 | 0 |
| Peripheral Artery Disease/Peripheral Vascular Disease | Scale | 1.14 | 1.073 | 1.212 | 0 |
| Current smoker | Scale | 1.941 | 1.8 | 2.093 | 0 |
| Ex-smoker | Scale | 1.27 | 1.198 | 1.345 | 0 |
| Anticoagulant agents Present | Scale | 1.313 | 1.198 | 1.439 | 0 |
| Treated Diabetes | Scale | 1.78 | 1.655 | 1.914 | 0 |
| Untreated Diabetes | Scale | 1.329 | 1.169 | 1.511 | 0 |
| Gender - Males | Scale | 1.343 | 1.272 | 1.417 | 0 |
| Cases group | Scale | 2.345 | 2.14 | 2.569 | 0 |
| Antihypertensive drugs | Scale | 1.483 | 1.374 | 1.601 | 0 |
| Age as continuous | Scale | 1.084 | 1.078 | 1.09 | 0 |
| Interaction of cases& antihypertensive drugs | Scale | 0.803 | 0.72 | 0.896 | 1.00E-04 |
| Variance (Sigma2) | | 0.059 | 0.042 | 0.083 | 0 |

5. **Transient ischemic stroke results mylongevity_double_cox_method4. Weibull distribution is used for baseline hazards.**

| Definition of parameter | Parameter | Estimates | CI | P-values |
|---|---|---|---|---|
| a | Scale | 225.137 | 179.407 - 282.524 | 0 |
| b | Shape | 2.412 | 2.313 - 2.514 | 0 |
| Born in 1921-1930 | Shape | 0.934 | 0.891 - 0.979 | 0.0044 |
| Born in 1931-1940 | Shape | 0.864 | 0.817 - 0.914 | 0 |
| Born in 1941-1960 | Shape | 0.772 | 0.703 - 0.848 | 0 |
| Heart-failure - Present | Shape | 0.936 | 0.92 - 0.952 | 0 |
| Antiplatelet therapy | Shape | 0.894 | 0.861 - 0.928 | 0 |
| Born in 1921-1930 | Scale | 0.524 | 0.389 - 0.705 | 0 |
| Born in 1931-1940 | Scale | 0.274 | 0.197 - 0.382 | 0 |
| Born in 1941-1960 | Scale | 0.12 | 0.072 - 0.201 | 0 |
| Females | Scale | 0.673 | 0.637 - 0.712 | 0 |
| IMD Quintile 2 | Scale | 0.852 | 0.778 - 0.932 | 5.00E-04 |
| IMD Quintile 3 | Scale | 0.833 | 0.762 - 0.911 | 1.00E-04 |
| IMD Quintile 4 | Scale | 0.755 | 0.689 - 0.827 | 0 |
| IMD Quintile 5 | Scale | 0.719 | 0.652 - 0.793 | 0 |
| BMI (Overweight & Obese) | Scale | 0.825 | 0.782 - 0.87 | 0 |
| Asthma - Present | Scale | 1.241 | 1.139 - 1.353 | 0 |
| Chronic obstructive pulmonary disease | Scale | 1.696 | 1.516 - 1.898 | 0 |
| Chronic Kidney Disease | Scale | 1.183 | 0.997 - 1.405 | 0.0545 |
| Myocardial infarction | Scale | 1.311 | 1.203 - 1.429 | 0 |
| Peripheral Artery Disease/Vascular Disease | Scale | 1.201 | 1.127 - 1.279 | 0 |
| Current smoker | Scale | 1.995 | 1.85 - 2.151 | 0 |
| Ex-smoker | Scale | 1.3 | 1.224 - 1.381 | 0 |
| Alcohol intake - Yes | Scale | 0.902 | 0.85 - 0.958 | 7.00E-04 |
| Atrial fibrillation - Present | Scale | 1.213 | 1.089 - 1.352 | 4.00E-04 |
| Treated Diabetes | Scale | 1.777 | 1.634 - 1.932 | 0 |
| Untreated Diabetes | Scale | 1.269 | 1.094 - 1.472 | 0.0016 |
| Anticoagulant agents | Scale | 1.395 | 1.244 - 1.564 | 0 |
| Cases-group | Scale | 1.641 | 1.515 - 1.777 | 0 |
| Antihypertensive agents | Scale | 1.328 | 1.25 - 1.41 | 0 |
| Antiplatelet therapy | Scale | 0.561 | 0.439 - 0.718 | 0 |
| Age as continuous | Scale | 1.085 | 1.078 - 1.092 | 0 |
| Interaction of cases & Antiplatelet Therapy | Scale | 0.803 | 0.712 - 0.905 | 3.00E-04 |
| Variance (sigma2) | | 0.066 | 0.046 - 0.093 | 0 |