Risk Predictions from Lung Cancer Models

Description
The R package provides individual risks of lung cancer and lung cancer death based on various published papers: Bach et al., 2003; Spitz et al., 2007; Cassidy et al., 2008 (LLP); Hoggart et al., 2012; Tammemagi et al., 2013; Marcus et al., 2015 (LLPi); Wilson and Weissfeld, 2015 (Pittsburgh); Katki et al., 2016 (LCRAT and LCDRAT).

Usage

lcmodels(x)

Arguments

x  A numeric matrix containing individuals' covariates for the model. Covariates should be in the following column and format:

- column 1 - current age (numeric);
- column 2 - gender (1=Female, 0=Male);
- column 3 - years smoked (numeric);
- column 4 - years quit (numeric or NA);
- column 5 - cigarettes per day (numeric);
- column 6 - race (0=Non-hispanic white, 1=Non-hispanic Black/African American, 2=Hispanic, 3=Other Ethnicity);
- column 7 - lung disease (1=COPD or Emphysema, 0=No COPD or Emphysema);
- column 8 - number of parents with lung cancer (0,1,2);
- column 9 - bmi;
- column 10 - highest education level (1=<12 grade, 2=HS graduate, 3=post hs, no college, 4=associate degree/some college, 5=bachelors degree, 6=graduate school);
- column 11 - asbestos exposure binary indicator (used for Bach, 2003 and Spitz, 2007);
- column 12 - prior history of pneumonia indicator (used for LLP, 2008);
- column 13 - prior history of cancer indicator (used for LLP, 2008; LLPi, 2015, and Tammemagi, 2013);
- column 14 - family history of lung cancer (0=none, 1=early onset, 2=late onset) (used for LLP, 2008 and LLPi, 2015);
- column 15 - Dust exposure (binary indicator) (used for Spitz, 2007);
- column 16 - 2 or more first degree relatives with cancer (binary indicator) (used for Spitz, 2007);
- column 17 - 1 or more first degree with smoking cancer (binary indicator) (used for Spitz, 2007);
- column 18 - no hay fever (binary indicator) (used for Spitz, 2007);
- column 19 - asian ethnicity (binary indicator) (used for Tammemagi, 2013);
- column 20 - islander ethnicity (binary indicator) (used for Tammemagi, 2013);
- column 21 - American indian ethnicity (binary indicator) (used for Tammemagi, 2013);

**Value**

A numeric matrix containing individuals' predictions:

- column 1 - An indicator variable for whether the individual is eligible for CT lung screening according to US Preventive Services Task Force (USPSTF) recommendations.
- column 2 - This is the probability of dying from lung cancer within 5 years if not undergoing screening (Katki, 2016).
- column 3 - This is the reduction in the probability of dying from lung cancer in 5 years
- column 4 - This is the probability of being diagnosed with lung cancer within 5 years if not undergoing screening (Katki, 2016).
- column 5 - This is the extra probability of lung cancer diagnosis in 5 years if undergoing 3 yearly CT lung screens as in the NLST (Katki, 2016).
- column 6 - This is the probability of having at least one false-positive CT screen out of 3 screens (Katki, 2016).
- column 7 - This is the expected number of false-positive CT screens after 3 screens (Katki, 2016).
- column 8 - This is the probability of being diagnosed with lung cancer within 10 years if not undergoing screening (Bach, 2003).
- column 9 - This is the probability of being diagnosed with lung cancer within 1 years if not undergoing screening (Hoggart, 2012).
- column 10 - This is the probability of being diagnosed with lung cancer within 5 years if not undergoing screening (LLP, 2008).
- column 11 - This is the probability of being diagnosed with lung cancer within 7.8 years if not undergoing screening (LLPi, 2015).
- column 12 - This is the probability of being diagnosed with lung cancer within 1 years if not undergoing screening (Spitz, 2007).
• column 13 - This is the probability of being diagnosed with lung cancer within 6 years if not undergoing screening (Tammemagi, 2013).

• column 14 - This is the probability of being diagnosed with lung cancer within 6 years if not undergoing screening (Pittsburgh, 2015).

Warning

VGAM is a required dependency of this package. VGAM may automatically be installed the first time this package is used.

Author(s)

Li C. Cheung, li.cheung@nih.gov, Stephanie A. Kovalchik, Hormuzd A. Katki

References


Examples

age <- c(66,58,75,72,56)
bmi <- c(23,28,26,27,24)
cpd <- c(36,36,40,24,40)
emp <- c(0,1,1,0,1)
fam.lung.trend <- c(0,2,0,2,0)
female <- c(0,1,0,1,0)
smkyears <- c(43,37,45,42,29)
qtyears <- c(NA,NA,9,6,6)
race <- c(0,1,2,2,3)
edu6 <- c(3,5,4,5,5)
asb <- c(0,0,0,0,0)
pneu <- c(0,0,0,0,0)
prior.cancer <- c(0,0,0,0,0)
fam.cancer.onset <- c(0,1,0,2,0)
dust <- c(0,0,0,0,0)
fam.cancer <- c(0,1,0,1,0)
fam.smoke.cancer <- c(0,1,0,1,0)
no.hayfever <- c(0,0,0,0,0)
asian <- c(0,0,0,0,1)
islander <- c(0,0,0,0,0)
indian <- c(0,0,0,0,0)

persons <- cbind(age,
female,
smkyears,
qtyears,
cpd,
race,
emp,
fam.lung.trend,
bmi,
edu6,
asb,
pneu,
prior.cancer,
fam.cancer.onset,
dust,
fam.cancer,
fam.smoke.cancer,
no.hayfever,
asian,
islander,
indian)

persons_predictions <- lcmodels(persons)
persons_predictions