Package 'cdlei'

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Title Cause-Deleted Life Expectancy Improvement Procedure

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Description The concept of cause-deleted life expectancy improvement is statistic designed to quantify the increase in life expectancy if a certain cause of death is removed. See Adamic, P. (2015) (<https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2689352>).

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`cdlei-package` *Cause-Deleted Life Expectancy Improvement Procedure*

Description

The concept of cause-deleted life expectancy improvement is statistic designed to quantify the increase inlife expectancy if a certain cause of death is removed.

Author(s)

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References

1. Adamic, P. (2015). Life Expectancy Improvement with a Curve Distribution for a cause of death, Australian Journal of Actuarial Practice, 3, 59-70.
2. Adamic, P. (2008). Cause-deleted life expectancy improvement in the presence of left and right censoring. Belgian Actuarial Bulletin, 8: 17-21.
3. Brown, R.L. (1997). Introduction to the Mathematics of Demography, 3rd ed, Winsted, Connecticut: Actex.

`cdlei` *The life expectancy improvement with a cure distribution for a cause of death.*

Description

In may circumstances, to increase in life expectancy when a certain cause of death is eliminated is sought, but this is usually done by taking the cause out of consideration fully, which is unrealistic. Here, we incorporate a probability distribution for the cure of the cause over time, to more accurately predict the increase in life expectancy at each age.

Usage

```
cdlei(age, qtau, qhiv, k, d)
```

Arguments

`age`	age
`qtau`	vector of probabilities of death by all causes at each age
`qhiv`	vector of probabilities of death by HIV at each age
`k`	cure probability parameter
`d`	index

Value

`cdlei`	cause-deleted life expectancy
`qx`	probability of deatch at age x
`px`	probability of survival at age x
`tpx`	probability an x year old survives to age x+t
`sumtpx`	sum of tpx
`Fk`	probability of curve

pxx	probability of survival at age x, using cure probability
tpxx	probability of sirviving t years after age x, using cure probability
sumtpxx	cumulative sum of tpx
df	data frame

Author(s)

Peter Adamic, Alicja Wolny-Dominiak

References

1. Adamic, P. (2015). Life Expectancy Improvement with a Curve Distribution for a cause of death, Australian Journal of Actuarial Practice, 3, 59-70.
2. Adamic, P. (2008). Cause-deleted life expectancy improvement in the presence of left and right censoring. Belgian Actuarial Bulletin, 8: 17-21.
3. Brown, R.L. (1997). Introduction to the Mathematics of Demography, 3rd ed, Winsted, Connecticut: Actex.

Examples

```
data(lifeData)
res <- cdlei(lifeData$age, lifeData$qtau, lifeData$qhiv, 0.02, 100000)
str(res)
res$cdlei
```

Fk *Curve Probability function*

Description

A simple discrete-time function accounting for the probability that HIV will be cured by time t. Assume the curve function begins at age 0.

Usage

```
Fk(age, k)
```

Arguments

age	age of person
k	cure probability parameter

Value

Fk	curve probability function

Author(s)

Peter Adamic, Alicja Wolny-Dominiak

References

1. Adamic, P. (2008). Cause-deleted life expectancy improvement in the presence of left and right censoring. Belgian Actuarial Bulletin, 8: 17-21.
2. Brown, R.L. (1997). Introduction to the Mathematics of Demography, 3rd ed, Winsted, Connecticut: Actex.

Examples

```
data(lifeData)
Fk(lifeData$age, 0.02)
```

---

lifeData *HIV-related deaths from Colorado, USA, between 2000-2012.*

Description

Input data matrix consists of the probabilities of death from all causes, and by HIV only, for ages 0 to 103 (inclusive).

Usage

```
data("lifeData")
```

Format

A data frame with 104 observations on the following 3 variables.

`age` a numeric vector

`qtau` a numeric vector

`qhiv` a numeric vector

Source

Data source: Colorado Department of Public Health and Environment.

Examples

```
data(lifeData)
str(lifeData)
```

Index