

# Package ‘cdlei’

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**Type** Package

**Title** Cause-Deleted Life Expectancy Improvement Procedure

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**Author** Peter Adamic, Alicja Wolny-Dominiak

**Maintainer** Alicja Wolny-Dominiak <woali@ue.katowice.pl>

## 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](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2689352)>).

**License** GPL-2

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 cdlei-package

*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.

### Author(s)

Peter Adamic, Alicja Wolny-Dominiak Maintainer: <alicja.wolny-dominiak@ue.katowice.pl>

### 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.

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 cdlei

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


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### Description

In many 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 death 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 surviving 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$age, lifeData$qttau, lifeData$qhiv, 0.02, 100000)
str(res)
res$cdlei
```

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Fk

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*Curve Probability function*


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**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)
```

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lifeData

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

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**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)
```

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