# nordpred

## Fit power5 and poisson Age-Period-Cohort models for prediction of cancer incidence

### Description

'nordpred' uses the power5 and poisson Age-Period-Cohort (APC) models to calculate prediction of cancer incidence and mortality

### Usage

```
nordpred(cases,pyr,startestage,startuseage,noperiods=NULL,recent=NULL,
        cuttrend=c(0,.25,.5,.75,.75),linkfunc="power5")
```

### Arguments

| | |
|---|---|
| cases | A `data.frame` with number of cases |
| pyr | A `data.frame` with observed and forecasted person years. |
| startestage | Youngest age group to be included in the regression model. Predictions for age groups below this limit it based on average rates from the last 10 years. |
| startuseage | Youngest age group which uses regression model as basis for predicted rates |
| noperiods | A list of candidate number of periods in prediction base (e.g 4:6).If the goodness of fit test is rejected based on the widest base (e.g.6 periods), the first period is exclude etc. Use a fixed number to force a specific prediction base. If e.g. noperiods=5, predictions is based on the last 5 five-year periods, irrespective of the result a goodness of fit evaluation |
| recent | Project average trend or use the slope for the last 10 years? (If recent=F, average trend for the whole observation period is used, if recent=T, the slope from the last 10 years is used. If NULL (default) the choice is based on a significance test for departure from linear trend |
| cuttrend | Cut trend in predictions? Default is 0, 25 %, 50 %, 75 %, 75 % cut in drift (a vector of proportions of drift to cut in each projection period) |
| linkfunc | Link function to use in the model. Default is special version used in the Nordpred project ("power5"), where the link is $g(x)=x^{0.2}$, while the alternative is the poisson function ("poisson"), where the link is $g(x)=\log(x)$ |

### Details

For details of the choice of prediction base, significance test for using recent slope, and for the power5 model, see Møller B., Fekjær H. et al. (2002), see references

## Value

an object of class `"nordpred"`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## Examples

```
# Reading package:
source("nordpred.S")
# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)
```

```
# Fit model & predict new incidence:
res <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75))
res2 <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75),linkfunc="poisson")

# Print / get results:
print(res)
nordpred.getpred(res)
summary(res,printpred=F)

# Get results with standardisation:
wstand <- c(0.12, 0.1, 0.09, 0.09, 0.08, 0.08, 0.06, 0.06, 0.06,
0.06,0.05,
            0.04, 0.04, 0.03, 0.02, 0.01, 0.005, 0.005)
round(nordpred.getpred(res,incidence=T,standpop=NULL),2)
round(nordpred.getpred(res,incidence=T,standpop=wstand),2)

# Plot results:
plot(res,standpop=wstand)

# Plot results with power5 and poisson links:
plot(res2,standpop=wstand)
plot(res,new=F,lty=c(1,2),standpop=wstand)

# Different cut trend scenarios, using average drift (recent=F):
plot(nordpred.prediction(est,startuseage=6,cuttrend=c(0,0,0,0,0),recent
=F),standpop=wstand,new=T)
plot(nordpred.prediction(est,startuseage=6,cuttrend=c(1,1,1,1,1),recent
=F),standpop=wstand,new=F,lty=c(1,2))
plot(nordpred.prediction(est,startuseage=6,cuttrend=c(0,.25,.5,.75,.75)
,recent=F),standpop=wstand,new=F,lty=c(1,4))
```

# nordpred.estimate

## Estimate power5 and poisson Age-Period-Cohort models

### Description

'nordpred.estimate' estimates parameters in the power5 or poisson Age-Period-Cohort (APC) model

### Usage

```
nordpred.estimate(cases,pyr,noperiod,startestage,linkfunc="power5")
```

## Arguments

cases        A `data.frame` with number of cases

pyr          A `data.frame` with observed and forecasted person years.

startestage  Youngest age group to include in the regression model

noperiod     The number of periods to be used in prediction base.

linkfunc     Link function to use in the model. Default is special version used in the
             Nordpred project ("power5"), where the link is $g(x)=x^{0.2}$, while the
             alternative is the poisson function ("poisson"), where the link is
             $g(x)=\log(x)$

## Details

For details of the power5 model, see Møller B., Fekjær H. et al. (2002), see references

## Value

An object of class `"nordpred.estimate"`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This
works fine for the point estimates, but the variance estimates found via the glm-objects
are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T.,
Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer
incidence in the Nordic countries: Empirical comparison of different approaches"
*Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B,
Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction

of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

**See Also**

```
nordpred, plot.nordpred, summary.nordpred, print.nordpred, getpred,
nordpred.prediction, print.nordpred.estimate, nordpred.estimate.object
```

**Examples**

```
# Reading package:
source("nordpred.S")
# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model using powerlink (default):
est <-
nordpred.estimate(cases=indata,pyr=inpop,noperiod=4,startestage=5)

# Fit model using poisson link:

est2 <- nordpred.estimate(indata,inpop,4,5,linkfunc="poisson")

# Print results:
print(est)
print(est$glm)

# Use estimat object to make predictions:

res <-
nordpred.prediction(est,startuseage=6,cuttrend=c(0,.25,.5,.75,.75),rece
nt=T)
```

# nordpred.estimate.object

## Nordpred.estimate-object with fit of power5 and poisson Age-Period-Cohort models for prediction of cancer incidence

## Description

'nordpred' uses the power5 and poisson Age-Period-Cohort (APC) models to calculate prediction of cancer incidence and mortality

This class of objects is returned by the `nordpred.estimate` class of functions to represent a fit of power5 and poisson Age-Period-Cohort models for prediction of cancer incidence

Objects of this class have methods for the functions `print`, `summary` and `plot`.

## COMPONENTS

The following components must be included in a legitimate `nordpred` object.

glm
> Fitted glm-object

cases
> A `data.frame` with number of cases

pyr
> A `data.frame` with observed and forecasted person years

noperiod
> Number of periods used in estimate

gofpvalue
> P-value for goodness of fit

startestage
> Youngest age group which have been included in the regression model. Predictions for age groups below this limit it based on average rates from the last 10 years.

suggestionrecent
> Indicator recommendation build on `pvaluerecent` for projecting of average trend or use the slope for the last 10 years? If recent=F, recommendation is to use average trend for the whole observation period, and if recent=T recommendation is to use the slope from the last 10 years

pvaluerecent
> P-value for use of recent trend based on a significance test for departure from linear trend

linkfunc
> Link function used in the model. Default is special version used in the Nordpred project ("power5"), where the link is $g(x)=x^{0.2}$, while the alternative is the poisson function ("poisson"), where the link is $g(x)=\log(x)$

The object will also contain the following, for documentation see the `lm` object: `formula`, `terms`, `assign` and `call`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## See Also

`plot.nordpred, summary.nordpred, print.nordpred, nordpred.estimate, getpred, nordpred.prediction, print.nordpred.estimate, nordpred.object`

---

# nordpred.getpred

## Gets the observed and predicted incidence rates on matrix form

### Description

'nordpred.getpred' uses a nordpred object to extract the observed and predicted incidence rates

### Usage

```
nordpred.getpred(nordpred.object,incidence=T,standpop=NULL,excludeobs=F
,byage,agegroups="all")
```

## Arguments

| | |
|---|---|
| `nordpred.object` | An object based on the 'nordpred()' or 'nordpred.prediction()' function |
| `incidence` | Indicates whether to give incidence or number of cases |
| `standpop` | A vector of weights for age standardisation. Default is no standardisation (crude rates), but using a standardisation (for the suitable no of age groups) is recommended |
| `excludeobs` | Exclude number for observed periods and only give numbers for predicted periods |
| `byage` | Report numbers by age groups. If false, crude or age standardised rates are given |
| `agegroups` | Which agegroups to include. E.g. c(5:18) includes age groups five to eighteen |

## Value

an object of class `"nordpred"`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction

of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

**Examples**

```
# Reading package:
source("nordpred.S")

# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model & predict new incidence:
res <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75))
res2 <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75),linkfunc="poisson")

# Print / get results:
print(res)
nordpred.getpred(res)
summary(res,printpred=F)

# Get results with standardisation:
wstand <- c(0.12, 0.1, 0.09, 0.09, 0.08, 0.08, 0.06, 0.06, 0.06,
0.06,0.05,
          0.04, 0.04, 0.03, 0.02, 0.01, 0.005, 0.005)
round(nordpred.getpred(res,incidence=T,standpop=NULL),2)
round(nordpred.getpred(res,incidence=T,standpop=wstand),2)
```

---

# nordpred.object

## Nordpred-object with fit of power5 and poisson Age-Period-Cohort models and related predictions for use on of cancer incidence data

**Description**

'nordpred' uses the power5 and poisson Age-Period-Cohort (APC) models to calculate prediction of cancer incidence and mortality

This class of objects is returned by the `nordpred` class of functions to represent a fit of power5 and poisson Age-Period-Cohort models for prediction of cancer incidence

Objects of this class have methods for the functions `print`, `summary` and `plot`.

## COMPONENTS

The following components must be included in a legitimate `nordpred` object.

predictions
      A `data.frame` with forecasted number of cases
pyr
      A `data.frame` with observed and forecasted person years
nopred
      Number of periods predicted
noperiod
      Number of periods used in estimate
gofpvalue
      P-value for goodness of fit
recent
      Indicator for project of average trend or use the slope for the last 10 years? If recent=F, average trend for the whole observation period have been used, and if recent=T the slope from the last 10 years have been used
pvaluerecent
      P-value for use of recent trend based on a significance test for departure from linear trend
cuttrend
      Degree of trend cut in predictions
startuseage
      Youngest age group which uses regression model as basis for predicted rates
startestage
      Youngest age group which have been included in the regression model. Predictions for age groups below this limit it based on average rates from the last 10 years.
glm
      Fitted glm-object

The object will also contain the following, for documentation see the `lm` object: `formula`, `terms`, `assign` and `call`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at:

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## See Also

```
plot.nordpred, summary.nordpred, print.nordpred, nordpred.estimate, getpred,
nordpred.prediction, print.nordpred.estimate, nordpred.estimate.object
```

---

# nordpred.prediction

## Calculates predictions based on a nordpred.estimate object

### Description

'nordpred.prediction' uses a nordpred.estimate object to calculate prediction of cancer incidence and mortality

### Usage

```
nordpred.prediction(nordpred.estimate.object,startuseage,recent,cuttren
d=c(0,.25,.5,.75,.75))
```

## Arguments

| | |
|---|---|
| `nordpred.estimate.object` | A glm-object based on the 'nordpred.estimate()' function |
| `startuseage` | Youngest age group which uses regression model as basis for predicted rates |
| `recent` | Project average trend or use the slope for the last 10 years? (If recent=F, average trend for the whole observation period is used, if recent=T, the slope from the last 10 years is used) |
| `cuttrend` | Cut trend in predictions? (a vector of proportions of drift to be cut in each projection period) |

## Details

For details of the significance test for using recent slope, see Møller B., Fekjær H. et al. (2003) 22:2751-2766, see references

## Value

an object of class `"nordpred.prediction"`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

**Examples**

```
# Reading package:
source("nordpred.S")

# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model using powerlink (default):
est <-
nordpred.estimate(cases=indata,pyr=inpop,noperiod=4,startestage=5)

# Fit model using poisson link:

est2 <- nordpred.estimate(indata,inpop,4,5,linkfunc="poisson")

# Use estimat object to make predictions:

res <-
nordpred.prediction(est,startuseage=6,cuttrend=c(0,.25,.5,.75,.75),rece
nt=T)
res2 <-
nordpred.prediction(est2,startuseage=6,cuttrend=c(0,.25,.5,.75,.75),rec
ent=T)

# Get results:
print.nordpred(res)
nordpred.getpred(res)
summary(res,printpred=F)
```

# plot.nordpred

## plots the predicted rates from a nordpred object

**Description**

'plot.nordpred' uses nordpred object to plot observed and predicted rates

## Usage

```
plot.nordpred
(nordpred.object,incidence=T,standpop=NULL,agegroups="all",startplot=1,

xlab="",ylab="",main="",labels=NULL,ylim=NULL,lty=c(1,3),col=c(1,1),new
=T,...)
```

## Arguments

| | |
|---|---|
| `nordpred.object` | An object based on the 'nordpred()' or 'nordpred.prediction()' function |
| `incidence` | Indicates whether to plot incidence or number of cases |
| `standpop` | A vector of weights for age standardisation. Default is no standardisation (crude rates), but using a standardisation (for the suitable no of age groups) is recommended |
| `agegroups` | Which agegroups to include |
| `noperiods` | Number of five year periods to make predictions for. Upper limit is five periods |
| `recent` | Project average trend or use the slope for the last 10 years? (If recent=F, average trend for the whole observation period is used, if recent=T (default) the slope from the last 10 years is used based on a significance test for departure from linear trend) |
| `cuttrend` | Cut trend in predictions? Default is 0, 25 %, 50 %, 75 %, 75 % cut in drift (a vector of proportions of drift to be cut in each projection period) |
| `linkfunc` | Link function to use in the model. Default is special version used in the Nordpred project ("power5"), where the link is $g(x)=x^{0.2}$, while the alternative is the poisson function ("poisson"), where the link is $g(x)=\log(x)$ |

## Details

This function is a method for the generic function `plot` for class nordpred. It can be invoked by calling `plot` for an object x of the appropriate class, or directly by calling plot.nordpred regardless of the class of the object. For more available options, see `plot`

For details of the significance test for using recent slope, and for the power5 model, see Møller B., Fekjær H. et al. (2003) 22:2751-2766, see references

## Value

an object of class `"nordpred"`.

## Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## Examples

```
source("nordpred.S")

# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model & predict new incidence:
res <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75))
res2 <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75),linkfunc="poisson")
```

```
# Get results with stanardiziotion:
wstand <- c(0.12, 0.1, 0.09, 0.09, 0.08, 0.08, 0.06, 0.06, 0.06,
0.06,0.05,
            0.04, 0.04, 0.03, 0.02, 0.01, 0.005, 0.005)
round(nordpred.getpred(res,incidence=T,standpop=NULL),2)
round(nordpred.getpred(res,incidence=T,standpop=wstand),2)

# Plot results:
plot(res,standpop=wstand)

# Plot results with power5 and poisson links:
plot(res2,standpop=wstand)
plot(res,new=F,lty=c(1,2),standpop=wstand)

# Different cut trend scenarios, using average drift (recent=F):
plot(nordpred.prediction(est,startuseage=6,cuttrend=c(0,0,0,0,0),recent
=F),standpop=wstand,new=T)
plot(nordpred.prediction(est,startuseage=6,cuttrend=c(1,1,1,1,1),recent
=F),standpop=wstand,new=F,lty=c(1,2))
plot(nordpred.prediction(est,startuseage=6,cuttrend=c(0,.25,.5,.75,.75)
,recent=F),standpop=wstand,new=F,lty=c(1,4))
```

# print.nordpred

## Prints a nordpred object

### Description

'print.nordpred' prints the observed and predicted number of cases in a nordpred object

### Usage

```
print.nordpred(nordpred.object,digits=1)
```

### Arguments

nordpred.object An object based on the 'nordpred()' or 'nordpred.prediction()' function

digits          Specifies the number of digits in the tabulation

### Value

an object of class "nordpred".

### Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

## Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

## References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## Examples

```
# Reading package:
source("nordpred.S")

# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model & predict new incidence:
res <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75))
res2 <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75),linkfunc="poisson")

# Print / get results:
```

```
print(res)
nordpred.getpred(res)
summary(res,printpred=F)
```

---

# print.nordpred.estimate

## Prints a nordpred estimate object

### Description

'print.nordpred.estimate' prints the estimation information from a nordpred.estimate object

### Usage

```
print.nordpred.estimate(nordpred.estimate.object)
```

### Arguments

`nordpred.estimate.object` An object produced by the 'nordpred.estimate()' function

### Value

an object of class `"nordpred"`.

### Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

### Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

### References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer incidence in the Nordic countries: Empirical comparison of different approaches" *Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## See Also

plot.nordpred, summary.nordpred, print.nordpred, nordpred.estimate, getpred, nordpred.prediction, print.nordpred, nordpred.estimate.object

## Examples

```
# Reading package:
source("nordpred.S")

# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model using powerlink (default):
est <-
nordpred.estimate(cases=indata,pyr=inpop,noperiod=4,startestage=5)

# Fit model using poisson link:

est2 <- nordpred.estimate(indata,inpop,4,5,linkfunc="poisson")

# Print results:
print(est)
print(est$glm)

# Use estimat object to make predictions:

res <-
nordpred.prediction(est,startuseage=6,cuttrend=c(0,.25,.5,.75,.75),rece
nt=T)
```

# summary.nordpred

## Makes a summary of a nordpred object

### Description

'summary.nordpred' uses a nordpred object to summarize the information

### Usage

```
summary.nordpred(nordpred.object,printpred=T,printcall=F,digits=1)
```

### Arguments

| | |
|---|---|
| `nordpred.object` | An object based on the 'nordpred()' or 'nordpred.prediction()' function |
| `printpred` | Indicates whether to print the observed and predicted number of cases |
| `printcall` | Indicates whether to print the function call |
| `digits` | Specifies the number of digits in the tabulation |

### Value

an object of class `"nordpred"`.

### Note

Remark for S-PLUS users: Powerlink is made via a special modification in S-PLUS. This works fine for the point estimates, but the variance estimates found via the glm-objects are wrong. For variance estimates, we would rather recommend using R.

### Author(s)

Harald Fekjær and Bjørn Møller (Cancer Registry of Norway)

### References

A website for nordpred is available at: http://www.kreftregisteret.no/software/nordpred/

Examples is distributed with the package.

Background for the methods can be found in: Møller B., Fekjær H., Hakulinen T., Sigvaldason H, Storm H. H., Talbäck M. and Haldorsen T "Prediction of cancer

incidence in the Nordic countries: Empirical comparison of different approaches"
*Statistics in Medicine* 2003; 22:2751-2766

An application of the function, using all the default settings, can be found in: Møller B, Fekjær H, Hakulinen T, Tryggvadóttir L, Storm HH, Talbäck M, Haldorsen T. Prediction of cancer incidence in the Nordic countries up to the year 2020. *Eur J Cancer Prev Suppl* 2002; 11: S1-S96

## Examples

```
# Reading package:
source("nordpred.S")

# Reading data (Colon cancer for Norwegian males)
indata <- read.table("data//colon-men-Norway.txt",header
=T,sep=",",row.names=1)
inpop1 <- read.table("data//men-Norway.txt",header
=T,sep=",",row.names=1)
inpop2 <- read.table("data//men-Norway-pred.txt",header
=T,sep=",",row.names=1)

# Include possible population predictions
inpop <- cbind(inpop1,inpop2)

# Fit model & predict new incidence:
res <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75))
res2 <-
nordpred(indata,inpop,startestage=5,startuseage=6,cuttrend=c(0,.25,.5,.
75,.75),linkfunc="poisson")

# Print / get results:
print(res)
nordpred.getpred(res)
summary(res,printpred=F)
```