Package 'COVE'

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Type Package

Title COVID-19 Vaccine Efficacy

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Description Implements a simple and rigorous framework for evaluating the efficacy of vaccines based on the dual or triple primary endpoints of infection, symptomatic disease, and severe disease.

License GPL-2

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Collate 'print.coveObj.R' 'cove.R' 'coveData.R'

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R topics documented:

cove *COVID-19 Vaccine Efficacy*

Description

Implements a simple and rigorous framework for evaluating the efficacy of vaccines based on the dual or triple primary endpoints of infection, symptomatic disease, and severe disease.

Usage

```
cove(
  vaccinated,
  time,
  infection,
  symptomatic,
  severe,
  nMC = 20000L,
  alpha = 0.05,
  VEnull = c(0.3, 0.3, 0.3)
)
```

Arguments

vaccinated	An integer vector object. Indicator of whether participant is vaccinated. 1 = vaccinated; 0 = not vaccinated.
time	A numeric vector object. Length of follow-up for each participant.
infection	An integer vector object. Indicator of whether participant is infected during the follow-up. 1 = is infected; 0 = not infected.
symptomatic	An integer vector object. Indicator of whether participant experiences symptomatic disease. 1 = experiences symptomatic disease; 0 otherwise.
severe	An integer vector object. Indicator of whether participant develops severe disease during the follow-up. 1 = develops severe disease; 0 otherwise.
nMC	An integer object. The number of Monte Carlo samples to be used in determining the adjusted critical values. The default is 20,000.
alpha	A numeric object. The two-sided family-wise type I error used in determining the adjusted critical value. The default is 0.05.
VEnull	A numeric vector object or NULL. The vaccine efficacies of the null hypothesis (VE_INF, VE_SYMP, VE_SVR). If NULL, the default values are taken as (0.3, 0.3, 0.3).

Value

A list containing

`singleEP` A matrix of the single endpoint results. The first column is the Z-scores. The subsequent columns are the estimated vaccine efficacy, its standard error, and its 95% confidence interval.

`multipleEP` A matrix of the multiple endpoint results for each combination of endpoints. The first two columns are standard-normal test statistics obtained by combining Z-scores(ComZScores) and by combining score statistics (ComScoreStats). The third column contains the critical value adjusted for multiple testing (AdjCriticalValue).

References

Lin, DY, Zeng, D, Mehrotra, DV, Corey, L, and Gilbert, PB (2021). Evaluating the Efficacy of COVID-19 Vaccines. doi: https://doi.org/10.1093/cid/ciaa1863.

Examples

```
data(coveData)

res <- cove(coveData$vaccinated, coveData$time,
            coveData$infection, coveData$symptomatic,
            coveData$severe, VEnull = c(0.0,0.0,0.0))
```

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coveData *Toy Dataset For Illustration*

Description

This data set is provided for the purposes of illustrating the use of the software.

Usage

```
data(coveData)
```

Format

coveData is a data.frame containing 27,000 participants The data.frame contains 5 columns,

vaccinated The indicator of vaccination (1 = vaccinated; 0 = not vaccinated)

time The follow-up time in days

infection The indicator of infection (1 = infected; 0 = not infected)

symptomatic The indicator of symptomatic disease (1 = symptomatic; 0 = not symptomatic)

severe The indicator of severe disease (1 = severe; 0 = not severe)

print *Print Analysis Results*

Description

Prints the key results.

Usage

```
## S3 method for class 'coveObj'
print(x, ...)
```

Arguments

x	A coveObj object. The value returned by cove().
...	Ignored.

Examples

```
data(coveData)

res <- cove(coveData$vaccinated, coveData$time,
            coveData$infection, coveData$symptomatic,
            coveData$severe, VEnull = c(0.1,0.1,0.1))

print(x = res)
```

Index