

Package ‘DiscoverySystemSimulator’

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Title Simulating Effect discovery in an Active Surveillance System

Version 0.0.1

Description An R package that simulates effect discovery in an active surveillance system.

Imports rlang,
dplyr,
Cyclops,
purrr

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createDatabaseSettings
<i>Create database settings</i>

Description

Create database settings

Usage

```
createDatabaseSettings(sampleSizeMultiplier = 1)
```

Arguments

sampleSizeMultiplier

The relative sample size of the database.

Value

A settings object

 createExposureOutcomeSettings
*Create exposure-outcome settings***Description**

Create exposure-outcome settings

Usage

```
createExposureOutcomeSettings(
  nTarget = 100,
  nComparator = nTarget * 2,
  backgroundRate = 1e-04,
  logRrMean = 0,
  logRrSd = 0,
  riskStart = 0,
  riskEnd = 21
)
```

Arguments

nTarget Number of subjects in the target population.

nComparator Number of subjects in the comparator (counterfactual) population.

backgroundRate Poisson background rate of the outcome.

logRrMean The mean of the log relative distribution across databases.

logRrSd The standard deviation (SD) of the log relative distribution across databases.

riskStart Start of the true risk window (relative to exposure start).

riskEnd End of the true risk window (relative to exposure start).

Details

For each database, an effect size is sampled from the relative risk distribution. The relative risk indicates the increase in the risk during the risk window.

Value

A settings object

createMethodSettings *Create method settings*

Description

Create method settings

Usage

```
createMethodSettings(systematicErrorMean = 0, systematicErrorSd = 0)
```

Arguments

systematicErrorMean

The mean of the systematic error distribution.

systematicErrorSd

The standard deviation (SD) of the systematic error distribution.

Value

A settings object

createSimulationSettings
 Create simulation settings

Description

Create simulation settings

Usage

```
createSimulationSettings(
  exposureOutcomeSettings = c(lapply(rep(1000, 90), createExposureOutcomeSettings,
    logRrMean = 0, logRrSd = 0), lapply(rep(1000, 10), createExposureOutcomeSettings,
    logRrMean = log(2), logRrSd = 0.25)),
  timeAtRiskSettings = list(createTimeAtRiskSettings(0, 7), createTimeAtRiskSettings(0,
    21), createTimeAtRiskSettings(0, 42), createTimeAtRiskSettings(0, 90)),
  methodSettings = list(createMethodSettings(0.05, 0.05), createMethodSettings(0.1,
    0.1), createMethodSettings(0.2, 0.2)),
  databaseSettings = list(createDatabaseSettings(1), createDatabaseSettings(0.5),
    createDatabaseSettings(2)),
  looks = 10
)
```

Arguments

exposureOutcomeSettings	A list of objects created using <code>createExposureOutcomeSettings()</code> .
timeAtRiskSettings	A list of objects created using <code>createTimeAtRiskSettings()</code> .
methodSettings	A list of objects created using <code>createMethodSettings()</code> .
databaseSettings	A list of objects created using <code>createDatabaseSettings()</code> .
looks	The number of looks over time.

Value

A settings object

createTimeAtRiskSettings	<i>Create time-at-risk settings</i>
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Description

Create time-at-risk settings

Usage

```
createTimeAtRiskSettings(start = 0, end = 21)
```

Arguments

start	The start of the time-at-risk (relative to exposure start).
end	The end of the time-at-risk (relative to exposure start).

Value

A settings object

simulateDiscoverySystem	<i>Simulate estimates generated by a discovery system.</i>
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Description

Simulate estimates generated by a discovery system.

Usage

```
simulateDiscoverySystem(simulationSettings = createSimulationSettings())
```

Arguments

`simulationSettings`

An object created using `createSimulationSettings()`.

Value

A tibble with counts and estimates per exposure-outcome, database, method, time-at-risk, and look at the data. A `profiles` attribute contains the likelihood profiles.

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