

# Package ‘CohortDiagnostics’

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**Title** Diagnostics for OHDSI studies

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**Description** Diagnostics for studies that use the OMOP Common Data Model and the OHDSI tools.

**Depends** DatabaseConnector

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ROhdsiWebApi,  
ParallelLogger,  
readr,  
tibble,  
dplyr,  
RJSONIO,  
FeatureExtraction,  
ff,  
digest

**Suggests** testthat,  
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DT,  
plotly,  
shiny,  
shinydashboard,  
RColorBrewer,  
VennDiagram,  
htmltools,  
Eunomia

**Remotes** ohdsi/ROhdsiWebApi,  
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ohdsi/Eunomia

**License** Apache License

**VignetteBuilder** knitr

**URL** <https://ohdsi.github.io/CohortDiagnostics>, <https://github.com/OHDSI/CohortDiagnostics>

**BugReports** <https://github.com/OHDSI/CohortDiagnostics/issues>

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---

breakDownIndexEvents	<i>Break down index events</i>
----------------------	--------------------------------

---

## Description

For the concepts included in the index event definition, count how often they are encountered at the cohort index date.

## Usage

```
breakDownIndexEvents(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  cohortSql = NULL,
```

```
    cohortId = cohortId
  )
```

### Arguments

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if cohortJson and cohortSql are provided.
webApiCohortId	The ID of the cohort in the WebAPI instance. Needn't be provided if cohortJson and cohortSql are provided.
cohortJson	A character string containing the JSON of a cohort definition. Needn't be provided if baseUrl and cohortId are provided.
cohortSql	The OHDSI SQL representation of the same cohort definition. Needn't be provided if baseUrl and cohortId are provided.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.

### Value

A data frame with concepts, and per concept the count of how often the concept was encountered at the index date.

---

```
compareCohortCharacteristics
```

*Compare cohort characteristics*

---

### Description

Compare the characteristics of two cohorts, computing the standardized difference of the mean.

### Usage

```
compareCohortCharacteristics(characteristics1, characteristics2)
```

**Arguments**

- `characteristics1`  
Characteristics of the first cohort, as created using the [getCohortCharacteristics](#) function.
- `characteristics2`  
Characteristics of the second cohort, as created using the [getCohortCharacteristics](#) function.

**Value**

A data frame comparing the characteristics of the two cohorts.

---

`computeCohortOverlap`    *Compute overlap between two cohorts*

---

**Description**

Computes the overlap between a target and a comparator cohort.

**Usage**

```
computeCohortOverlap(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  targetCohortId,
  comparatorCohortId
)
```

**Arguments**

- `connectionDetails`  
An object of type `connectionDetails` as created using the [createConnectionDetails](#) function in the `DatabaseConnector` package. Can be left `NULL` if connection is provided.
- `connection`  
An object of type `connection` as created using the [connect](#) function in the `DatabaseConnector` package. Can be left `NULL` if `connectionDetails` is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
- `cohortDatabaseSchema`  
Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example `'scratch.dbo'`.
- `cohortTable`  
Name of the cohort table.
- `targetCohortId`  
The cohort definition ID used to reference the target cohort in the cohort table.
- `comparatorCohortId`  
The cohort definition ID used to reference the comparator cohort in the cohort table.

**Value**

A data frame with overlap statistics.

---

createCohortTable	Create cohort table(s)
-------------------	------------------------

---

## Description

This function creates an empty cohort table. Optionally, additional empty tables are created to store statistics on the various inclusion criteria.

## Usage

```
createCohortTable(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  createInclusionStatsTables = FALSE,
  resultsDatabaseSchema = cohortDatabaseSchema,
  cohortInclusionTable = paste0(cohortTable, "_inclusion"),
  cohortInclusionResultTable = paste0(cohortTable, "_inclusion_result"),
  cohortInclusionStatsTable = paste0(cohortTable, "_inclusion_stats"),
  cohortSummaryStatsTable = paste0(cohortTable, "_summary_stats")
)
```

## Arguments

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
createInclusionStatsTables	Create the four additional tables for storing inclusion rule statistics?
resultsDatabaseSchema	Schema name where the statistics tables reside. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortInclusionTable	Name of the inclusion table, one of the tables for storing inclusion rule statistics.
cohortInclusionResultTable	Name of the inclusion result table, one of the tables for storing inclusion rule statistics.
cohortInclusionStatsTable	Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.

cohortSummaryStatsTable

Name of the summary stats table, one of the tables for storing inclusion rule statistics.

---

createConceptCountsTable

*Create concept counts table*

---

## Description

Create a table with counts of how often each concept ID occurs in the CDM.

## Usage

```
createConceptCountsTable(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE
)
```

## Arguments

connectionDetails

An object of type connectionDetails as created using the [createConnectionDetails](#) function in the DatabaseConnector package. Can be left NULL if connection is provided.

connection

An object of type connection as created using the [connect](#) function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm\_data.dbo'.

oracleTempSchema

Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

conceptCountsDatabaseSchema

Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if conceptCountsTableIsTemp = TRUE.

conceptCountsTable

Name of the concept counts table. This table can be created using the [createConceptCountsTable](#).

conceptCountsTableIsTemp

Is the concept counts table a temp table?

---

findCohortIncludedSourceConcepts

*Check source codes used in a cohort definition*


---

## Description

This function first extracts all concept sets used in a cohort definition. Then, for each concept set the concept found in the CDM database the contributing source codes are identified.

## Usage

```
findCohortIncludedSourceConcepts(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  cohortSql = NULL,
  byMonth = FALSE,
  useSourceValues = FALSE
)
```

## Arguments

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if cohortJson and cohortSql are provided.
webApiCohortId	The ID of the cohort in the WebAPI instance. Needn't be provided if cohortJson and cohortSql are provided.
cohortJson	A character string containing the JSON of a cohort definition. Needn't be provided if baseUrl and cohortId are provided.
cohortSql	The OHDSI SQL representation of the same cohort definition. Needn't be provided if baseUrl and cohortId are provided.

byMonth	Compute counts by month? If FALSE, only overall counts are computed.
useSourceValues	Use the source_value fields to find the codes used in the data? If not, this analysis will rely entirely on the source_concept_id fields instead. Note that, depending on the source data and ETL, it might be possible for the source_value fields to contain patient-identifiable information by accident.

### Value

A data frame with source codes, with counts per domain how often the code was encountered in the CDM.

---

findCohortOrphanConcepts

*Find orphan concepts for all concept sets in a cohort*

---

### Description

Searches for concepts that should belong to the concept sets in a cohort definition but don't, for example because of missing source-to-standard concept maps, or erroneous hierarchical relationships.

### Usage

```
findCohortOrphanConcepts(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE
)
```

### Arguments

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.



oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if cohortJson is provided.
webApiCohortId	The ID of the cohort in the WebAPI instance. Needn't be provided if cohortJson is provided.
cohortJson	A character string containing the JSON of a cohort definition. Needn't be provided if baseUrl and webApiCohortId are provided.
conceptCountsDatabaseSchema	Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if conceptCountsTableIsTemp = TRUE.
conceptCountsTable	Name of the concept counts table. This table can be created using the <a href="#">createConceptCountsTable</a> .
conceptCountsTableIsTemp	Is the concept counts table a temp table?

## Details

Logically, this function performs the following steps for each concept set expression in the cohort definition:

- Given the concept set expression, find all included concepts.
- Find all names of the input concepts, including synonyms, and the names of source concepts that map to them.
- Search for concepts (standard and source) that contain any of those names as substring.
- Filter those concepts to those that are not in the original set of concepts (i.e. orphans).
- Restrict the set of orphan concepts to those that appear in the CDM database and across network concept prevalence (as either source concept or standard concept).

## Value

A data frame with orphan concepts, with counts how often the code was encountered in the CDM.

---

findOrphanConcepts	<i>Find (source) concepts that do not roll up to their ancestor(s)</i>
--------------------	--

---

## Description

Searches for concepts that should belong to the set of concepts but don't, for example because of missing source-to-standard concept maps, or erroneous hierarchical relationships.

**Usage**

```

findOrphanConcepts(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  conceptIds,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE
)

```

**Arguments**

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
conceptIds	A vector of concept IDs for which we want to find orphans.
conceptCountsDatabaseSchema	Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if conceptCountsTableIsTemp = TRUE.
conceptCountsTable	Name of the concept counts table. This table can be created using the <a href="#">createConceptCountsTable</a> .
conceptCountsTableIsTemp	Is the concept counts table a temp table?

**Details**

Logically, this function performs the following steps for the input set of concept IDs:

- Find all names of the input concepts, including synonyms, and the names of source concepts that map to them.
- Search for concepts (standard and source) that contain any of those names as substring.
- Filter those concepts to those that are not in the original set of concepts (i.e. orphans).
- Restrict the set of orphan concepts to those that appear in the CDM database and across network concept prevalence (as either source concept or standard concept).

**Value**

A data frame with orphan concepts, with counts how often the code was encountered in the CDM.

---

getCohortCharacteristics

*Create characterization of a cohort*

---

**Description**

Computes features using all drugs, conditions, procedures, etc. observed on or prior to the cohort index date.

**Usage**

```
getCohortCharacteristics(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  cohortId,
  covariateSettings = FeatureExtraction::createDefaultCovariateSettings()
)
```

**Arguments**

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.
covariateSettings	Either an object of type covariateSettings as created using one of the create-Covariate functions in the FeatureExtraction package, or a list of such objects.

**Value**

A data frame with cohort characteristics.

---

getCohortCounts	<i>Count the cohort(s)</i>
-----------------	----------------------------

---

**Description**

Computes the subject and entry count per cohort

**Usage**

```
getCohortCounts(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  cohortIds = c()
)
```

**Arguments**

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortIds	The cohort definition ID(s) used to reference the cohort in the cohort table. If left empty, all cohorts in the table will be included.

**Value**

A data frame with cohort counts

---

getIncidenceRate	<i>Compute incidence rate for a cohort</i>
------------------	--

---

## Description

Returns yearly incidence rate stratified by age and gender

## Usage

```
getIncidenceRate(
  connectionDetails = NULL,
  connection = NULL,
  cohortDatabaseSchema,
  cohortTable,
  cdmDatabaseSchema,
  oracleTempSchema = oracleTempSchema,
  firstOccurrenceOnly = TRUE,
  washoutPeriod = 365,
  cohortId
)
```

## Arguments

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
firstOccurrenceOnly	Use only the first occurrence of the cohort per person?
washoutPeriod	The minimum amount of observation time required before the occurrence of a cohort entry. This is also used to eliminate immortal time from the denominator.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.

**Value**

Returns a data frame of cohort count, person year count, and incidence rate per 1000 persons years with the following stratifications: 1) no stratification, 2) gender stratification, 3) age (10-year) stratification, 4) calendar year and age (10-year) stratification, 5) calendar year and gender stratification, 6) calendar year, age (10-year), and gender stratification with option to save dataframes.

---

```
getInclusionStatistics
```

*Get statistics on cohort inclusion criteria*

---

**Description**

Get statistics on cohort inclusion criteria

**Usage**

```
getInclusionStatistics(
  connectionDetails = NULL,
  connection = NULL,
  resultsDatabaseSchema,
  cohortId,
  simplify = TRUE,
  cohortTable = "cohort",
  cohortInclusionTable = paste0(cohortTable, "_inclusion"),
  cohortInclusionResultTable = paste0(cohortTable, "_inclusion_result"),
  cohortInclusionStatsTable = paste0(cohortTable, "_inclusion_stats"),
  cohortSummaryStatsTable = paste0(cohortTable, "_summary_stats")
)
```

**Arguments**

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
resultsDatabaseSchema	Schema name where the statistics tables reside. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.
simplify	Simply output the attrition table?
cohortTable	Name of the cohort table. Used only to conveniently derive names of the four rule statistics tables.
cohortInclusionTable	Name of the inclusion table, one of the tables for storing inclusion rule statistics.

cohortInclusionResultTable  
Name of the inclusion result table, one of the tables for storing inclusion rule statistics.

cohortInclusionStatsTable  
Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.

cohortSummaryStatsTable  
Name of the summary stats table, one of the tables for storing inclusion rule statistics.

### Value

If 'simplify = TRUE', this function returns a single data frame. Else a list of data frames is returned.

---

getInclusionStatisticsFromFiles

*Get inclusion criteria statistics from files*

---

### Description

Gets inclusion criteria statistics from files, as stored when using the `ROhdsiWebApi::insertCohortDefinitionSetInPa` function with `generateStats = TRUE`.

### Usage

```
getInclusionStatisticsFromFiles(
  cohortId,
  folder,
  cohortInclusionFile = file.path(folder, "cohortInclusion.csv"),
  cohortInclusionResultFile = file.path(folder, "cohortIncResult.csv"),
  cohortInclusionStatsFile = file.path(folder, "cohortIncStats.csv"),
  cohortSummaryStatsFile = file.path(folder, "cohortSummaryStats.csv"),
  simplify = TRUE
)
```

### Arguments

cohortId      The cohort definition ID used to reference the cohort in the cohort table.

folder      The path to the folder where the inclusion statistics are stored.

cohortInclusionFile  
Name of the inclusion table, one of the tables for storing inclusion rule statistics.

cohortInclusionResultFile  
Name of the inclusion result table, one of the tables for storing inclusion rule statistics.

cohortInclusionStatsFile  
Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.

cohortSummaryStatsFile  
Name of the summary stats table, one of the tables for storing inclusion rule statistics.

simplify      Simply output the attrition table?

**Value**

If 'simplify = TRUE', this function returns a single data frame. Else a list of data frames is returned.

---

getTimeDistributions	<i>Get time distributions of a cohort</i>
----------------------	---

---

**Description**

Computes the distribution of the observation time before and after index, and time within a cohort.

**Usage**

```
getTimeDistributions(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  cohortId
)
```

**Arguments**

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.

**Value**

A data frame with time distributions



---

instantiateCohort	<i>Instantiate a cohort</i>
-------------------	-----------------------------

---

## Description

This function instantiates the cohort in the cohort table. Optionally, the inclusion rule statistics are computed and stored in the inclusion rule statistics tables described in [createCohortTable](#)).

## Usage

```
instantiateCohort(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  baseUrl = NULL,
  webApiCohortId = NULL,
  cohortJson = NULL,
  cohortSql = NULL,
  cohortId = webApiCohortId,
  generateInclusionStats = FALSE,
  resultsDatabaseSchema = cohortDatabaseSchema,
  cohortInclusionTable = paste0(cohortTable, "_inclusion"),
  cohortInclusionResultTable = paste0(cohortTable, "_inclusion_result"),
  cohortInclusionStatsTable = paste0(cohortTable, "_inclusion_stats"),
  cohortSummaryStatsTable = paste0(cohortTable, "_summary_stats")
)
```

## Arguments

- |                      |  |
|----------------------|--|
| connectionDetails    | An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.  |
| connection           | An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes. |
| cdmDatabaseSchema    | Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.   |
| oracleTempSchema     | Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.   |
| cohortDatabaseSchema | Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.   |

cohortTable	Name of the cohort table.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Needn't be provided if cohortJson and cohortSql are provided.
webApiCohortId	The ID of the cohort in the WebAPI instance. Needn't be provided if cohortJson and cohortSql are provided.
cohortJson	A character string containing the JSON of a cohort definition. Needn't be provided if baseUrl and cohortId are provided.
cohortSql	The OHDSI SQL representation of the same cohort definition. Needn't be provided if baseUrl and cohortId are provided.
cohortId	The cohort definition ID used to reference the cohort in the cohort table.
generateInclusionStats	Compute and store inclusion rule statistics?
resultsDatabaseSchema	Schema name where the statistics tables reside. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortInclusionTable	Name of the inclusion table, one of the tables for storing inclusion rule statistics.
cohortInclusionResultTable	Name of the inclusion result table, one of the tables for storing inclusion rule statistics.
cohortInclusionStatsTable	Name of the inclusion stats table, one of the tables for storing inclusion rule statistics.
cohortSummaryStatsTable	Name of the summary stats table, one of the tables for storing inclusion rule statistics.

---

instantiateCohortSet    *Instantiate a set of cohort*

---

## Description

This function instantiates a set of cohort in the cohort table, using definitions that are fetched from a WebApi interface. Optionally, the inclusion rule statistics are computed and stored in the inclusionStatisticsFolder.

## Usage

```
instantiateCohortSet(
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema = cdmDatabaseSchema,
  cohortTable = "cohort",
  cohortIds = NULL,
  packageName = NULL,
  cohortToFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
```

```

    cohortSetReference = NULL,
    generateInclusionStats = FALSE,
    inclusionStatisticsFolder = NULL,
    createCohortTable = FALSE,
    incremental = FALSE,
    incrementalFolder = NULL
)

```

## Arguments

connectionDetails	An object of type connectionDetails as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
connection	An object of type connection as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
cdmDatabaseSchema	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
oracleTempSchema	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortIds	Optionally, provide a subset of cohort IDs to restrict the construction to.
packageName	The name of the package containing the cohort definitions. Can be left NULL if baseUrl and cohortSetReference have been specified.
cohortToCreateFile	The location of the cohortToCreate file within the package. Is ignored if baseUrl and cohortSetReference have been specified.
baseUrl	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if packageName and cohortToCreateFile have been specified.
cohortSetReference	A data frame with four columns, as described in the details. Can be left NULL if packageName and cohortToCreateFile have been specified.
generateInclusionStats	Compute and store inclusion rule statistics?
inclusionStatisticsFolder	The folder where the inclusion rule statistics are stored. Can be left NULL if generateInclusionStats = FALSE.
createCohortTable	Create the cohort table? If incremental = TRUE and the table already exists this will be skipped.
incremental	Create only cohorts that haven't been created before?

incrementalFolder

If incremental = TRUE, specify a folder where records are kept of which definition has been executed.

## Details

Currently two ways of executing this function are supported, either (1) embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSet` or (2) by using a `WebApi` interface to retrieve the cohort definitions.

When using this function from within a study package, use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the cohortToCreate file within that package, respectively

When using this function using a `WebApi` interface, use the `baseUrl` and `cohortSetReference` to specify how to connect to the `WebApi`, and which cohorts to fetch, respectively.

The `cohortSetReference` argument must be a data frame with the following columns:

**atlasId** The cohort ID in ATLAS.

**atlasName** The full name of the cohort. This will be shown in the Shiny app.

**cohortId** The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

**name** A short name for the cohort, to use to create file names. do not use special characters.

---

launchCohortExplorer    *Launch the CohortExplorer Shiny app*

---

## Description

Launch the CohortExplorer Shiny app

## Usage

```
launchCohortExplorer(
  connectionDetails,
  cdmDatabaseSchema,
  cohortDatabaseSchema,
  cohortTable,
  cohortId,
  sampleSize = 100,
  subjectIds = NULL
)
```

## Arguments

connectionDetails

An object of type `connectionDetails` as created using the [createConnectionDetails](#) function in the `DatabaseConnector` package.

cdmDatabaseSchema

Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example `'cdm_data.dbo'`.

cohortDatabaseSchema	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
cohortTable	Name of the cohort table.
cohortId	The ID of the cohort.
sampleSize	Number of subjects to sample from the cohort. Ignored if subjectIds is specified.
subjectIds	A vector of subject IDs to view.

### Details

Launches a Shiny app that allows the user to explore a cohort of interest.

---

launchDiagnosticsExplorer  
*Launch the Diagnostics Explorer Shiny app*

---

### Description

Launch the Diagnostics Explorer Shiny app

### Usage

```
launchDiagnosticsExplorer(dataFolder, launch.browser = FALSE)
```

### Arguments

dataFolder	A folder where the exported zip files for the diagnostics are stored. Use the <a href="#">runCohortDiagnostics</a> function to generate these zip files. Zip files containing results from multiple databases can be placed in the same folder.
launch.browser	Should the app be launched in your default browser, or in a Shiny window. Note: copying to clipboard will not work in a Shiny window.

### Details

Launches a Shiny app that allows the user to explore the diagnostics

---

plotincidenceRate      *Plot incidence rate by year, age, and/or gender*

---

### Description

Characterizes the incidence rate of a cohort definition.

**Usage**

```
plotIncidenceRate(
  incidenceRate,
  minPersonYears = 1000,
  stratifyByAge = TRUE,
  stratifyByGender = TRUE,
  stratifyByCalendarYear = TRUE,
  fileName = NULL
)
```

**Arguments**

incidenceRate	Incidence rate time series data for plotting generated using <a href="#">getIncidenceRate</a> function.
minPersonYears	Estimates get very unstable with low background counts, so removing them makes for cleaner plots.
stratifyByAge	Should the plot be stratified by age?
stratifyByGender	Should the plot be stratified by gender?
stratifyByCalendarYear	Should the plot be stratified by calendar year?
fileName	Optional: name of the file where the plot should be saved, for example 'plot.png'. See the function ggsave in the ggplot2 package for supported file formats.

**Details**

Generates time series plots of the incidence rate per 1000 person years of cohort entry by year, age, and/or gender.

**Value**

A ggplot object. Use the [ggsave](#) function to save to file in a different format.

---

```
preMergeDiagnosticsFiles
```

*Premerge Shiny diagnostics files*

---

**Description**

If there are many diagnostics files, starting the Shiny app may take a very long time. This function already does most of the preprocessing, increasing loading speed.

The merged data will be stored in the same folder, and will automatically be recognized by the Shiny app.

**Usage**

```
preMergeDiagnosticsFiles(dataFolder)
```

**Arguments**

`dataFolder`      folder where the exported zip files for the diagnostics are stored. Use the [runCohortDiagnostics](#) function to generate these zip files. Zip files containing results from multiple databases can be placed in the same folder.

---

`runCohortDiagnostics`    *Run cohort diagnostics*

---

**Description**

Runs the cohort diagnostics on all (or a subset of) the cohorts instantiated using the `ROhdsiWebApi::insertCohortDefinition` function. Assumes the cohorts have already been instantiated.

**Usage**

```
runCohortDiagnostics(
  packageName = NULL,
  cohortToFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
  cohortSetReference = NULL,
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortDatabaseSchema,
  cohortTable = "cohort",
  cohortIds = NULL,
  inclusionStatisticsFolder = NULL,
  exportFolder,
  databaseId,
  databaseName = databaseId,
  databaseDescription = "",
  runInclusionStatistics = TRUE,
  runIncludedSourceConcepts = TRUE,
  runOrphanConcepts = TRUE,
  runTimeDistributions = TRUE,
  runBreakdownIndexEvents = TRUE,
  runIncidenceRate = TRUE,
  runCohortOverlap = TRUE,
  runCohortCharacterization = TRUE,
  minCellCount = 5,
  incremental = FALSE,
  incrementalFolder = exportFolder
)
```

**Arguments**

`packageName`      The name of the package containing the cohort definitions. Can be left NULL if `baseUrl` and `cohortSetReference` have been specified.

<code>cohortToCreateFile</code>	The location of the cohortToCreate file within the package. Is ignored if <code>baseUrl</code> and <code>cohortSetReference</code> have been specified.
<code>baseUrl</code>	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if <code>packageName</code> and <code>cohortToCreateFile</code> have been specified.
<code>cohortSetReference</code>	A data frame with four columns, as described in the details. Can be left NULL if <code>packageName</code> and <code>cohortToCreateFile</code> have been specified.
<code>connectionDetails</code>	An object of type <code>connectionDetails</code> as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if connection is provided.
<code>connection</code>	An object of type <code>connection</code> as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if <code>connectionDetails</code> is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
<code>cdmDatabaseSchema</code>	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
<code>oracleTempSchema</code>	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.
<code>cohortDatabaseSchema</code>	Schema name where your cohort table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'.
<code>cohortTable</code>	Name of the cohort table.
<code>cohortIds</code>	Optionally, provide a subset of cohort IDs to restrict the diagnostics to.
<code>inclusionStatisticsFolder</code>	The folder where the inclusion rule statistics are stored. Can be left NULL if <code>runInclusionStatistics = FALSE</code> .
<code>exportFolder</code>	The folder where the output will be exported to. If this folder does not exist it will be created.
<code>databaseId</code>	A short string for identifying the database (e.g. 'Synpuf').
<code>databaseName</code>	The full name of the database.
<code>databaseDescription</code>	A short description (several sentences) of the database.
<code>runInclusionStatistics</code>	Generate and export statistic on the cohort inclusion rules?
<code>runIncludedSourceConcepts</code>	Generate and export the source concepts included in the cohorts?
<code>runOrphanConcepts</code>	Generate and export potential orphan concepts?
<code>runTimeDistributions</code>	Generate and export cohort time distributions?
<code>runBreakdownIndexEvents</code>	Generate and export the breakdown of index events?



runIncidenceRate      Generate and export the cohort incidence rates?

runCohortOverlap      Generate and export the cohort overlap?

runCohortCharacterization      Generate and export the cohort characterization?

minCellCount      The minimum cell count for fields contains person counts or fractions.

incremental      Create only cohort diagnostics that haven't been created before?

incrementalFolder      If incremental = TRUE, specify a folder where records are kept of which cohort diagnostics has been executed.

## Details

Currently two ways of executing this function are supported, either (1) embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSet` or (2) by using a `WebApi` interface to retrieve the cohort definitions.

When using this function from within a study package, use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the cohortToCreate file within that package, respectively

When using this function using a `WebApi` interface, use the `baseUrl` and `cohortSetReference` to specify how to connect to the `WebApi`, and which cohorts to fetch, respectively.

The `cohortSetReference` argument must be a data frame with the following columns:

**atlasId** The cohort ID in ATLAS.

**atlasName** The full name of the cohort. This will be shown in the Shiny app.

**cohortId** The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

**name** A short name for the cohort, to use to create file names. do not use special characters.

---

runCohortDiagnosticsUsingExternalCounts

*Run cohort diagnostics using external concept counts*

---

## Description

Runs cohort diagnostics on all (or a subset of) the cohorts, but using external concept counts. The external counts must have the following columns:

**concept\_id** The source or target concept ID.

**concept\_count** The number of records having the concept.

**concept\_subjects** The number of unique persons having the concept.

**Usage**

```
runCohortDiagnosticsUsingExternalCounts(
  packageName = NULL,
  cohortToCreateFile = "settings/CohortsToCreate.csv",
  baseUrl = NULL,
  cohortSetReference = NULL,
  connectionDetails = NULL,
  connection = NULL,
  cdmDatabaseSchema,
  oracleTempSchema = NULL,
  cohortIds = NULL,
  conceptCountsDatabaseSchema = cdmDatabaseSchema,
  conceptCountsTable = "concept_counts",
  conceptCountsTableIsTemp = FALSE,
  exportFolder,
  databaseId,
  databaseName = databaseId,
  databaseDescription = "",
  runIncludedSourceConcepts = TRUE,
  runOrphanConcepts = TRUE,
  minCellCount = 5
)
```

**Arguments**

<code>packageName</code>	The name of the package containing the cohort definitions. Can be left NULL if <code>baseUrl</code> and <code>cohortSetReference</code> have been specified.
<code>cohortToCreateFile</code>	The location of the <code>cohortToCreate</code> file within the package. Is ignored if <code>baseUrl</code> and <code>cohortSetReference</code> have been specified.
<code>baseUrl</code>	The base URL for the WebApi instance, for example: "http://server.org:80/WebAPI". Can be left NULL if <code>packageName</code> and <code>cohortToCreateFile</code> have been specified.
<code>cohortSetReference</code>	A data frame with four columns, as described in the details. Can be left NULL if <code>packageName</code> and <code>cohortToCreateFile</code> have been specified.
<code>connectionDetails</code>	An object of type <code>connectionDetails</code> as created using the <a href="#">createConnectionDetails</a> function in the DatabaseConnector package. Can be left NULL if <code>connection</code> is provided.
<code>connection</code>	An object of type <code>connection</code> as created using the <a href="#">connect</a> function in the DatabaseConnector package. Can be left NULL if <code>connectionDetails</code> is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
<code>cdmDatabaseSchema</code>	Schema name where your patient-level data in OMOP CDM format resides. Note that for SQL Server, this should include both the database and schema name, for example 'cdm_data.dbo'.
<code>oracleTempSchema</code>	Should be used in Oracle to specify a schema where the user has write privileges for storing temporary tables.

<code>cohortIds</code>	Optionally, provide a subset of cohort IDs to restrict the diagnostics to.
<code>conceptCountsDatabaseSchema</code>	Schema name where your concept counts table resides. Note that for SQL Server, this should include both the database and schema name, for example 'scratch.dbo'. Ignored if <code>conceptCountsTableIsTemp</code> = TRUE.
<code>conceptCountsTable</code>	Name of the concept counts table. This table can be created using the <a href="#">createConceptCountsTable</a> .
<code>conceptCountsTableIsTemp</code>	Is the concept counts table a temp table?
<code>exportFolder</code>	The folder where the output will be exported to. If this folder does not exist it will be created.
<code>databaseId</code>	A short string for identifying the database (e.g. 'Synpuf').
<code>databaseName</code>	The full name of the database.
<code>databaseDescription</code>	A short description (several sentences) of the database.
<code>runIncludedSourceConcepts</code>	Generate and export the source concepts included in the cohorts?
<code>runOrphanConcepts</code>	Generate and export potential orphan concepts?
<code>minCellCount</code>	The minimum cell count for fields contains person counts or fractions.

## Details

Currently two ways of executing this function are supported, either (1) embedded in a study package, assuming the cohort definitions are stored in that package using the `ROhdsiWebApi::insertCohortDefinitionSet` or (2) by using a `WebApi` interface to retrieve the cohort definitions.

When using this function from within a study package, use the `packageName` and `cohortToCreateFile` to specify the name of the study package, and the name of the `cohortToCreate` file within that package, respectively

When using this function using a `WebApi` interface, use the `baseUrl` and `cohortSetReference` to specify how to connect to the `WebApi`, and which cohorts to fetch, respectively.

The `cohortSetReference` argument must be a data frame with the following columns:

**atlasId** The cohort ID in ATLAS.

**atlasName** The full name of the cohort. This will be shown in the Shiny app.

**cohortId** The cohort ID to use in the package. Usually the same as the cohort ID in ATLAS.

**name** A short name for the cohort, to use to create file names. do not use special characters.

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