Package 'DrugExposure'

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Type Package

Title DrugExposure: To learn patterns of Medication Compliance, Aderence and Persistence

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Description The DrugExposure R package analyzes medication compliance and persistence in cohorts. It assesses drug utilization from first exposure, calculates key metrics like medication possession ratio and proportional days covered, and enhances insights into real-world adherence to improve patient outcomes.

Depends DatabaseConnector (>= 5.0.0),
R (>= 4.1.0)

Imports checkmate,
CirceR,
CohortGenerator,
dplyr,
lifecycle,
rlang,
SqlRender,
stringr

Suggests Eunomia,
remotes,
rmarkdown,
RJSONIO,
knitr,
testthat,
withr

Remotes CirceR

License Apache License

RoxygenNote 7.3.1

VignetteBuilder knitr

Roxygen list(markdown = TRUE)

Encoding UTF-8

Language en-US

URL https://ohdsi.github.io/DrugExposure/, https://github.com/OHDSI/DrugExposure

BugReports https://github.com/OHDSI/DrugExposure/issues

R topics documented:

`createCodeSetTableFromConceptSetExpression`
Generate a Temporary Codeset Table from a Concept Set Expression

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Description

This function takes a Circe-generated `conceptSetExpression` object (list) and creates a temporary table containing unique concept IDs.

Usage

```
createCodeSetTableFromConceptSetExpression(
  connection,
  vocabularyDatabaseSchema,
  conceptSetExpression,
  tempEmulationSchema = getOption("sqlRenderTempEmulationSchema"),
  conceptSetTable = "#concept_sets"
)
```

Arguments

`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.
`vocabularyDatabaseSchema`	Schema name where your OMOP vocabulary data resides. This is commonly the same as cdmDatabaseSchema. Note that for SQL Server, this should include both the database and schema name, for example 'vocabulary.dbo'.
`conceptSetExpression`	A R object (list) that is conforming to OHDSI Circe concept set expression. Usually from RObhdsiWebApi. Defines the cncept set expression as r list object. This is converted to json and given to CirceR to get concept set expression sql.
`tempEmulationSchema`	Some database platforms like Oracle and Impala do not truly support temp tables. To emulate temp tables, provide a schema with write privileges where temp tables can be created.
`conceptSetTable`	The name of a remote temp table that has the unique concept_id. Should have column name concept_id and be unique.

`defaultCohortGeneratorSubsetOperator` *Create Default Subset Operators for Cohort Generation*

Description

This function configures a set of default subset operators used in cohort generation. It uses CohortGenerator package subset operator, and allows for easily specifying demographic and temporal parameters to subset a cohort and create a new cohort.

Usage

```
defaultCohortGeneratorSubsetOperator(
  minAge = 0,
  maxAge = 90,
  genderSubset = c(8532, 8507),
  restrictToEarliestOccurrence = TRUE,
  race = NULL,
  calendarStartDate = "2016-01-01",
  calendarEndDate = Sys.Date() - 365,
  priorTime = 365,
  followUpTime = 365,
  ethnicity = NULL,
  limitTo = "firstEver"
)
```

Arguments

`minAge`	Integer, optional. The minimum age at first drug exposure. Defaults to 0 years.
`maxAge`	Integer, optional. The maximum age at first drug exposure. Defaults to 90 years.
`genderSubset`	Numeric vector, optional. Identifies genders using concept IDs. Defaults to c(8532, 8507).
`restrictToEarliestOccurrence`	Logical, optional. Specifies whether to restrict the analysis to the earliest occurrence of the drug exposure. Defaults to TRUE.
`race`	Integer, optional. Concept ID for specifying race.
`calendarStartDate`	Date, optional. Specifies the earliest date from which to consider drug exposures, used to left-censor data. Defaults to '2016-01-01'.
`calendarEndDate`	Date, optional. The latest date up to which to consider drug exposures, used to right-censor data. By default, it is set to one year before the current date to account for claims accrual lag.
`priorTime`	Integer, optional. Represents the number of days of prior observation required before the start of drug exposure. Defaults to 365 days.
`followUpTime`	Integer, optional. Represents the number of days of follow-up observation after the start of drug exposure. Defaults to 365 days.
`ethnicity`	Integer, optional. Concept ID for specifying ethnicity.

limitTo — Character, optional. Describes whether to restrict the analysis to the first-ever observation period or to all observation periods with drug exposure. Defaults to 'firstEver'.

Value

A list of configured subset operators suitable for use in cohort generation functions.

Examples

```
defaultCohortGeneratorSubsetOperator(
  minAge = 18,
  maxAge = 65,
  genderSubset = c(8532),
  restrictToEarliestOccurrence = FALSE,
  race = 2106,
  calendarStartDate = as.Date("2010-01-01"),
  calendarEndDate = as.Date("2020-12-31"),
  priorTime = 180,
  followUpTime = 180,
  ethnicity = 38003564,
  limitTo = "all"
)
```

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getDenominatorCohort *Create Denominator Cohort for Drug Exposure Analysis*

Description

This function constructs a cohort based on the first drug exposure within an observation period. It identifies the first drug exposure event in either the first (default) or all observation periods for each individual, based on the concept set expression provided. The start date of this exposure is set as the cohort start date. The cohort end date is determined by the maximum follow-up days allowed, but it will not exceed the end date of the observation period.

Usage

```
getDenominatorCohort(
  connection,
  cdmDatabaseSchema,
  tempEmulationSchema = getOption("sqlRenderTempEmulationSchema"),
  denominatorCohortTable = "#denominator",
  denominatorCohortId = 1,
  conceptSetTable = "#concept_sets",
  restrictToFirstObservationperiod = TRUE,
  maxFollowUpDays = 365,
  cohortGeneratorSubsetOperators = defaultCohortGeneratorSubsetOperator()
)
```

Arguments

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'.
tempEmulationSchema	Some database platforms like Oracle and Impala do not truly support temp tables. To emulate temp tables, provide a schema with write privileges where temp tables can be created.
denominatorCohortTable	String, optional. The name of the temporary table to store cohort data. Defaults to "#denominator".
denominatorCohortId	Integer, optional. The ID assigned to the denominator cohort. Defaults to 1.
conceptSetTable	The name of a remote temp table that has the unique concept_id. Should have column name concept_id and be unique.
restrictToFirstObservationperiod	(optional) Default TRUE
maxFollowUpDays	(optional, default 365) max number of days to followup the person with continuous observation
cohortGeneratorSubsetOperators	(optional) A CohortGenerator Subset operator

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getDrugExposureInDenominatorCohort

get drug exposure events for a person

Description

Given a concept set expression and a denominator cohort to restrict the persons and exposure event to period in the denominator cohort, this function creates a temp table that has the records from drug_exposure table.

Usage

```
getDrugExposureInDenominatorCohort(
  connection = NULL,
  conceptSetExpression,
  cdmDatabaseSchema,
  tempEmulationSchema = getOption("sqlRenderTempEmulationSchema"),
  conceptSetTable = "#concept_sets",
  denominatorCohortDatabaseSchema = NULL,
  denominatorCohortTable = "#denominator",
  denominatorCohortId = 0,
  drugExposureOutputTable = "#drug_exposure"
)
```

Arguments

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.
conceptSetExpression	A R object (list) that is conforming to OHDSI Circe concept set expression. Usually from RObhdsiWebApi. Defines the cncept set expression as r list object. This is converted to json and given to CirceR to get concept set expression sql.
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'.
tempEmulationSchema	Some database platforms like Oracle and Impala do not truly support temp tables. To emulate temp tables, provide a schema with write privileges where temp tables can be created.
conceptSetTable	The name of a remote temp table that has the unique concept_id. Should have column name concept_id and be unique.
denominatorCohortDatabaseSchema	(optional) The cohort database schema that has the denominator cohort.
denominatorCohortTable	Denominator cohort table.
denominatorCohortId	(optional) The cohort id of the denominator cohort. Default 0.
drugExposureOutputTable	the output table

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getNumeratorCohorts *Create Numerator Cohorts*

Description

This function takes an input a cohort (called denominator to bind the numerator cohort to), a concept set expression to create the numerator cohort.

Usage

```
getNumeratorCohorts(
  connection = NULL,
  cdmDatabaseSchema,
  tempEmulationSchema = getOption("sqlRenderTempEmulationSchema"),
  numeratorCohortTableBaseName = "#numerator",
  drugExposureTable = "#drug_exposure",
  persistenceDays = c(0),
  baseCohortDefinitionId = 100
)
```

Arguments

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'.
tempEmulationSchema	Some database platforms like Oracle and Impala do not truly support temp tables. To emulate temp tables, provide a schema with write privileges where temp tables can be created.
numeratorCohortTableBaseName	The name of the output table
drugExposureTable	The name of the table with "#drug_exposure". Should be a temp table.
persistenceDays	Number of days to check for persistence of drug exposure.
baseCohortDefinitionId	The minimum cohortId to create cohorts for all persistenceDays

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runDrugExposure *Run Drug Exposure Analysis*

Description

This function takes as a input a Circe compatible concept set expression (as r list object that can be converted to json), a denominator cohort or a set of rules to create the denominator cohort, and checks for occurrence of drug exposure events in the drug_exposure table of the CDM for the conceptId in the given concept expression in the period and for the subjects in the denominator cohort. It then computes a series of drug utilization metrics (adherence, persistence, utilization, patterns) and reports returns a list of objects that maybe utilized in a drug exposure report.

Usage

```
runDrugExposure(
  connectionDetails = NULL,
  connection = NULL,
  conceptSetExpression,
  cdmDatabaseSchema,
  vocabularyDatabaseSchema = cdmDatabaseSchema,
  tempEmulationSchema = getOption("sqlRenderTempEmulationSchema"),
  restrictToFirstObservationperiod = TRUE,
  maxFollowUpDays = 365,
  persistenceDays = c(0),
  cohortGeneratorSubsetOperators = defaultCohortGeneratorSubsetOperator()
)
```

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.

`conceptSetExpression`
: A R object (list) that is conforming to OHDSI Circe concept set expression. Usually from ROhdsiWebApi. Defines the cncept set expression as r list object. This is converted to json and given to CirceR to get concept set expression sql.

`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'.

`vocabularyDatabaseSchema`
: Schema name where your OMOP vocabulary data resides. This is commonly the same as cdmDatabaseSchema. Note that for SQL Server, this should include both the database and schema name, for example 'vocabulary.dbo'.

`tempEmulationSchema`
: Some database platforms like Oracle and Impala do not truly support temp tables. To emulate temp tables, provide a schema with write privileges where temp tables can be created.

`restrictToFirstObservationperiod`
: (optional) Default TRUE

`maxFollowUpDays`
: (optional, default 365) max number of days to followup the person with continuous observation

`persistenceDays`
: (optional) Number of days to check for persistence of drug exposure. Can take a array of days, and report will be generated for all.

`cohortGeneratorSubsetOperators`
: (optional) A CohortGenerator Subset operator

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