

Package ‘CohortConstructor’

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Title Build and Manipulate Study Cohorts Using a Common Data Model

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Description Create and manipulate study cohorts in data mapped to the Observational Medical Outcomes Partnership Common Data Model.

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Contents

collapseCohorts	2
conceptCohort	3
demographicsCohort	4
entryAtFirstDate	5
entryAtLastDate	6
exitAtDeath	7
exitAtFirstDate	8
exitAtLastDate	9
exitAtObservationEnd	10
intersectCohorts	11
matchCohorts	12
measurementCohort	13
mockCohortConstructor	15
requireAge	16
requireCohortIntersect	17
requireConceptIntersect	18
requireDeathFlag	19
requireDemographics	20
requireFutureObservation	22
requireInDateRange	23
requireIsFirstEntry	24
requireIsLastEntry	24
requirePriorObservation	25
requireSex	26
requireTableIntersect	27
sampleCohorts	28
stratifyCohorts	29
subsetCohorts	30
trimDemographics	31
trimToDateRange	32
unionCohorts	33
yearCohorts	34
Index	35

collapseCohorts	<i>Collapse cohort entries using a certain gap to concatenate records.</i>
-----------------	--

Description

collapseCohorts() concatenates cohort records, allowing for some number of days between one finishing and the next starting.

Usage

```
collapseCohorts(cohort, cohortId = NULL, gap = 0, name = tableName(cohort))
```

Arguments

cohort	A cohort table
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
gap	Number of days to use when merging cohort entries.
name	Name of the cohort table.

Value

A cohort table

conceptCohort	<i>Create cohorts based on a concept set</i>
---------------	--

Description

conceptCohort() creates a cohort table from patient records from the clinical tables in the OMOP CDM.

The following tables are currently supported for creating concept cohorts:

- condition_occurrence
- device_exposure
- drug_exposure
- measurement
- observation
- procedure_occurrence
- visit_occurrence

Cohort duration is based on record start and end (e.g. condition_start_date and condition_end_date for records coming from the condition_occurrence tables). So that the resulting table satisfies the requirements of an OMOP CDM cohort table:

- Overlapping records are collapsed into a single cohort entry.
- If a record starts outside of an observation period it will be silently ignored.
- If a record ends outside of an observation period it will be trimmed so as to end at the preceding observation period end date.

Usage

```
conceptCohort(cdm, conceptSet, name)
```

Arguments

cdm	A cdm reference.
conceptSet	A conceptSet, which can either be a codelist or a conceptSetExpression.
name	Name of the cohort in the cdm object.

Value

A cohort table

Examples

```
library(CohortConstructor)

cdm <- mockCohortConstructor(conditionOccurrence = TRUE)

cohort <- conceptCohort(cdm = cdm, conceptSet = list(a = 1), name = "cohort")

cohort |> attrition()
```

demographicsCohort *Create cohorts based on patient demographics*

Description

demographicsCohort() creates a cohort table based on patient characteristics. If and when an individual satisfies all the criteria they enter the cohort. When they stop satisfying any of the criteria their cohort entry ends.

Usage

```
demographicsCohort(
  cdm,
  name,
  ageRange = NULL,
  sex = NULL,
  minPriorObservation = NULL,
  minFutureObservation = NULL
)
```

Arguments

cdm	A cdm reference.
name	Name of the new cohort table
ageRange	A list of vectors specifying minimum and maximum age.
sex	Can be "Both", "Male" or "Female".

minPriorObservation
A minimum number of prior observation days in the database.

minFutureObservation
A minimum number of future observation days in the database.

Value

A cohort table

Examples

```
library(CohortConstructor)

cdm <- mockCohortConstructor()

cohort <- cdm |> demographicsCohort(name = "cohort3", ageRange = c(18,40), sex = "Male")

attrition(cohort)
```

entryAtFirstDate	<i>Update cohort start date to be the first date from of a set of column dates</i>
------------------	--

Description

entryAtFirstDate() resets cohort start date based on a set of specified column dates. The first date that occurs is chosen.

Usage

```
entryAtFirstDate(
  cohort,
  dateColumns,
  cohortId = NULL,
  returnReason = TRUE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	Date columns in the cohort table to consider.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
returnReason	If TRUE it will return a column stating which column in dateColumns is used as a new cohort end date.
name	Name of the new cohort with the restriction.

Value

The cohort table.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor(tables = list(
  "cohort" = dplyr::tibble(
    cohort_definition_id = 1,
    subject_id = c(1, 2, 3, 4),
    cohort_start_date = as.Date(c("2000-06-03", "2000-01-01", "2015-01-15", "2000-12-09")),
    cohort_end_date = as.Date(c("2001-09-01", "2001-01-12", "2015-02-15", "2002-12-09")),
    date_1 = as.Date(c("2001-08-01", "2001-01-01", "2015-01-15", "2002-12-09")),
    date_2 = as.Date(c("2001-08-01", NA, "2015-02-14", "2002-12-09"))
  )
))
cdm$cohort |> entryAtLastDate(dateColumns = c("date_1", "date_2"))
```

entryAtLastDate *Set cohort start date to the last of a set of column dates*

Description

Set cohort start date to the last of a set of column dates

Usage

```
entryAtLastDate(
  cohort,
  dateColumns,
  cohortId = NULL,
  returnReason = TRUE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	description
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
returnReason	If TRUE it will return a column stating which column in dateColumns is used as a new cohort end date. description
name	Name of the new cohort with the restriction.

Value

The cohort table.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor(tables = list(
  "cohort" = dplyr::tibble(
    cohort_definition_id = 1,
    subject_id = c(1, 2, 3, 4),
    cohort_start_date = as.Date(c("2000-06-03", "2000-01-01", "2015-01-15", "2000-12-09")),
    cohort_end_date = as.Date(c("2001-09-01", "2001-01-12", "2015-02-15", "2002-12-09")),
    date_1 = as.Date(c("2001-08-01", "2001-01-01", "2015-01-15", "2002-12-09")),
    date_2 = as.Date(c("2001-08-01", NA, "2015-02-14", "2002-12-09"))
  )
))
cdm$cohort |> entryAtLastDate(dateColumns = c("date_1", "date_2"))
```

exitAtDeath

Set cohort end date to death date

Description

This functions changes cohort end date to subject's death date. In the case were this generates overlapping records in the cohort, those overlapping entries will be merged.

Usage

```
exitAtDeath(
  cohort,
  cohortId = NULL,
  requireDeath = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
requireDeath	If TRUE, subjects without a death record will be dropped, while if FALSE their end date will be left as is.
name	Name of the new cohort with the restriction.

Value

The cohort table.

Examples

```
library(PatientProfiles)
library(CohortConstructor)
cdm <- mockPatientProfiles()
cdm$cohort1 |> exitAtDeath()
```

exitAtFirstDate	<i>Set cohort end date to the first of a set of column dates</i>
-----------------	--

Description

exitAtFirstDate() resets cohort end date based on a set of specified column dates. The first date that occurs is chosen.

Usage

```
exitAtFirstDate(
  cohort,
  dateColumns,
  cohortId = NULL,
  returnReason = TRUE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	Date columns in the cohort table to consider.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
returnReason	If TRUE it will return a column stating which column in dateColumns is used as a new cohort end date.
name	Name of the new cohort with the restriction.

Value

The cohort table.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor(tables = list(
  "cohort" = dplyr::tibble(
    cohort_definition_id = 1,
    subject_id = c(1, 2, 3, 4),
    cohort_start_date = as.Date(c("2000-06-03", "2000-01-01", "2015-01-15", "2000-12-09")),
```



```

    cohort_end_date = as.Date(c("2001-09-01", "2001-01-12", "2015-02-15", "2002-12-09")),
    date_1 = as.Date(c("2001-08-01", "2001-01-01", "2015-01-15", "2002-12-09")),
    date_2 = as.Date(c("2001-08-01", NA, "2015-04-15", "2002-12-09"))
  )
))
cdm$cohort |> exitAtFirstDate(dateColumns = c("date_1", "date_2"))

```

exitAtLastDate	<i>Set cohort end date to the last of a set of column dates</i>
----------------	---

Description

exitAtLastDate() resets cohort end date based on a set of specified column dates. The last date that occurs is chosen.

Usage

```

exitAtLastDate(
  cohort,
  dateColumns,
  cohortId = NULL,
  returnReason = TRUE,
  name = tableName(cohort)
)

```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	description
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
returnReason	If TRUE it will return a column stating which column in dateColumns is used as a new cohort end date. description
name	Name of the new cohort with the restriction.

Value

The cohort table.

Examples

```

library(CohortConstructor)
cdm <- mockCohortConstructor(tables = list(
  "cohort" = dplyr::tibble(
    cohort_definition_id = 1,
    subject_id = c(1, 2, 3, 4),

```

```

cohort_start_date = as.Date(c("2000-06-03", "2000-01-01", "2015-01-15", "2000-12-09")),
cohort_end_date = as.Date(c("2001-09-01", "2001-01-12", "2015-02-15", "2002-12-09")),
date_1 = as.Date(c("2001-08-01", "2001-01-01", "2015-01-15", "2002-12-09")),
date_2 = as.Date(c("2001-08-01", NA, "2015-04-15", "2002-12-09"))
)
))
cdm$cohort |> exitAtLastDate(dateColumns = c("date_1", "date_2"))

```

exitAtObservationEnd *Set cohort end date to end of observation*

Description

exitAtObservationEnd() resets cohort end date based on a set of specified column dates. The last date that occurs is chosen.

This functions changes cohort end date to the end date of the observation period corresponding to the cohort entry. In the case were this generates overlapping records in the cohort, overlapping entries will be merged.

Usage

```
exitAtObservationEnd(cohort, cohortId = NULL, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
name	Name of the new cohort with the restriction.

Value

The cohort table.

Examples

```

library(CohortConstructor)

cdm <- mockCohortConstructor()
cdm$cohort1 |> exitAtObservationEnd()

```

intersectCohorts	<i>Generate a combination cohort set between the intersection of different cohorts.</i>
------------------	---

Description

intersectCohorts() combines different cohort entries, with those records that overlap combined and kept. Cohort entries are when an individual was in *both* of the cohorts.

Usage

```
intersectCohorts(  
  cohort,  
  cohortId = NULL,  
  gap = 0,  
  mutuallyExclusive = FALSE,  
  returnOnlyComb = FALSE,  
  name = tableName(cohort)  
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will be removed from the cohort set.
gap	Number of days between two subsequent cohort entries to be merged in a single cohort record.
mutuallyExclusive	Whether the generated cohorts are mutually exclusive or not.
returnOnlyComb	Whether to only get the combination cohort back
name	Name of the new cohort with the demographic requirements.

Value

A cohort table.

Examples

```
library(CohortConstructor)  
  
cdm <- mockCohortConstructor(nPerson = 100)  
  
cdm$cohort3 <- intersectCohorts(  
  cohort = cdm$cohort2,  
  name = "cohort3",  
)
```

```
settings(cdm$cohort3)
```

matchCohorts	<i>Generate a new cohort matched cohort</i>
--------------	---

Description

matchCohorts() generate a new cohort matched to individuals in an existing cohort. Individuals can be matched based on year of birth and sex.

Usage

```
matchCohorts(
  cohort,
  cohortId = NULL,
  matchSex = TRUE,
  matchYearOfBirth = TRUE,
  ratio = 1,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will be removed from the cohort set.
matchSex	Whether to match in sex.
matchYearOfBirth	Whether to match in year of birth.
ratio	Number of allowed matches per individual in the target cohort.
name	Name of the new generated cohort set.

Value

A cohort table.

Examples

```
library(CohortConstructor)
library(dplyr)
cdm <- mockCohortConstructor(nPerson = 200)
cdm$new_matched_cohort <- cdm$cohort2 |>
  matchCohorts(
    name = "new_matched_cohort",
    cohortId = 2,
```

```

    matchSex = TRUE,
    matchYearOfBirth = TRUE,
    ratio = 1)
cdm$new_matched_cohort

```

measurementCohort *Create cohorts measurement based cohorts*

Description

measurementCohort() creates cohorts based on patient records contained in the measurement table. This function extends the conceptCohort() as it allows for measurement values associated with the records to be specified.

- If valueAsConcept and valueAsNumber are NULL then no requirements on of the values associated with measurement records and using measurementCohort() will lead to the same result as using conceptCohort() (so long as all concepts are from the measurement domain).
- If one of valueAsConcept and valueAsNumber is not NULL then records will be required to have values that satisfy the requirement specified.
- If both valueAsConcept and valueAsNumber are not NULL, records will be required to have values that fulfill *either* of the requirements

Usage

```

measurementCohort(
  cdm,
  conceptSet,
  name,
  valueAsConcept = NULL,
  valueAsNumber = NULL
)

```

Arguments

cdm	A cdm reference.
conceptSet	A conceptSet, which can either be a codelist or a conceptSetExpression.
name	Name of the cohort in the cdm object.
valueAsConcept	A vector of cohort IDs used to filter measurements. Only measurements with these values in the value_as_concept_id column of the measurement table will be included. If NULL all entries independently of their value as concept will be considered.
valueAsNumber	A named list indicating the range of values and the unit they correspond to, as follows: list("unit_concept_id" = c(rangeValue1, rangeValue2)). If NULL, all entries independently of their value as number will be included.

Value

A cohort table

Examples

```

library(CohortConstructor)
cdm <- mockCohortConstructor(con = NULL)
cdm$concept <- cdm$concept |>
  dplyr::union_all(
    dplyr::tibble(
      concept_id = c(4326744, 4298393, 45770407, 8876, 4124457),
      concept_name = c("Blood pressure", "Systemic blood pressure",
        "Baseline blood pressure", "millimeter mercury column",
        "Normal range"),
      domain_id = "Measurement",
      vocabulary_id = c("SNOMED", "SNOMED", "SNOMED", "UCUM", "SNOMED"),
      standard_concept = "S",
      concept_class_id = c("Observable Entity", "Observable Entity",
        "Observable Entity", "Unit", "Qualifier Value"),
      concept_code = NA,
      valid_start_date = NA,
      valid_end_date = NA,
      invalid_reason = NA
    )
  )
cdm$measurement <- dplyr::tibble(
  measurement_id = 1:4,
  person_id = c(1, 1, 2, 3),
  measurement_concept_id = c(4326744, 4298393, 4298393, 45770407),
  measurement_date = as.Date(c("2000-07-01", "2000-12-11", "2002-09-08",
    "2015-02-19")),
  measurement_type_concept_id = NA,
  value_as_number = c(100, 125, NA, NA),
  value_as_concept_id = c(0, 0, 0, 4124457),
  unit_concept_id = c(8876, 8876, 0, 0)
)
cdm <- CDMConnector::copyCdmTo(
  con = DBI::dbConnect(duckdb::duckdb()),
  cdm = cdm, schema = "main")

cdm$cohort <- measurementCohort(
  cdm = cdm,
  name = "cohort",
  conceptSet = list("normal_blood_pressure" = c(4326744, 4298393, 45770407)),
  valueAsConcept = c(4124457),
  valueAsNumber = list("8876" = c(70, 120))
)

cdm$cohort

```

mockCohortConstructor *Function to create a mock cdm reference for CohortConstructor*

Description

mockCohortConstructor() creates an example dataset that can be used for demonstrating and testing the package

Usage

```
mockCohortConstructor(
  nPerson = 10,
  conceptTable = NULL,
  tables = NULL,
  conceptId = NULL,
  conceptIdClass = NULL,
  drugExposure = FALSE,
  conditionOccurrence = FALSE,
  measurement = FALSE,
  death = FALSE,
  otherTables = NULL,
  con = DBI::dbConnect(duckdb::duckdb()),
  writeSchema = "main",
  seed = 123
)
```

Arguments

nPerson	number of person in the cdm
conceptTable	user defined concept table
tables	list of tables to include in the cdm
conceptId	list of concept id
conceptIdClass	the domain class of the conceptId
drugExposure	T/F include drug exposure table in the cdm
conditionOccurrence	T/F include condition occurrence in the cdm
measurement	T/F include measurement in the cdm
death	T/F include death table in the cdm
otherTables	it takes a list of single tibble with names to include other tables in the cdm
con	A DBI connection to create the cdm mock object.
writeSchema	Name of an schema on the same connection with writing permissions.
seed	Seed passed to omock::mockCdmFromTable

Value

cdm object

Examples

```
library(CohortConstructor)

cdm <- mockCohortConstructor()

cdm
```

requireAge	<i>Restrict cohort on age</i>
------------	-------------------------------

Description

requireAge() filters cohort records, keeping only records where individuals satisfy the specified age criteria.

Usage

```
requireAge(
  cohort,
  ageRange,
  cohortId = NULL,
  indexDate = "cohort_start_date",
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
ageRange	A list of minimum and maximum age.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Variable in cohort that contains the date to compute the demographics characteristics on which to restrict on.
name	Name of the new cohort with the age requirement.

Value

The cohort table with only records for individuals satisfying the age requirement

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 |>
  requireAge(indexDate = "cohort_start_date",
            ageRange = list(c(18, 65)))
```

requireCohortIntersect

Require cohort subjects are present (or absence) in another cohort

Description

requireCohortIntersect() filters a cohort table based on a requirement that an individual is seen (or not seen) in another cohort in some time window around an index date.

Usage

```
requireCohortIntersect(
  cohort,
  targetCohortTable,
  window,
  intersections = c(1, Inf),
  cohortId = NULL,
  targetCohortId = NULL,
  indexDate = "cohort_start_date",
  targetStartDate = "cohort_start_date",
  targetEndDate = "cohort_end_date",
  censorDate = NULL,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
targetCohortTable	Name of the cohort that we want to check for intersect.
window	Window to consider events over.
intersections	A range indicating number of intersections for criteria to be fulfilled. If a single number is passed, the number of intersections must match this.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
targetCohortId	Vector of cohort definition ids to include.
indexDate	Variable in x that contains the date to compute the intersection.

targetStartDate	Date of reference in cohort table, either for start (in overlap) or on its own (for incidence).
targetEndDate	Date of reference in cohort table, either for end (overlap) or NULL (if incidence).
sensorDate	Whether to censor overlap events at a specific date or a column date of x.
name	Name of the new cohort with the future observation restriction.

Value

Cohort table with only those isatisfying the criteria kept

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 |>
  requireCohortIntersect(targetCohortTable = "cohort2",
                        targetCohortId = 1,
                        indexDate = "cohort_start_date",
                        window = c(-Inf, 0))
```

requireConceptIntersect

Require cohort subjects to have (or not have) events of a concept list

Description

requireConceptIntersect() filters a cohort table based on a requirement that an individual is seen (or not seen) to have events related to a concept list in some time window around an index date.

Usage

```
requireConceptIntersect(
  cohort,
  conceptSet,
  window,
  intersections = c(1, Inf),
  cohortId = NULL,
  indexDate = "cohort_start_date",
  targetStartDate = "event_start_date",
  targetEndDate = "event_end_date",
  sensorDate = NULL,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
conceptSet	Concept set list.
window	Window to consider events over.
intersections	A range indicating number of intersections for criteria to be fulfilled. If a single number is passed, the number of intersections must match this.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged..
indexDate	Variable in x that contains the date to compute the intersection.
targetStartDate	Date of reference in cohort table, either for start (in overlap) or on its own (for incidence).
targetEndDate	Date of reference in cohort table, either for end (overlap) or NULL (if incidence).
sensorDate	Whether to censor overlap events at a specific date or a column date of x.
name	Name of the new cohort with the future observation restriction.

Value

Cohort table with only those with the events in the concept list kept (or those without the event if negate = TRUE)

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor(conditionOccurrence = TRUE)
cdm$cohort2 <- requireConceptIntersect(
  cohort = cdm$cohort1,
  conceptSet = list(a = 1),
  window = c(-Inf, 0),
  name = "cohort2")
```

requireDeathFlag *Require cohort subjects have (or do not have) a death record*

Description

requireDeathFlag() filters a cohort table based on a requirement that an individual is seen (or not seen) to have a death in some time window around an index date.

Usage

```
requireDeathFlag(
  cohort,
  window,
  cohortId = NULL,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  negate = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
window	Window to consider events over.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Variable in x that contains the date to compute the intersection.
censorDate	Whether to censor overlap events at a specific date or a column date of x.
negate	If set as TRUE, criteria will be applied as exclusion rather than inclusion (i.e. require absence in another cohort).
name	Name of the new cohort with the future observation restriction.

Value

Cohort table with only those with a death event kept (or without if negate = TRUE)

Examples

```
library(CDMConnector)
library(CohortConstructor)
cdm <- mockCohortConstructor(death = TRUE)
cdm$cohort1 <- cdm$cohort1 |> requireDeathFlag(window = list(c(0, Inf)))
attrition(cdm$cohort1)
```

requireDemographics *Restrict cohort on patient demographics*

Description

requireDemographics() filters cohort records, keeping only records where individuals satisfy the specified demographic criteria.

Usage

```
requireDemographics(
  cohort,
  cohortId = NULL,
  indexDate = "cohort_start_date",
  ageRange = list(c(0, 150)),
  sex = c("Both"),
  minPriorObservation = 0,
  minFutureObservation = 0,
  requirementInteractions = TRUE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Variable in cohort that contains the date to compute the demographics characteristics on which to restrict on.
ageRange	A list of minimum and maximum age.
sex	Can be "Both", "Male" or "Female". If one of the latter, only those with that sex will be included.
minPriorObservation	A minimum number of prior observation days in the database.
minFutureObservation	A minimum number of future observation days in the database.
requirementInteractions	If TRUE, cohorts will be created for all combinations of ageGroup, sex, and daysPriorObservation. If FALSE, only the first value specified for the other factors will be used. Consequently, order of values matters when requirementInteractions is FALSE.
name	Name of the new cohort with the demographic requirements.

Value

The cohort table with only records for individuals satisfying the demographic requirements

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor(nPerson = 100)
cdm$cohort1 |>
  requireDemographics(indexDate = "cohort_start_date",
    ageRange = list(c(18, 65)),
    sex = "Female",
    minPriorObservation = 365)
```

`requireFutureObservation`*Restrict cohort on future observation*

Description

`requireFutureObservation()` filters cohort records, keeping only records where individuals satisfy the specified future observation criteria.

Usage

```
requireFutureObservation(  
  cohort,  
  minFutureObservation,  
  cohortId = NULL,  
  indexDate = "cohort_start_date",  
  name = tableName(cohort)  
)
```

Arguments

<code>cohort</code>	A cohort table in a cdm reference.
<code>minFutureObservation</code>	A minimum number of future observation days in the database.
<code>cohortId</code>	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
<code>indexDate</code>	Variable in cohort that contains the date to compute the demographics characteristics on which to restrict on.
<code>name</code>	Name of the new cohort with the future observation restriction.

Value

The cohort table with only records for individuals satisfying the future observation requirement

Examples

```
library(CohortConstructor)  
cdm <- mockCohortConstructor()  
cdm$cohort1 |>  
  requireFutureObservation(indexDate = "cohort_start_date",  
                           minFutureObservation = 30)
```

requireInDateRange *Require that an index date is within a date range*

Description

requireInDateRange() filters cohort records, keeping only those for which the index date is within the specified date range.

Usage

```
requireInDateRange(  
  cohort,  
  dateRange,  
  cohortId = NULL,  
  indexDate = "cohort_start_date",  
  name = tableName(cohort)  
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateRange	A window of time during which the index date must have been observed.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Variable in cohort that contains the index date of interest
name	Name of the new cohort with the restriction.

Value

The cohort table with any cohort entries outside of the date range dropped

Examples

```
library(CohortConstructor)  
  
cdm <- mockCohortConstructor(nPerson = 100)  
cdm$cohort1 |>  
  requireInDateRange(indexDate = "cohort_start_date",  
                     dateRange = as.Date(c("2010-01-01", "2019-01-01")))
```

requireIsFirstEntry *Restrict cohort to first entry*

Description

requireIsFirstEntry() filters cohort records, keeping only the first cohort entry per person.

Usage

```
requireIsFirstEntry(
  cohort,
  cohortId = NULL,
  indexDate = "cohort_start_date",
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Column name in cohort that contains the date to restrict on.
name	Name of the new cohort with the restriction.

Value

A cohort table in a cdm reference.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 <- requireIsFirstEntry(cdm$cohort1)
```

requireIsLastEntry *Restrict cohort to last entry per person*

Description

requireIsLastEntry() filters cohort records, keeping only the last cohort entry per person.

Usage

```
requireIsLastEntry(  
  cohort,  
  cohortId = NULL,  
  indexDate = "cohort_start_date",  
  name = tableName(cohort)  
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Column name in cohort that contains the date to restrict on.
name	Name of the new cohort with the restriction.

Value

A cohort table in a cdm reference.

Examples

```
library(CohortConstructor)  
cdm <- mockCohortConstructor()  
cdm$cohort1 <- requireIsLastEntry(cdm$cohort1)
```

requirePriorObservation

Restrict cohort on prior observation

Description

requirePriorObservation() filters cohort records, keeping only records where individuals satisfy the specified prior observation criteria.

Usage

```
requirePriorObservation(  
  cohort,  
  minPriorObservation,  
  cohortId = NULL,  
  indexDate = "cohort_start_date",  
  name = tableName(cohort)  
)
```

Arguments

cohort	A cohort table in a cdm reference.
minPriorObservation	A minimum number of prior observation days in the database.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Variable in cohort that contains the date to compute the demographics characteristics on which to restrict on.
name	Name of the new cohort with the prior observation restriction.

Value

The cohort table with only records for individuals satisfying the prior observation requirement

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 |>
  requirePriorObservation(indexDate = "cohort_start_date",
                          minPriorObservation = 365)
```

requireSex	<i>Restrict cohort on sex</i>
------------	-------------------------------

Description

requireSex() filters cohort records, keeping only records where individuals satisfy the specified sex criteria.

Usage

```
requireSex(cohort, sex, cohortId = NULL, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
sex	Can be "Both", "Male" or "Female". If one of the latter, only those with that sex will be included.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
name	Name of the new cohort with the sex requirements.

Value

The cohort table with only records for individuals satisfying the sex requirement

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 |>
  requireSex(sex = "Female")
```

requireTableIntersect *Require cohort subjects are present in another clinical table*

Description

requireTableIntersect() filters a cohort table based on a requirement that an individual is seen (or not seen) to have a record (or no records) in a clinical table in some time window around an index date.

Usage

```
requireTableIntersect(
  cohort,
  tableName,
  window,
  intersections = c(1, Inf),
  cohortId = NULL,
  indexDate = "cohort_start_date",
  targetStartDate = startDateColumn(tableName),
  targetEndDate = endDateColumn(tableName),
  censorDate = NULL,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
tableName	Name of the table to check for intersect.
window	Window to consider events over.
intersections	A range indicating number of intersections for criteria to be fulfilled. If a single number is passed, the number of intersections must match this.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Variable in x that contains the date to compute the intersection.
targetStartDate	Date of reference in cohort table, either for start (in overlap) or on its own (for incidence).

targetEndDate	Date of reference in cohort table, either for end (overlap) or NULL (if incidence).
sensorDate	Whether to censor overlap events at a specific date or a column date of x.
name	Name of the new cohort with the future observation restriction.

Value

Cohort table with only those in the other table kept (or those that are not in the table if negate = TRUE)

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor(drugExposure = TRUE)
cdm$cohort1 |>
  requireTableIntersect(tableName = "drug_exposure",
                        indexDate = "cohort_start_date",
                        window = c(-Inf, 0))
```

sampleCohorts

Sample a cohort table for a given number of individuals.

Description

sampleCohorts() samples an existing cohort table for a given number of people. All records of these individuals are preserved.

Usage

```
sampleCohorts(cohort, cohortId = NULL, n, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will not be sampled.
n	Number of people to be sampled for each included cohort.
name	Name of the new sampled cohort.

Value

Cohort table with the specified cohorts sampled.

Examples

```
library(CohortConstructor)

cdm <- mockCohortConstructor(nPerson = 100)

cdm$cohort2 |> sampleCohorts(cohortId = 1, n = 10)
```

stratifyCohorts	<i>Create a new cohort table from stratifying an existing one</i>
-----------------	---

Description

stratifyCohorts() creates new cohorts, splitting an existing cohort based on specified columns on which to stratify on.

Usage

```
stratifyCohorts(
  cohort,
  strata,
  cohortId = NULL,
  removeStrata = TRUE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
strata	A strata list that point to columns in cohort table.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will be removed from the cohort set.
removeStrata	Whether to remove strata columns from final cohort table.
name	Name of the new cohort.

Value

Cohort table stratified.

Examples

```
library(CohortConstructor)
library(PatientProfiles)

cdm <- mockCohortConstructor()

cdm$my_cohort <- cdm$cohort1 |>
```

```

addAge(ageGroup = list("child" = c(0, 17), "adult" = c(18, Inf))) |>
addSex() |>
stratifyCohorts(
  strata = list("sex", c("sex", "age_group")), name = "my_cohort"
)

cdm$my_cohort

settings(cdm$my_cohort)

attrition(cdm$my_cohort)

```

subsetCohorts	<i>Generate a cohort table using a subset of cohorts from another table.</i>
---------------	--

Description

subsetCohorts() filters an existing cohort table, keeping only the records from cohorts that are specified.

Usage

```
subsetCohorts(cohort, cohortId, minCohortCount = 0, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will be removed from the cohort set.
minCohortCount	the minimum count of a cohort to be included. Default is 0, meaning all non-empty cohorts will be included. Cohorts not included will be removed from the cohort set.
name	Name of the new cohort with the demographic requirements.

Value

Cohort table with only cohorts in cohortId.

Examples

```

library(CohortConstructor)

cdm <- mockCohortConstructor(nPerson = 100)

cdm$cohort1 |> subsetCohorts(cohortId = 1)

```

trimDemographics	<i>Restrict cohort on patient demographics</i>
------------------	--

Description

trimDemographics() resets the cohort start and end date based on the specified demographic criteria is satisfied.

Usage

```
trimDemographics(  
  cohort,  
  cohortId = NULL,  
  ageRange = NULL,  
  sex = NULL,  
  minPriorObservation = NULL,  
  minFutureObservation = NULL,  
  name = tableName(cohort)  
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to modify. If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
ageRange	A list of minimum and maximum age.
sex	Can be "Both", "Male" or "Female". If one of the latter, only those with that sex will be included.
minPriorObservation	A minimum number of prior observation days in the database.
minFutureObservation	A minimum number of future observation days in the database.
name	Name of the new cohort with the demographic requirements.

Value

The cohort table with only records for individuals satisfying the demographic requirements

Examples

```
library(CohortConstructor)  
  
cdm <- mockCohortConstructor(nPerson = 100)  
  
cdm$cohort1 |> trimDemographics(ageRange = list(c(10, 30)))
```

unionCohorts	<i>Generate cohort from the union of different cohorts</i>
--------------	--

Description

unionCohorts() combines different cohort entries, with those records that overlap combined and kept. Cohort entries are when an individual was in *either* of the cohorts.

Usage

```
unionCohorts(  
  cohort,  
  cohortId = NULL,  
  gap = 0,  
  cohortName = NULL,  
  name = tableName(cohort)  
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will be removed from the cohort set.
gap	Number of days between two subsequent cohort entries of a subject that will be merged in a single cohort entry
cohortName	Name of the returned cohort. If NULL, the cohort name will be created by collapsing the individual cohort names, separated by "_".
name	Name of the new cohort table.

Value

A cohort table.

Examples

```
library(CohortConstructor)  
  
cdm <- mockCohortConstructor(nPerson = 100)  
  
cdm$cohort2 <- cdm$cohort2 |> unionCohorts()  
settings(cdm$cohort2)
```

yearCohorts	<i>Generate a new cohort table restricting cohort entries to certain years</i>
-------------	--

Description

yearCohorts() splits a cohort into multiple cohorts, one for each year.

Usage

```
yearCohorts(cohort, years, cohortId = NULL, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
years	Numeric vector of years to use to restrict observation to.
cohortId	IDs of the cohorts to include. If NULL all cohorts will be considered. Cohorts not included will be removed from the cohort set.
name	Name of the new cohort table.

Value

A cohort table.

Examples

```
library(CohortConstructor)

cdm <- mockCohortConstructor(nPerson = 100)

cdm$cohort1 <- cdm$cohort1 |> yearCohorts(years = 2000:2002)
settings(cdm$cohort1)
```

Index

[collapseCohorts](#), [2](#)
[conceptCohort](#), [3](#)

[demographicsCohort](#), [4](#)

[entryAtFirstDate](#), [5](#)
[entryAtLastDate](#), [6](#)
[exitAtDeath](#), [7](#)
[exitAtFirstDate](#), [8](#)
[exitAtLastDate](#), [9](#)
[exitAtObservationEnd](#), [10](#)

[intersectCohorts](#), [11](#)

[matchCohorts](#), [12](#)
[measurementCohort](#), [13](#)
[mockCohortConstructor](#), [15](#)

[requireAge](#), [16](#)
[requireCohortIntersect](#), [17](#)
[requireConceptIntersect](#), [18](#)
[requireDeathFlag](#), [19](#)
[requireDemographics](#), [20](#)
[requireFutureObservation](#), [22](#)
[requireInDateRange](#), [23](#)
[requireIsFirstEntry](#), [24](#)
[requireIsLastEntry](#), [24](#)
[requirePriorObservation](#), [25](#)
[requireSex](#), [26](#)
[requireTableIntersect](#), [27](#)

[sampleCohorts](#), [28](#)
[stratifyCohorts](#), [29](#)
[subsetCohorts](#), [30](#)

[trimDemographics](#), [31](#)
[trimToDateRange](#), [32](#)

[unionCohorts](#), [33](#)

[yearCohorts](#), [34](#)