

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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`addCohortTableIndex` *Add an index to a cohort table*

Description

Adds an index on `subject_id` and `cohort_start_date` to a cohort table. Note, currently only indexes will be added if the table is in a postgres database.

Usage

```
addCohortTableIndex(cohort)
```

Arguments

`cohort` A cohort table in a cdm reference.

Value

The cohort table

Examples

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

benchmarkCohortConstructor

Run benchmark of CohortConstructor package

Description

Run benchmark of CohortConstructor cohort instantiation time compared to CIRCE from JSON. More information in the benchmarking vignette.

Usage

```
benchmarkCohortConstructor(
  cdm,
  runCIRCE = TRUE,
  runCohortConstructorDefinition = TRUE,
  runCohortConstructorDomain = TRUE,
  dropCohorts = TRUE
)
```

Arguments

cdm	A cdm reference.
runCIRCE	Whether to run cohorts from JSON definitions generated with Atlas.
runCohortConstructorDefinition	Whether to run the benchmark part where cohorts are created with CohortConstructor by definition (one by one, separately).
runCohortConstructorDomain	Whether to run the benchmark part where cohorts are created with CohortConstructor by domain (instantiating base cohort all together, as a set).
dropCohorts	Whether to drop cohorts created during benchmark.

benchmarkData

Benchmarking results

Description

Benchmarking results

Usage

```
benchmarkData
```

Format

A list of results from benchmarking

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),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 between two subsequent cohort entries to be merged in a single cohort record.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

A cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
# collapse just cohort 1, with a gap of 7 days
cdm$cohort1 <- cdm$cohort1 |>
  collapseCohorts(cohortId = 1, gap = 7)

# collapse both cohorts with a gap of 1 year, and change table name
```

```
cdm$collapsed_cohort <- cdm$cohort1 |>
  collapseCohorts(gap = 365, name = "collapsed_cohort")
```

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:

- Cohort entries will not overlap. Overlapping records will be combined based on the overlap argument.
- Cohort entries will not go out of observation. 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,
  exit = "event_end_date",
  overlap = "merge",
  table = NULL,
  useRecordsBeforeObservation = FALSE,
  useSourceFields = FALSE,
  subsetCohort = NULL,
  subsetCohortId = NULL
)
```

Arguments

cdm	A cdm reference.
conceptSet	A conceptSet, which can either be a codelist or a conceptSetExpression.
name	Name of the new cohort table created in the cdm object.
exit	How the cohort end date is defined. Can be either "event_end_date" or "event_start_date".
overlap	How to deal with overlapping records. In all cases cohort start will be set as the earliest start date. If "merge", cohort end will be the latest end date. If "extend", cohort end date will be set by adding together the total days from each of the overlapping records.
table	Name of OMOP tables to search for records of the concepts provided. If NULL, each concept will be search at the assigned domain in the concept table.
useRecordsBeforeObservation	If FALSE, only records that fall entirely (start and end) within an observation period are used. If TRUE, records that start before an observation period are included by shifting their start date to the beginning of the individual's subsequent observation period, and records that start or end outside an observation period are trimmed so that cohort records fall entirely within the corresponding observation period.
useSourceFields	If TRUE, the source concept_id fields will also be used when identifying relevant clinical records. If FALSE, only the standard concept_id fields will be used.
subsetCohort	A character referring to a cohort table containing individuals for whom cohorts will be generated. Only individuals in this table will appear in the generated cohort.
subsetCohortId	Optional. Specifies cohort IDs from the subsetCohort table to include. If none are provided, all cohorts from the subsetCohort are included.

Value

A cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort <- conceptCohort(cdm = cdm, conceptSet = list(a = 444074), name = "cohort")

cdm$cohort |>
  attrition()

# Create a cohort based on a concept set. The cohort exit is set to the event start date.
# If two records overlap, the cohort end date is set as the sum of the duration of
# all overlapping records. Only individuals included in the existing `cohort` will be considered.

conceptSet <- list(
```

```

    "nitrogen" = c(35604434, 35604439),
    "potassium" = c(40741270, 42899580, 44081436)
  )

  cdm$study_cohort <- conceptCohort(cdm = cdm,
                                   conceptSet = conceptSet,
                                   name = "study_cohort",
                                   exit = "event_start_date",
                                   overlap = "extend",
                                   subsetCohort = "cohort")

  cdm$study_cohort |>
    attrition()

```

 copyCohorts

Copy a cohort table

Description

copyCohorts() copies an existing cohort table to a new location.

Usage

```
copyCohorts(cohort, name, n = 1, cohortId = NULL)
```

Arguments

cohort	A cohort table in a cdm reference.
name	Name of the new cohort table created in the cdm object.
n	Number of times to duplicate the selected cohorts.
cohortId	Vector identifying which cohorts to include (cohort_definition_id or cohort_name). Cohorts not included will be removed from the cohort set.

Value

A new cohort table containing cohorts from the original cohort table.

Examples

```

library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort3 <- copyCohorts(cdm$cohort1, n = 2, cohortId = 1, name = "cohort3")

```

deathCohort	<i>Create cohort based on the death table</i>
-------------	-----------------------------------------------

Description

Create cohort based on the death table

Usage

```
deathCohort(cdm, name, subsetCohort = NULL, subsetCohortId = NULL)
```

Arguments

cdm	A cdm reference.
name	Name of the new cohort table created in the cdm object.
subsetCohort	A character referring to a cohort table containing individuals for whom cohorts will be generated. Only individuals in this table will appear in the generated cohort.
subsetCohortId	Optional. Specifies cohort IDs from the subsetCohort table to include. If none are provided, all cohorts from the subsetCohort are included.

Value

A cohort table with a death cohort in cdm

Examples

```
library(CohortConstructor)

cdm <- mockCohortConstructor()

# Generate a death cohort
death_cohort <- deathCohort(cdm, name = "death_cohort")
death_cohort

# Create a demographics cohort with age range and sex filters
cdm$my_cohort <- demographicsCohort(cdm, "my_cohort", ageRange = c(50,100), sex = "Female")
# Generate a death cohort, restricted to individuals in 'my_cohort'
death_cohort <- deathCohort(cdm, name = "death_cohort", subsetCohort = "my_cohort")
death_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  
)
```

Arguments

cdm	A cdm reference.
name	Name of the new cohort table created in the cdm object.
ageRange	A list of vectors specifying minimum and maximum age.
sex	Can be "Both", "Male" or "Female".
minPriorObservation	A minimum number of continuous prior 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)  
  
# Can also create multiple demographic cohorts, and add minimum prior history requirements.  
  
cohort <- cdm |>  
  demographicsCohort(name = "cohort4",
```

```

ageRange = list(c(0, 19),c(20, 64),c(65, 150)),
sex = c("Male", "Female", "Both"),
minPriorObservation = 365)

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 = FALSE,
  keepDateColumns = TRUE,
  name = tableName(cohort),
  .softValidation = FALSE
)

```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	Character vector indicating date columns in the cohort table to consider.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 indicating which of the dateColumns was used.
keepDateColumns	If TRUE the returned cohort will keep columns in dateColumns.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

The cohort table.

Examples

```
library(CohortConstructor)
library(PatientProfiles)
cdm <- mockCohortConstructor()

cdm$cohort1 <- cdm$cohort1 |>
  addTableIntersectDate(
    tableName = "drug_exposure",
    nameStyle = "prior_drug",
    order = "last",
    window = c(-Inf, 0)
  ) |>
  addPriorObservation(priorObservationType = "date", name = "cohort1")

cdm$cohort1 |>
  entryAtFirstDate(dateColumns = c("prior_drug", "prior_observation"))
```

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

Description

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

Usage

```
entryAtLastDate(
  cohort,
  dateColumns,
  cohortId = NULL,
  returnReason = FALSE,
  keepDateColumns = TRUE,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	Character vector indicating date columns in the cohort table to consider.

cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 indicating which of the dateColumns was used.
keepDateColumns	If TRUE the returned cohort will keep columns in dateColumns.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

The cohort table.

Examples

```
library(CohortConstructor)
library(PatientProfiles)

cdm <- mockCohortConstructor()

cdm$cohort1 <- cdm$cohort1 |>
  addTableIntersectDate(
    tableName = "drug_exposure",
    nameStyle = "prior_drug",
    order = "last",
    window = c(-Inf, 0)
  ) |>
  addPriorObservation(priorObservationType = "date", name = "cohort1")

cdm$cohort1 |>
  entryAtLastDate(dateColumns = c("prior_drug", "prior_observation"))
```

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),
  .softValidation = FALSE
)

```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

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 = FALSE,
  keepDateColumns = TRUE,
  name = tableName(cohort),
  .softValidation = FALSE
)

```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	Character vector indicating date columns in the cohort table to consider.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 indicating which of the dateColumns was used.
keepDateColumns	If TRUE the returned cohort will keep columns in dateColumns.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

The cohort table.

Examples

```

library(CohortConstructor)
library(PatientProfiles)
cdm <- mockCohortConstructor()

cdm$cohort1 <- cdm$cohort1 |>
  addTableIntersectDate(tableName = "observation", nameStyle = "next_obs", order = "first") |>
  addFutureObservation(futureObservationType = "date", name = "cohort1")

cdm$cohort1 |>
  exitAtFirstDate(dateColumns = c("next_obs", "future_observation"))

```

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 = FALSE,
  keepDateColumns = TRUE,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateColumns	Character vector indicating date columns in the cohort table to consider.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 indicating which of the dateColumns was used.
keepDateColumns	If TRUE the returned cohort will keep columns in dateColumns.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

The cohort table.

Examples

```
library(CohortConstructor)
library(PatientProfiles)
cdm <- mockCohortConstructor()

cdm$cohort1 <- cdm$cohort1 |>
  addTableIntersectDate(tableName = "observation", nameStyle = "next_obs", order = "first") |>
  addFutureObservation(futureObservationType = "date", name = "cohort1")

cdm$cohort1 |>
  exitAtLastDate(dateColumns = c("next_obs", "future_observation"))
```

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,
  persistAcrossObservationPeriods = FALSE,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
persistAcrossObservationPeriods	If FALSE, limits the cohort to one entry per person, ending at the current observation period. If TRUE, subsequent observation periods will create new cohort entries (starting from the start of that observation period and ending at the end of that observation period).
name	Name of the new cohort table created in the cdm object.

`.softValidation`

Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

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,
  returnNonOverlappingCohorts = FALSE,
  keepOriginalCohorts = FALSE,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to include (<code>cohort_definition_id</code> or <code>cohort_name</code>). 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.
returnNonOverlappingCohorts	Whether the generated cohorts are mutually exclusive or not.

keepOriginalCohorts
 If TRUE the original cohorts will be return together with the new ones. If FALSE only the new cohort will be returned.

name
 Name of the new cohort table created in the cdm object.

.softValidation
 Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

A cohort table.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort3 <- intersectCohorts(cohort = cdm$cohort2, name = "cohort3")

settings(cdm$cohort3)
```

matchCohorts

Generate a new cohort matched cohort

Description

matchCohorts() generate a new cohort matched to individuals in an existing cohort. Individuals can be matched based on year of birth and sex. Matching is done at the record level, so if individuals have multiple cohort entries they can be matched to different individuals for each of their records.

Two new cohorts will be created when matching. The first is those cohort entries which were matched ("_sampled" is added to the original cohort name for this cohort). The other is the matches found from the database population ("_matched" is added to the original cohort name for this cohort).

Usage

```
matchCohorts(
  cohort,
  cohortId = NULL,
  matchSex = TRUE,
  matchYearOfBirth = TRUE,
  ratio = 1,
  keepOriginalCohorts = FALSE,
```

```

    name = tableName(cohort),
    .softValidation = FALSE
  )

```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to include (cohort_definition_id or cohort_name). 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.
keepOriginalCohorts	If TRUE the original cohorts will be return together with the new ones. If FALSE only the new cohort will be returned.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

A cohort table.

Examples

```

library(CohortConstructor)
library(dplyr)
cdm <- mockCohortConstructor()
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 measurement-based cohorts*

Description

measurementCohort() creates cohorts based on patient records from the measurement or observation tables. It extends the function conceptCohort() by allowing users to specify measurement values associated with those records.

This function supports both concept-based and value-based filtering:

- Either valueAsConcept or valueAsNumber must be provided.
- If one of them is specified (not NULL), only records that satisfy the other filter will be included.
- If both are provided, records that meet *either* filter will be included.

Usage

```
measurementCohort(
  cdm,
  conceptSet,
  name,
  valueAsConcept = NULL,
  valueAsNumber = NULL,
  table = NULL,
  useRecordsBeforeObservation = FALSE,
  useSourceFields = FALSE,
  subsetCohort = NULL,
  subsetCohortId = NULL
)
```

Arguments

cdm	A cdm reference.
conceptSet	A conceptSet, which can either be a codelist or a conceptSetExpression.
name	Name of the new cohort table created in the cdm object.
valueAsConcept	A named list defining cohorts based on measurement values as concept IDs. Each element name defines the name of cohort to create, and its value is a vector of concept IDs used to filter measurements by value_as_concept_id. If NULL, all records will be included regardless of value_as_concept_id. For instance, to create two bmi cohorts from a bmi conceptSet we can do the following: valueAsConcept = list(high_bmi = c(4328749, 35819253), low_bmi = c(4267416, 45881666)) See more examples in the function examples.

valueAsNumber	<p>A named list defining cohorts based on numeric measurement ranges. Each list element should contain one or more numeric vectors of length two, specifying the allowed range(s) for the measurement value. If the numeric vector is named, the name should correspond to the <code>unit_concept_id</code> that will be used for that range.</p> <p>For example, the following creates a cohort named "low_weight" based on measurements recorded in kilograms (<code>unit_concept_id = 9529</code>) and stones (<code>unit_concept_id = 21498905</code>): <code>valueAsNumber = list("low_weight" = list("9529" = c(30, 40), "21498905" = c(4.7, 6.3)))</code></p> <p>See the examples below for how to define multiple cohorts based on different measurement filters.</p>
table	Character vector specifying which OMOP tables to use. Accepts "measurement", "observation", or both.
useRecordsBeforeObservation	<p>If FALSE, only records that fall entirely (start and end) within an observation period are used. If TRUE, records that start before an observation period are included by shifting their start date to the beginning of the individual's subsequent observation period, and records that start or end outside an observation period are trimmed so that cohort records fall entirely within the corresponding observation period.</p>
useSourceFields	<p>If TRUE, the source <code>concept_id</code> fields will also be used when identifying relevant clinical records. If FALSE, only the standard <code>concept_id</code> fields will be used.</p>
subsetCohort	A character referring to a cohort table containing individuals for whom cohorts will be generated. Only individuals in this table will appear in the generated cohort.
subsetCohortId	Optional. Specifies cohort IDs from the <code>subsetCohort</code> table to include. If none are provided, all cohorts from the <code>subsetCohort</code> are included.

Value

A cohort table.

Examples

```
library(CohortConstructor)
library(omock)
library(dplyr)

cdm <- mockVocabularyTables(concept = 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_character_,
valid_start_date = as.Date(NA_character_),
valid_end_date = as.Date(NA_character_),
invalid_reason = NA_character_
)) |>
mockCdmFromTables(
  tables = list(
    measurement = tibble(
      measurement_id = 1:4L,
      person_id = c(1L, 1L, 2L, 3L),
      measurement_concept_id = c(4326744L, 4298393L, 4298393L, 45770407L),
      measurement_date = as.Date(c("2000-07-01", "2000-12-11", "2002-09-08", "2015-02-19")),
      measurement_type_concept_id = 0L,
      value_as_number = c(100, 125, NA, NA),
      value_as_concept_id = c(0L, 0L, 0L, 4124457L),
      unit_concept_id = c(8876L, 8876L, 0L, 0L)
    )
  )
))

# create one cohort of blood pressure measurements indicating normal levels
cdm$cohort <- measurementCohort(
  cdm = cdm,
  name = "cohort",
  conceptSet = list("blood_pressure" = c(4326744, 4298393, 45770407)),
  valueAsConcept = list("normal_blood_preassure" = c(4124457)),
  valueAsNumber = list("normal_blood_preassure" = list("8876" = c(70, 120))),
  useRecordsBeforeObservation = FALSE
)

cdm$cohort

# create two cohorts of blood preassure measurements, one with results
# indicating normal blood pressure and the other inidcating high

cdm$cohort2 <- measurementCohort(
  cdm = cdm,
  name = "cohort2",
  conceptSet = list("blood_pressure" = c(4326744, 4298393, 45770407)),
  valueAsConcept = list(
    "normal_blood_pressure" = 4124457,
    "high_blood_pressure" = 4328749
  ),
  valueAsNumber = list(
    "normal_blood_pressure" = list("8876" = c(70, 120)),
    "high_blood_pressure" = list("8876" = c(121, 200))
  ),
  useRecordsBeforeObservation = TRUE
)

cdm$cohort2 |> settings()

```

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(source = "local")
```

Arguments

source Source for the mock cdm, it can either be 'local' or 'duckdb'.

Value

cdm object

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm
```

padCohortDate *Set cohort start or cohort end*

Description

Set cohort start or cohort end

Usage

```
padCohortDate(
  cohort,
  days,
  cohortDate = "cohort_start_date",
  indexDate = "cohort_start_date",
  collapse = TRUE,
  requireFullContribution = FALSE,
  cohortId = NULL,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
days	Integer with the number of days to add or name of a column (that must be numeric) to add.
cohortDate	'cohort_start_date' or 'cohort_end_date'.
indexDate	Variable in cohort that contains the index date to add.
collapse	Whether to collapse the overlapping records (TRUE) or drop the records that have an ongoing prior record.
requireFullContribution	Whether to require individuals to contribute all required days. If TRUE, those individuals for which adding days would take them out of observation will be dropped. If FALSE, days will only be added up to the day when the individual leaves observation.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

Cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 |>
  padCohortDate(
    cohortDate = "cohort_end_date",
    indexDate = "cohort_start_date",
    days = 10)
```

Description

`padCohortEnd()` Adds (or subtracts) a certain number of days to the cohort end date. Note:

- If the days added means that cohort end would be after observation period end date, then observation period end date will be used for cohort exit.
- If the days added means that cohort exit would be after the next cohort start then these overlapping cohort entries will be collapsed.
- If days subtracted means that cohort end would be before cohort start then the cohort entry will be dropped.

Usage

```
padCohortEnd(
  cohort,
  days,
  collapse = TRUE,
  requireFullContribution = FALSE,
  cohortId = NULL,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

<code>cohort</code>	A cohort table in a cdm reference.
<code>days</code>	Integer with the number of days to add or name of a column (that must be numeric) to add.
<code>collapse</code>	Whether to collapse the overlapping records (TRUE) or drop the records that have an ongoing prior record.
<code>requireFullContribution</code>	Whether to require individuals to contribute all required days. If TRUE, those individuals for which adding days would take them out of observation will be dropped. If FALSE, days will only be added up to the day when the individual leaves observation.
<code>cohortId</code>	Vector identifying which cohorts to modify (<code>cohort_definition_id</code> or <code>cohort_name</code>). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
<code>name</code>	Name of the new cohort table created in the cdm object.
<code>.softValidation</code>	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

Cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
# add 10 days to each cohort exit
cdm$cohort1 |>
  padCohortEnd(days = 10)
```

padCohortStart	<i>Add days to cohort start</i>
----------------	---------------------------------

Description

padCohortStart() Adds (or subtracts) a certain number of days to the cohort start date. Note:

- If the days added means that cohort start would be after cohort end then the cohort entry will be dropped.
- If subtracting day means that cohort start would be before observation period start then the cohort entry will be dropped.

Usage

```
padCohortStart(
  cohort,
  days,
  collapse = TRUE,
  requireFullContribution = FALSE,
  cohortId = NULL,
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
days	Integer with the number of days to add or name of a column (that must be numeric) to add.
collapse	Whether to collapse the overlapping records (TRUE) or drop the records that have an ongoing prior record.
requireFullContribution	Whether to require individuals to contribute all required days. If TRUE, those individuals for which adding days would take them out of observation will be dropped. If FALSE, days will only be added up to the day when the individual leaves observation.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

Cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
# add 10 days to each cohort entry
cdm$cohort1 |>
  padCohortStart(days = 10)
```

renameCohort	<i>Utility function to change the name of a cohort.</i>
--------------	---------------------------------------------------------

Description

Utility function to change the name of a cohort.

Usage

```
renameCohort(cohort, newCohortName, cohortId = NULL)
```

Arguments

cohort	A cohort table in a cdm reference.
newCohortName	Character vector with same
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.

Value

A cohort_table object.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

settings(cdm$cohort1)

cdm$cohort1 <- cdm$cohort1 |>
  renameCohort(newCohortName = "new_name")

settings(cdm$cohort1)
```

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",
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
ageRange	A list of vectors specifying minimum and maximum age.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

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,
  cohortCombinationCriteria = "all",
  indexDate = "cohort_start_date",
  targetStartDate = "cohort_start_date",
  targetEndDate = "cohort_end_date",
  censorDate = NULL,
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

<code>cohort</code>	A cohort table in a cdm reference.
<code>targetCohortTable</code>	Name of the cohort that we want to check for intersect.
<code>window</code>	A list of vectors specifying minimum and maximum days from <code>indexDate</code> to consider events over.
<code>intersections</code>	A range indicating number of intersections for criteria to be fulfilled. If a single number is passed, the number of intersections must match this.
<code>cohortId</code>	Vector identifying which cohorts to modify (<code>cohort_definition_id</code> or <code>cohort_name</code>). If <code>NULL</code> , 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.
cohortCombinationCriteria	Can be 'all', 'any', or a numeric vector (length 1 or 2) that specifies how many of the target cohorts must meet the intersection requirement. Examples: <ul style="list-style-type: none"> • 'all': must meet criteria for each of the target cohorts. • 'any': must meet criteria for only one of the target cohorts. • Single value: e.g., 4, exactly 4 cohorts must meet the criteria. If there were 4 target cohorts, this would be the same as 'all'. • Range: e.g., c(2, Inf), must meet criteria at last 2 of the target cohorts. Note, c(1, Inf) is equivalent to 'any'.
indexDate	Name of the column in the cohort that contains the date to compute the intersection.
targetStartDate	Start date of reference in cohort table.
targetEndDate	End date of reference in cohort table. If NULL, incidence of target event in the window will be considered as intersection, otherwise prevalence of that event will be used as intersection (overlap between cohort and event).
sensorDate	Whether to censor overlap events at a specific date or a column date of the cohort.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

Value

Cohort table with only those entries satisfying the criteria

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",
  inObservation = TRUE,
  censorDate = NULL,
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

<code>cohort</code>	A cohort table in a cdm reference.
<code>conceptSet</code>	A <code>conceptSet</code> , which can either be a <code>codelist</code> or a <code>conceptSetExpression</code> .
<code>window</code>	A list of vectors specifying minimum and maximum days from <code>indexDate</code> to consider events over.
<code>intersections</code>	A range indicating number of intersections for criteria to be fulfilled. If a single number is passed, the number of intersections must match this.
<code>cohortId</code>	Vector identifying which cohorts to modify (<code>cohort_definition_id</code> or <code>cohort_name</code>). If <code>NULL</code> , all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
<code>indexDate</code>	Name of the column in the cohort that contains the date to compute the intersection.
<code>targetStartDate</code>	Start date of reference in cohort table.
<code>targetEndDate</code>	End date of reference in cohort table. If <code>NULL</code> , incidence of target event in the window will be considered as intersection, otherwise prevalence of that event will be used as intersection (overlap between cohort and event).
<code>inObservation</code>	If <code>TRUE</code> only records inside an observation period will be considered
<code>censorDate</code>	Whether to censor overlap events at a specific date or a column date of the cohort.
<code>atFirst</code>	If <code>FALSE</code> the requirement will be applied to all records, if <code>TRUE</code> , it will only be required for the first entry of each subject.
<code>name</code>	Name of the new cohort table created in the cdm object.

Value

Cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort2 <- requireConceptIntersect(
  cohort = cdm$cohort1,
  conceptSet = list(a = 194152),
  window = c(-Inf, 0),
  name = "cohort2")
```

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,
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 vectors specifying minimum and maximum age.

sex	Can be "Both", "Male" or "Female".
minPriorObservation	A minimum number of continuous prior observation days in the database.
minFutureObservation	A minimum number of continuous future observation days in the database.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

Value

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

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort1 |>
  requireDemographics(indexDate = "cohort_start_date",
                      ageRange = list(c(18, 65)),
                      sex = "Female",
                      minPriorObservation = 365)
```

requireDuration	<i>Require cohort entries last for a certain number of days</i>
-----------------	-----------------------------------------------------------------

Description

requireDuration() filters cohort records, keeping only those which last for the specified amount of days

Usage

```
requireDuration(
  cohort,
  daysInCohort,
  cohortId = NULL,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
daysInCohort	Number of days cohort entries must last. Can be a vector of length two if a range, or a vector of length one if a specific number of days. Note, cohort entry and exit on the same day counts as one day in the cohort. So if, for example, you wish to require individuals are in the cohort for at least one night then set daysInCohort to c(2, Inf). Meanwhile, if set to c(30, 90) then only cohort entries that are 30 days or more longer and shorter or equal to 90 days will be kept.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.

Value

The cohort table with any cohort entries that last less or more than the required duration dropped

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 |>
  requireDuration(daysInCohort = c(2, Inf))
```

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",
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
minFutureObservation	A minimum number of continuous future observation days in the database.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

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",
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateRange	A date vector with the minimum and maximum dates between which the index date must have been observed.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Name of the column in the cohort that contains the date of interest.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

Value

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

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort2 <- cdm$cohort1 |>
  requireInDateRange(
    indexDate = "cohort_start_date",
    dateRange = as.Date(c("2010-01-01", "2019-01-01")),
    name = "cohort2"
  )

# modify same input cohort table to start between 2010 until end of data
cdm$cohort1 <- cdm$cohort1 |>
  requireInDateRange(
    indexDate = "cohort_start_date",
    dateRange = as.Date(c("2010-01-01", NA))
  )
```

requireIsEntry	<i>Restrict cohort to specific entry</i>
----------------	------------------------------------------

Description

requireIsEntry() filters cohort records, keeping only a range a specified cohort entries per person.

Usage

```
requireIsEntry(cohort, entryRange, cohortId = NULL, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
entryRange	Range for entries to include.
cohortId	Vector identifying which cohorts to modify (<code>cohort_definition_id</code> or <code>cohort_name</code>). 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 table created in the cdm object.

Value

A cohort table in a cdm reference.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
cdm$cohort1 <- requireIsEntry(cdm$cohort1, c(1, Inf))
```

`requireIsFirstEntry` *Restrict cohort to first entry*

Description

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

Usage

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

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to modify (<code>cohort_definition_id</code> or <code>cohort_name</code>). 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 table created in the cdm object.

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, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.

Value

A cohort table in a cdm reference.

Examples

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

requireMinCohortCount *Filter cohorts to keep only records for those with a minimum amount of subjects*

Description

requireMinCohortCount() filters an existing cohort table, keeping only records from cohorts with a minimum number of individuals

Usage

```
requireMinCohortCount(
  cohort,
  minCohortCount,
  cohortId = NULL,
  updateSettings = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
minCohortCount	The minimum count of subjects for a cohort to be included.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
updateSettings	If TRUE, dropped cohorts will also be removed from all cohort table attributes (i.e., settings, attrition, counts, and codelist). If FALSE, these attributes will be retained but updated to reflect that the affected cohorts have been suppressed.
name	Name of the new cohort table created in the cdm object.

Value

Cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort1 |>
requireMinCohortCount(5)
```

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",
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
minPriorObservation	A minimum number of continuous prior observation days in the database.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

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

Restrict cohort on sex

Description

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

Usage

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

Arguments

cohort	A cohort table in a cdm reference.
sex	Can be "Both", "Male" or "Female".
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

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),
  inObservation = TRUE,
  censorDate = NULL,
  atFirst = FALSE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
tableName	Name of the table to check for intersect.
window	A list of vectors specifying minimum and maximum days from indexDate 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	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
indexDate	Name of the column in the cohort that contains the date to compute the intersection.
targetStartDate	Start date of reference in cohort table.
targetEndDate	End date of reference in cohort table. If NULL, incidence of target event in the window will be considered as intersection, otherwise prevalence of that event will be used as intersection (overlap between cohort and event).
inObservation	If TRUE only records inside an observation period will be considered
censorDate	Whether to censor overlap events at a specific date or a column date of the cohort.
atFirst	If FALSE the requirement will be applied to all records, if TRUE, it will only be required for the first entry of each subject.
name	Name of the new cohort table created in the cdm object.

Value

Cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

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,
  n,
  independent = TRUE,
  cohortId = NULL,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
n	Number of people to be sampled.
independent	If TRUE, cohorts will be sampled independently with each cohort randomly sampled for n. If FALSE, cohorts will be jointly sampled for n across all cohorts.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.

Value

Cohort table with the specified cohorts sampled.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

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	Vector identifying which cohorts to include (cohort_definition_id or cohort_name). 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 table created in the cdm object.

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(name = "my_cohort") |>
```

```

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 keeping a subset of cohorts.</i>
---------------	-------------------------------------------------------------

Description

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

Usage

```
subsetCohorts(cohort, cohortId, name = tableName(cohort), negate = FALSE)
```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to include (cohort_definition_id or cohort_name). Cohorts not included will be removed from the cohort set.
name	Name of the new cohort table created in the cdm object.
negate	If TRUE, the cohorts specified in cohortId will be excluded and the remaining cohorts kept.

Value

Cohort table with only cohorts in cohortId.

Examples

```

library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort1 |>
  subsetCohorts(cohortId = 1)

```

timeWindowCohorts *Split cohorts based on time-windows*

Description

Split cohorts based on time-windows

Usage

```
timeWindowCohorts(
  cohort,
  window,
  cohortId = NULL,
  keepOriginalCohorts = TRUE,
  name = tableName(cohort)
)
```

Arguments

cohort	A cohort table in a cdm reference.
window	A list specifying the time windows (in days) used to split the cohort. Each element must be a numeric vector of length 2: <code>c(start_day, end_day)</code> , where the values are days since <code>cohort_start_date</code> . Use <code>Inf</code> as the end value to indicate a window that extends until the subject's <code>cohort_end_date</code> . If the list is named, window names will be used to identify the output cohorts
cohortId	Vector identifying which cohorts to include (<code>cohort_definition_id</code> or <code>cohort_name</code>). Cohorts not included will be removed from the cohort set.
keepOriginalCohorts	If <code>TRUE</code> the original cohorts will be return together with the new ones. If <code>FALSE</code> only the new cohort will be returned.
name	Name of the new cohort table created in the cdm object.

Value

A cohort table

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()
# if "cohort1" contained pregnancy episodes, we can generate trimester-specific
# cohorts with this function
cdm$pregnancy_trimesters <- timeWindowCohorts(
  cohort = cdm$cohort1,
  window = list(
    "trimester_1" = c(0, 90),
    "trimester_2" = c(91,180),
```

```

    "trimester_3" = c(181, Inf)
  ),
  cohortId = NULL,
  keepOriginalCohorts = FALSE,
  name = "pregnancy_trimesters"
)

```

trimDemographics	<i>Trim 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	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 vectors specifying minimum and maximum age.
sex	Can be "Both", "Male" or "Female".
minPriorObservation	A minimum number of continuous prior observation days in the database.
minFutureObservation	A minimum number of continuous future observation days in the database.
name	Name of the new cohort table created in the cdm object.

Value

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

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort1 |>
  trimDemographics(ageRange = list(c(10, 30)))
```

trimDuration	<i>Trim cohort dates to be within a certain interval of days</i>
--------------	------------------------------------------------------------------

Description

trimDuration() resets the cohort start and end date, keeping only those which include the specified amount of days

Usage

```
trimDuration(cohort, daysInCohort, cohortId = NULL, name = tableName(cohort))
```

Arguments

cohort	A cohort table in a cdm reference.
daysInCohort	Number of days cohort relative to current cohort start dates. Cohort entries will be trimmed to these dates. Note, cohort entry and exit on the same day counts as one day in the cohort. Set lower bound to 1 if keeping cohort start to the same as current cohort start.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). 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 table created in the cdm object.

Value

The cohort table with any cohort entries that last less or more than the required duration dropped

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort1 |>
  requireDuration(daysInCohort = c(2, Inf))
```

trimToDateRange	<i>Trim cohort dates to be within a date range</i>
-----------------	----------------------------------------------------

Description

trimToDateRange() resets the cohort start and end date based on the specified date range.

Usage

```
trimToDateRange(
  cohort,
  dateRange,
  cohortId = NULL,
  startDate = "cohort_start_date",
  endDate = "cohort_end_date",
  name = tableName(cohort),
  .softValidation = FALSE
)
```

Arguments

cohort	A cohort table in a cdm reference.
dateRange	A window of time during which the start and end date must have been observed.
cohortId	Vector identifying which cohorts to modify (cohort_definition_id or cohort_name). If NULL, all cohorts will be used; otherwise, only the specified cohorts will be modified, and the rest will remain unchanged.
startDate	Variable with earliest date.
endDate	Variable with latest date.
name	Name of the new cohort table created in the cdm object.
.softValidation	Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

The cohort table with record timings updated to only be within the date range. Any records with all time outside of the range will have been dropped.

Examples

```

library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort2 <- cdm$cohort1 |>
  trimToDateRange(
    startDate = "cohort_start_date",
    endDate = "cohort_end_date",
    dateRange = as.Date(c("2015-01-01", "2015-12-31")),
    name = "cohort2"
  )

cdm$cohort1 <- cdm$cohort1 |>
  trimToDateRange(
    dateRange = as.Date(c(NA, "2015-12-31"))
  )

```

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,
  keepOriginalCohorts = FALSE,
  name = tableName(cohort)
)

```

Arguments

cohort	A cohort table in a cdm reference.
cohortId	Vector identifying which cohorts to include (cohort_definition_id or cohort_name). 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.
cohortName	Name of the returned cohort. If NULL, the cohort name will be created by collapsing the individual cohort names, separated by "_".

keepOriginalCohorts
 If TRUE the original cohorts will be return together with the new ones. If FALSE only the new cohort will be returned.

name
 Name of the new cohort table created in the cdm object.

Value

A cohort table.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

cdm$cohort2 <- cdm$cohort2 |>
  unionCohorts()

settings(cdm$cohort2)
```

yearCohorts

Generate a new cohort table restricting cohort entries to certain years

Description

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

Usage

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

Arguments

cohort
 A cohort table in a cdm reference.

years
 Numeric vector of years to use to restrict observation to.

cohortId
 Vector identifying which cohorts to include (cohort_definition_id or cohort_name). Cohorts not included will be removed from the cohort set.

name
 Name of the new cohort table created in the cdm object.

`.softValidation`

Whether to perform a soft validation of consistency. If set to FALSE four additional checks will be performed: 1) a check that cohort end date is not before cohort start date, 2) a check that there are no missing values in required columns, 3) a check that cohort duration is all within observation period, and 4) that there are no overlapping cohort entries

Value

A cohort table.

Examples

```
library(CohortConstructor)
cdm <- mockCohortConstructor()

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

settings(cdm$cohort1)
```

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