

Package ‘CohortUtilisation’

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Title Healthcare Resource Utilization on OMOP CDM Cohorts

Version 0.6.1

Description In-database healthcare resource utilization (HCRU) extraction across inpatient, emergency, outpatient, pharmacy, and procedure domains for Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) cohorts following DARWIN EU standards.

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URL <https://www.iomed.health/>, <https://github.com/iomedhealth/omopHeor>

BugReports <https://github.com/iomedhealth/omopHeor/issues>

Depends R (>= 4.1.0)

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Suggests DBI, tibble, gt, PatientProfiles (>= 1.2.0), CohortConstructor (>= 0.2.0), CohortCharacteristics (>= 0.3.0), visOmopResults, duckdb, testthat (>= 3.0.0), withr

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addEmergencyCare	<i>Add Emergency Care Utilization Metrics to a Cohort</i>
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Description

Identifies emergency encounters by querying visit_occurrence and provider tables, capturing encounters with emergency visit concept IDs (e.g. 9203, 262, 581478) as well as visits delivered by emergency medicine specialist providers (e.g. 38004510), with optional granular specialty stratification.

Usage

```
addEmergencyCare(
  x,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  window = list(c(-365, -1), c(0, 365)),
  emergencyVisitConceptIds = c(9203L, 262L, 581478L),
  emergencySpecialtyConceptIds = c(38004510L),
  stratifySpecialty = FALSE,
  specialties = NULL,
  nameStyle = "emergency_visits_{window_name}",
  name = NULL
)
```

```
addEmergency(
  x,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  window = list(c(-365, -1), c(0, 365)),
  emergencyVisitConceptIds = c(9203L, 262L, 581478L),
  emergencySpecialtyConceptIds = c(38004510L),
  stratifySpecialty = FALSE,
  specialties = NULL,
  nameStyle = "emergency_visits_{window_name}",
  name = NULL
)
```

```

)

addEmergencyVisits(
  x,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  window = list(c(-365, -1), c(0, 365)),
  emergencyVisitConceptIds = c(9203L, 262L, 581478L),
  emergencySpecialtyConceptIds = c(38004510L),
  stratifySpecialty = FALSE,
  specialties = NULL,
  nameStyle = "emergency_visits_{window_name}",
  name = NULL
)

```

Arguments

<code>x</code>	A cohort table or <code>cdm_table</code> .
<code>indexDate</code>	Date variable in <code>x</code> anchoring the observation window. Default: <code>"cohort_start_date"</code> .
<code>censorDate</code>	Optional date variable in <code>x</code> to censor observation.
<code>window</code>	A named or unnamed list of 2-element numeric vectors. Default: <code>list(c(-365, -1), c(0, 365))</code> .
<code>emergencyVisitConceptIds</code>	OMOP visit concept IDs for emergency care. Default: <code>c(9203L, 262L, 581478L)</code> .
<code>emergencySpecialtyConceptIds</code>	OMOP provider specialty concept IDs for emergency medicine. Default: <code>c(38004510L)</code> .
<code>stratifySpecialty</code>	Logical; whether to compute specialty breakdown. Default: <code>FALSE</code> .
<code>specialties</code>	Optional named list of integer vectors of OMOP specialty concept IDs for granular specialty breakdown. Default: <code>NULL</code> .
<code>nameStyle</code>	Column naming pattern. Default: <code>"emergency_visits_{window_name}"</code> .
<code>name</code>	Name of the new table in the write schema. If <code>NULL</code> , a temporary table is returned.

Value

The cohort table `x` with added emergency visit metric columns.

<code>addInpatients</code>	<i>Add Inpatient and ICU Hospitalization Metrics to a Cohort</i>
----------------------------	--

Description

Add Inpatient and ICU Hospitalization Metrics to a Cohort

Usage

```
addInpatients(  
  x,  
  indexDate = "cohort_start_date",  
  censorDate = NULL,  
  window = list(c(-365, -1), c(0, 365)),  
  visitConceptIds = c(9201L, 8717L, 581379L),  
  icuConceptIds = 32037L,  
  icuSpecialtyConceptIds = c(38004500L),  
  stratifySpecialty = FALSE,  
  specialties = NULL,  
  readmissions = FALSE,  
  nameStyle = "{domain}_{metric}_{window_name}",  
  name = NULL  
)  
  
addHospitalizations(  
  x,  
  indexDate = "cohort_start_date",  
  censorDate = NULL,  
  window = list(c(-365, -1), c(0, 365)),  
  visitConceptIds = c(9201L, 8717L, 581379L),  
  icuConceptIds = 32037L,  
  icuSpecialtyConceptIds = c(38004500L),  
  stratifySpecialty = FALSE,  
  specialties = NULL,  
  readmissions = FALSE,  
  nameStyle = "{domain}_{metric}_{window_name}",  
  name = NULL  
)  
  
addInpatient(  
  x,  
  indexDate = "cohort_start_date",  
  censorDate = NULL,  
  window = list(c(-365, -1), c(0, 365)),  
  visitConceptIds = c(9201L, 8717L, 581379L),  
  icuConceptIds = 32037L,  
  icuSpecialtyConceptIds = c(38004500L),  
  stratifySpecialty = FALSE,  
  specialties = NULL,  
  readmissions = FALSE,  
  nameStyle = "{domain}_{metric}_{window_name}",  
  name = NULL  
)
```

Arguments

x	A cohort table or cdm_table.
indexDate	Date variable in x anchoring the observation window. Default: "cohort_start_date".
censorDate	Optional date variable in x to censor observation.
window	A named or unnamed list of 2-element numeric vectors. Default: list(c(-365, -1), c(0, 365)).
visitConceptIds	OMOP visit concept IDs for general inpatient stays. Default: c(9201L, 8717L, 581379L).
icuConceptIds	OMOP visit concept IDs for ICU stays. Default: 32037L.
icuSpecialtyConceptIds	OMOP provider specialty concept IDs for ICU stays. Default: c(38004500L).
stratifySpecialty	Logical; whether to compute specialty breakdown. Default: FALSE.
specialties	Optional named list of integer vectors of OMOP specialty concept IDs for granular specialty breakdown. Default: NULL.
readmissions	Logical; whether to compute 30-day and 90-day readmissions. Default: FALSE.
nameStyle	Column naming pattern. Default: "{domain}_{metric}_{window_name}".
name	Name of the new table in the write schema. If NULL, a temporary table is returned.

Value

The cohort table x with added inpatient metric columns.

addOutpatientVisits	<i>Add Outpatient and Emergency Visits to a Cohort</i>
---------------------	--

Description

Add Outpatient and Emergency Visits to a Cohort

Usage

```
addOutpatientVisits(
  x,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  window = list(c(-365, -1), c(0, 365)),
  stratifySpecialty = TRUE,
  gpSpecialtyConceptIds = c(38004446L),
  specialties = NULL,
  includeEmergency = TRUE,
  nameStyle = "{setting}_visits_{window_name}",
  name = NULL
)
```

Arguments

x	A cohort table or cdm_table.
indexDate	Date variable in x anchoring the observation window. Default: "cohort_start_date".
censorDate	Optional date variable in x to censor observation.
window	A named or unnamed list of 2-element numeric vectors. Default: list(c(-365, -1), c(0, 365)).
stratifySpecialty	Logical; whether to partition visits by GP vs Specialist vs ED. Default: TRUE.
gpSpecialtyConceptIds	OMOP provider specialty concept IDs for General Practice. Default: c(38004446L).
specialties	Optional named list of integer vectors of OMOP specialty concept IDs for granular specialty breakdown. Default: NULL.
includeEmergency	Logical; whether to include emergency visits. Default: TRUE.
nameStyle	Column naming pattern. Default: "{setting}_visits_{window_name}".
name	Name of the new table in the write schema. If NULL, a temporary table is returned.

Value

The cohort table x with added outpatient visit metric columns.

addPrescriptions	<i>Add Prescription and Medication Metrics to a Cohort</i>
------------------	--

Description

Add Prescription and Medication Metrics to a Cohort

Usage

```
addPrescriptions(
  x,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  window = list(c(-365, -1), c(0, 365)),
  conceptSet = NULL,
  infusionRouteConceptIds = c(4171047L, 4171048L),
  daysSupply = TRUE,
  pdc = FALSE,
  nameStyle = "{metric}_{window_name}",
  name = NULL
)
```

Arguments

x	A cohort table or cdm_table.
indexDate	Date variable in x anchoring the observation window. Default: "cohort_start_date".
censorDate	Optional date variable in x to censor observation.
window	A named or unnamed list of 2-element numeric vectors. Default: list(c(-365, -1), c(0, 365)).
conceptSet	Optional concept set / codelist of specific drugs.
infusionRouteConceptIds	OMOP route concept IDs for parenteral/IV infusions. Default: c(4171047L, 4171048L).
daysSupply	Logical; whether to compute cumulative days supply. Default: TRUE.
pdc	Logical; whether to compute Proportion of Days Covered. Default: FALSE.
nameStyle	Column naming pattern. Default: "{metric}_{window_name}".
name	Name of the new table in the write schema. If NULL, a temporary table is returned.

Value

The cohort table x with added prescription metric columns.

addProcedures	<i>Add Diagnostic Measurements and Procedure Occurrences to a Cohort</i>
---------------	--

Description

Add Diagnostic Measurements and Procedure Occurrences to a Cohort

Usage

```
addProcedures(  
  x,  
  indexDate = "cohort_start_date",  
  censorDate = NULL,  
  window = list(c(-365, -1), c(0, 365)),  
  labConceptSet = NULL,  
  imagingConceptSet = NULL,  
  procedureConceptSet = NULL,  
  nameStyle = "{metric}_count_{window_name}",  
  name = NULL  
)
```

Arguments

x	A cohort table or cdm_table.
indexDate	Date variable in x anchoring the observation window. Default: "cohort_start_date".
censorDate	Optional date variable in x to censor observation.
window	A named or unnamed list of 2-element numeric vectors. Default: list(c(-365, -1), c(0, 365)).
labConceptSet	Optional concept set / codelist for laboratory tests in measurement.
imagingConceptSet	Optional concept set / codelist for imaging scans in procedure_occurrence.
procedureConceptSet	Optional concept set / codelist for procedures in procedure_occurrence.
nameStyle	Column naming pattern. Default: "{metric}_count_{window_name}".
name	Name of the new table in the write schema. If NULL, a temporary table is returned.

Value

The cohort table x with added procedure and diagnostic metric columns.

addVisits	<i>Add Multi-Setting Visit Utilization Metrics to a Cohort</i>
-----------	--

Description

Enriches an OMOP cohort table with Healthcare Resource Utilization (HCRU) metrics across Inpatient, Outpatient, and Emergency care settings in a single unified execution, with full support for provider specialty stratification across domains.

Usage

```
addVisits(
  x,
  indexDate = "cohort_start_date",
  censorDate = NULL,
  window = list(c(-365, -1), c(0, 365)),
  settings = c("inpatient", "outpatient", "emergency"),
  stratifySpecialty = TRUE,
  gpSpecialtyConceptIds = c(38004446L),
  icuSpecialtyConceptIds = c(38004500L),
  emergencySpecialtyConceptIds = c(38004510L),
  specialties = NULL,
  inpatientVisitConceptIds = c(9201L, 8717L, 581379L),
  outpatientVisitConceptIds = c(9202L, 581477L),
  emergencyVisitConceptIds = c(9203L, 262L, 581478L),
```

```

    icuConceptIds = 32037L,
    readmissions = FALSE,
    name = NULL
  )

```

Arguments

x	A cohort table or cdm_table.
indexDate	Date variable in x anchoring the observation window. Default: "cohort_start_date".
censorDate	Optional date variable in x to censor observation.
window	A named or unnamed list of 2-element numeric vectors. Default: list(c(-365, -1), c(0, 365)).
settings	Character vector of care settings to extract. Allowed values: "inpatient", "outpatient", "emergency". Default: c("inpatient", "outpatient", "emergency").
stratifySpecialty	Logical; whether to partition visits by specialty. Default: TRUE.
gpSpecialtyConceptIds	OMOP provider specialty concept IDs for General Practice. Default: c(38004446L).
icuSpecialtyConceptIds	OMOP provider specialty concept IDs for ICU stays. Default: c(38004500L).
emergencySpecialtyConceptIds	OMOP provider specialty concept IDs for Emergency Medicine. Default: c(38004510L).
specialties	Optional named list of integer vectors of OMOP specialty concept IDs for granular specialty breakdown. Default: NULL.
inpatientVisitConceptIds	OMOP visit concept IDs for inpatient stays. Default: c(9201L, 8717L, 581379L).
outpatientVisitConceptIds	OMOP visit concept IDs for outpatient care. Default: c(9202L, 581477L).
emergencyVisitConceptIds	OMOP visit concept IDs for emergency care. Default: c(9203L, 262L, 581478L).
icuConceptIds	OMOP visit concept IDs for ICU stays. Default: 32037L.
readmissions	Logical; whether to compute 30-day and 90-day readmissions for inpatient stays. Default: FALSE.
name	Name of the new table in the write schema. If NULL, a temporary table is returned.

Value

The cohort table x with added multi-setting visit metric columns.

```
computeInfusionCohorts
```

Create Infusion Administration Episode Cohorts

Description

Create Infusion Administration Episode Cohorts

Usage

```
computeInfusionCohorts(
  cdm,
  name,
  conceptSet = NULL,
  routeConceptIds = c(4171047L, 4171048L),
  collapseGap = 0L
)
```

Arguments

cdm	A cdm_reference object.
name	String specifying the cohort table name in the write schema.
conceptSet	Optional concept set / codelist of specific infused drugs.
routeConceptIds	Integer vector of OMOP route concept IDs. Default: c(4171047L, 4171048L).
collapseGap	Maximum gap in days between contiguous administration records to collapse. Default: 0L.

Value

An omopgenerics::cohort_table object.

```
compute_hospitalization_cohorts
```

Generate Hospitalization and Readmission Cohorts (Stage 1 & 2)

Description

Extracts inpatient visits from visit_occurrence, collapses contiguous or overlapping stays into discrete hospitalization episodes, and derives readmission cohorts within a specified washout window.

Usage

```
compute_hospitalization_cohorts(
  cdm,
  name,
  visit_concept_ids = c(9201L, 262L, 32037L, 581379L),
  readmission_window = 30L
)

computeHospitalizationCohorts(
  cdm,
  name,
  visitConceptIds = c(9201L, 262L, 581379L),
  icuConceptIds = 32037L,
  readmissionWindow = 30L,
  readmission_window = NULL
)
```

Arguments

cdm	A cdm_reference object.
name	String specifying the cohort table name in the write schema.
visit_concept_ids	Integer vector of OMOP visit concept IDs. Default: c(9201L, 262L, 32037L, 581379L).
readmission_window	Backward compatible snake_case parameter.
visitConceptIds	Integer vector of OMOP visit concept IDs. Default: c(9201L, 262L, 581379L).
icuConceptIds	Integer vector of OMOP ICU visit concept IDs. Default: 32037L.
readmissionWindow	Maximum days between previous discharge and next admission. Default: 30.

Value

An omopgenerics cohort table with cohort definitions:

- 1: hospitalization (collapsed inpatient episodes)
- 2: readmission (episodes occurring within readmission_window days of prior discharge)

plotUtilization

Plot Summarised Healthcare Resource Utilization

Description

Plot Summarised Healthcare Resource Utilization

Usage

```
plotUtilization(result, metric = "inpatient_admissions", plotType = "barplot")
```

Arguments

result	A summarised_result object from summariseUtilization().
metric	Column or metric name pattern to plot. Default: "inpatient_admissions".
plotType	Visualization type: "barplot" or "boxplot". Default: "barplot".

Value

A ggplot2 visualization object.

summariseUtilization *Summarise Healthcare Resource Utilization for a Cohort*

Description

Summarise Healthcare Resource Utilization for a Cohort

Usage

```
summariseUtilization(
  cohort,
  group = list("cohort_name"),
  strata = list(),
  estimates = c("mean", "sd", "median", "q25", "q75", "min", "max"),
  variables = NULL
)
```

Arguments

cohort	An enriched cohort table containing utilization columns.
group	List of character vectors specifying grouping columns. Default: list("cohort_name").
strata	List of character vectors specifying stratification columns. Default: list().
estimates	Summary estimators to compute. Default: c("mean", "sd", "median", "q25", "q75", "min", "max").
variables	Optional character vector of specific variables to summarise. If NULL, auto-detects utilization columns.

Value

An omopgenerics::summarised_result object.

tableUtilization	<i>Format Summarised Utilization as a Table</i>
------------------	---

Description

Format Summarised Utilization as a Table

Usage

```
tableUtilization(
  result,
  type = "gt",
  header = c("cdm_name", "cohort_name"),
  estimateName = c(N = "<count>", `Mean (SD)` = "<mean> (<sd>)", `Median (IQR)` =
    "<median> (<q25> - <q75>)", `Min - Max` = "<min> - <max>"),
  ...
)
```

Arguments

result	A summarised_result object from summariseUtilization().
type	Output table format: "gt", "flextable", or "tibble". Default: "gt".
header	Character vector of columns to include in the header. Default: c("cdm_name", "cohort_name").
estimateName	Named character vector mapping estimate names.
...	Additional arguments passed to visOmapResults::visOmapTable().

Value

A formatted table object (gt_tbl, flextable, or tibble).

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