

Package ‘incidence2’

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Type Package

Title Compute, Handle and Plot Incidence of Dated Events

Version 2.1.0

Description Provides functions and classes to compute, handle and visualise incidence from dated events for a defined time interval. Dates can be provided in various standard formats. The class 'incidence2' is used to store computed incidence and can be easily manipulated, subsetted, and plotted. This package is part of the RECON (<<https://www.repidemicsconsortium.org/>>) toolkit for outbreak analysis (<<https://www.reconverse.org/>>).

Encoding UTF-8

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URL <https://github.com/reconverse/incidence2>

BugReports <https://github.com/reconverse/incidence2/issues>

Depends grates (>= 1.0.0), R (>= 3.5.0)

Imports grDevices, data.table, pillar, utils

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R topics documented:

accessors	2
as.data.frame.incidence2	4
as_incidence	5
complete_dates	6
covidregionaldataUK	7
cumulate	8
incidence	8
keep	11
plot.incidence2	12
print.incidence2	14
regroup	14
summary.incidence2	15
vibrant	16
Index	17

accessors	<i>Access various elements of an incidence object</i>
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Description

Access various elements of an incidence object

Usage

```

get_date_index_name(x, ...)

## Default S3 method:
get_date_index_name(x, ...)

## S3 method for class 'incidence2'
get_date_index_name(x, ...)

get_dates_name(x, ...)

get_count_variable_name(x, ...)

## Default S3 method:
get_count_variable_name(x, ...)

## S3 method for class 'incidence2'
get_count_variable_name(x, ...)

get_count_value_name(x, ...)

## Default S3 method:

```

```
get_count_value_name(x, ...)

## S3 method for class 'incidence2'
get_count_value_name(x, ...)

get_group_names(x, ...)

## Default S3 method:
get_group_names(x, ...)

## S3 method for class 'incidence2'
get_group_names(x, ...)

get_date_index(x, ...)

## Default S3 method:
get_date_index(x, ...)

## S3 method for class 'incidence2'
get_date_index(x, ...)

get_dates(x, ...)

get_count_variable(x, ...)

## Default S3 method:
get_count_variable(x, ...)

## S3 method for class 'incidence2'
get_count_variable(x, ...)

get_count_value(x, ...)

## Default S3 method:
get_count_value(x, ...)

## S3 method for class 'incidence2'
get_count_value(x, ...)

get_groups(x, ...)

## Default S3 method:
get_groups(x, ...)

## S3 method for class 'incidence2'
get_groups(x, ...)
```

Arguments

x An R object.
 ... Not currently used.

Value

- `get_date_index_name()`: The name of the `date_index` variable of `x`.
- `get_dates_name()`: Alias for `get_date_index_name()`.
- `get_count_variable_name()`: The name of the count variable of `x`.
- `get_count_value_name()`: The name of the count value of `x`.
- `get_group_names()`: The name(s) of the group variable(s) of `x`.
- `get_date_index()`: The `date_index` variable of `x`.
- `get_dates()`: Alias for `get_date_index()`.
- `get_count_variable()`: The count variable of `x`.
- `get_count_value()`: The count value of `x`.
- `get_groups()`: List of the group variable(s) of `x`.

Examples

```
if (requireNamespace("outbreaks", quietly = TRUE)) {

  data(ebola_sim_clean, package = "outbreaks")
  dat <- ebola_sim_clean$linelist
  i <- incidence(dat, date_index = "date_of_onset",
                 groups = c("gender", "hospital"))

  get_count_variable_name(i)
  get_group_names(i)
  get_dates_name(i)

}
```

as.data.frame.incidence2

Convert incident object to a data frame

Description

Convert incident object to a data frame

Usage

```
## S3 method for class 'incidence2'
as.data.frame(x, row.names, optional, ...)
```

Arguments

x	<incidence2> object.
row.names	Not used.
optional	Not used.
...	Not used.

Examples

```
dat <- data.frame(
  dates = Sys.Date() + 1:100,
  names = rep(c("Jo", "John"), 5)
)

dat <- incidence(dat, date_index = "dates", groups = "names")
as.data.frame(dat)
```

as_incidence	<i>Coerce to an incidence object</i>
--------------	--------------------------------------

Description

Generic for coercion to an <incidence2> object.

Usage

```
as_incidence(x, ...)

## Default S3 method:
as_incidence(x, ...)

## S3 method for class 'incidence2'
as_incidence(x, ...)
```

Arguments

x	An R object.
...	Additional arguments to be passed to or from other methods.

Value

An <incidence2> object.

complete_dates	<i>Complete dates for all group combinations</i>
----------------	--

Description

This function ensures that an incidence object has the same range of dates for each grouping. By default missing counts will be filled with 0L.

Usage

```
complete_dates(x, expand = TRUE, fill = 0L, by = 1L, allow_POSIXct = FALSE)
```

Arguments

x	<incidence2> object.
expand	[logical] Should a range of dates from the minimum to maximum value of the date index also be created. If expand is TRUE (default) then complete_dates will attempt to use <code>function(x) seq(min(x), max(x), by = 1)</code> to generate a complete sequence of dates.
fill	[numeric] The value to replace missing counts by. Defaults to 0L.
by	[Defunct] Ignored.
allow_POSIXct	[logical] Should this function work with POSIXct dates? Defaults to FALSE.

Value

An <incidence2> object.

Examples

```
x <- data.frame(
  dates = Sys.Date() + c(1,3,4),
  groups = c("grp1", "grp2", "grp1"),
  counts = 1:3
)

i <- incidence(x, date_index = "dates", groups = "groups", counts = "counts")
complete_dates(i)
```

covidregionaldataUK *Regional data for COVID-19 cases in the UK*

Description

A dataset containing the daily time-series of cases, tests, hospitalisations, and deaths for UK.

Usage

```
covidregionaldataUK
```

Format

A data frame with 6370 rows and 26 variables:

date the date that the counts were reported (YYYY-MM-DD)

region the region name

region_code the region code

cases_new new reported cases for that day

cases_total total reported cases up to and including that day

deaths_new new reported deaths for that day

deaths_total total reported deaths up to and including that day

recovered_new new reported recoveries for that day

recovered_total total reported recoveries up to and including that day

hosp_new new reported hospitalisations for that day

hosp_total total reported hospitalisations up to and including that day (note this is cumulative total of new reported, not total currently in hospital).

tested_new tests for that day

tested_total total tests completed up to and including that day

Details

Extracted using the `covidregionaldata` package on 2021-06-03.

Source

<https://CRAN.R-project.org/package=covidregionaldata>

cumulate	<i>Compute cumulative 'incidence'</i>
----------	---------------------------------------

Description

cumulate() computes the cumulative incidence over time for an <incidence2> object.

Usage

```
cumulate(x)
```

Arguments

x [incidence2] object.

Examples

```
dat <- data.frame(
  dates = as.integer(c(0,1,2,2,3,5,7)),
  groups = factor(c(1, 2, 3, 3, 3, 3, 1))
)

i <- incidence(dat, date_index = "dates", groups = "groups")
cumulate(i)
```

incidence	<i>Compute the incidence of events</i>
-----------	--

Description

incidence() calculates event the *incidence* of different events across specified time periods and groupings.

Usage

```
incidence(
  x,
  date_index,
  groups = NULL,
  counts = NULL,
  count_names_to = "count_variable",
  count_values_to = "count",
  date_names_to = "date_index",
  rm_na_dates = TRUE,
```

```

    interval = NULL,
    offset = NULL,
    ...
)

```

Arguments

x	A data frame object representing a linelist or pre-aggregated dataset.
date_index	[character] The time index(es) of the given data. This should be the name(s) corresponding to the desired date column(s) in x. A name vector can be used for convenient relabelling of the resultant output. Multiple indices only make sense when x is a linelist.
groups	[character] An optional vector giving the names of the groups of observations for which incidence should be grouped.
counts	[character] The count variables of the given data. If NULL (default) the data is taken to be a linelist of individual observations.
count_names_to	[character] The column to create which will store the counts column names provided that counts is not NULL.
count_values_to	[character] The name of the column to store the resultant count values in.
date_names_to	[character] The name of the column to store the date variables in.
rm_na_dates	[logical] Should NA dates be removed prior to aggregation?
interval	An optional scalar integer or string indicating the (fixed) size of the desired time interval you wish to use for for computing the incidence. Defaults to NULL in which case the date_index columns are left unchanged. Numeric values are coerced to integer and treated as a number of days to group. Text strings can be one of: <ul style="list-style-type: none"> * day or daily * week(s) or weekly * epiweek(s) * isoweek(s) * month(s) or monthly * yearmonth(s) * quarter(s) or quarterly * yearquarter(s) * year(s) or yearly More details can be found in the "Interval specification" section.

offset	<p>Only applicable when <code>interval</code> is not <code>NULL</code>.</p> <p>An optional scalar integer or date indicating the value you wish to start counting periods from relative to the Unix Epoch:</p> <ul style="list-style-type: none"> • Default value of <code>NULL</code> corresponds to 0L. • For other integer values this is stored scaled by <code>n</code> (<code>offset <- as.integer(offset) %% n</code>). • For date values this is first converted to an integer offset (<code>offset <- floor(as.numeric(offset))</code>) and then scaled via <code>n</code> as above.
...	Not currently used.

Details

`<incidence2>` objects are a sub class of data frame with some additional invariants. That is, an `<incidence2>` object must:

- have one column representing the date index (this does not need to be a date object but must have an inherent ordering over time);
- have one column representing the count variable (i.e. what is being counted) and one variable representing the associated count;
- have zero or more columns representing groups;
- not have duplicated rows with regards to the date and group variables.

Value

An object of class `<incidence2, data.frame>`.

Interval specification

Where `interval` is specified, `incidence()`, predominantly uses the `grates` package to generate appropriate date groupings. The grouping used depends on the value of `interval`. This can be specified as either an integer value or a string corresponding to one of the classes:

- integer values: `<grates_period>` object, grouped by the specified number of days.
- day, daily: `<Date>` objects.
- week(s), weekly, isoweek: `<grates_isoweek>` objects.
- epiweek(s): `<grates_epiweek>` objects.
- month(s), monthly, yearmonth: `<grates_yearmonth>` objects.
- quarter(s), quarterly, yearquarter: `<grates_yearquarter>` objects.
- year(s) and yearly: `<grates_year>` objects.

For "day" or "daily" interval, we provide a thin wrapper around `as.Date()` that ensures the underlying data are whole numbers and that time zones are respected. Note that additional arguments are not forwarded to `as.Date()` so for greater flexibility users are advised to modifying your input prior to calling `incidence()`.

See Also

`browseVignettes("grates")` for more details on the grate object classes.

Examples

```

if (requireNamespace("outbreaks", quietly = TRUE)) {

  data(ebolavirus_clean, package = "outbreaks")
  dat <- ebolavirus_clean$linelist
  incidence(dat, "date_of_onset")
  incidence(dat, "date_of_onset", groups = c("gender", "hospital"))

}

```

keep	<i>Keep first, last and peak occurrences</i>
------	--

Description

keep_first() and keep_last() keep the first and last n rows to occur for each grouping when in ascending date order. keep_peaks() keeps the rows with the maximum count value for each group.

Usage

```

keep_first(x, n, complete_dates = TRUE, ...)

keep_last(x, n, complete_dates = TRUE, ...)

keep_peaks(x, complete_dates = TRUE, first_only = FALSE, ...)

```

Arguments

x	<incidence2> object.
n	[integer] Number of entries to keep. double vectors will be converted via as.integer(n).
complete_dates	[bool] Should complete_dates() be called on the data prior to keeping the first entries. Defaults to TRUE.
...	Other arguments passed to complete_dates().
first_only	[bool] Should only the first peak (by date) be kept. Defaults to TRUE.

Value

Incidence object with the chosen entries.

Examples

```
if (requireNamespace("outbreaks", quietly = TRUE)) {  
  
  data(ebola_sim_clean, package = "outbreaks")  
  dat <- ebola_sim_clean$linelist  
  inci <- incidence(dat, "date_of_onset")  
  keep_first(inci, 3)  
  keep_last(inci, 3)  
  
}
```

plot.incidence2 *Plot an incidence object*

Description

plot() can be used to provide a quick bar plot of an incidence object.

Usage

```
## S3 method for class 'incidence2'  
plot(  
  x,  
  y,  
  width = 1,  
  colour_palette = vibrant,  
  border_colour = NA,  
  na_colour = "grey",  
  alpha = 0.7,  
  title = NULL,  
  angle = 0,  
  size = NULL,  
  nrow = NULL,  
  ...  
)
```

Arguments

x	<incidence2> object.
y	Not used. Required for compatibility with the plot() generic.
width	[numeric] Value between 0 and 1 indicating the relative size of the bars to the interval. Default 1.

colour_palette	[function]	The color palette to be used for the different count variables. Defaults to vibrant (see ?palettes).
border_colour	[character]	The color to be used for the borders of the bars. Use NA (default) for invisible borders.
na_colour	[character]	The colour to plot NA values in graphs. Defaults to grey.
alpha	[numeric]	The alpha level for color transparency, with 1 being fully opaque and 0 fully transparent Defaults to 0.7.
title	[character]	Optional title for the graph.
angle	[numeric]	Rotation angle for text.
size	[numeric]	text size in pts.
nrow	[integer]	Number of rows used for facetting if there are group variables present and just one count in the incidence object.
...		Not currently used.

Details

- Facetting will occur automatically if either grouping variables or multiple counts are present.
- If there are multiple count variables, each count will occupy a different row of the resulting plot.
- Utilises ggplot2 so this must be installed to use.

Value

- A [ggplot2::ggplot()] object.

Examples

```
if (requireNamespace("outbreaks", quietly = TRUE) && requireNamespace("ggplot2", quietly = TRUE)) {
  withAutoprint({
    data(ebola_sim_clean, package = "outbreaks")
    dat <- ebola_sim_clean$linelist

    inci <- incidence(dat, date_index = "date_of_onset", groups = "hospital")
    plot(inci, angle = 45)

    inci2 <- regroup(inci)
  })
}
```

```

    plot(inci2)
  })
}

```

```
print.incidence2      Print an incidence object.
```

Description

Printing of <incidence2> objects is handled via the **pillar** package.

Usage

```
## S3 method for class 'incidence2'
print(x, ...)
```

Arguments

```
x          <incidence2> object.
...        Additional arguments passed through to pillar::tbl_format_setup().
```

Examples

```

if (requireNamespace("outbreaks", quietly = TRUE)) {

  data(ebola_sim_clean, package = "outbreaks")
  dat <- ebola_sim_clean$linelist

  (out <- incidence(dat, "date_of_onset"))

  # use `n` to print more lines
  print(out, n = 20L)

}

```

```
regroup      Regroup 'incidence' objects
```

Description

This function regroups an <incidence2> object across the specified groups. The resulting <incidence2> object will contain counts summed over the groups present in the input.

Usage

```
regroup(x, groups = NULL)
```

Arguments

x	<incidence2> object.
groups	[character] The groups to sum over. If NULL (default) then the function returns the corresponding object with no groupings.

Examples

```
if (requireNamespace("outbreaks", quietly = TRUE)) {
  data(ebola_sim_clean, package = "outbreaks")
  dat <- ebola_sim_clean$linelist
  i <- incidence(
    dat,
    date_index = "date_of_onset",
    groups = c("gender", "hospital")
  )
  regroup(i)
  regroup(i, "hospital")
}
```

summary.incidence2 *Summary of an incidence object*

Description

Summary of an incidence object

Usage

```
## S3 method for class 'incidence2'
summary(object, ...)
```

Arguments

object	An 'incidence' object.
...	Not used.

Value

object (invisibly).

Examples

```
data(ebola_sim_clean, package = "outbreaks")
dat <- ebola_sim_clean$linelist
inci <- incidence(dat, "date_of_onset", groups = c("gender", "hospital"))
summary(inci)
```

vibrant

Color palettes used in incidence

Description

These functions are color palettes used in incidence. The palettes come from <https://personal.sron.nl/~pault/#sec:qualitative> and exclude grey, which is reserved for missing data.

Usage

```
vibrant(n)
```

```
muted(n)
```

Arguments

n [integer]
Number of colours.
double vectors will be converted via `as.integer(n)`.

Examples

```
vibrant(5)
muted(10)
```

Index

* datasets

covidregionaldataUK, 7

<Date>, 10

<grates_epiweek>, 10

<grates_isoweek>, 10

<grates_period>, 10

<grates_year>, 10

<grates_yearmonth>, 10

<grates_yearquarter>, 10

accessors, 2

as.data.frame.incidence2, 4

as_incidence, 5

complete_dates, 6

covidregionaldataUK, 7

cumulate, 8

get_count_value (accessors), 2

get_count_value_name (accessors), 2

get_count_variable (accessors), 2

get_count_variable_name (accessors), 2

get_date_index (accessors), 2

get_date_index_name (accessors), 2

get_dates (accessors), 2

get_dates_name (accessors), 2

get_group_names (accessors), 2

get_groups (accessors), 2

incidence, 8

keep, 11

keep_first (keep), 11

keep_last (keep), 11

keep_peaks (keep), 11

muted (vibrant), 16

palettes (vibrant), 16

plot.incidence2, 12

print.incidence2, 14

regroup, 14

summary.incidence2, 15

vibrant, 16