Package 'chlorpromazineR'

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Title Convert Antipsychotic Doses to Chlorpromazine Equivalents

Version 0.2.0

Description As different antipsychotic medications have different potencies,
the doses of different medications cannot be directly compared. Various
strategies are used to convert doses into a common reference so that
comparison is meaningful. Chlorpromazine (CPZ) has historically been used
as a reference medication into which other antipsychotic doses can be
converted, as ``chlorpromazine-equivalent doses''. Using conversion keys
generated from widely-cited scientific papers, e.g. Gardner et. al 2010
<doi:10.1176/appi.ajp.2009.09060802> and Leucht et al. 2016
<doi:10.1093/schbul/sbv167>, antipsychotic doses are converted
to CPZ (or any specified antipsychotic) equivalents. The use of the package
is described in the included vignette. Not for clinical use.

URL https://docs.ropensci.org/chlorpromazineR/,
https://github.com/ropensci/chlorpromazineR

BugReports https://github.com/ropensci/chlorpromazineR/issues

Depends R (>= 3.5)

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Suggests knitr, rmarkdown, testthat, covr

VignetteBuilder knitr

NeedsCompilation no

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R topics documented:

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add_key   *Combine 2 keys with base key taking precedence*

Description

Use this to combine 2 keys by using the whole "base" key, and adding any antipsychotics from the "added" key that are not in the "base" key.

Usage

```
add_key(base, added, trim, verbose = TRUE)
```

Arguments

base	the base key
added	the key from which other antipsychotics are found to add
trim	TRUE to use trim_key on both the base and added key, needed when one does not use the full names (e.g. leucht2016).
verbose	If TRUE, added antipsychotic names will be shown in a message

Value

a merged key

See Also

Other key functions: check_key(), trim_key()

Examples

```
add_key(gardner2010, leucht2016, trim = TRUE)
```

---

check_ap *Checks whether antipsychotic names are in the key*

Description

Provided a data.frame, x, this checks that the antipsychotic names stored in the x's variable ap_label
are present in the key.

Usage

```
check_ap(
  input_data,
  key = chlorpromazineR::gardner2010,
  ap_label,
  route,
  route_label
)
```

Arguments

input_data	data.frame with antipsychotic name and dose data
key	source of the conversion factors–defaults to Gardner et al. 2010
ap_label	column in x that stores antipsychotic name
route	options include "oral", "sai", "lai" or "mixed"
route_label	if "mixed" route is specified, provide the column that stores the route information

Value

number of antipsychotic names in x[,ap_label] that don't match key

Examples

```
participant_ID <- c("P01", "P02", "P03", "P04")
age <- c(42, 29, 30, 60) # not used in calculation, just shows other data
                          # can exist in the data.frame
antipsychotic <- c("olanzapine", "olanzapine", "quetiapine", "ziprasidone")
dose <- c(10, 12.5, 300, 60)
example_oral <- data.frame(participant_ID, age, antipsychotic, dose,
                           stringsAsFactors = FALSE)
check_ap(example_oral, ap_label = "antipsychotic", route = "oral",
         key = gardner2010)
```

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check_key   *Check whether a conversion key is the expected format*

Description

chlorpromazineR uses conversion factors stored in a named list of 3 named lists. This verifies that the key is in a usable format, which can be helpful when creating custom keys or modifying included keys.

Usage

```
check_key(key)
```

Arguments

key   the key to check

Value

TRUE if the key is valid, otherwise a error is thrown.

See Also

Other key functions: [add_key](), [trim_key]()

Examples

```
check_key(gardner2010)
```

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davis1974   *Chlorpromazine equivalent key from Davis 1974 data*

Description

A list of antipsychotics and their chlorpromazine equivalent doses, generated from the following file included with the package: system.file("extdata", "davis1974.csv", package="chlorpromazineR").

Usage

```
davis1974
```

Format

A named list of 3 named lists (1 for each route) and each sub-list contains the conversion factors for each antipsychotic. The 3 top-level lists are named 'oral', 'sai', and 'lai' (route), and the lists they contain have names corresponding to the antipsychotic, e.g. 'olanzapine'.

Source

John Davis (1974). Dose equivalence of the anti-psychotic drugs. Journal of Psychiatric Research, 11, 65-69. <https://doi.org/10.1016/0022-3956(74)90071-5>

---

gardner2010	*Chlorpromazine equivalent key from Gardner et al. 2010 data*

Description

A list of antipsychotics and their chlorpromazine equivalent doses, generated from the following file included with the package: system.file("extdata", "gardner2010.csv", package="chlorpromazineR").

Usage

```
gardner2010
```

Format

A named list of 3 named lists (1 for each route) and each sub-list contains the conversion factors for each antipsychotic. The 3 top-level lists are named 'oral', 'sai', and 'lai' (route), and the lists they contain have names corresponding to the antipsychotic, e.g. 'olanzapine'.

Details

The SAI data is not included in this key, because the original study did not specify a conversion factor from chlorpromazine LAI to oral. The alternative key gardner2010_withsai can be used, which includes the SAI data, but the chlorpromazine equivalent doses produced are equivalent to chlorpromazine SAI not chlorpromazine oral. They could be manually converted (e.g. by multiplying the SAI doses by 3 per equivalence noted by Davis 1974 <https://doi.org/10.1016/0022-3956(74)90071-5>)

Source

Gardner, D. M., Murphy, A. L., O'Donnell, H., Centorrino, F., & Baldessarini, R. J. (2010). International consensus study of antipsychotic dosing. The American Journal of Psychiatry, 167(6), 686–693. <https://doi.org/10.1176/appi.ajp.2009.09060802>

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gardner2010_withsai   *Chlorpromazine equivalent key from Gardner et al. 2010 data*

Description

A list of antipsychotics and their chlorpromazine equivalent doses, generated from the following file included with the package: system.file("extdata", "gardner2010.csv", package="chlorpromazineR").

Usage

```
gardner2010_withsai
```

Format

A named list of 3 named lists (1 for each route) and each sub-list contains the conversion factors for each antipsychotic. The 3 top-level lists are named 'oral', 'sai', and 'lai' (route), and the lists they contain have names corresponding to the antipsychotic, e.g. 'olanzapine'.

Details

The SAI equivalents produced by this key are equivalent to chlorpromazine SAI not oral. They could be manually converted.

Source

Gardner, D. M., Murphy, A. L., O'Donnell, H., Centorrino, F., & Baldessarini, R. J. (2010). International consensus study of antipsychotic dosing. The American Journal of #' Psychiatry, 167(6), 686–693. <https://doi.org/10.1176/appi.ajp.2009.09060802>

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leucht2016   *Chlorpromazine equivalent key from Leucht et al. 2016 data*

Description

A list of antipsychotics and their chlorpromazine equivalent doses, generated from the following file included with the package: system.file("extdata", "leucht2016.csv", package="chlorpromazineR").

Usage

```
leucht2016
```

Format

A named list of 3 named lists (1 for each route) and each sub-list contains the conversion factors for each antipsychotic. The 3 top-level lists are named 'oral', 'sai', and 'lai' (route), and the lists they contain have names corresponding to the antipsychotic, e.g. 'olanzapine'.

Source

Leucht, S., Samara, M., Heres, S., & Davis, J. M. (2016). Dose Equivalents for Antipsychotic Drugs: The DDD Method. Schizophrenia Bulletin, 42(suppl_1), S90–S94. <https://doi.org/10.1093/schbul/sbv167>

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leucht2020	*Antipsychotic equivalent key from Leucht et al. 2020 data*

Description

A list of antipsychotics and their olanzapine-equivalent doses, generated from the following file included with the package: system.file("extdata", "leucht2020.csv", package="chlorpromazineR").

Usage

```
leucht2020
```

Format

A named list of 3 named lists (1 for each route) and each sub-list contains the conversion factors for each antipsychotic. The 3 top-level lists are named 'oral', 'sai', and 'lai' (route), and the lists they contain have names corresponding to the antipsychotic, e.g. 'olanzapine'.

Details

This reference does not include chlorpromazine, so the conversion from leucht2016 is implied (i.e. chlorpromazine = olanzapine * 30).

Source

Leucht, S., Crippa, A., Siafis, S., Patel, M., Orsini, N. & Davis, J. M. (2020). Dose-Response Meta-Analysis of Antipsychotic Drugs for Acute Schizophrenia. American Journal of Psychiatry. 117(4). <https://doi.org/10.1176/appi.ajp.2019.19010034>

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to_ap	*Calculates equivalent doses*

Description

As in to_cpz(), to_ap() converts doses of antipsychotics into equivalent doses to a reference antipsychotic. Whereas in to_cpz() the reference antipsychotic is chlorpromazine (CPZ), to_ap() converts to equivalents of an arbitrary antipsychotic specified as a string to convert_to_ap. Conversion factors are specified in the key.

Usage

```
to_ap(
  input_data,
  convert_to_ap = "olanzapine",
  convert_to_route = "oral",
  ap_label,
  dose_label,
  route = "oral",
  key = chlorpromazineR::gardner2010,
  cpz_eq_label = "cpz_eq",
  ref_eq_label = "ap_eq",
  factor_label = "cpz_conv_factor",
  route_label = NULL,
  q_label = NULL
)
```

Arguments

`input_data`	data.frame with antipsychotic name and dose data
`convert_to_ap`	name of desired reference antipsychotic
`convert_to_route`	
	the route of the desired reference antipsychotic
`ap_label`	column in x that stores antipsychotic name
`dose_label`	column in x that stores dose
`route`	options include "oral", "sai", "lai" or "mixed"
`key`	source of the conversion factors–defaults to Gardner et al. 2010
`cpz_eq_label`	the name of the column to be created, to save the calculated CPZ-equivalent dose
`ref_eq_label`	the name of the column to be created to save the doses in terms of the specified reference antipsychotic (in convert_to_ap)
`factor_label`	the name of the column to be created to store the conversion factors
`route_label`	if "mixed" route is specified, provide the column that stores the route information
`q_label`	if long-acting injectable doses are included, provide the column that stores the injection frequency (days), or only if the doses have already been divided, set q_label = 1.

Value

data.frame with new variables storing conversion factor and CPZ-equivalent doses

See Also

Other conversion functions: [to_cpz](#)()

Examples

```
participant_ID <- c("P01", "P02", "P03", "P04")
age <- c(42, 29, 30, 60) # not used in calculation, just shows other data
                         # can exist in the data.frame
antipsychotic <- c("olanzapine", "olanzapine", "quetiapine", "ziprasidone")
dose <- c(10, 12.5, 300, 60)
example_oral <- data.frame(participant_ID, age, antipsychotic, dose,
                           stringsAsFactors = FALSE)
to_ap(example_oral, convert_to_ap="olanzapine", convert_to_route="oral",
      ap_label = "antipsychotic", dose_label = "dose", route = "oral")
```

---

to_cpz *Calculates chlorpromazine-equivalent doses*

Description

Given a data.frame containing doses of antipsychotics to_cpz() converts the doses into the equivalent chlorpromazine (CPZ) doses, using the conversion factors specified in the key.

Usage

```
to_cpz(
  input_data,
  ap_label,
  dose_label,
  route = "oral",
  key = chlorpromazineR::gardner2010,
  eq_label = "cpz_eq",
  factor_label = "cpz_conv_factor",
  route_label = NULL,
  q_label = NULL
)
```

Arguments

input_data	data.frame with antipsychotic name and dose data
ap_label	column in x that stores antipsychotic name
dose_label	column in x that stores dose
route	options include "oral", "sai", "lai" or "mixed"
key	source of the conversion factors–defaults to Gardner et al. 2010
eq_label	the name of the column to be created, to save the calculated CPZ-equivalent dose
factor_label	the name of the column to be created to store the conversion factors
route_label	if "mixed" route is specified, provide the column that stores the route information

q_label   if long-acting injectable doses are included, provide the column that stores the
                   injection frequency (days), or only if the doses have already been divided, set
                   q_label = 1.

Details

The default key is gardner2010 which has data for both oral and long-acting antipsychotic medications. See help(gardner2010) for the source reference.

Value

data.frame with new variables storing conversion factor and CPZ-equivalent doses

See Also

Other conversion functions: [to_ap()](#)

Examples

```
participant_ID <- c("P01", "P02", "P03", "P04")
age <- c(42, 29, 30, 60)
antipsychotic <- c("olanzapine", "olanzapine", "quetiapine", "ziprasidone")
dose <- c(10, 12.5, 300, 60)
example_oral <- data.frame(participant_ID, age, antipsychotic, dose,
                           stringsAsFactors = FALSE)
to_cpz(example_oral, ap_label = "antipsychotic", dose_label = "dose",
       route = "oral")
```

---

trim_key   *Modify the names in a conversion key to only include the first word*

Description

For parenteral (sai) and long-acting/depot (lai) antipsychotics, the name consists of the usual generic name (such as haloperidol) and a second word describing the formulation (e.g. haloperidol decanoate). Since to_cpz() and add_key() require exact matches to work properly, removing the second word may be required, but should be done with care as it can add ambiguity (e.g. fluphenazine enanthate and decanoate).

Usage

```
trim_key(key)
```

Arguments

key   the key to trim

Value

the key that was trimmed (a named list of 3 named lists)

See Also

Other key functions: add_key(), check_key()

Examples

```
trim_key(gardner2010)
```

---

woods2003   *Chlorpromazine equivalent key from Woods 2003 data*

Description

A list of antipsychotics and their chlorpromazine equivalent doses, generated from the following file included with the package: system.file("extdata", "woods2003.csv", package="chlorpromazineR").

Usage

```
woods2003
```

Format

A named list of 3 named lists (1 for each route) and each sub-list contains the conversion factors for each antipsychotic. The 3 top-level lists are named 'oral', 'sai', and 'lai' (route), and the lists they contain have names corresponding to the antipsychotic, e.g. 'olanzapine'.

Source

Scott Woods (2003). Chlorpromazine Equivalent Doses for the Newer Atypical Antipsychotics. Journal of Clinical Psychiatry. 64(6). 663-667. <https://doi.org/10.4088/JCP.v64n0607>

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