Package 'MappingCalc'

May 7, 2026

Title Mapping Calculator for EQ-5D Utility Scores

Version 2.0.0

Description Provides a 'shiny' web application to map scores from clinical instruments (PANSS, SQLS, WHODAS 2.0, PHQ-8, EQ-5D-5L) to preference-based EQ-5D-5L health utility values using validated regression-based and beta-mixture mapping algorithms developed from Singapore population studies. Intended for use in health economic evaluations and cost-utility analyses.
Methods are based on:
Abdin et al. (2019) <doi:10.1007/s11136-018-2037-7>,
Seow et al. (2023) <doi:10.1080/14737167.2023.2215430>,
Abdin et al. (2021) <doi:10.1186/s12888-021-03463-0>,
Abdin et al. (2024) <doi:10.1080/14737167.2024.2376100>.

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Encoding UTF-8

RoxygenNote 7.3.3

Depends R (>= 4.1.0)

Imports shiny (>= 1.7.0), bslib, ggplot2, readxl, haven, writexl, tibble

Suggests DT, testthat (>= 3.0.0), spelling

Language en-GB

NeedsCompilation no

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Repository CRAN

Date/Publication 2026-03-27 10:20:12 UTC

Contents

`MappingCalc-package` *MappingCalc: Mapping Calculator for EQ-5D Utility Scores*

Description

Provides a 'shiny' web application to map scores from clinical instruments (PANSS, SQLS, WHO-DAS 2.0, PHQ-8, EQ-5D-5L) to preference-based EQ-5D-5L health utility values using validated regression-based and beta-mixture mapping algorithms developed from Singapore population studies. Intended for use in health economic evaluations and cost-utility analyses. Methods are based on: Abdin et al. (2019) doi:10.1007/s11136018203377, Seow et al. (2023) doi:10.1080/14737167.2023.2215430, Abdin et al. (2021) doi:10.1186/s12888021034630, Abdin et al. (2024) doi:10.1080/14737167.2024.2376100.

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Analyses_server *Data Analysis Module Server*

Description

Shiny module server for the Data Analysis tab. All analysis tabs share a single uploaded dataset. Covers descriptive statistics, linear regression, cost-utility analysis, and probabilistic sensitivity analysis.

Usage

```
Analyses_server(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A Shiny module server function (called for its side effects).

Analyses_ui *Data Analysis Module UI*

Description

Shiny module UI for the Data Analysis tab. Provides tools for descriptive statistics, linear regression, basic cost-utility analysis (ICER), and probabilistic sensitivity analysis (PSA) with CEAC. A single shared dataset upload at the top feeds all analysis tabs.

Usage

```
Analyses_ui(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A Shiny `tabPanel` UI element.

`eq5d5l_index_comparison` *Compare EQ-5D-5L Profile Value to Singapore Population Mean*

Description

Returns whether the index value for a given EQ-5D-5L health state profile is above or below the Singapore population mean of 0.95.

Usage

```
eq5d5l_index_comparison(
  Mobility,
  SelfCare,
  UsualActivities,
  PainDiscomfort,
  AnxietyDepression,
  profile_data
)
```

Arguments

`Mobility`	Integer 1–5. Mobility dimension level.
`SelfCare`	Integer 1–5. Self-care dimension level.
`UsualActivities`	Integer 1–5. Usual activities dimension level.
`PainDiscomfort`	Integer 1–5. Pain/discomfort dimension level.
`AnxietyDepression`	Integer 1–5. Anxiety/depression dimension level.
`profile_data`	Data frame with columns `profile` (character) and `values` (numeric), loaded from the package profile lookup table.

Value

Character. `"above"` if index value > 0.95, `"below"` otherwise.

Examples

```
profile_file <- system.file("extdata", "profile.csv",
                            package = "MappingCalc")
profile_data <- utils::read.csv(profile_file)
eq5d5l_index_comparison(1, 1, 1, 1, 1, profile_data)
eq5d5l_index_comparison(5, 5, 5, 5, 5, profile_data)
```

`eq5d5l_index_value` *Look Up EQ-5D-5L Index Value from Profile*

Description

Returns the EQ-5D-5L index value for a given five-digit health state profile using the Singapore value set (Luo et al., 2014) via the crosswalk method (van Hout et al., 2012).

Usage

```
eq5d5l_index_value(
  Mobility,
  SelfCare,
  UsualActivities,
  PainDiscomfort,
  AnxietyDepression,
  profile_data
)
```

Arguments

`Mobility`	Integer 1–5. Mobility dimension level.
`SelfCare`	Integer 1–5. Self-care dimension level.
`UsualActivities`	Integer 1–5. Usual activities dimension level.
`PainDiscomfort`	Integer 1–5. Pain/discomfort dimension level.
`AnxietyDepression`	Integer 1–5. Anxiety/depression dimension level.
`profile_data`	Data frame with columns `profile` (character) and `values` (numeric), loaded from the package profile lookup table.

Value

Numeric scalar. EQ-5D-5L index value for the specified profile.

Examples

```
profile_file <- system.file("extdata", "profile.csv",
                            package = "MappingCalc")
profile_data <- utils::read.csv(profile_file)
eq5d5l_index_value(1, 1, 1, 1, 1, profile_data)
eq5d5l_index_value(3, 3, 3, 3, 3, profile_data)
```

`eq5d5l_profile_string` *Build EQ-5D-5L Profile String*

Description

Concatenates the five EQ-5D-5L dimension levels into a five-digit profile string (e.g., `"11111"` for full health).

Usage

```
eq5d5l_profile_string(
  Mobility,
  SelfCare,
  UsualActivities,
  PainDiscomfort,
  AnxietyDepression
)
```

Arguments

`Mobility`	Integer 1–5. Mobility dimension level.
`SelfCare`	Integer 1–5. Self-care dimension level.
`UsualActivities`	Integer 1–5. Usual activities dimension level.
`PainDiscomfort`	Integer 1–5. Pain/discomfort dimension level.
`AnxietyDepression`	Integer 1–5. Anxiety/depression dimension level.

Value

Character scalar. Five-digit EQ-5D-5L profile string.

Examples

```
eq5d5l_profile_string(1, 2, 3, 2, 1)
eq5d5l_profile_string(3, 3, 3, 3, 3)
```

mod_eq_5d_5l_server *EQ_5D_5L Calculator Server*

Description

EQ_5D_5L Calculator Server

Usage

```
mod_eq_5d_5l_server(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

Called for its side effects.

mod_eq_5d_5l_ui *EQ_5D_5L Calculator UI*

Description

EQ_5D_5L Calculator UI

Usage

```
mod_eq_5d_5l_ui(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A `tabPanel` UI element.

mod_eq_panss_server *EQ_PANSS Calculator Server*

Description

EQ_PANSS Calculator Server

Usage

```
mod_eq_panss_server(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

Called for its side effects.

mod_eq_panss_ui *EQ_PANSS Calculator UI*

Description

EQ_PANSS Calculator UI

Usage

```
mod_eq_panss_ui(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A `tabPanel` UI element.

mod_eq_phq8_server *EQ_PHQ8 Calculator Server*

Description

Shiny module server for the EQ_PHQ8 calculator. Handles individual score prediction and batch dataset upload/download using a 2-component Beta Mixture Model.

Usage

```
mod_eq_phq8_server(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A Shiny module server function (called for its side effects).

mod_eq_phq8_ui *EQ_PHQ8 Calculator UI*

Description

Shiny module UI for the EQ_PHQ8 calculator tab. Maps PHQ-8 scores to EQ-5D-5L utility values using a 2-component Beta Mixture Model.

Usage

```
mod_eq_phq8_ui(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A Shiny `tabPanel` UI element.

mod_eq_sqls_server *EQ_SQLS Calculator Server*

Description

EQ_SQLS Calculator Server

Usage

```
mod_eq_sqls_server(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

Called for its side effects.

mod_eq_sqls_ui *EQ_SQLS Calculator UI*

Description

EQ_SQLS Calculator UI

Usage

```
mod_eq_sqls_ui(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A `tabPanel` UI element.

mod_eq_whodas_server *EQ_WHODAS Calculator Server*

Description

EQ_WHODAS Calculator Server

Usage

```
mod_eq_whodas_server(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

Called for its side effects.

mod_eq_whodas_ui *EQ_WHODAS Calculator UI*

Description

EQ_WHODAS Calculator UI

Usage

```
mod_eq_whodas_ui(id)
```

Arguments

id	Character. The Shiny module namespace ID.

Value

A `tabPanel` UI element.

panss_utility_comparison *Compare PANSS-Predicted Utility to Singapore Population Mean*

Description

Returns whether the predicted EQ-5D-5L utility is above or below the Singapore population mean of 0.95.

Usage

```
panss_utility_comparison(positive, negative, gps, age1, gender)
```

Arguments

positive	Numeric. PANSS Positive subscale score (range: 7–49).
negative	Numeric. PANSS Negative subscale score (range: 7–49).
gps	Numeric. PANSS General Psychopathology score (range: 16–112).
age1	Numeric. Patient age in years (minimum: 21).
gender	Numeric. Gender code: 1 = female, 0 = male.

Value

Character. "above" if predicted utility > 0.95, "below" otherwise.

Examples

```
panss_utility_comparison(34, 17, 80, 40, 1)
```

panss_utility_score *Estimate EQ-5D-5L Utility Score from PANSS Subscales*

Description

Predicts the EQ-5D-5L utility index value using an OLS regression model from Abdin et al. (2019). Predicted scores above 1.000 are capped at 1.000.

Usage

```
panss_utility_score(positive, negative, gps, age1, gender)
```

Arguments

positive	Numeric. PANSS Positive subscale score (range: 7–49).
negative	Numeric. PANSS Negative subscale score (range: 7–49).
gps	Numeric. PANSS General Psychopathology score (range: 16–112).
age1	Numeric. Patient age in years (minimum: 21).
gender	Numeric. Gender code: 1 = female, 0 = male.

Value

Numeric scalar. EQ-5D-5L utility value rounded to 3 decimal places, capped at a maximum of 1.000.

References

Abdin E, Chong SA, Seow E et al. (2019). Mapping the Positive and Negative Syndrome Scale scores to EQ-5D-5L and SF-6D utility scores in patients with schizophrenia. *Quality of Life Research*, 28, 177–186. doi:10.1007/s1113601820377

Examples

```
panss_utility_score(34, 17, 80, 40, 1)
panss_utility_score(positive = 20, negative = 15, gps = 40,
                    age1 = 35, gender = 0)
```

---

run_app *Launch the MappingCalc Shiny Application*

Description

Launches the MappingCalc interactive Shiny calculator in the default web browser. Provides validated mapping calculators for PANSS, SQLS, WHODAS 2.0, PHQ-8, and EQ-5D-5L instruments, plus a Data Analysis module for descriptive statistics, linear regression, cost-utility analysis, and probabilistic sensitivity analysis.

Usage

```
run_app(...)
```

Arguments

...	Additional arguments passed to runApp, such as port or host.

Value

Called for its side effect of launching a Shiny application. Returns the value of `shiny::runApp()` invisibly.

Examples

```
if (interactive()) {
  run_app()
}
```

`sqls_utility_comparison` *Compare SQLS-Predicted Utility to Singapore Population Mean*

Description

Returns whether the predicted EQ-5D-5L utility is above or below the Singapore population mean of 0.95.

Usage

```
sqls_utility_comparison(psychosocial, motivation, symptoms, age, gender)
```

Arguments

`psychosocial`	Numeric. SQLS Psychosocial subscale score (range: 0–100).
`motivation`	Numeric. SQLS Motivation subscale score (range: 0–100).
`symptoms`	Numeric. SQLS Symptoms subscale score (range: 0–100).
`age`	Numeric. Patient age in years.
`gender`	Numeric. Gender code: 1 = female, 0 = male.

Value

Character. `"above"` if predicted utility > 0.95, `"below"` otherwise.

Examples

```
sqls_utility_comparison(50, 50, 50, 40, 1)
```

sqls_utility_score *Estimate EQ-5D-5L Utility Score from SQLS Subscales*

Description

Predicts the EQ-5D-5L utility index value using an OLS regression model from Seow et al. (2023).

Usage

```
sqls_utility_score(psychosocial, motivation, symptoms, age, gender)
```

Arguments

psychosocial	Numeric. SQLS Psychosocial subscale score (range: 0–100).
motivation	Numeric. SQLS Motivation subscale score (range: 0–100).
symptoms	Numeric. SQLS Symptoms subscale score (range: 0–100).
age	Numeric. Patient age in years.
gender	Numeric. Gender code: 1 = female, 0 = male.

Value

Numeric scalar. EQ-5D-5L utility value rounded to 3 decimal places.

References

Seow E, Abdin E, Subramaniam M, Chong SA (2023). Mapping the schizophrenia quality of life scale to EQ-5D, HUI3 and SF-6D utility scores in patients with schizophrenia. *Expert Review of Pharmacoeconomics and Outcomes Research*, 23(7), 813–821. doi:10.1080/14737167.2023.2215430

Examples

```
sqls_utility_score(50, 50, 50, 40, 1)
```

whodas_total_utility_comparison *Compare WHODAS-Predicted Utility to Singapore Population Mean*

Description

Returns whether the predicted EQ-5D-5L utility is above or below the Singapore population mean of 0.95.

Usage

```
whodas_total_utility_comparison(whodas_scores)
```

Arguments

whodas_scores	Numeric. WHODAS 2.0 total score (range: 0–48).

Value

Character. "above" if predicted utility > 0.95, "below" otherwise.

Examples

```
whodas_total_utility_comparison(10)
```

---

whodas_total_utility_score

Estimate EQ-5D-5L Utility Score from WHODAS 2.0 Total Score

Description

Predicts the EQ-5D-5L utility index value from the WHODAS 2.0 12-item total score using a robust regression model from Abdin et al. (2024). Predicted values below -0.584 are floored at -0.584.

Usage

```
whodas_total_utility_score(whodas_scores)
```

Arguments

whodas_scores	Numeric. WHODAS 2.0 total score (range: 0–48).

Value

Numeric scalar. EQ-5D-5L utility value rounded to 3 decimal places, floored at a minimum of -0.584.

References

Abdin E et al. (2024). Mapping the World Health Organization Disability Assessment Schedule 2.0 to the EQ-5D-5L in patients with mental disorders. *Expert Review of Pharmacoeconomics and Outcomes Research*. doi:10.1080/14737167.2024.2376100

Examples

```
whodas_total_utility_score(10)
whodas_total_utility_score(48)
```

Index