Package: VOWR (via r-universe)

May 20, 2026

Title Vital Operational Waiting Risk for Healthcare Systems

Version 0.1.0

Description Vital Operational Waiting Risk (VOWR) provides tools for analysing monthly Referral-to-Treatment (RTT) panel data in healthcare systems. The package supports provider-level profiling, operational risk classification, waiting-time volatility assessment, Kaplan-Meier survival analysis, Cox proportional hazards modelling, and visualisation of time-to-threshold breach patterns. It is designed to help analysts and decision-makers identify providers with high waiting times, unstable performance, and increased risk of earlier threshold breach. The survival modelling methods follow Cox (1972) <doi:10.1111/j.2517-6161.1972.tb00899.x> and Kaplan and Meier (1958) <doi:10.1080/01621459.1958.10501452>.

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Encoding UTF-8

RoxygenNote 7.3.3

Imports dplyr, ggplot2, survival, stats, utils, survminer

Suggests testthat (>= 3.0.0),

Config/testthat/edition 3

URL https://github.com/zerish12/VOWR

BugReports https://github.com/zerish12/VOWR/issues

NeedsCompilation no

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Contents

`plot_km_by_delay` *Kaplan-Meier plot by group*

Description

Kaplan-Meier plot by group

Usage

```
plot_km_by_delay(data, time, event, group)
```

Arguments

`data`	A data frame.
`time`	Name of duration/time variable.
`event`	Name of event variable: 1 = event occurred, 0 = censored.
`group`	Name of grouping variable.

Value

A survminer ggsurvplot object.

vowr_cox_model *Estimate Cox proportional hazards model for threshold breach*

Description

Estimate Cox proportional hazards model for threshold breach

Usage

```
vowr_cox_model(surv_profile)
```

Arguments

surv_profile	Data frame from vowr_survival_merge()

Value

A fitted Cox proportional hazards model

vowr_flag *Flag high-risk providers*

Description

Flag high-risk providers

Usage

```
vowr_flag(profile, wait_threshold = 18, vol_percentile = 0.9)
```

Arguments

profile	A data frame produced by vowr_profile()
wait_threshold	The mean wait time threshold (default 18 weeks)
vol_percentile	The percentile for volatility (default 0.90)

Value

The profile data frame with a 'risk_flag' column

vowr_import *Import and validate RTT data*

Description

Import and validate RTT data

Usage

```
vowr_import(path = NULL)
```

Arguments

path	Optional path to an NHS Referral-to-Treatment (RTT) CSV file. If NULL, the example data included in the package is loaded.

Value

A cleaned data frame.

Examples

```
sample_path <- system.file(
  "extdata",
  "rtt_trust_month_panel_last24_FIXED-2.csv",
  package = "VOWR"
)

data <- vowr_import(sample_path)
head(data)
```

vowr_km_by_risk *Kaplan-Meier plot by provider risk group*

Description

Kaplan-Meier plot by provider risk group

Usage

```
vowr_km_by_risk(surv_profile)
```

Arguments

surv_profile	Data frame from vowr_survival_merge()

Value

A survminer Kaplan-Meier plot object

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vowr_plot *Visualize provider risk distribution*

Description

Visualize provider risk distribution

Usage

```
vowr_plot(flagged_data)
```

Arguments

flagged_data	A data frame produced by vowr_flag()

Value

A ggplot object

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vowr_profile *Profile National Health Service provider performance*

Description

Profile National Health Service provider performance

Usage

```
vowr_profile(data)
```

Arguments

data	A data frame from vowr_import().

Value

A summary table with the number of months, mean waiting time, median waiting time, waiting-time volatility, and total backlog for each provider.

vowr_survival *Estimate time-to-breach survival model*

Description

Estimate time-to-breach survival model

Usage

```
vowr_survival(data, threshold = 18)
```

Arguments

data	A data frame from vowr_import().
threshold	Mean waiting-time threshold in weeks. Default is 18.

Value

A list containing a Kaplan-Meier survival model object and the data used to fit the model.

vowr_survival_merge *Merge survival output with provider profile and risk flags*

Description

Merge survival output with provider profile and risk flags

Usage

```
vowr_survival_merge(surv_result, profile, flagged)
```

Arguments

surv_result	Output from vowr_survival()
profile	Output from vowr_profile()
flagged	Output from vowr_flag()

Value

A provider-level survival analysis data frame

`vowr_workflow` *Run complete Volatility-Oriented Waiting-time Risk workflow*

Description

Run complete Volatility-Oriented Waiting-time Risk workflow

Usage

```
vowr_workflow(data, wait_threshold = 18, vol_percentile = 0.9)
```

Arguments

`data`	A data frame from vowr_import()
`wait_threshold`	Waiting-time breach threshold. Default is 18 weeks.
`vol_percentile`	Volatility percentile for risk flagging. Default is 0.90.

Value

A list containing profile, flagged data, risk plot, survival output, survival profile, Cox model, and Kaplan-Meier plot by risk group.

Index