# Package: vimcheck (via r-universe)

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**Title** Diagnostics for Vaccine Impact Modelling Consortium Burden and Impact Estimates

**Version** 0.0.3

**Description** Run diagnostics on burden estimates submitted by modellers in the Vaccine Impact Modelling Consortium (VIMC) and impact estimates calculated by the VIMC Science & Policy team.

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**URL** https://github.com/vimc/vimcheck, https://vimc.github.io/vimcheck/

**BugReports** https://github.com/vimc/vimcheck/issues

**Depends** R (>= 3.5)

**Imports** checkmate, cli, dplyr, forcats, ggplot2, glue, readr, rlang, scales, stringr, tidyr

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`vimcheck-package` *vimcheck: Diagnostics for Vaccine Impact Modelling Consortium Burden and Impact Estimates*

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## Description

Run diagnostics on burden estimates submitted by modellers in the Vaccine Impact Modelling Consortium (VIMC) and impact estimates calculated by the VIMC Science & Policy team.

## Author(s)

**Maintainer**: Pratik Gupte <p.gupte24@imperial.ac.uk> (ORCID)

Authors:

- Katy Gaythorpe (ORCID)
- Xiang Li (ORCID)
- Zoë Gibney (ORCID)

Other contributors:

- Imperial College of Science, Technology and Medicine [copyright holder, funder]

## See Also

Useful links:

- https://github.com/vimc/vimcheck
- https://vimc.github.io/vimcheck/
- Report bugs at https://github.com/vimc/vimcheck/issues

## basic_burden_sanity *Sanity checks on burden estimates*

### Description

Helper function for sanity checks on burden estimate values. Checks whether any burden estimates are non-numeric, missing, or negative.

### Usage

```
basic_burden_sanity(burden)
```

### Arguments

| | |
|---|---|
| burden | A <data.frame> of disease burden estimates. Must have at least a single column named "value" of numeric burden estimates. |

### Value

A character vector of messages generated by checks on burden estimates, with the length of the vector depending on how many checks fail.

## check_demography_alignment *Check incoming burden cohort size against interpolated population*

### Description

Check the modelled disease burden data has similar population sizes as the provided population data.

### Usage

```
check_demography_alignment(
  burden_set,
  wpp,
  gender = c("Both", "Male", "Female")
)
```

### Arguments

| | |
|---|---|
| burden_set | A <data.frame> of modeller-provided burden-set data. |
| wpp | Population estimates for the country in burden_set, provided by VIMC. |
| gender | The assigned sex for which demography is to be checked. Options are "Both" (default), "Male", or "Female". |

## Value

A <tibble> giving the alignment, i.e., percentage difference of modelled population size from the WPP-derived population estimates.

---

`constants` *Package constants*

---

## Description

Package constants

## Usage

```
file_dict_colnames

scenario_data_colnames

burden_outcome_names

colnames_plot_demog_compare
```

## Format

An object of class `character` of length 5.

An object of class `character` of length 4.

An object of class `character` of length 10.

An object of class `character` of length 7.

---

`eg_burden_template` *Example of VIMC burden template provided to modellers*

---

## Description

An example of the central burden template provided by VIMC to modelling groups.

## Usage

```
eg_burden_template
```

### Format

`eg_burden_template`:
A data frame with 10,201 rows and 11 columns:

**disease** Disease name
**year** Year
**age** Age
**country** Country name in short format; this is a placeholder name.
**country_name** Country name in long format; this is a placeholder.
**cases** Cases of the disease averted.
**dalys** DALYs averted.
**deaths** Deaths averted.
**yll** Years of life-loss averted.
**cohort_size** Population size of the country in a year.
**scenario** Vaccination scenario.

### Source

Prepared by the VIMC secretariat.

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## `eg_coverage` *Example of scenario coverage data*

---

### Description

Example of scenario coverage data

### Usage

```
eg_coverage
```

### Format

`eg_coverage`:
A data frame with 11 rows and 19 columns.

**scenario_type** Scenario type name.
**scenario_type_description** Scenario type description string.
**scenario** Scenario name string.
**scenario_description** Scenario description string.
**coverage_set** Coverage set string.
**gavi_support_level** String for whether GAVI supported the scenario.
**source_from** String identifier for the source.
**disease** Infection identifier.
**vaccine** Vaccine identifier.

**activity_type** Vaccination activity identifier.
**year** Year
**country** Country name in short format; this is a placeholder name.
**age_from** Age limit lower limit.
**age_to** Age limit upper limit.
**age_range_verbatim** Description of age range.
**target** Target for vaccination.
**coverage** Proportional coverage.
**gender** Sex to which data applies, may be "Male", "Female", or "Both".
**proportion_risk** Proportional risk value.

## Source

Prepared by the VIMC secretariat.

---

`eg_fvps` *Example of FVP estimate data*

---

## Description

Example data of fully-vaccinated persons (FVPs).

## Usage

```
eg_fvps
```

## Format

`eg_fvps`**:**
A data frame with 11 rows and 24 columns:
**scenario_type** Scenario type name.
**scenario_type_description** Scenario type description string.
**scenario** Scenario name string.
**scenario_description** Scenario description string.
**coverage_set** Coverage set string.
**gavi_support_level** String for whether GAVI supported the scenario.
**source_from** String identifier for the source.
**disease** Infection identifier.
**vaccine** Vaccine identifier.
**activity_type** Vaccination activity identifier.
**year** Year
**country** Country name in short format; this is a placeholder name.
**age_from** Age limit lower limit.

**age_to** Age limit upper limit.
**age_range_verbatim** Description of age range.
**target** Target for vaccination.
**coverage** Proportional coverage.
**gender** Sex to which data applies, may be "Male", "Female", or "Both".
**proportion_risk** Proportional risk value.
**job** Job code as a numeric.
**fvps** Count of FVPs.
**fvps_adjusted** Count of adjusted FVPs.
**target_adjusted** Adjusted vaccination target.
**coverage_adjusted** Ratio of adjusted FVPs to adjusted target.

## Source

Prepared by the VIMC secretariat.

---

`eg_wpp` *Example of UN-WPP time-series data*

---

## Description

An example of the population estimate data used by VIMC.

## Usage

```
eg_wpp
```

## Format

`eg_wpp`**:**
A data frame with 65,448 rows and 5 columns:

**country** Country name; this is a placeholder name.
**year** Year
**age** Age
**gender** Sex given as three categories, "Male", "Female", or "Both".
**value** Population size

## Source

Derived from data originally prepared by the United Nations as part of the World Population Prospects: https://population.un.org/wpp/.

plotting *Plot burden and impact diagnostics*

## Description

Plotting functions for burden and impact diagnostics. All functions operate on data prepared for plotting by a corresponding plotting-preparation function.

## Usage

```
plot_compare_demography(data, fig_number)

plot_age_patterns(burden_age, fig_number)

plot_global_burden_decades(burden_decades, fig_number)

plot_global_burden(burden_data, outcome_name, fig_number)

plot_coverage_set(coverage_set, fig_number)

plot_fvp(fvp_data, fig_number)
```

## Arguments

| | |
|---|---|
| data | A <data.frame> that gives the comparison between VIMC-provided and modeller-used demography values, in long-format. This is expected to be the output of check_demography_alignment() processed by prep_plot_demography(). |
| fig_number | The figure number displayed in the plot title. |
| burden_age | A <tibble> with the minimum column names "age", "value_millions", "burden_outcome", and "scenario"; expected to be the output of prep_plot_age(). |
| burden_decades | A <tibble> giving the burden by decade, up to year_max; expected to be the output of prep_plot_burden_decades(). |
| burden_data | This is expected to be a <tibble> from a nested-<tibble> constructed using prep_plot_global_burden(). |
| outcome_name | A string for an outcome name. Allowed outcome names are given in the package constant constants. |
| coverage_set | A <tibble> that is the output of prep_plot_coverage_set(). |
| fvp_data | A <tibble> of estimates of fully-vaccinated persons (FVPs) per scenario, with scenarios as factors in order of the number of adjusted-FVPs. Expected to be the output of prep_plot_fvp(). |

## Value

A <ggplot> object that can be printed to screen in the plot frame or saved to an output device (i.e., saved as an image file).

plotting_prep *Prepare data for plotting*

## Description

Transform burden estimate data from modelling groups to make them suitable for plotting using an appropriate plotting function. Each preparation function corresponds to a plotting function.

## Usage

```
prep_plot_demography(burden)

prep_plot_age(burden)

prep_plot_burden_decades(burden, year_max)

prep_plot_global_burden(burden)

prep_plot_coverage_set(coverage)

prep_plot_fvp(fvp, year_min, year_max)
```

## Arguments

| | |
|---|---|
| burden | For `prep_plot_demography()`, a `<tibble>` output from `check_demography_alignment()`. For other functions, a burden dataset similar to eg_burden_template. |
| year_max | The maximum year to be represented in a subsequent figure. For `prep_plot_burden_decades()`, must be a decade, i.e., multiple of 10. |
| coverage | WIP. Coverage data. |
| fvp | WIP. Data on counts of fully vaccinated persons. |
| year_min | Minimum year. |

## Value

- For `prep_plot_demography()`: a `<tibble>` in long-format, with the identifier-columns, "scenario", "age", and "year", with the added column "value_millions".
- For `prep_plot_age()`: a `<tibble>` with the columns "scenario", "burden_outcome", "age", "value_millions".
- For `prep_plot_burden_decades()`: a `<tibble>` with the columns "scenario", "burden_outcome", "decade_label", and "value_millions".
- For `prep_plot_global_burden()`: a nested `<tibble>` with the string column "burden_outcome", and a list column of tibbles "burden_data".
- For `prep_plot_coverage_set()`: WIP
- For `prep_plot_fvp()`: WIP.

plotting_theme *Plotting theme for vimcheck*

## Description

A simple plotting theme building on ggplot2::theme_bw().

## Usage

```
theme_vimc(x_text_angle = 45, y_text_angle = 0, ...)

theme_vimc_noxaxis()
```

## Arguments

| | |
|---|---|
| x_text_angle | The angle for X-axis labels. Defaults to 45 degrees. |
| y_text_angle | The angle for Y-axis labels. Defaults to 0 degrees. |
| ... | <dynamic-dots> Other arguments passed to ggplot2::theme(). These will be applied in addition to, or in place of, pre-existing elements defined by this theme. See the examples for this theme's appearance. |

## Value

A ggplot2 theme that can be added to ggplot2 plots or objects.

## Examples

```
# using an inbuilt dataset
data(mtcars)

# standard theme
ggplot2::ggplot(mtcars, ggplot2::aes(disp, mpg)) +
  ggplot2::geom_point() +
  theme_vimc()

# with X-axis suppression
ggplot2::ggplot(mtcars, ggplot2::aes(disp, mpg)) +
  ggplot2::geom_point() +
  theme_vimc_noxaxis()
```

## validate_complete_incoming_files

*Validate files in a burden estimate*

### Description

Check that incoming data files in a burden estimate are complete, and that no extra files have been included. This function expects that incoming burden files are in the directory given by `path_burden`, which holds a file dictionary which maps each data file to a specific scenario.

### Usage

```
validate_complete_incoming_files(path_burden = "incoming_burden_estimates")
```

### Arguments

| | |
|---|---|
| `path_burden` | A directory with burden estimate data. |

### Value

A `<tibble>` of the scenario file dictionary in `path_burden` if all checks pass. Otherwise, exits with informative errors on failed checks.

## validate_file_dict_template

*Validate file dictionary template*

### Description

Function to create a `file_dictionary` template. It maps to touchstone disease scenarios and you will see expected number of scenarios i.e. the number of files that we expect from a model. Users should populate the file column to match the scenario-file. This function will run if a `file_dictionary.csv` file does not exist

### Usage

```
validate_file_dict_template(disease, path_burden = "incoming_burden_estimates")
```

### Arguments

| | |
|---|---|
| `disease` | A disease identifier. |
| `path_burden` | A directory with burden estimate data. |

## Value

Nothing; called primarily for its side-effects. If the file `path_burden/file_dictionary.csv` does not exist, a file dictionary CSV file is written to the same location. Prints a message to screen informing the user whether any action has been taken.

---

`validate_template_alignment`

*Check incoming burden set against template*

---

## Description

Identify extra and missing columns and rows in burden data.

## Usage

```
validate_template_alignment(burden_set, template)
```

## Arguments

| | |
|---|---|
| `burden_set` | A `<data.frame>` of modeller-provided burden-set data. |
| `template` | A `<data.frame>` of the burden template as provided to modelling groups by VIMC. |

## Value

A named list of checks carried out on `burden_set` to compare it against `template`, with information on missing and extra data.

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