Consistency check for Age-dependent Reference Intervals

Installation:

Download the Zip-File from GitHub under https://github.com/SandraKla/Zlog_AdRI. Unzip the file and set your working direction to the path of the folder. The package shiny must be installed before using the Shiny app.

```
1. if("shiny" %in% rownames(installed.packages())){
2.   library(shiny)}
3. else{
4.   install.packages("shiny")}
```

And then start the app with the following code:

```
1. library(shiny)
2. runApp("app.R")
```

Or use the function runGitHub() from the package shiny:

```
1. library(shiny)
2. runGitHub("Zlog_AdRI", "SandraKla")
```

The package DT is downloaded or imported when starting this app. The used R-Version must be ≥ 3.6.1. The package DT must be ≥ 0.13 and shiny ≥ 1.4.0.

Data:

Preloaded dataset:

The CALIPER-Dataset with age-dependent reference intervals has been preloaded into this Shiny App. For this purpose, the data was brought into the appropriate shape for the analysis from the Supplemental Table from Age-Specific and Sex-Specific Pediatric Reference Intervals for 40 Biochemical Markers.
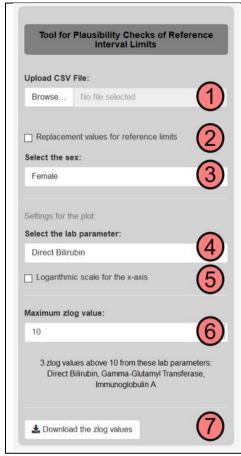
New data:

For new data use the CALIPER-Dataset as template with the columns:

1. **CODE**: Name of the analyte ("Calcium")
2. **LABUNIT**: Unit of the analyte ("mmol/L")
3. **SEX**: "M" for male and "F" for female
4. **UNIT**: Unit of the age range in "year", "month", "week" or "day"
5. **AgeFrom**: Start of the age range
6. **AgeUntil**: End of the age range
7. **LowerLimit**: Start of the reference interval (LL)
8. **UpperLimit**: Start of the reference interval (UL)

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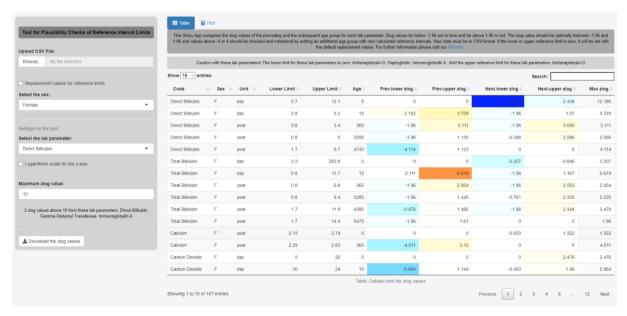
Guide:

Settings:

1. **Upload CSV File:** Upload own datasets with reference intervals
2. **Replacement values:** If the lower reference limit is zero, it will be set to 0.001 and the upper reference limit to 100 or by the given reference limits.
3. **Select the Sex:** Important for the plot
4. **Select the lab parameter:** Important for the plot
5. **Logarithmic scale for the x-axis:** Important for the plot
6. **Maximum zlog value:** Quick determination of very high zlog values
7. **Download the data:** Download the data-table with the zlog values

Determination of the zlog values and analysis:

Table:

With the help of the table, find high zlog values and the appropriate laboratory parameters. These can be visualized in step 3. The table shows the zlog values. Zlog values under -1.96 in blue and above 1.96 in orange. The zlog value should be optimally between 1.96 and -1.96 in white.

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Plot:

This Shiny App computes for each lab parameter and each age group the zlog values of the preceding and the subsequent age group. This is the left plot. The zlog value should be optimally in the middle of the green lines between 1.96 and -1.96. Zlog values above 4 or -4 should be checked and minimized by adding an additional age group with new calculated reference intervals. The right plot shows the current used reference intervals. The upper reference limit is in red and the lower limit in blue. Legend: ■ Zlog to the preceding age group, • Zlog to the subsequent age group and ▲ stands for the reference intervals.