

# Interactive Access to Current Hospital-Specific Antimicrobial Consumption Data: The ANRESIS Dashboard

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## Background

Surveillance of antibiotic consumption is a crucial element in "antibiotic stewardship", and it has been shown, that optimizing the use of antibiotics may prevent the spreading of resistant bacteria<sup>1,2,3,4</sup>.

The Swiss Centre for Antibiotic Resistance (ANRESIS) collects aggregated antibiotic consumption data from 70 hospitals distributed all over Switzerland since 2006. Data analyses from ANRESIS are transmitted as feedback and benchmark reports to individual hospitals to support them in defining aims for antibiotic stewardship programs.

## Objective

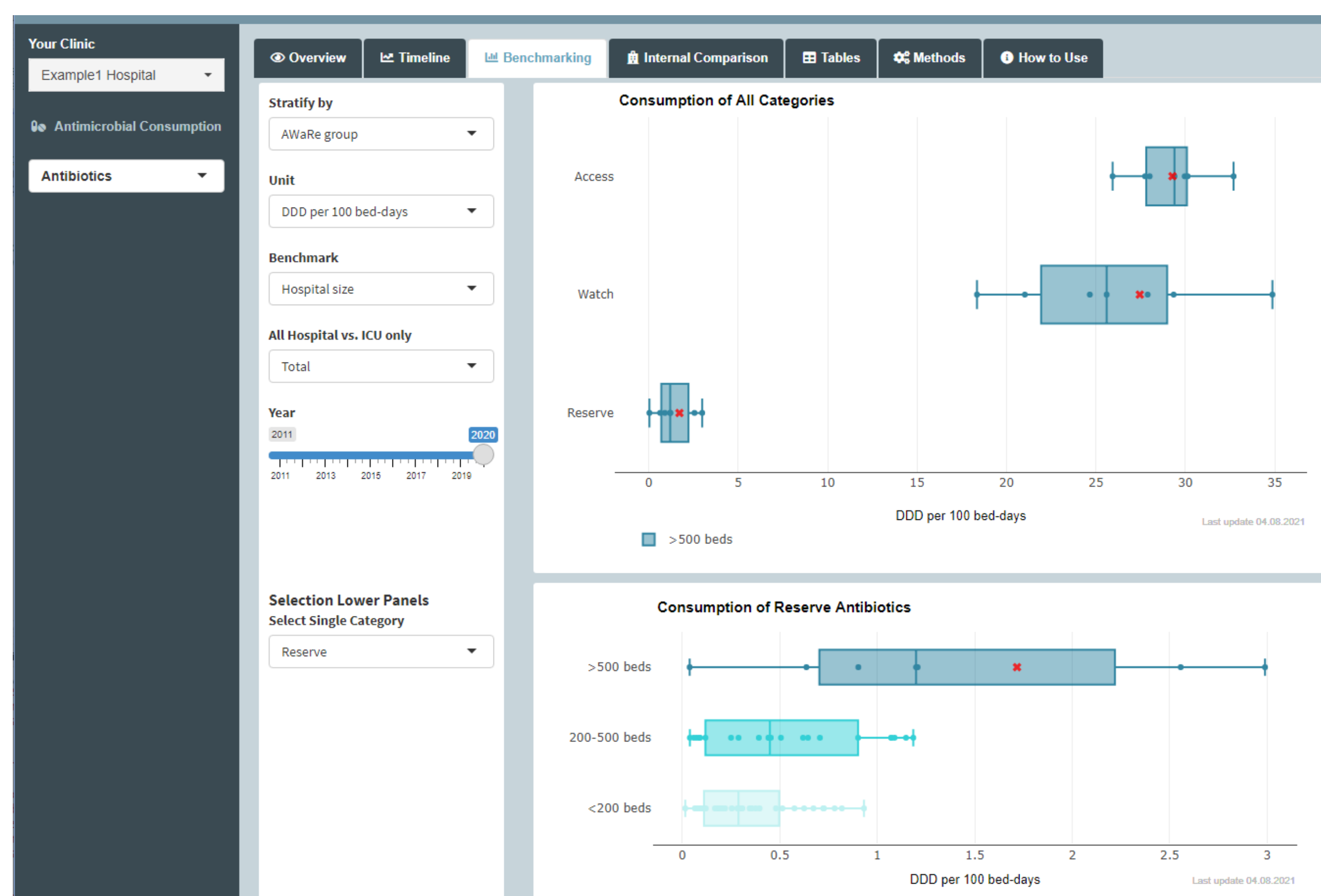
The main aim of this project was to develop an interactive dashboard in order to supplement the ANRESIS PDF reports with customised visualisations according to the hospital-specific needs.

## Methods

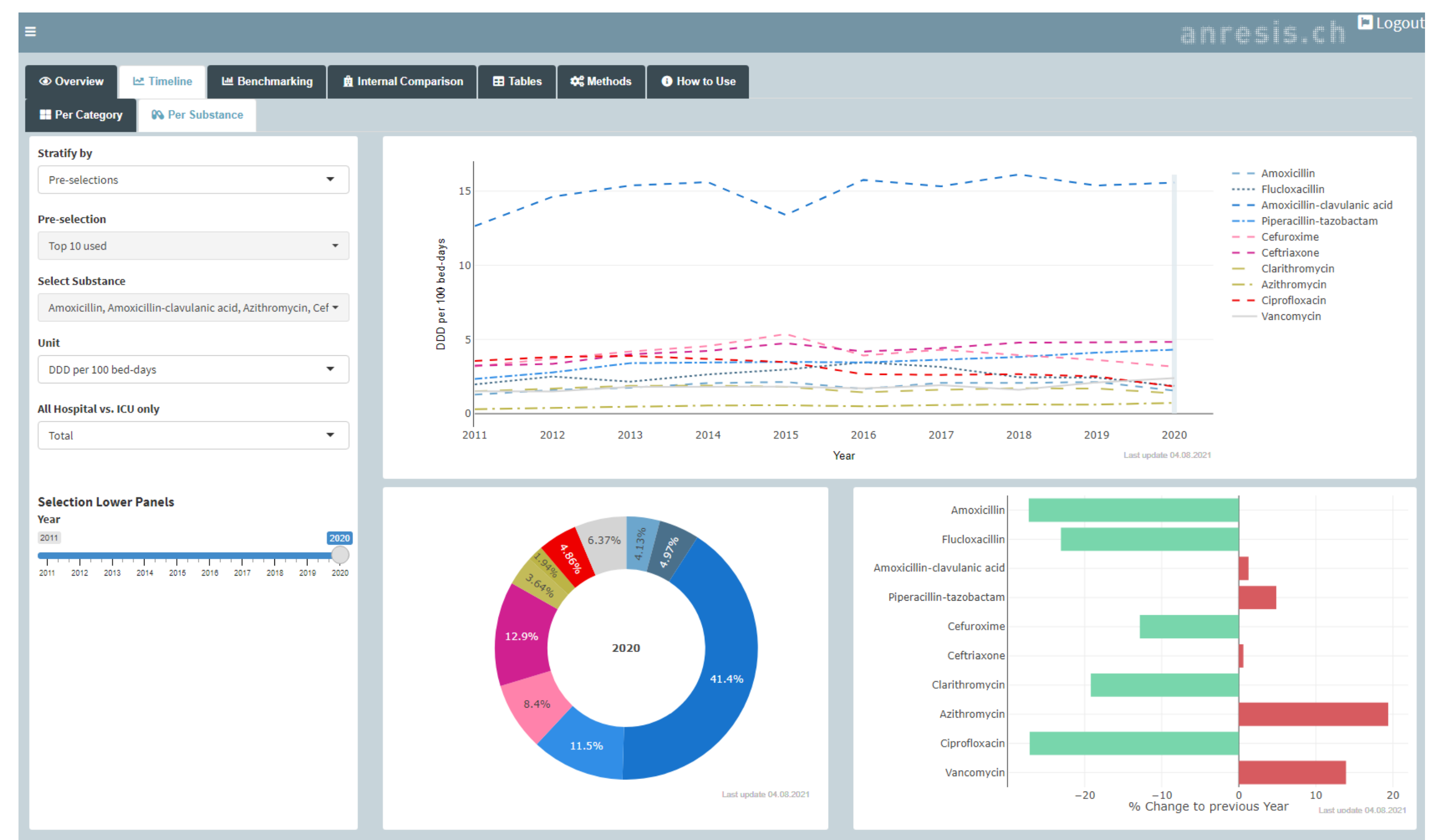
Antibiotic consumption data, which was provided by the hospitals, that are part of the ANRESIS surveillance system, is used as data source. The dashboard was programmed by the R software environment (Version 4.0.4, R core team, Vienna, Austria), using packages such as Shiny and Plotly.

## Results

The ANRESIS Dashboard is a web application with hospital-specific login providing free access to interactive graphics and interactive tables to hospitals which are part of the ANRESIS surveillance system (Figure 1, Figure 2).



**Figure 1:** Screenshot of the benchmarking view of the ANRESIS Dashboard. The consumption of an example hospital (red cross) is compared to consumption of other hospitals. Upper panel: consumption data is stratified per aware group and compared to other hospitals with a size over 500 beds. Lower panel: consumption of reserve antibiotics is compared between different hospital sizes.



**Figure 2:** Screenshot of the timeline view of the ANRESIS Dashboard. Consumption of the top 10 used substances of an example hospital are visualized. Upper panel: consumption over time. Lower left panel: yearly percentage of consumption in the selected year. Lower right panel: consumption in the selected year is compared to the consumption of the previous year.

The current beta version contains data of 64 Swiss hospitals (including 17 hospital groups) and will be updated yearly. The temporal course of the user's hospital antimicrobial consumption is depicted graphically. Data can be filtered by users according to antimicrobial categories and substances, departments, consumption units and additional parameters. A benchmark boxplot enables the user to compare the consumption of his hospital with other hospitals of the same size or the same linguistic region.

## Conclusion

The ANRESIS Dashboard conveys antimicrobial consumption data in an interactive form to hospitals and provides state-of-the-art information technology to antibiotic stewardship programs.

## Outlook

Legal and data security aspects are currently being clarified by the authorities.

Hospitals which are participating in the ANRESIS surveillance network will be informed when the ANRESIS Dashboard is available.

Due to its flexible design, the dashboard may be adjusted to the users' needs and extended with further panels.

## References

1. Barlam TF et al., Clin Infect Dis, 2016, 62(10): e51-e77
2. Howard Ph. et al., J Antimicrob Chemother, 2017, 72(10): 2910-2914
3. Pollack LA. & Srinivasan A., Clin Infect Dis, 2014, 59(3): S97-S100
4. Fishman N. et al., Infect Control Hosp Epidemiol, 2012, 33(4): 322-327