

The ANRESIS Dashboard: A Unified Platform to Support AMR Surveillance, IPC, and Antibiotic Stewardship in Switzerland



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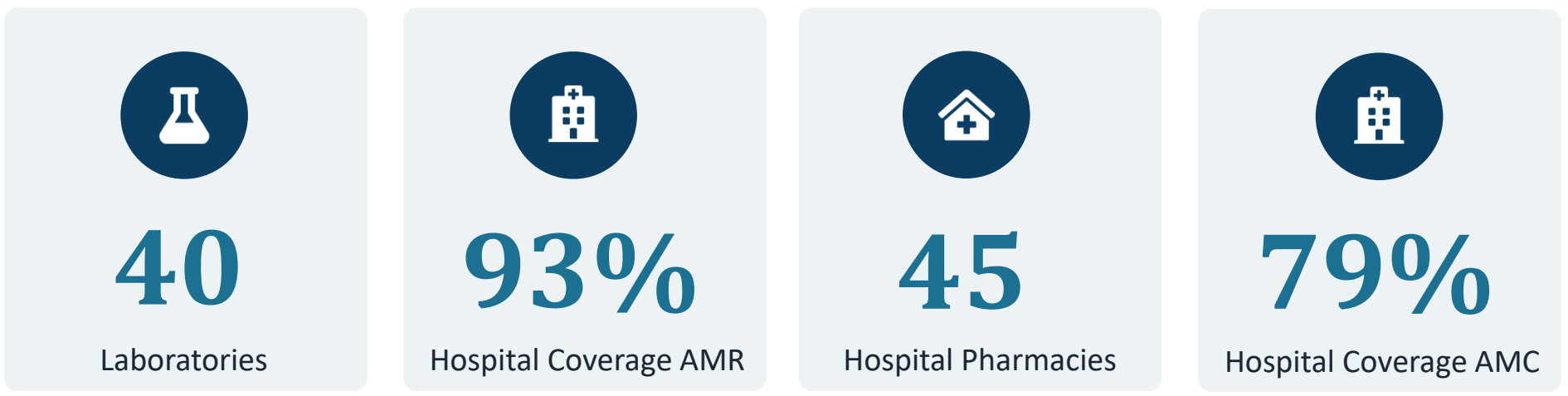
M. Gasser¹, O. Friedli¹, A. Kronenberg¹

¹ANRESIS, the Swiss Centre for Antibiotic Resistance, Institute for Infectious Diseases, University of Bern, Bern, Switzerland
Contact: michael.gasser@unibe.ch

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Background and Aim

ANRESIS, the Swiss Centre for Antibiotic Resistance, continuously collects anonymised antimicrobial susceptibility testing data from 40 clinical microbiology laboratories, as well as antimicrobial consumption (AMC) data from 45 hospital pharmacies covering around 70 hospital sites. Translating these data into timely, actionable feedback is central to AMR surveillance, infection prevention and control (IPC) and antibiotic stewardship. Interactive dashboards can close this feedback loop (Figure 1), enabling microbiologists, pharmacists, ID specialists and IPC teams to monitor their own data and benchmark them against peers and national estimates. The aim was therefore to develop a unified, role-based dashboard delivering tailored AMR and AMC information to both laboratory and hospital specialists.



Methods

The platform is implemented as an R package using the golem framework for production-grade Shiny applications. Its architecture comprises a tile overview, which was developed as a standalone R package and numerous modules containing graphs and tables. Data are stored in anonymised, aggregated form in a dedicated MariaDB database developed specifically for the dashboard.

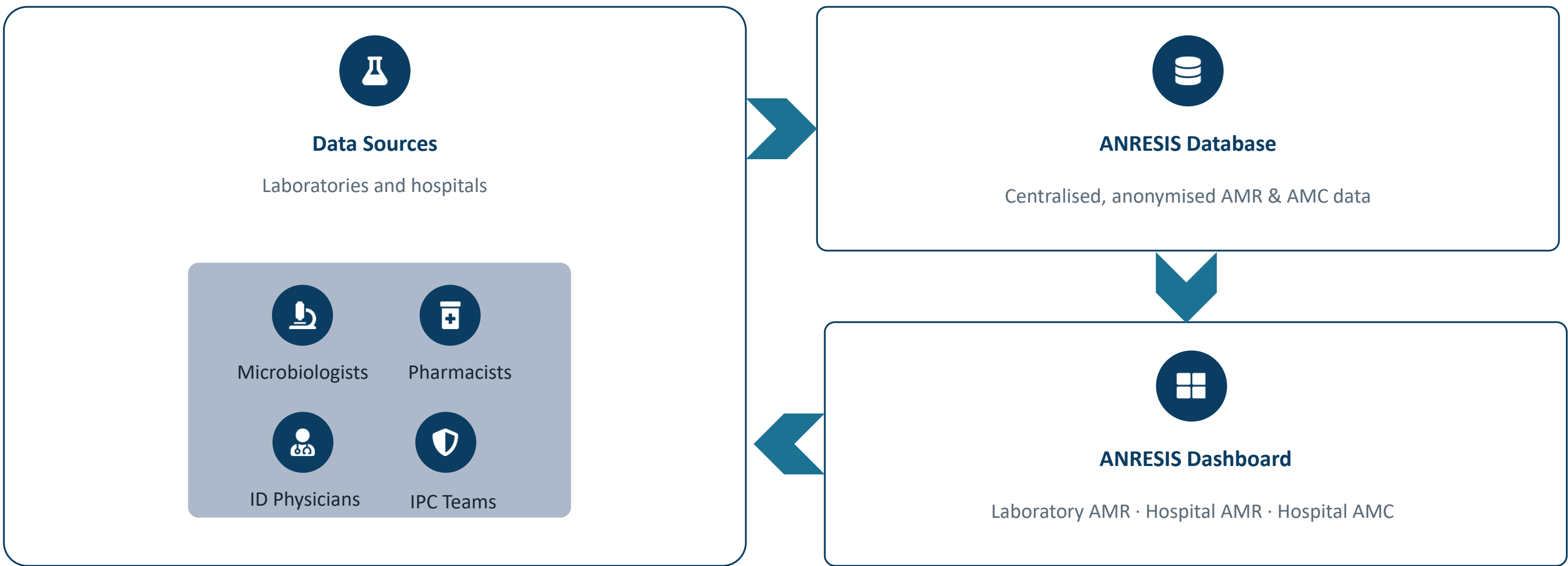


Figure 1: Workflow of institutional data submission to ANRESIS and customised feedback.

The Dashboard Overview Page ...

The ANRESIS dashboard comprises two main role-specific views: A laboratory AMR view and a combined Hospital AMR and AMC view. Upon login via a dedicated website, each user sees a personalised overview, tailored to their role and to the institutions they are authorised to access. This overview page (Figure 2) contains different tiles with basic statistics as a teaser. After clicking on an individual tile, a more detailed view is opened (section below).

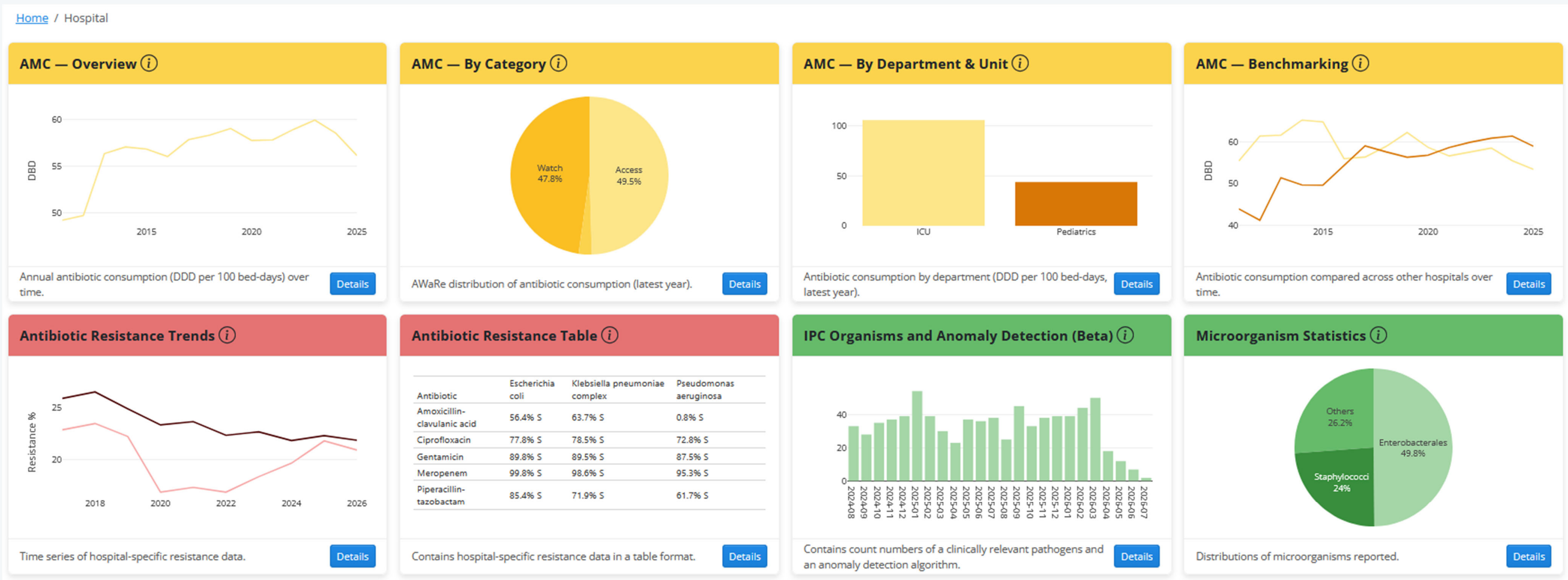


Figure 2: Hospital AMR and AMC overview with institution-specific data tiles. Tiles are coloured according to their thematic content.

... and Different Sub-Sections

Laboratory Resistance

The Laboratory Resistance sub-section contains numerous modules with resistance data. For example, laboratory-specific resistance data can be compared with those of Switzerland as a whole or with data from other anonymised laboratories (Figure 3), or customised statistics can be downloaded. There are also statistics on the distribution of microorganisms, on data submissions and on laboratory-specific indicators.

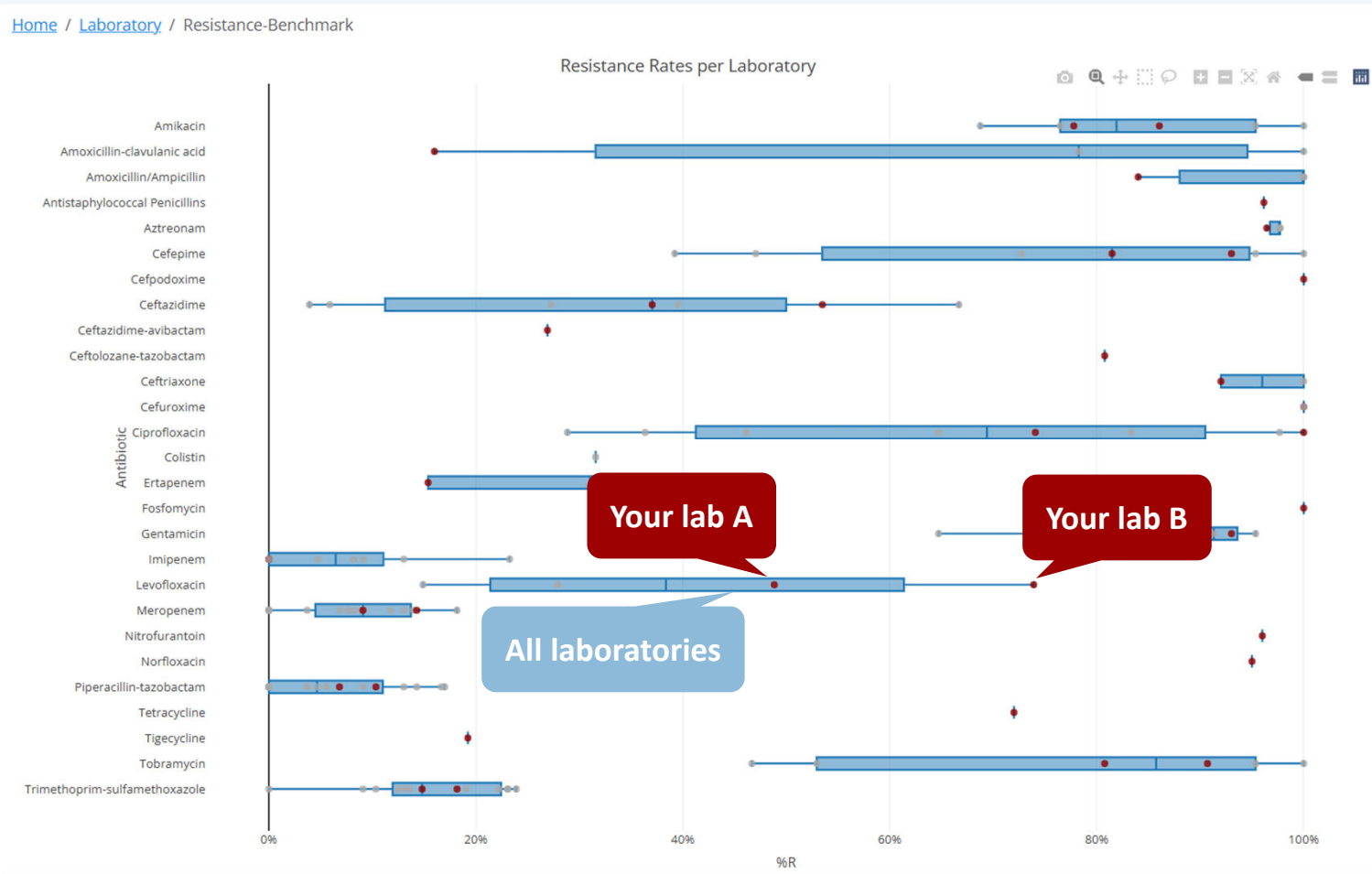


Figure 3: A benchmark plot allows resistance data to be compared between different laboratories.

Hospital Resistance

The Hospital Resistance sub-section comprises several modules from the laboratory sub-section, as well as additional modules specific to hospital resistance surveillance. One module enables the visualisation of clinically relevant pathogens as stacked time series, while another implements the Farrington Flexible anomaly detection algorithm to identify monthly aberrations in time series data (Figure 4). Aberration detection can be performed at both the hospital and department levels.

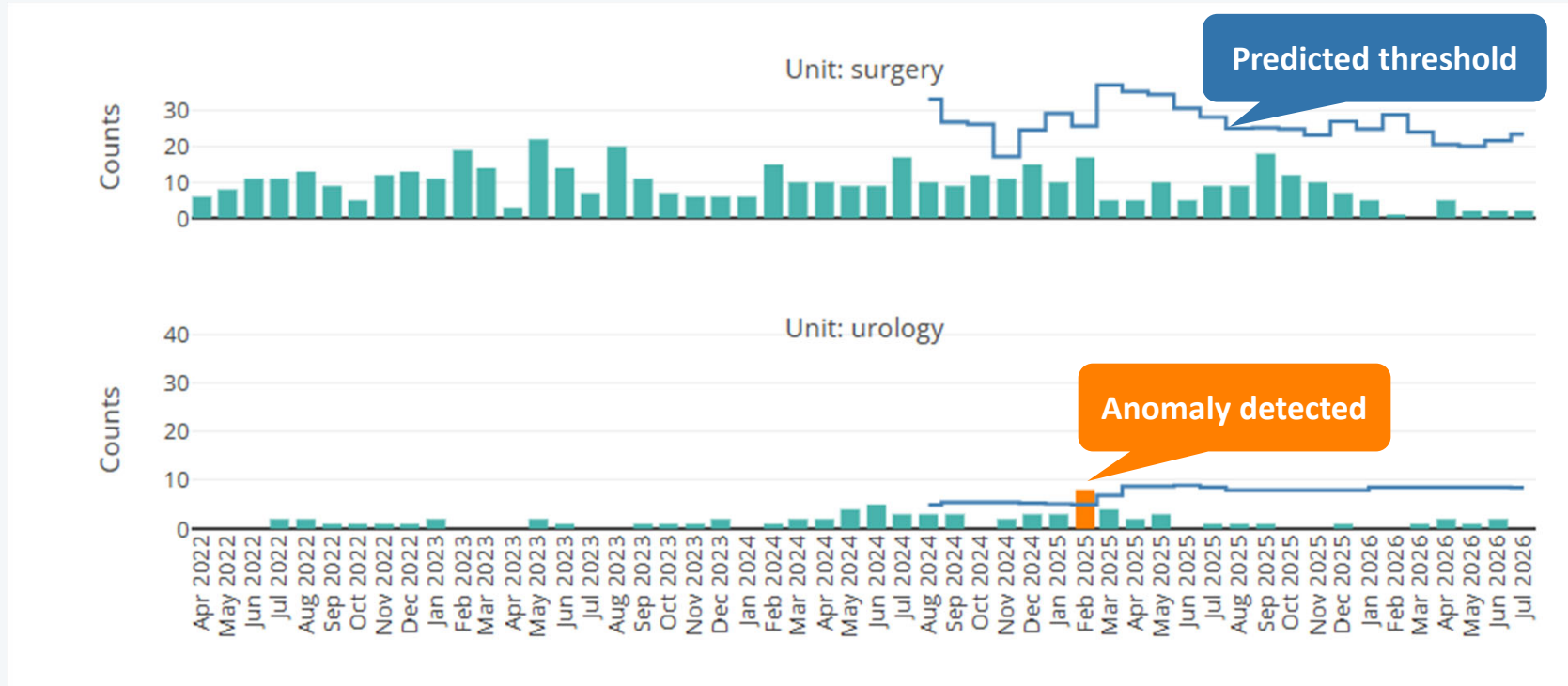


Figure 4: Anomaly detection using the Farrington Flexible algorithm on department-specific count data.

Hospital Antimicrobial Consumption

The Hospital Antimicrobial Consumption sub-section contains numerous modules with consumption data. For example, antimicrobial use can be tracked over time and broken down by AWARe category or by antimicrobial spectrum or analysed at the level of individual substances. Hospitals can also benchmark their consumption against other anonymised hospitals and compare use across departments and units within their own institution (Figure 5).

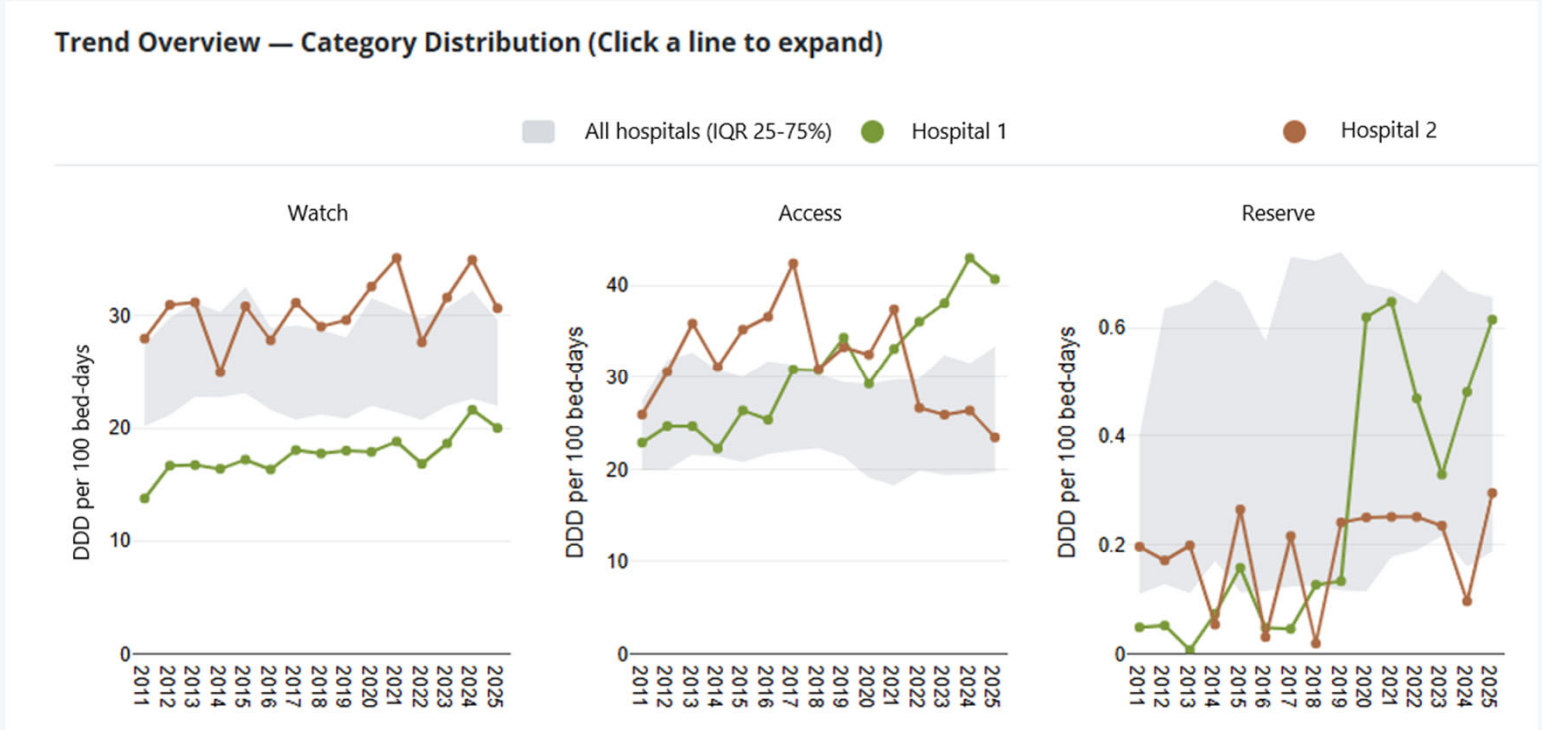


Figure 5: Consumption benchmarking view: two hospital sites of one hospital group, benchmarked against other institutions.

Conclusion

A modular, role-based dashboard turns ANRESIS surveillance data into targeted feedback for microbiologists, clinicians, pharmacists and IPC teams, enabling them to take appropriate action. This enables evidence-based antibiotic stewardship, facilitates early detection of anomalies, and enhances data reporting.

Future Perspectives

Future work will include beta testing and iterative refinement based on user feedback. Additional user roles, including cantonal and federal authorities, may be implemented. The modular architecture will also facilitate the addition of new functionalities, such as patient-specific statistics, while the development of a veterinary edition will support a One Health approach to antimicrobial resistance surveillance.