

# Advanced Level Data Analysis Training Course

**DATE |** Feb 18, 19, 20, 2025

**VENUE |** Feb 18: 2F IRIS , Feb 19: 2F Camellia,  
Feb 20: 2F Lotus, Grand InterContinental Seoul Parnas Hotel



# Quick Analysis of Antimicrobial Patterns and Trends (QAAPT) – <https://qaapt.com>

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February 18, 2025



*QAAPT: A Free, Web-Based Platform for  
AMR Data Management and Visualization.*

# Session Plan

- Introduction
- Motivations
- AMR Data Management Simplifications
- QAAPT Architecture
- Pre requirements and Privacy Policy
- Design Principles
- Features overview
- Antibigrams
- ML and Generative AI
- Live Demo

# What is QAAPT?



QAAPT is a free web-based platform developed by CAPTURA for the analysis of AMR data.

DASHBOARD (Beta 2.0)

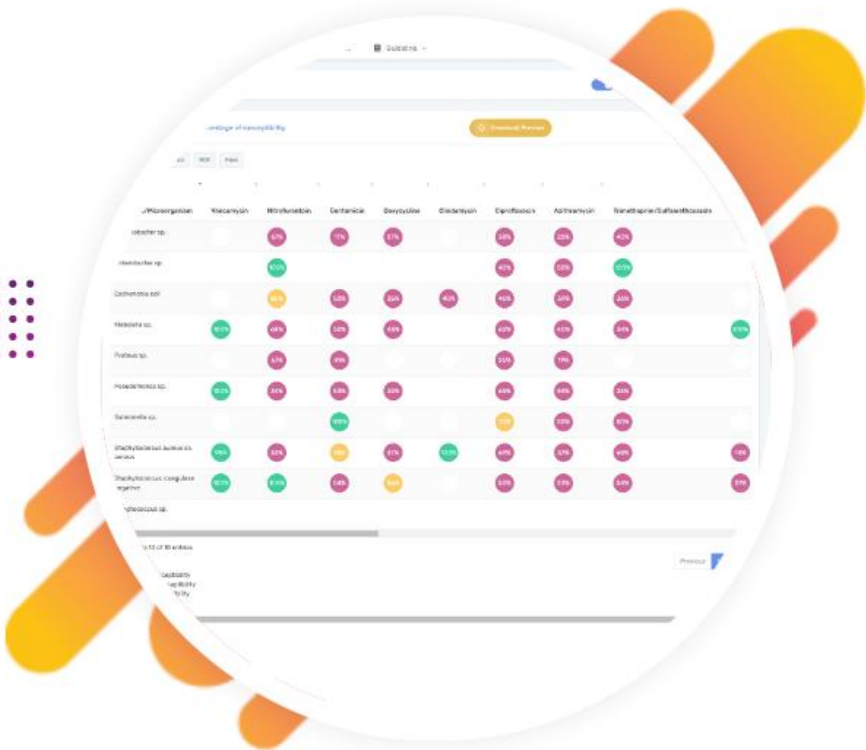


Home About Academy Utilities Support Blog

## WELCOME TO QAAPT

QAAPT, which stands for Quick Analysis of Antimicrobial Patterns and Trends, is a free, web-based tool for visualizing antimicrobial resistance data. Developed by the Capturing Data on Antimicrobial Patterns and Trends in Use in Region of Asia (CAPTURA) project which has been funded by the UK Government Fleming Fund Regional Grant.

QAAPT is designed for use by decision-makers, including healthcare professionals, national AMR coordinators, microbiologists, technologists, and practitioners involved in AMR surveillance or microbiology laboratory work. It seamlessly integrates with WHONET software, allowing for the direct importation of WHONET SQLITE and CSV files. Moreover, QAAPT's 'qLoad' data conversion module enables the conversion of ANY LIS datasets, while its web application programming interface (API) and interoperability facilitates integration with live surveillance dashboards or health/laboratory information systems. Read more: [Click here](#).



Live Dashboard

Academy

# QAAPT in Numbers



**139**

Lab Users



**7**

Number of countries



**10053**

Website Content Visitors



**400**

Training Provided

# Why Should I use QAAPT?



EXPLORE

## Why Should I use QAAPT?



### A free of charge tool

QAAPT is completely free to use. You don't need to pay any fees or have IT knowledge to get started with it.



### No hardware or server

QAAPT is a cloud-based platform, so there's no need to purchase additional hardware or maintain servers.



### No Technical Expertise Required

Easily import, process, and curate raw data without needing any technical expertise.



### Available Resources

QAAPT offers a range of step-by-step learning materials to help you get started, no matter your experience level. Feel free to explore documentations.



### Data Security

We use industry-standard measures to protect your data from unauthorized access, misuse, or disclosure, ensuring top-tier security.



### Data Sharing

QAAPT ensures strict data separation and privacy, preventing users from viewing data or information from others or different facilities.



### Data Retention

We offer a permanent data deletion option that removes any dataset from the platform. Once deleted, the data is gone forever.



### User Rights

You have full control over your data. This includes rights to access, modify, delete, and withdraw consent for any data processing at any time.



# Migrations of Metadata from WHONET



**38190**

Breakpoints from 2012



**560**

Antibiotics



**2947**

Organisms



# How QAAPT Simplifies AMR Data Management [1]



EXPLORE

## Core Functionalities



### Manage Multiple Projects & Datasets

Upload and manage multiple datasets, including WHONET and LIS exports, all within QAAPT.



### Import WHONET Dataset

Upload WHONET datasets in SQLite or CSV format, with easy export options via SQLite Browser.



### Import Any LIS Dataset

Convert and upload raw LIS data in Excel or CSV format for seamless integration.



### Live System Integration

Easily connect LIS/HIS/EMR systems with QAAPT through its powerful API.



### Single-Window Dashboard

Generate dashboards with advanced filters for quick, insightful data analysis.



### Automated Clinical Categories

Determine R/I/S categories and inhibition zone diameters automatically.



### Advanced Filtering Options

Search and filter data based on organisms, specimens, and other criteria.



### Export Reports in Multiple Formats

Download reports as PNG, JPG, EXCEL, CSV, PDF, or tables as needed.

# How QAAPT Simplifies AMR Data Management [2]



## Track Resistance Trends

Visualize resistance patterns over time for more informed decision-making.



## Monitor Susceptibility Trends

Observe susceptibility changes in multiple organisms over specific periods.



## One-Click Antibigram

Create hospital antibiograms instantly to track antibiotic effectiveness.



## Facility Comparison Map

Compare facility data globally, including organism prevalence and statistics.



## AI-Powered Query Generation

Use Generative AI and NLP to generate queries from natural language inputs.



## Predictive Resistance Modeling

Leverage machine learning to forecast antibiotic resistance patterns.



## EXPLORE

### NEQA Module

supports microbiology laboratories in registering their facilities, enrolling users, submitting proficiency test results, and generating a scoring dashboard.



**Laboratory  
Registration**



**Laboratory User  
Enrollment**



**Antibiotic Panel  
Preparation**



**Bacterial and  
Reference Strains**



**New Test  
Management**



**Expected  
Interpretation Mgt.**

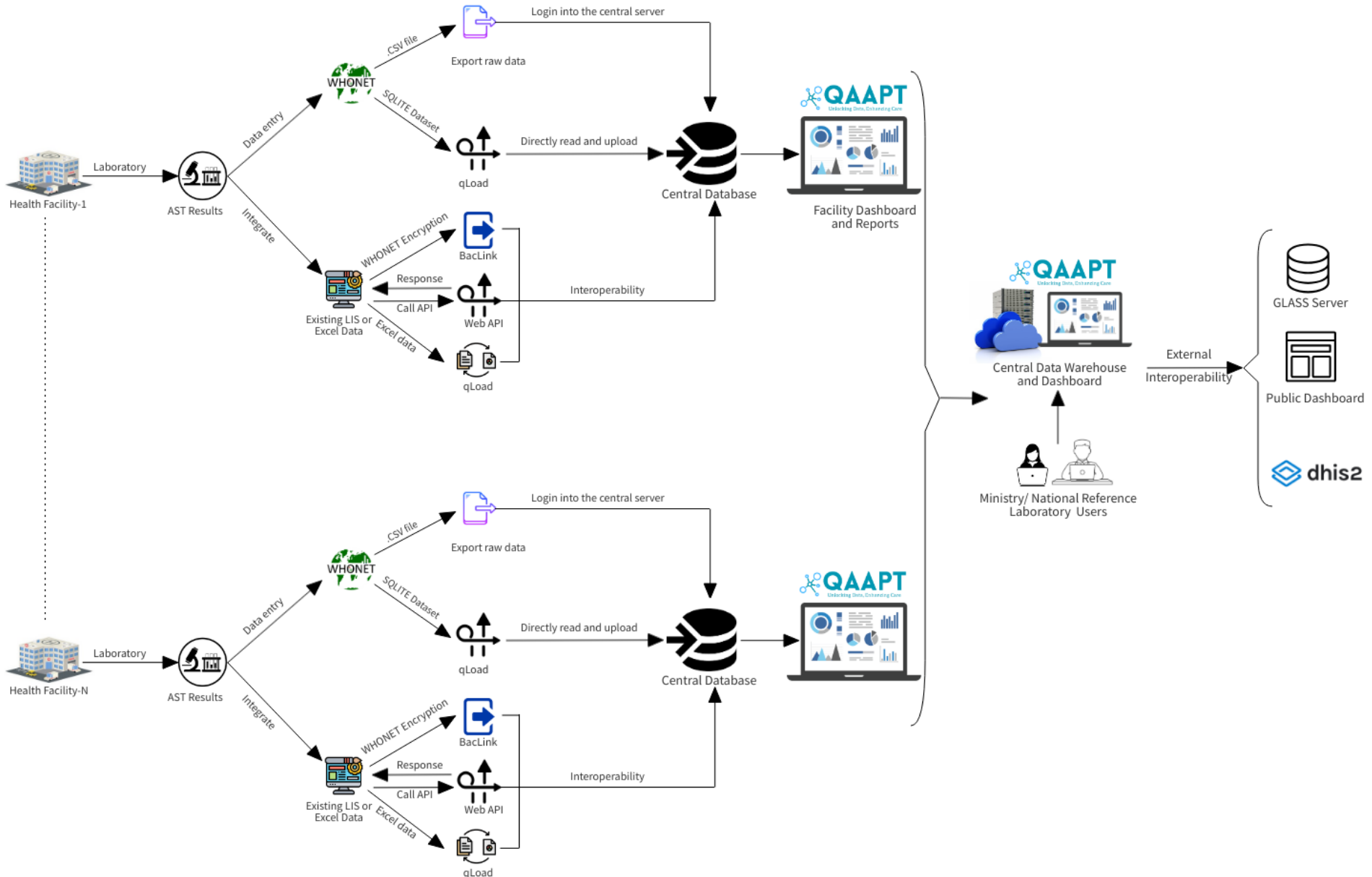


**Data Collection by  
Strain ID**



**Dashboard Reporting  
and Scoring**

# Process Flow and Architecture





## MOTIVATIONS

### Why We Developed QAAPT

From 2019 to 2023, during CAPTURA Phase I, we analyzed 2.37 million records from seven countries using QAAPT and WHONET. This work exposed major gaps in how antimicrobial resistance (AMR) data is collected, managed, and visualized.

- ✓ AMR data comes from different sources and formats, making it hard to manage.
- ✓ Privately owned LIS and HIS systems create integration challenges.
- ✓ No dedicated tool existed for powerful AMR data visualization.
- ✓ Microbiology and IT must work together, but often lack a common platform.
- ✓ Stronger AMR surveillance systems are needed for better global health insights.

Interested in QAAPT? Connect with us via Live Support



## QAAPT Design Principle



### Agile Development

Utilizing iterative and incremental development methodologies to adapt quickly to changing requirements and provide continuous improvements.



### Microbiology First

Prioritizing microbiological accuracy and relevance in the design and functionality of the system.



### Flexibility

Ensuring the system is adaptable to various use cases, data sources, and user needs.



### Usability

Focusing on user-friendly interfaces and ease of use to enhance user experience and efficiency.



### Interoperability

Guaranteeing seamless integration with other systems and platforms to facilitate comprehensive data exchange.

# Steps to start [1]



## Steps to start

### Step 1 Dataset

#### Export WHONET/LIS/Excel Dataset

QAAPT enables you to export WHONET datasets from the "Data Analysis" module or via the SQLite Database Browser. Ensure that your CSV file includes the following fields: Unique ID, Age, Sex, Specimen Name, Specimen Date, Organism, and AST results.

### Step 2 QAAPT

#### QAAPT Laboratory Registration and Login

Register your laboratory to access QAAPT. Upon successful registration, you will receive your login credentials. QAAPT operates as a restricted, permission-based system, ensuring secure access to your data. Before completing your registration, please review the [Privacy Policy](#).

[Registration](#)[Login](#)



# Steps to start [2]



## Step-3 qLoad

### Dataset Import

Access the qLoad module to upload your dataset.

Supported formats include:

1. WHONET .sqlite file
2. WHONET .csv file exported via SQLite Browser
3. Datasets exported from LIS or Excel files
4. Vitek 2 dataset integration
5. Live dashboard integration

## Generate Reports

The dashboard enables you to generate various reports, including demographic analysis, trend evaluation, resistance patterns, antibiograms, and custom report generation.

## Step-4 Dashboard

## Step 5 Get Started

### Begin Your QAAPT Journey

Ready to explore QAAPT? Register your laboratory today and unlock powerful data analysis, reporting, and visualization tools.

[Register Your Laboratory](#)



# Motivations to develop QAAPT



## Recent publications

### QAAPT - Frontiers in Microbiology

Published Article: [Read Full Article](#)

**Citation:** *Sujan MJ, Gautam S, Aboushady AT, Clark A, Kwon S, Joh HS, Holm M, Stelling J, Marks F, and Poudyal N (2025). QAAPT: an interoperable web-based open-source tool for antimicrobial resistance data analysis and visualization. **Front. Microbiol.** 16:1513454.*

**DOI:** [10.3389/fmicb.2025.1513454](https://doi.org/10.3389/fmicb.2025.1513454)

**Received:** 18 October 2024 | **Accepted:** 03 January 2025 | **Published:** 07 February 2025

QAAPT Publication PDF:

The screenshot shows a PDF viewer interface for the article "QAAPT: an interoperable web-based open-source tool for antimicrobial resistance data analysis and visualisation". The viewer's top bar includes a menu icon, the article title, page number "1 / 7", zoom level "100%", and icons for download, print, and a settings menu. The article content is displayed on a white background with a dark sidebar on the left. The sidebar contains the "frontiers" logo, the journal name "Frontiers in Microbiology", a "Check for updates" button, and an "OPEN ACCESS" section. The "OPEN ACCESS" section lists the editor, Magdalena Popowska, and the reviewers, Paul Richard Himes and Ibrar Ahmed. The main content area features the article title, authors "Mohammad Julhas Sujan<sup>1\*</sup>, Sanjay Gautam<sup>1\*</sup>", and the journal information "TYPE: Original Research, PUBLISHED: 07 February 2025, DOI: 10.3389/fmicb.2025.1513454".



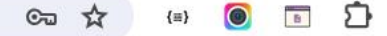
## Global Users of the QAAPT Website from July 2024



# Live Demo – New Registration



demo.qaapt.com/sign/up



Create a new account

First Name\*

Enter first name

Last Name\*

Enter last name

Designation\*

Enter designation

Email\*

Enter email

Choose organization Select Organization

Username\*

bherihospital

Password\*

.....

☐ By registering you agree to the QAAPT [Terms of Use](#).

Create account

I have an account [Sign in now](#)

Live support? [Click here](#)

# Privacy Policy



qaapt.com/sign/up



## Privacy Notice and Terms of Use of QAAPT (Quick Analysis of Antimicrobial Patterns and Trends) ✕

**Effective Date: May 6, 2024**

At QAAPT, we are committed to protecting your privacy. This privacy notice explains how and why we collect, store, use, and share ("process") your information when you use this platform. By using the platform, you consent to the practices described in this policy.

### 1. Information We Collect

We may collect the following personal information when you register on this platform or interact with it:

**Personal Identifiable Information (PII):** Name, Designation, Email, Office Address, Country, and Organization.

**Microbiological/AST Data:** Data you upload or store regarding antimicrobial susceptibility testing (AST), microbiological information, and other relevant datasets.

### 2. How We Use Your Information? We process your information to:

**Provide Platform Services:** Facilitate your registration, maintain your account, and allow the uploading and storing of microbiological and AST data.

**Data Integrity and Reporting:** Analyze, process, and display the microbiological/AST data for clinical, research, or regulatory purposes.

### 3. Data Sharing

We do not have access to the data you upload or process. Only the Superadmin of the platform has system-wide access, but even the Superadmin is not permitted to view individual datasets without the explicit consent of the dataset owner. The platform is designed to ensure that users cannot view or access the data or information of other users or facilities, maintaining strict data separation and privacy.

**Regulatory Bodies/Institutions:** Only the data owners are allowed to share the data with them.

**Third-Party Service Providers:** For technical support and platform management, we may work with third-party service providers under strict confidentiality agreements. We are committed to not sharing any information with these third parties without the written consent of the data owners.

### 4. Data Security

We use industry-standard measures to protect your data from unauthorized access, disclosure, or misuse. However, no system is completely secure, and we cannot guarantee absolute security.

We have implemented a robust authentication system, user role management, and the most widely recognized security protocols at both the application and server levels to ensure the safety and integrity of the platform.

### 5. Data Retention

Your data will be stored for as long as necessary to fulfill the purposes outlined in this privacy notice or as required by law.



# Live Demo - Login



demo.qaapt.com/login



Sign in to continue.

Username\*

bherihospital

Password\*

[Forgot password?](#)

.....



☐ Remember me

Sign In

Don't have an account? [Sign up now](#)


Live support? [Click here](#)





## IMPORT DATASET

Laboratory dataset > Import dataset

### qLoad: QAAPT Dataset Converter

 **Upload** File selection,  
preview and import

 **Preparation** Step by step  
guideline

 **History** File upload  
history

Select your file type

☒ WHONET SQLITE (.sqlite)/ CSV (.csv) ☐ Other LIS Excel file ☐ Any live database

### File Information

☒ Select only WHONET SQLITE (.sqlite) original file or CSV (.csv) file exported from WHONET

☒ **Ensure required variables:** Patient ID, Age, Sex, Specimen type, Specimen date, Microorganism

☒ Maximum size: 50 MB

☒ Please select your file. It will be uploaded to a temporary location and then converted by a CLICK event.

Choose File

No file chosen



# Dashboard – Standard report



## Results 1. QAAPT standard report

Dataset name: ff\_QAAPT\_Demo\_Dataset

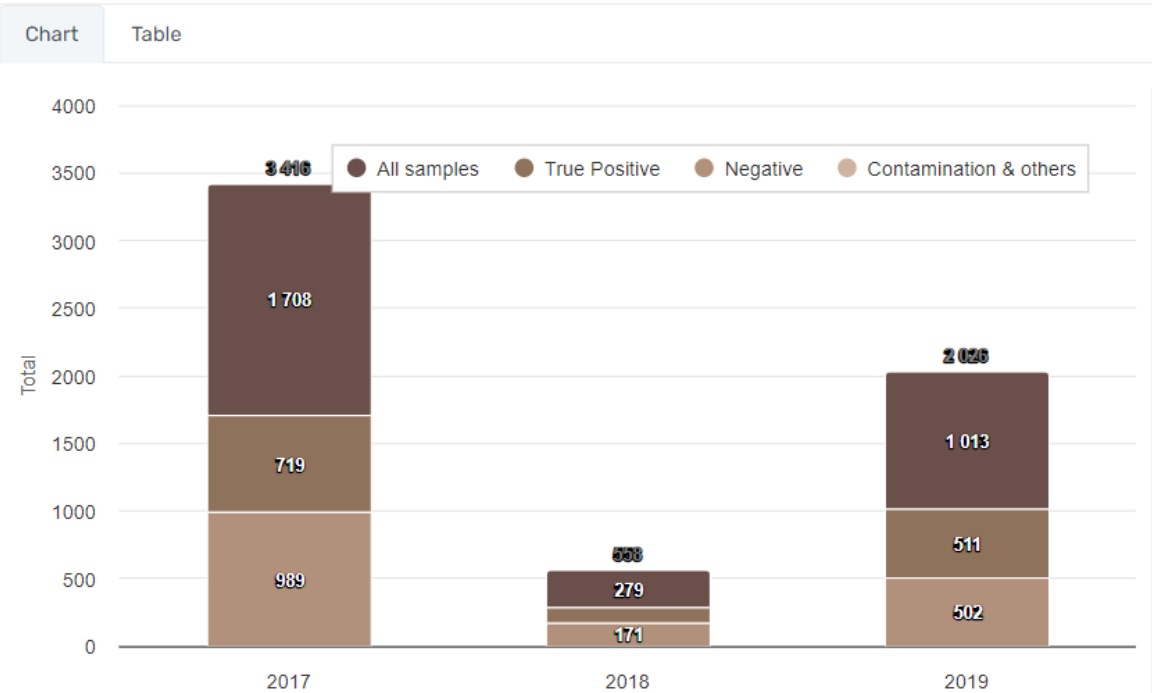
Observed specimen start date: 2017-03-21

Observed specimen end date: 2019-07-28

### Summary results

Total Records	3000
Positive Records	1338
True Pathogens	1294
Mixed Pathogens	0
Negative Records	1662
Missing Organism	0
Missing SpecimenDate	0
Missing Specimens	0
Missing Patient ID	0
Missing Age	0

### Number of records by year



- ☒ QAAPT Demo Dataset
- ☐ BD\_BITID
- ☐ NP\_BHERI
- ☐ Sample\_LIS\_Dataset\_Nepal

### Reports

- ☒ 1. QAAPT standard report
- ☐ 2. Clinical/ demographic distribution
- ☐ 3. Specimen type
- ☐ 4. Microorganism distribution
- ☐ 5. AMR pattern

Sex ALL

Age group ALL

Specimen ALL

Records from 03/21/2017

Records to 07/28/2019

Culture result ALL

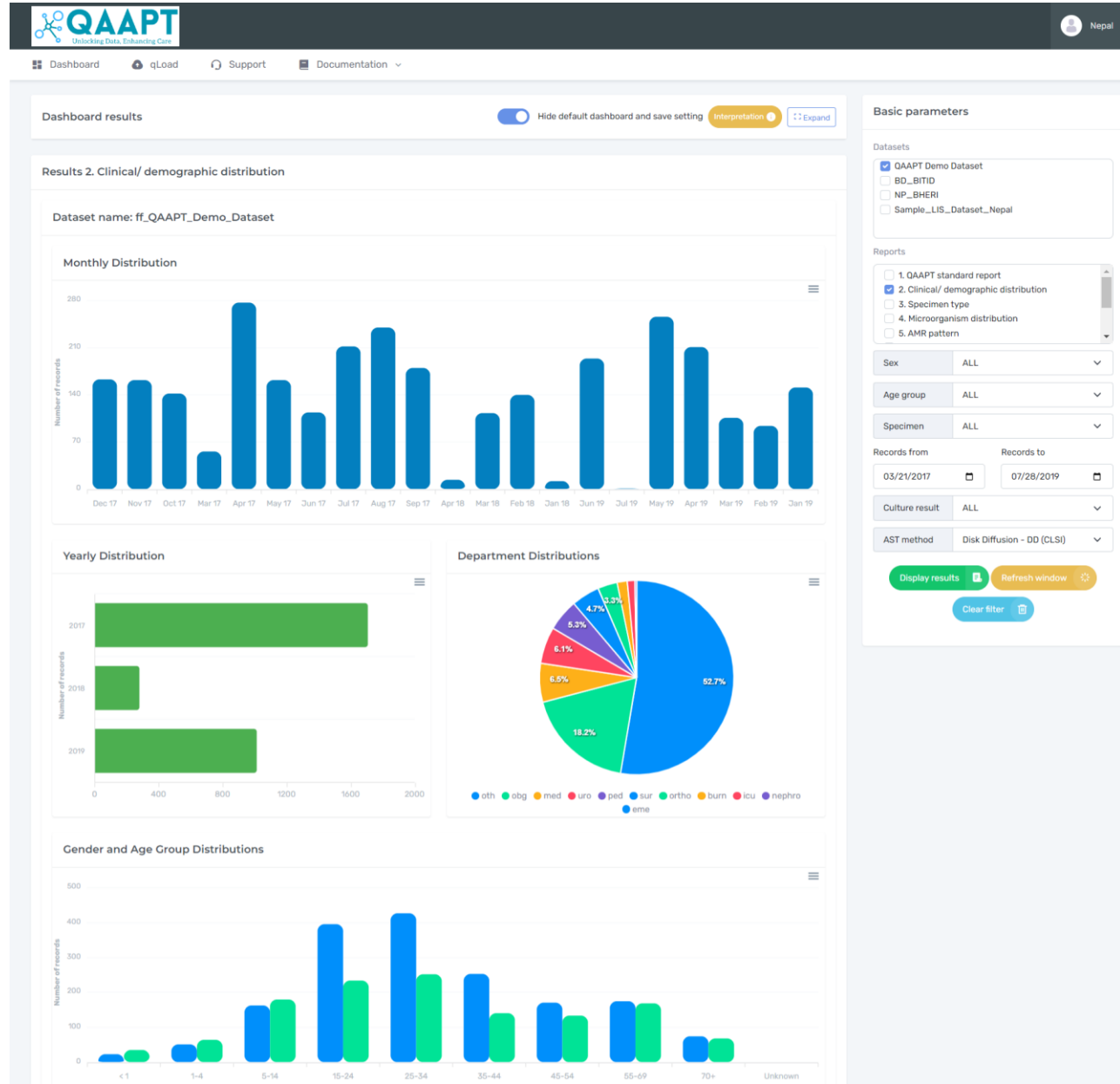
AST method Disk Diffusion - DD (CLSI)

Display results

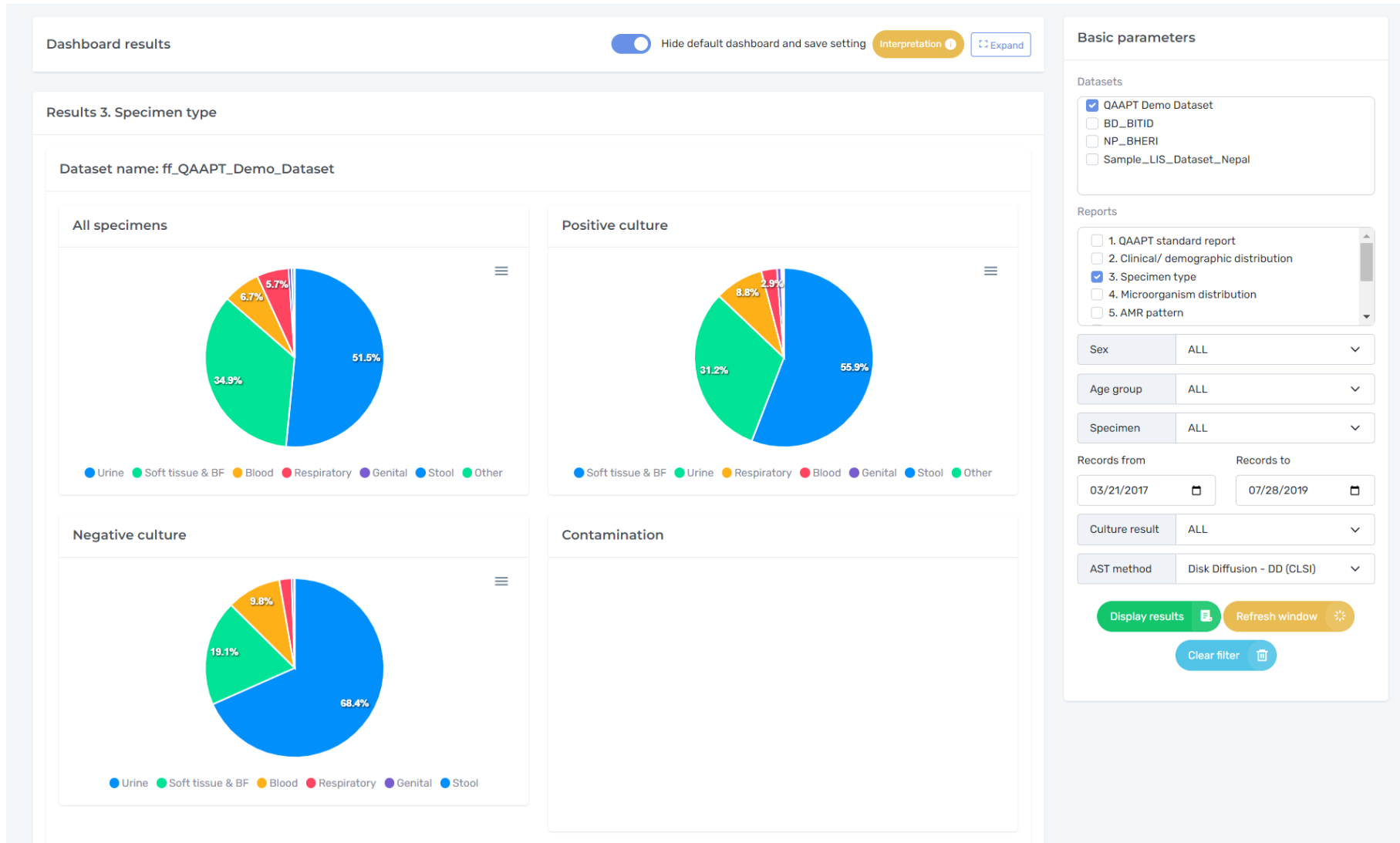
Refresh window

Clear filter 23

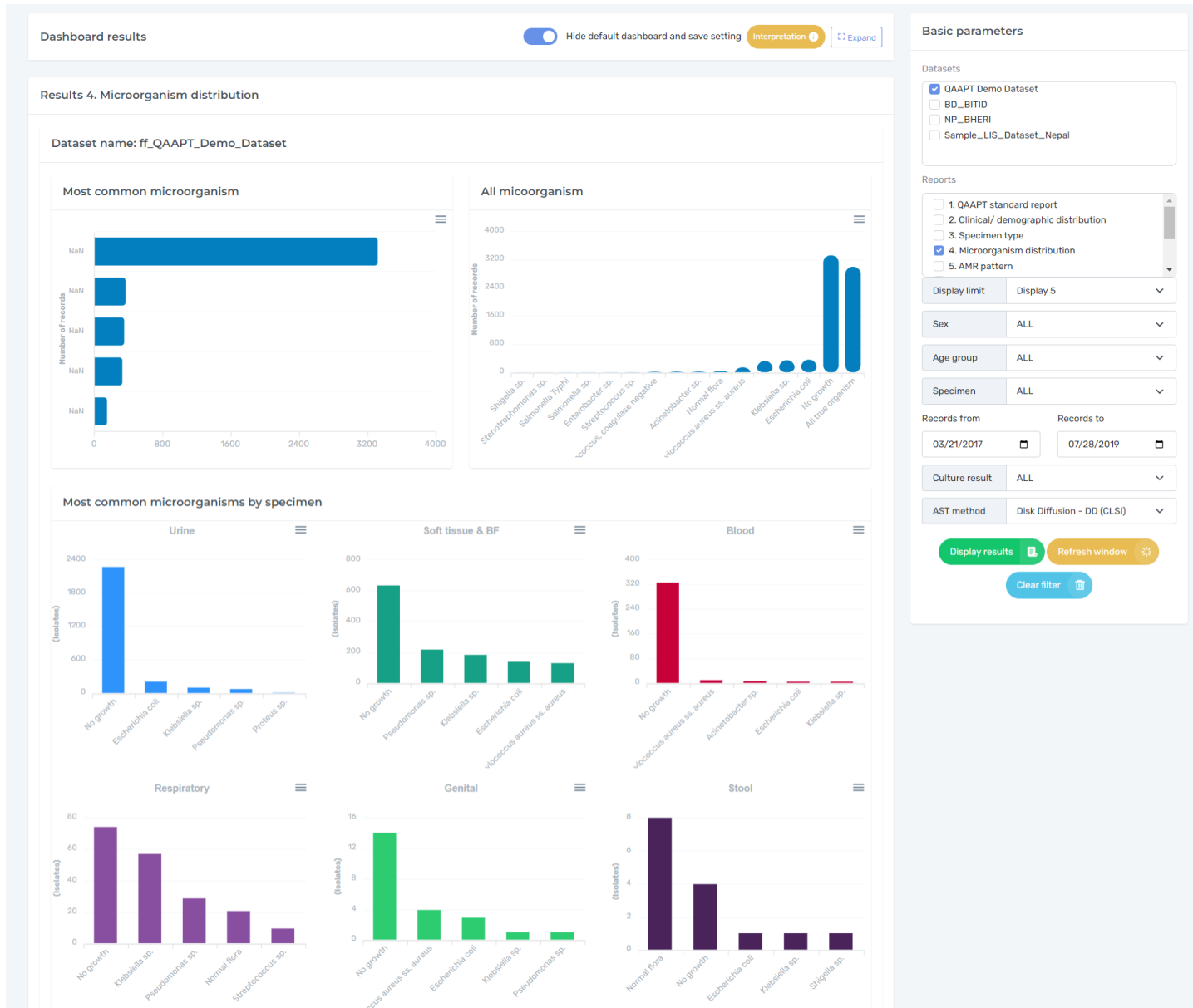
# Dashboard – Clinical report



# Dashboard – Specimen distributions



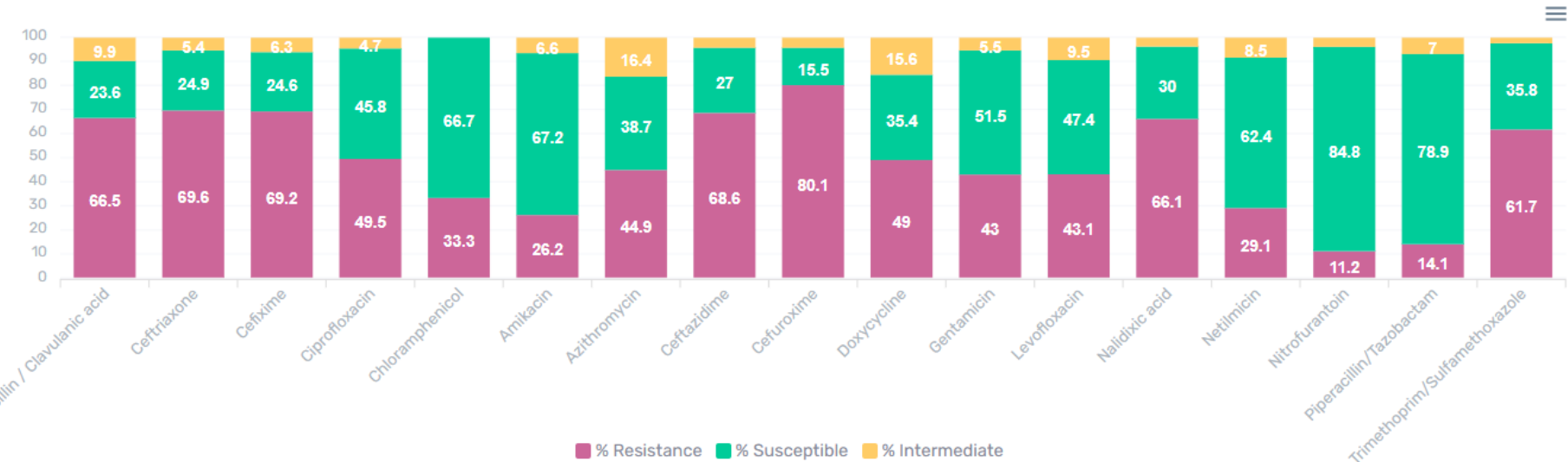
# Dashboard – Microorganism distribution



# Dashboard – AMR Trends



## Antimicrobial Susceptibility Test (AST) result



## Antimicrobial Susceptibility Test (AST) result

Copy Excel CSV PDF Showing 1 to 17 of 17 entries

Antibiotics	Total tested isolates (n)	Resistance (n, %)	Susceptible (n, %)	Intermediate (n, %)
Amikacin	305	80, 26.2%	205, 67.2%	20, 6.6%

☒ QAAPT Demo Dataset

☐ BD\_BITID

☐ NP\_BHERI

☐ Sample\_LIS\_Dataset\_Nepal

### Reports

☐ 1. QAAPT standard report

☐ 2. Clinical/ demographic distribution

☐ 3. Specimen type

☐ 4. Microorganism distribution

☒ 5. AMR pattern

### Microorganism

Escherichia coli

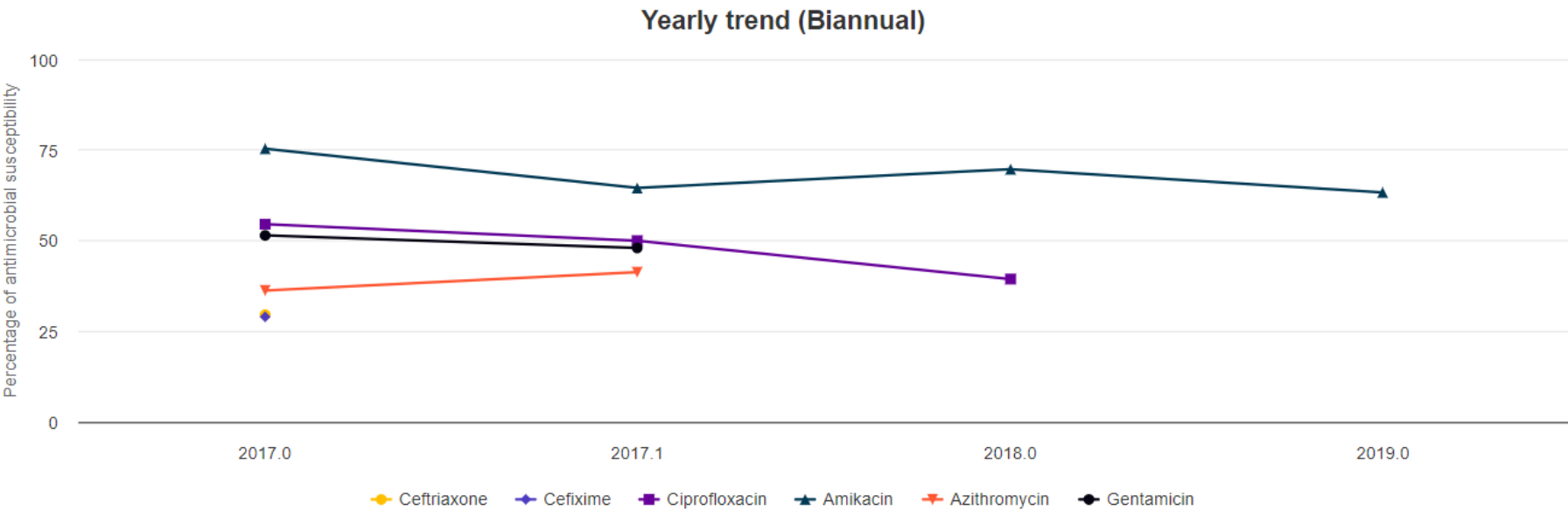
### Antibiotic (Multiple selection)

- ☒ Amoxicillin / Clavulanic acid
- ☒ Ampicillin
- ☒ Ceftriaxone
- ☒ Cefixime
- ☒ Ciprofloxacin
- ☒ Chloramphenicol
- ☒ Amikacin
- ☒ Azithromycin
- ☒ Ceftazidime
- ☒ Cefuroxime
- ☒ Colistin
- ☒ Doxycycline
- ☒ Gentamicin
- ☒ Imipenem
- ☒ Levofloxacin
- ☒ Meropenem
- ☒ Nalidixic acid
- ☒ Netilmicin
- ☒ Nitrofurantoin
- ☒ Piperacillin/Tazobactam
- ☒ Tetracycline
- ☒ Tigecycline
- ☒ Trimethoprim/Sulfamethoxazole
- ☒ Select All

# Dashboard – AMR Patterns



## Antimicrobial Susceptibility Test (AST) trend result



Antibiotics	2017.0	2017.1	2018.0	2019.0	2019.1
Ceftriaxone	21/71 (29.58%)				
Cefixime	20/69 (28.99%)				
Ciprofloxacin	24/44 (54.55%)	47/94 (50%)	41/104 (39.42%)		
Amikacin	52/69 (75.36%)	60/93 (64.52%)	23/33 (69.7%)	69/109 (63.3%)	

☒ QAAPT Demo Dataset

☐ BD\_BITID

☐ NP\_BHERI

☐ Sample\_LIS\_Dataset\_Nepal

Reports

☐ 3. Specimen type

☐ 4. Microorganism distribution

☐ 5. AMR pattern

☒ 6. AMR trend

☐ 7. Antibigram

☐ 8. Dataset preview and download

Microorganism

Escherichia coli

Antibiotic (Multiple selection)

×

Ampicillin

×

Ceftriaxone

×

Cefixime

×

Ciprofloxacin

×

Amikacin

×

Azithromycin

×

Doxycycline

×

Gentamicin

No. of Isolates

20

AST result

S

Sex

ALL

Age group

ALL

# Dashboard – Cumulative antibiogram



Dashboard qLoad Support Documentation

## Cumulative Antibiogram - Percentage of susceptibility

Download Preview

Copy Excel CSV PDF Print

Antibiotic/Microorganism	Vancomycin	Nitrofurantoin	Gentamicin	Doxycycline	Clindamycin	Ciprofloxacin	Azithromycin	Trimethoprim/Sulf
Acinetobacter sp.		67%	17%	57%		38%	25%	40%
Enterobacter sp.		100%				40%	50%	100%
Escherichia coli		85%	52%	35%	40%	46%	39%	36%
Klebsiella sp.	100%	68%	52%	43%		62%	40%	34%
Proteus sp.		67%	41%			26%	19%	
Pseudomonas sp.	100%	34%	53%	22%		65%	53%	26%
Salmonella sp.			100%			75%	50%	50%

- ☒ QAAPT Demo Dataset
- ☐ BD\_BITID
- ☐ NP\_BHERI
- ☐ Sample\_LIS\_Dataset\_Nepal

### Reports

- ☐ 3. Specimen type
- ☐ 4. Microorganism distribution
- ☐ 5. AMR pattern
- ☐ 6. AMR trend
- ☒ 7. Antibiogram
- ☐ 8. Dataset preview and download

Choose template Cumulative antibiogram

AST result S

Sex ALL

Age group ALL

Specimen ALL

Records from

03/21/2017

Records to

07/28/2019

Culture result ALL

AST method Disk Diffusion - DD (CLSI)



# Dashboard – Antibigram by Class



Dashboard results

Enable default dashboard and save setting Interpretation Expand

Laboratories on Map

Ask a question...

Search

Antibiogram by Class

Gram Negative Organisms

CSV Excel PDF Print

Organism	Total Isolates	Aminoglycosides			Beta-lactam+Inhibitors		Cephems			
		Amikacin	Gentamicin	Netilmicin	Amoxicillin/Clavulanic acid	Piperacillin/Tazobactam	Cefepime	Cefotaxime	Ceftazidime	Ceftriaxone
Escherichia coli	365	100% (305/305)	94.5% (222/235)	91.5% (173/189)	100% (233/233)	78.9% (56/71)	0%	97.2% (106/109)	95.7% (177/185)	94.6% (243/257)
Klebsiella sp.	349	100% (300/300)	94.3% (217/230)	94.7% (143/151)	100% (207/207)	78% (64/82)	0%	97.6% (122/125)	94.8% (184/194)	97.2% (242/249)

Showing 1 to 2 of 2 entries

Previous 1 Next

Legend: ≥90% 70-89% 1-69% N/A or ≤0%

Gram Positive Organisms

CSV Excel PDF Print

Organism	Total Isolates	Aminoglycosides			Beta-lactam+Inhibitors		Cephems			
		Amikacin	Gentamicin	Netilmicin	Amoxicillin/Clavulanic acid	Piperacillin/Tazobactam	Cefepime	Cefotaxime	Ceftazidime	Ceftriaxone
Staphylococcus aureus ss. aureus	148	87.6% (120/137)	78.4% (80/102)	97.4% (37/38)	82.3% (65/79)	0%	0%	57.1% (24/42)	100% (85/85)	93.4% (99/106)

Showing 1 to 1 of 1 entries

Previous 1 Next

Legend: ≥90% 70-89% 1-69% N/A or ≤0%

Basic parameters

Human Animal OH

Select Dataset

QAAPT Demo Dataset

Select Report (s)

- ☐ 5. AMR pattern  
☐ 6. AMR trend  
☒ 7. Antibiogram  
☐ 8. MDR Prevalence  
☐ 9. GLASS indicators  
☐ 10. AMR Prediction

No. of Isolates

20

Template\*

Antibiogram by Class

Organism type\*

Both

Microorganism (Multiple selection)

Escherichia coli (365)

Klebsiella sp. (349)

Staphylococcus aureus ss. aureus (148)

Antibiotic Class (Multiple selection)

Aminoglycosides

Beta-lactam+Inhibitors

Cephems

Cephems-Oral

Isolate type

First Isolates

AST result

S

Sex

ALL

Age group

ALL

Specimen

ALL

Records from

21/03/2017

Records to

28/07/2019

Culture result

ALL

Display results

Refresh window

Clear filter

# Dashboard – Prediction Model

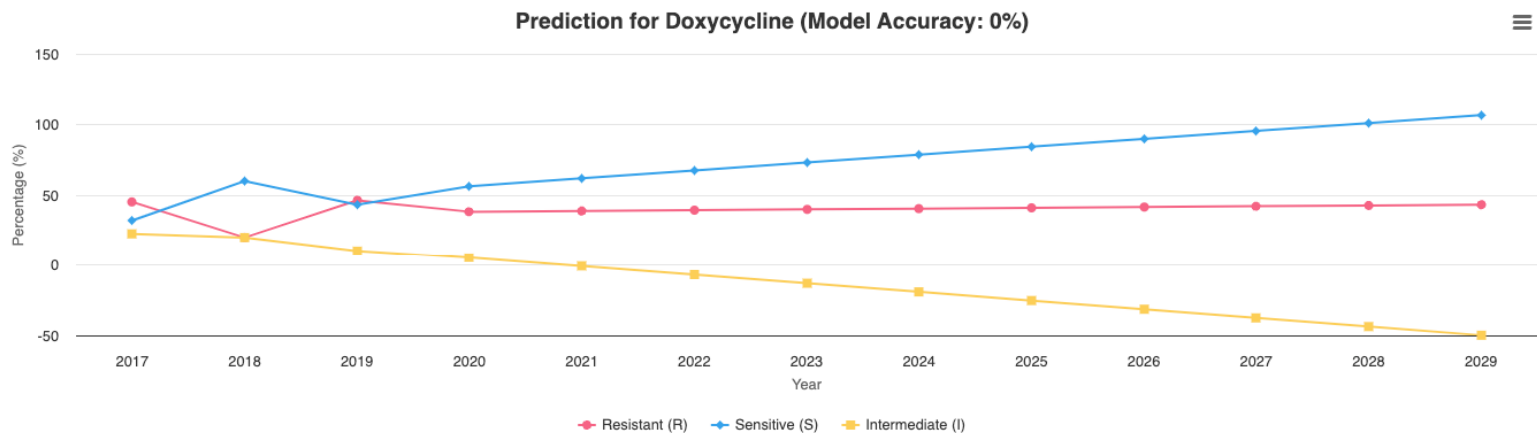
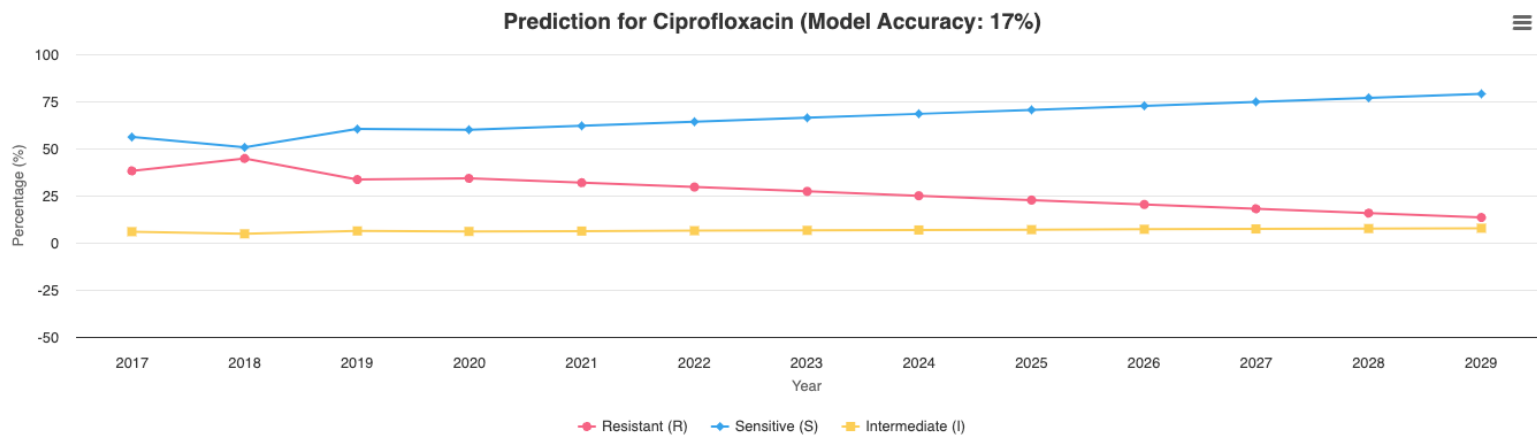


Dashboard qLoad Support Documentation Configuration Facility users Academy

## Dashboard results

Hide default dashboard and save setting Interpretation Expand

### Laboratories on Map



## Basic parameters

Human Animal OH

Select Dataset

QAAPT Demo Dataset

Select Report (s)

- ☐ 6. AMR trend  
☐ 7. Antibigram  
☐ 8. MDR Prevalence  
☐ 9. GLASS indicators  
☒ 10. AMR Prediction

No. of Isolates

20

Microorganism

Escherichia coli (365)

Antibiotic (Multiple selection)

Ciprofloxacin Doxycycline

Select pattern

RIS statistics

Isolate type

First Isolates

Sex

ALL

Age group

ALL

Specimen

ALL

Records from

21/03/2017

Records to

28/07/2019

Culture result

ALL

Display results

Refresh window

Clear filter



I want to see unique department percentage

Search

## Query Result

department	total	percentage
oth	1580	52.6667
obg	547	18.2333
med	194	6.4667
uro	183	6.1000
ped	160	5.3333
sur	141	4.7000
ortho	98	3.2667
burn	50	1.6667
icu	38	1.2667
nephro	8	0.2667
eme	1	0.0333

QAAPT Demo Dataset

Select Report (s)

- ☐ 1. QAAPT standard report
- ☐ 2. Clinical/ demographic distribution
- ☐ 3. Specimen type
- ☐ 4. Microorganism distribution
- ☐ 5. AMR pattern

Sex ALL

Age group ALL

Specimen ALL

Records from

21/03/2017

Records to

28/07/2019

Culture result ALL

Display results

Refresh window

Clear filter

# Introducing NLP-Powered Query Generation in QAAPT



QAAPT now enables **seamless data querying** using **Natural Language Processing (NLP)**. Simply type a question, and the system intelligently converts it into a precise SQL query.

## NLP-Powered Query Generation

- ✓ **Advanced NLP Models** – Uses OpenAI's GPT and **Agentic** for accurate data interpretation.
- ✓ **User Intent Recognition** – Understands synonyms, variations, and natural phrasing.
- ✓ **Smart Query Pre-Processing** – Identifies key terms, variables, and functions for precise SQL generation.

## Integrating the Agentic Tool

- ✓ **AI-Driven Query Generation** – Optimizes complex SQL queries dynamically.
- ✓ **Context-Aware Analysis** – Determines the best charts, tables, and metrics based on dataset type.
- ✓ **Interactive Refinement** – Users can review, edit, and fine-tune AI-generated queries.

## Why It Matters?

- ✓ **Faster Insights** – No SQL expertise needed! Get results in seconds.
- ✓ **More Accurate Queries** – AI enhances interpretation and reduces errors.
- ✓ **Better Decision-Making** – Generates tables, cards, and graphs based on real-time input.



<https://qaapt.com>

# Thank you!