NHSN Antimicrobial Resistance (AR) Option: Facility-Wide Antibiogram Report

2021 NHSN Annual Training

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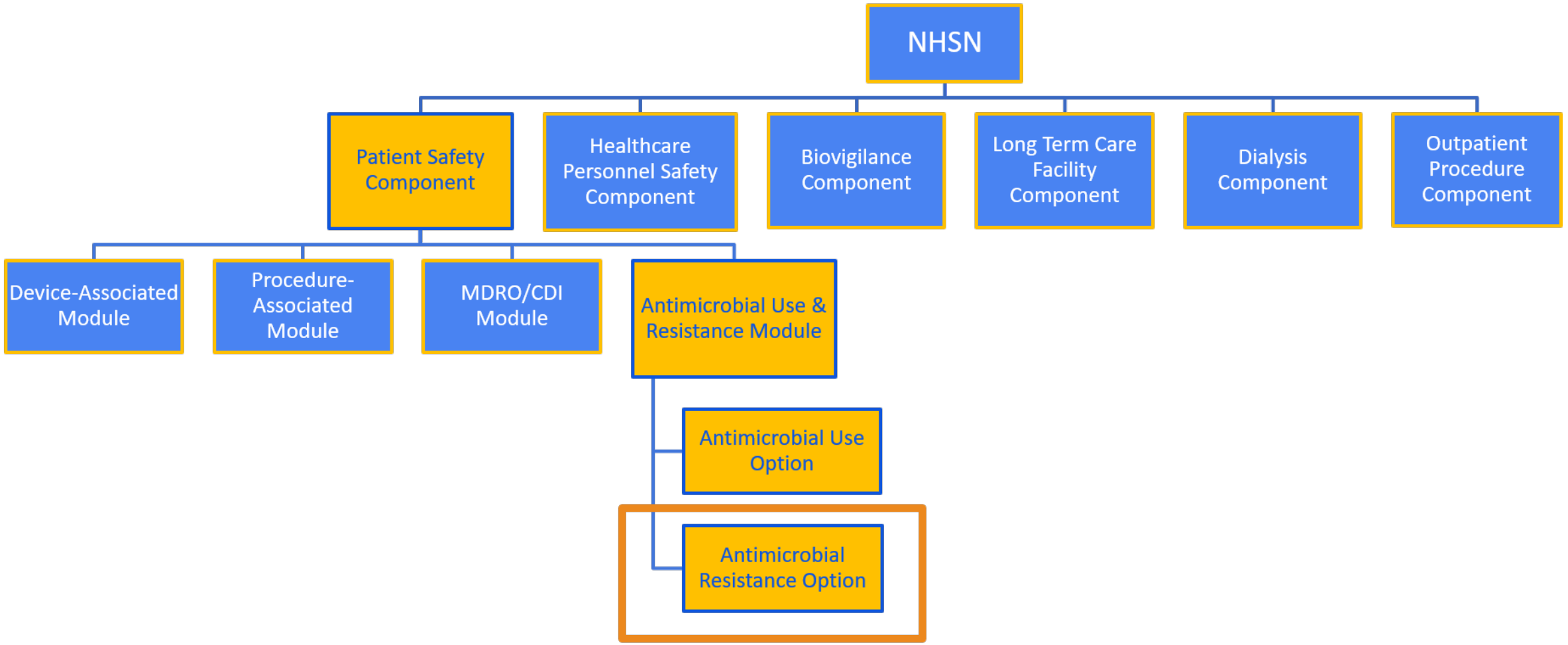
Objectives

- Briefly describe the AR Option
- Describe Facility-Wide Antibiogram analysis report, including recent updates
- Provide examples on how to modify, run and interpret the Facility-Wide Antibiogram report

AR Option Brief Overview

NHSN Structure



Antimicrobial Resistance (AR) Option

- Purpose:
  - Facilitate evaluation of AR data using standardized approach & definitions
  - Provide facilities with improved awareness of AR issues to aid in clinical decision making and prioritize transmission prevention efforts
- Voluntary reporting
  - Not part of CMS Quality Reporting Programs
  - *Included as one option for Public Health Registry reporting for Promoting Interoperability (previously Meaningful Use [MU])

*MU 3 Final Rule: https://www.federalregister.gov/articles/2015/10/16/2015-25595/medicare-and-medicaid-programs-electronic-health-record-incentive-program-stage-3-and-modifications
*NHSN MU3 page: https://www.cdc.gov/nhsn/cdaportal/meaningfuluse.html

Requirements for AR Data Submission
Who Can Participate?

- Hospitals* that have:
  - Electronic Laboratory Information System (LIS) and
  - Admission Discharge Transfer (ADT) System
  - *Or electronic access to required data elements*

AND

  - Ability to collect and package data using HL7 standardized format: Clinical Document Architecture https://www.cdc.gov/nhsn/cdaportal/index.html

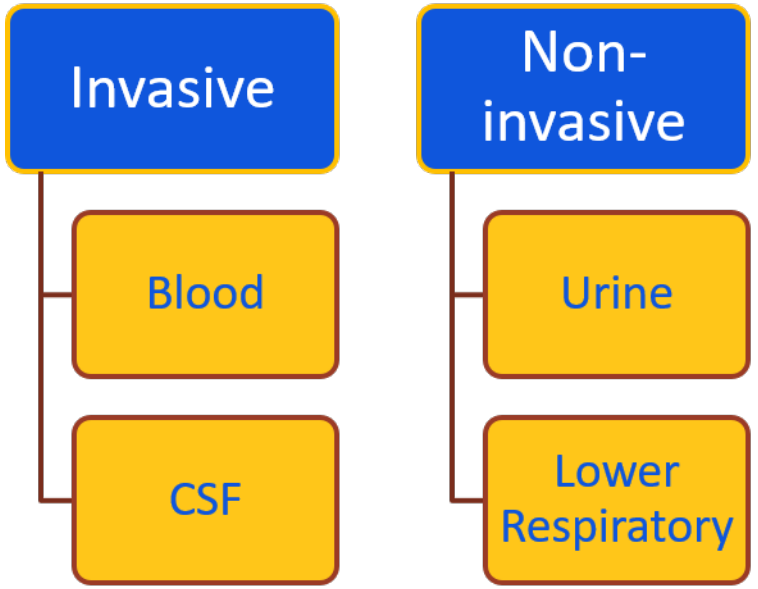
*Inpatient facilities enrolled in NHSN & participating in the Patient Safety Component

AR Data Elements
What Data Are Collected?

- Two separate file types (similar to MDRO FacWideIN LabID reporting):
  - AR Event files – contain all information associated with the individual isolate
    - Each AR Event is a separate, individual file
    - Reported from:
      - All inpatient locations
      - 3 outpatient location types: ED, pediatric ED & 24-hour observation area
  - AR Summary files – contain summary-level patient day and admission counts
    - Reported for FacWideIN only
    - Not submitted for individual inpatient locations
    - Summary files for outpatient locations will be accepted later in 2021

AR Events – What Qualifies?

- Event data: Isolate-level susceptibility results for specific organisms
- Qualifying isolate criteria for an AR Event:
  1. Collected from one of four specimen types:
     - Blood
     - Cerebral spinal fluid (CSF)
     - Urine
     - Lower respiratory
  2. One of over 20 organisms identified
     - See list on next slide
  3. Antimicrobial susceptibility testing must be completed
     - Qualifies for submission regardless of susceptibility results



2021 Eligible Organisms

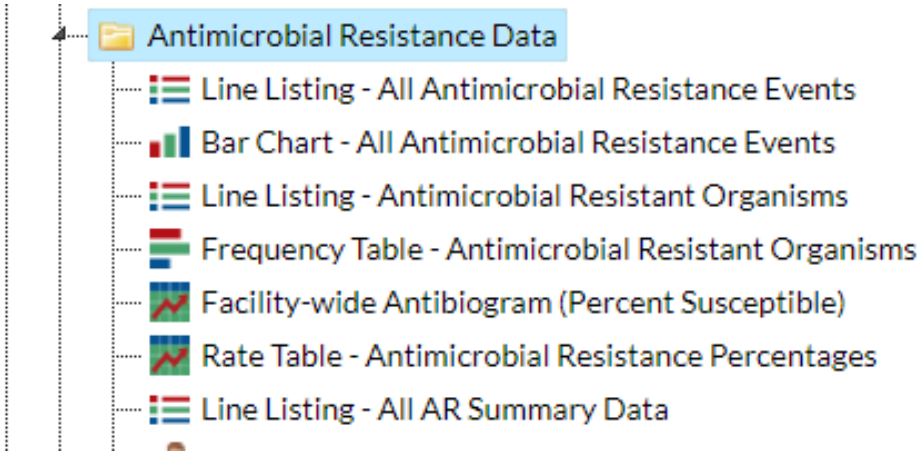
- All *Acinetobacter*
- *Candida albicans; auris; glabrata; parapsilosis; tropicalis*
- *Citrobacter amalonaticus; freundii; koseri*
- All *Enterobacter*
- *Enterococcus faecalis; faecium*
- All *Enterococcus* spp.
- *Escherichia coli*
- *Klebsiella aerogenes; oxytoca; pneumoniae*
- *Morganella morganii*
- *Proteus mirabilis; penneri; vulgaris*
- *Pseudomonas aeruginosa*
- *Serratia marcescens*
- *Staphylococcus aureus*
- *Stenotrophomonas maltophilia*
- *Streptococcus agalactiae (Group B Streptococci)*
- *Streptococcus pneumoniae*

For a complete list of eligible pathogens see the AR Option Pathogen Roll-up Workbook posted within the Antimicrobial Resistance Option CDA Toolkit on this webpage: https://www.cdc.gov/nhsn/cdaportal/toolkits.html.

AR Option Facility-Wide Antibiogram Report

AR Option Report Types

- AR Event reports
  - Line list, bar chart, antibiogram
- AR Organism reports*
  - Line list, frequency table, rate table
- AR Denominator
  - Line list



*Antimicrobial Resistant Phenotype Definitions for AR Option Data: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/ar-phenotype-definitions-508.pdf

AR Facility-wide Antibiogram:

- Provides a table based on AR events reported in NHSN
- **NEW** Displays the calculated percent susceptible (%S) for each organism-antimicrobial combination reported from all locations (inpatient and outpatient)
  - Prior to the December 2020 9.5 release the antibiogram displayed the calculated percent non-susceptible (% NS)
- Available to both facilities and groups
- Filters allow for customization of the output

Percent Susceptible

- The %S is calculated for each organism-antimicrobial pairing using the following formula:

$$\frac{Number\ isolates\ tested\ suceptible}{Number\ of\ isolates\ tested} = \%S$$

- %S only calculated if at least 30 isolates are tested for the specific antimicrobial

Additional updates to the Facility-Wide Antibiogram Report

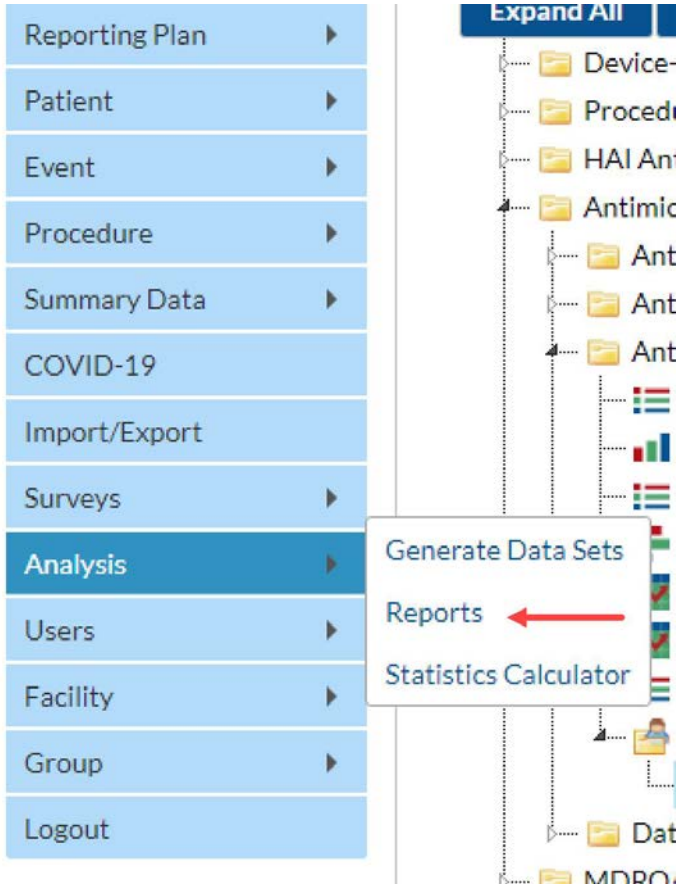
- New filters
  - Organism category
  - Drug class
  - Onset
  - Age group (adult, pediatric, neonatal)
  - Location, CDC location, & location type
- Updated display
  - Columns sorted by organism category
  - Rows sorted by drug class

Default settings

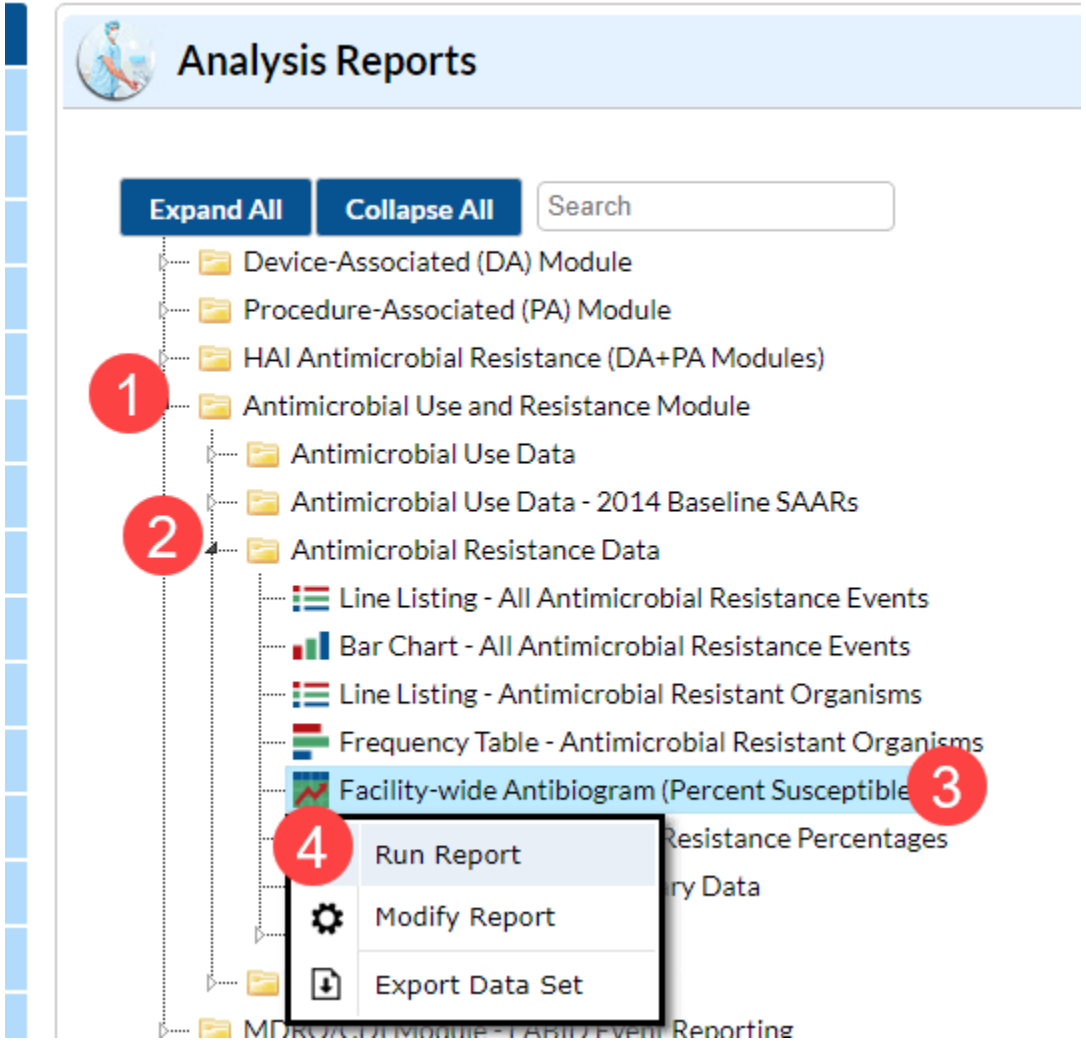
- Tables by month
- Isolates from:
  - all specimen types (blood, cerebrospinal fluid, urine, and lower respiratory)
  - all patient ages
  - all locations
- All isolates regardless of organism category (gram negative, gram positive, or fungal)
- Both healthcare facility and community onset

Run the default report

- Let’s review how to access the Facility-Wide Antibiogram within the NHSN application
- Suppose you want to run the report with the default settings
- After generating datasets, navigate to Analysis > Reports to get started



Facility-wide Antibiogram



Facility-wide Antibiogram

National Healthcare Safety Network
Facility-wide Antibiogram (Percent Susceptible)
Rate per 100 Isolates
As of: December 24, 2020 at 10:58 AM
Date Range: All AUR_SUMMARY

orgID=33617 CCN=N/A SpecimenDateYM=2020M01

Gram-Negative				
Drug Class	Drug	Enterobacter ludwigii - ENTELUDW	Escherichia coli - EC	K aer
Aminoglycosides	AMK	.	82.0	
	GENTA	.	82.0	
	STREP			
	TOBRA	.	.	
Azoles	FLUCO			
	ITRA			
	POSAC			
	VORI			
B-lactam/ B-lactamase inhibitor combination	AMOXWC	.	21.0	
	AMPIWS	.	1.0	

Data for example only

Facility-wide Antibiogram: Dataset generation

National Healthcare Safety Network
Facility-wide Antibiogram (Percent Susceptible)
Rate per 100 Isolates
As of: December 24, 2020 at 10:58 AM
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	STREP			
	TOBRA	.	.	
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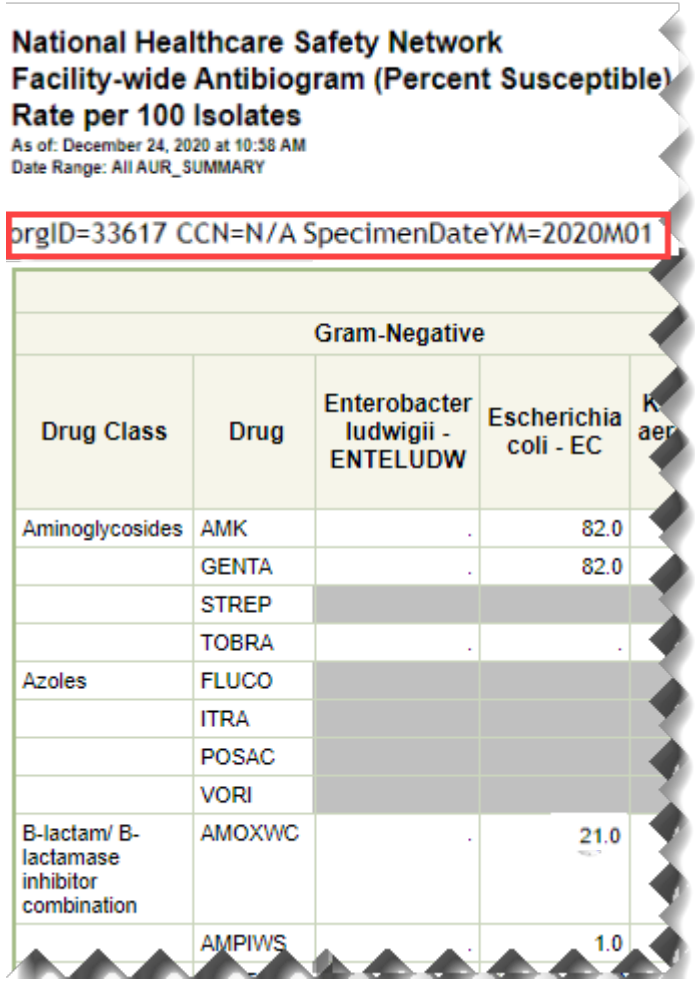
	VORI			
B-lactam/ B-lactamase inhibitor combination	AMOXWC	.	21.0	
	AMPIWS	.	1.0	

Data for example only

Facility-wide Antibiogram: Table details



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B-lactam/ B-lactamase inhibitor combination	AMOXWC	.	21.0	
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Data for example only

Facility-wide Antibiogram: Organism category

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Facility-wide Antibiogram (Percent Susceptible)
Rate per 100 Isolates
As of: December 24, 2020 at 10:58 AM
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	STREP			
	TOBRA	.	.	
Azoles	FLUCO			
	ITRA			
	POSAC			
	VORI			
B-lactam/ B-lactamase inhibitor combination	AMOXWC	.	21.0	
	AMPIWS	.	1.0	

Data for example only

Facility-wide Antibiogram: Drug class

National Healthcare Safety Network
Facility-wide Antibiogram (Percent Susceptible) Rate per 100 Isolates
As of: December 24, 2020 at 10:58 AM
Date Range: All AUR_SUMMARY

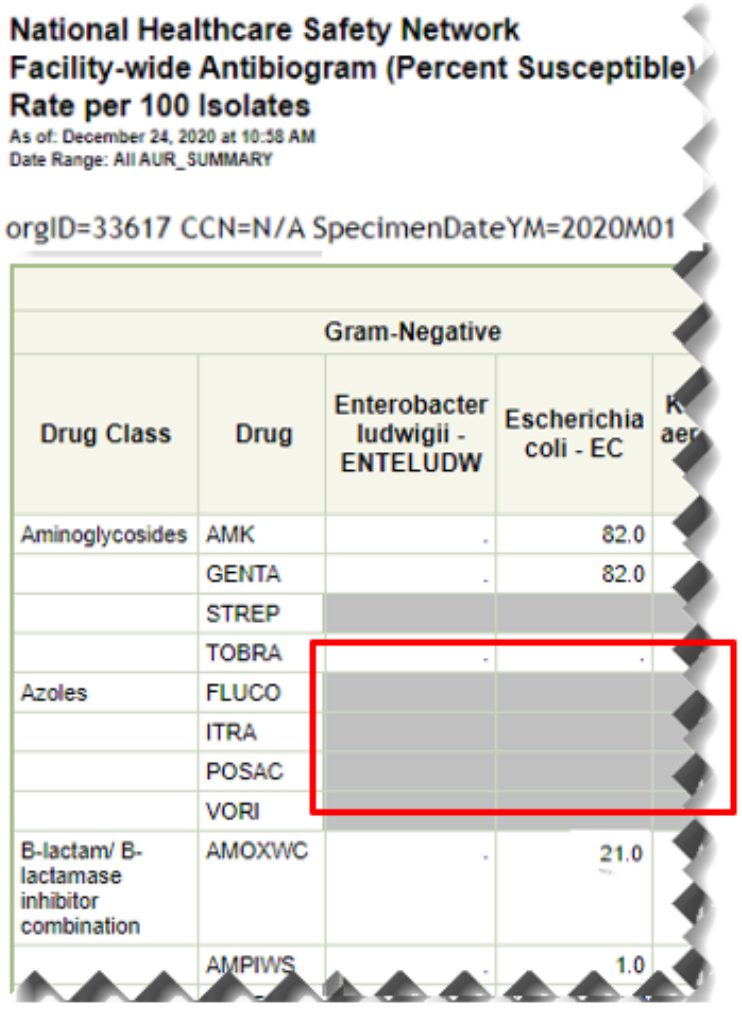
orgID=33617 CCN=N/A SpecimenDateYM=2020M01

Gram-Negative				
Drug Class	Drug	Enterobacter ludwigii - ENTELUDW	Escherichia coli - EC	K aer
Aminoglycosides	AMK	.	82.0	
	GENTA	.	82.0	
	STREP			
	TOBRA	.	.	
Azoles	FLUCO			
	ITRA			
	POSAC			
	VORI			
B-lactam/ B-lactamase inhibitor combination	AMOXWC	.	21.0	
	AMPIWS	.	1.0	

Data for example only

Facility-wide Antibiogram: Non-valid combinations

- Cells shaded in grey represent non-valid pathogen/drug combinations.
- Refer to the AUR protocol for all valid pathogen/drug combinations.



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Facility-wide Antibiogram (Percent Susceptible) Rate per 100 Isolates
As of: December 24, 2020 at 10:58 AM
Date Range: All AUR_SUMMARY

orgID=33617 CCN=N/A SpecimenDateYM=2020M01

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Aminoglycosides	AMK	.	82.0	
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	STREP			
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	ITRA			
	POSAC			
	VORI			
B-lactam/ B-lactamase inhibitor combination	AMOXWC	.	21.0	
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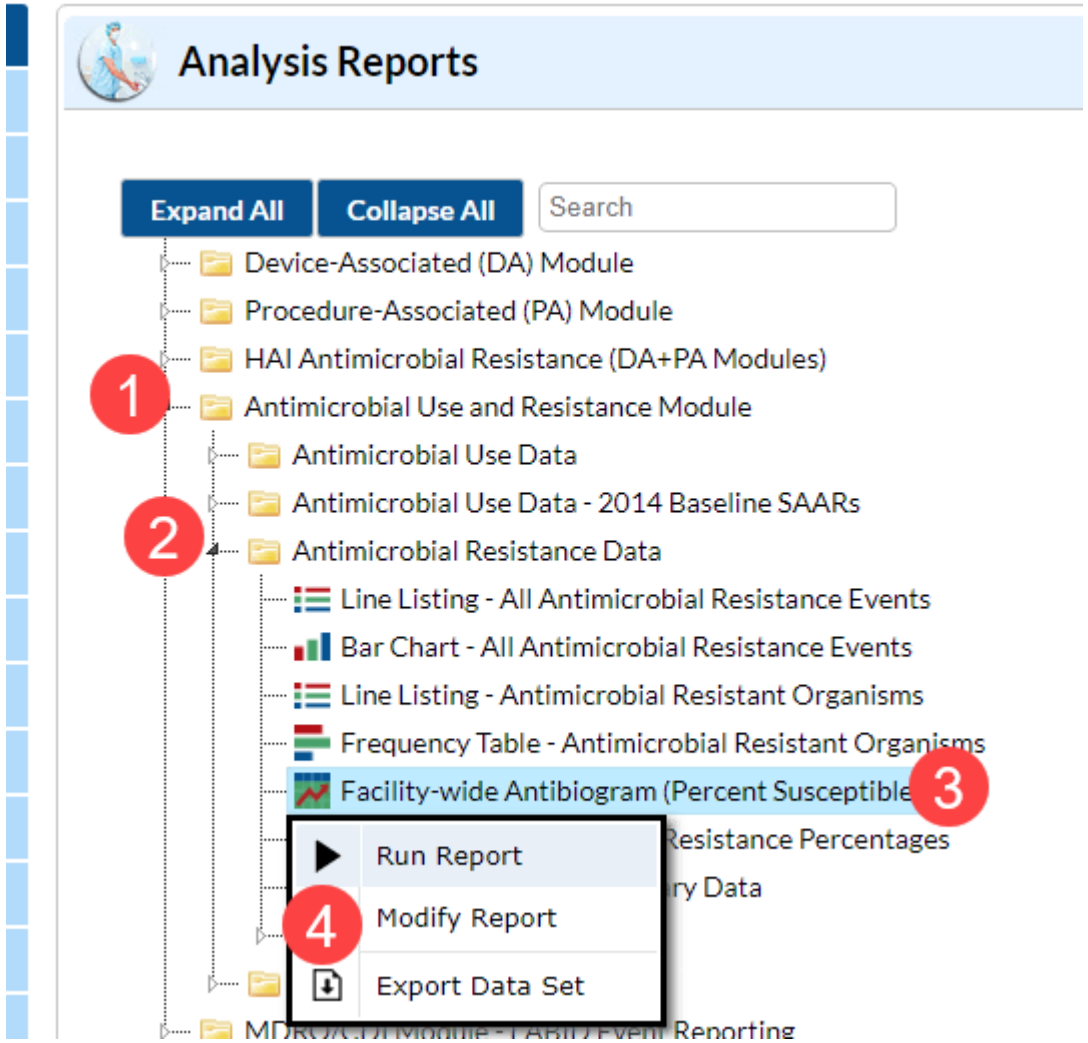
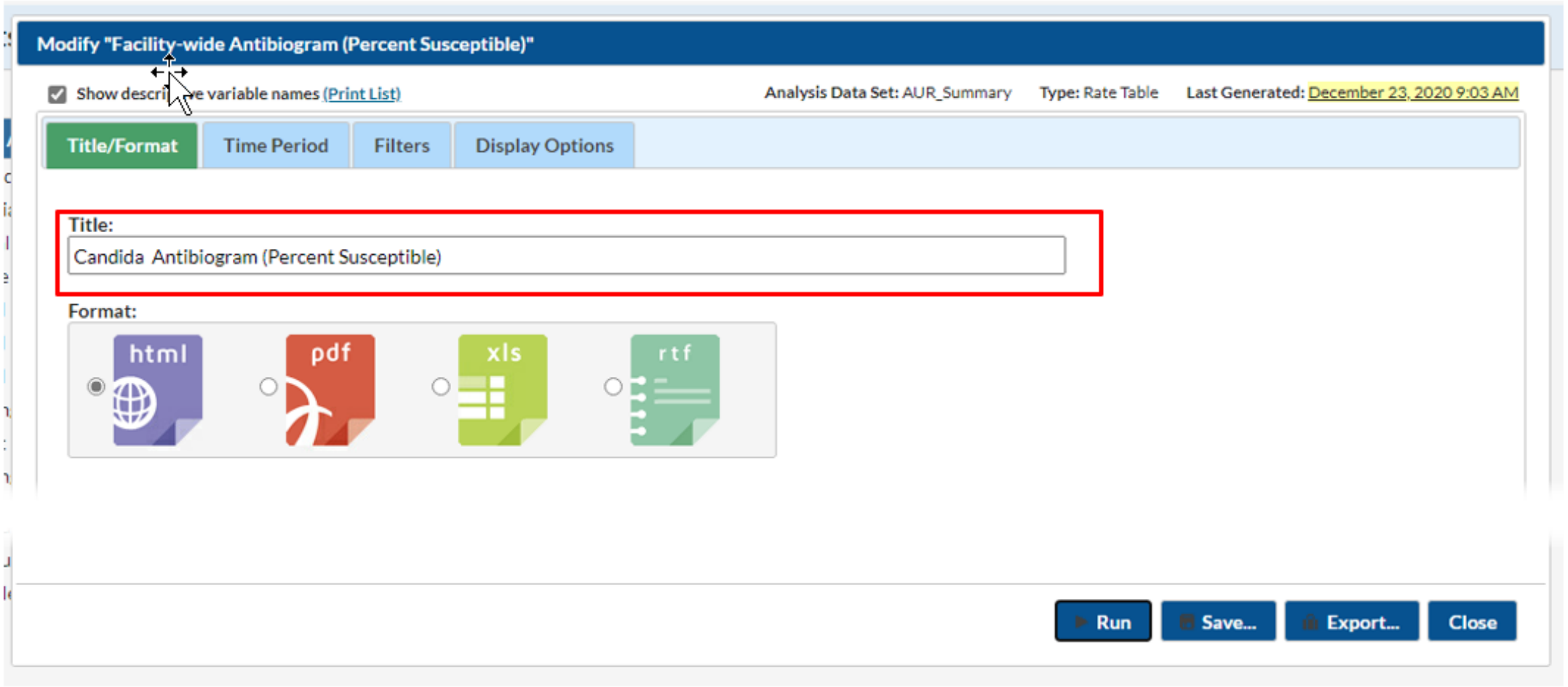
Customize the report

- Suppose you want to review the resistance patterns for *Candida* spp.
- You want this report to include healthcare facility-onset isolates from critical care locations submitted to the AR Option for the entire calendar year of 2020.

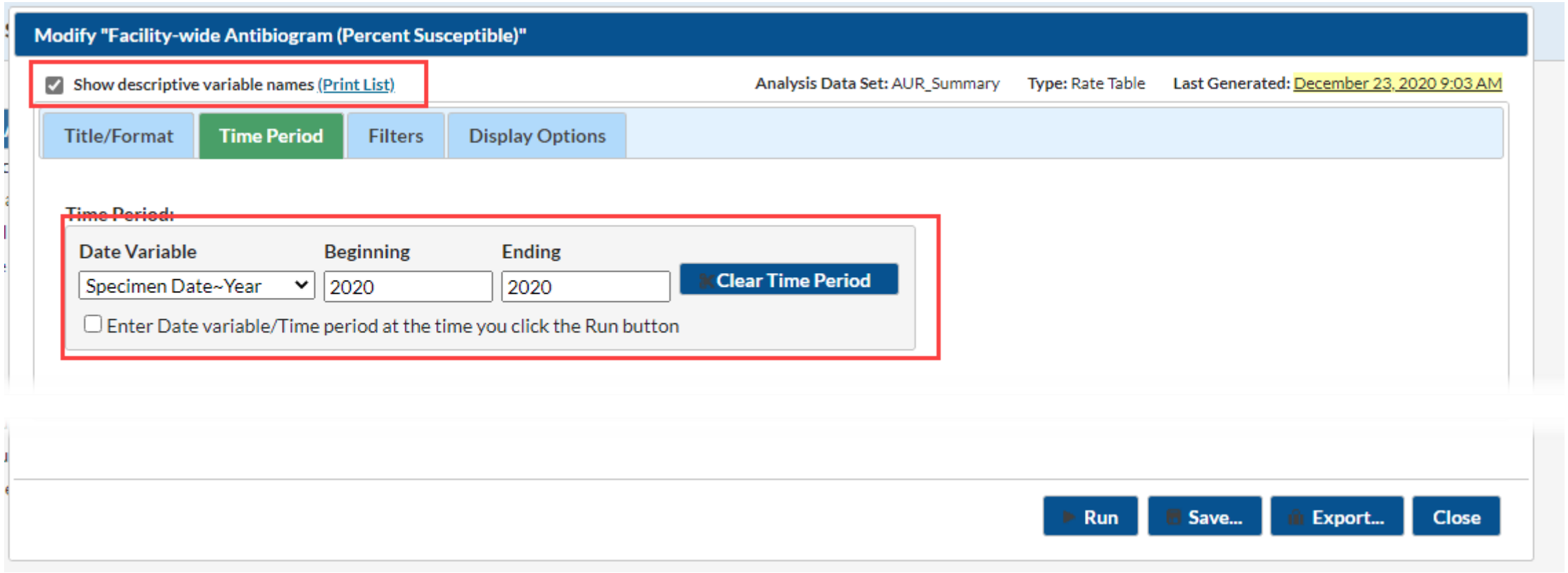
Navigate to the report



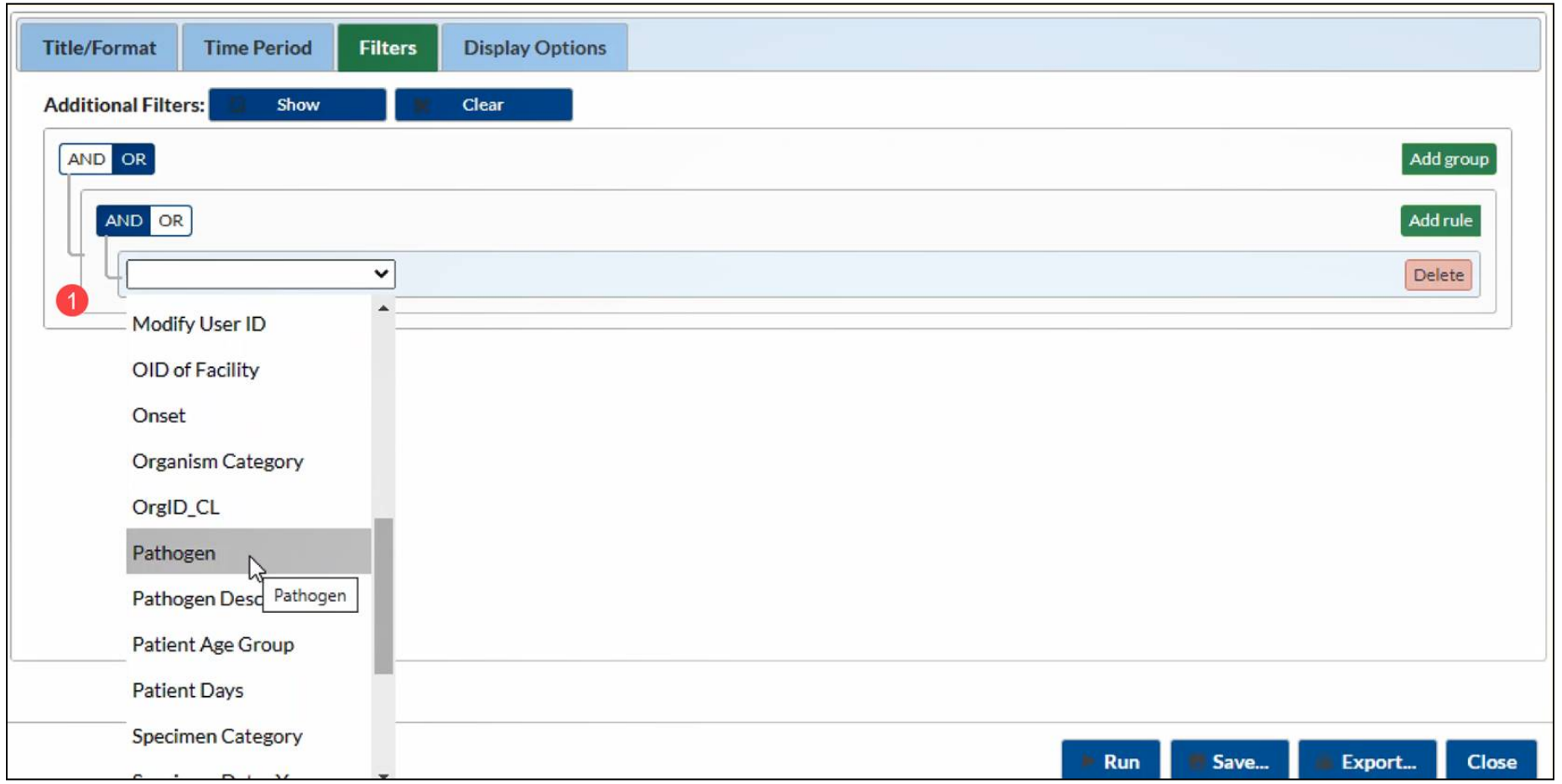
Modifications: Title



Modifications: Time period



Modifications: Filters



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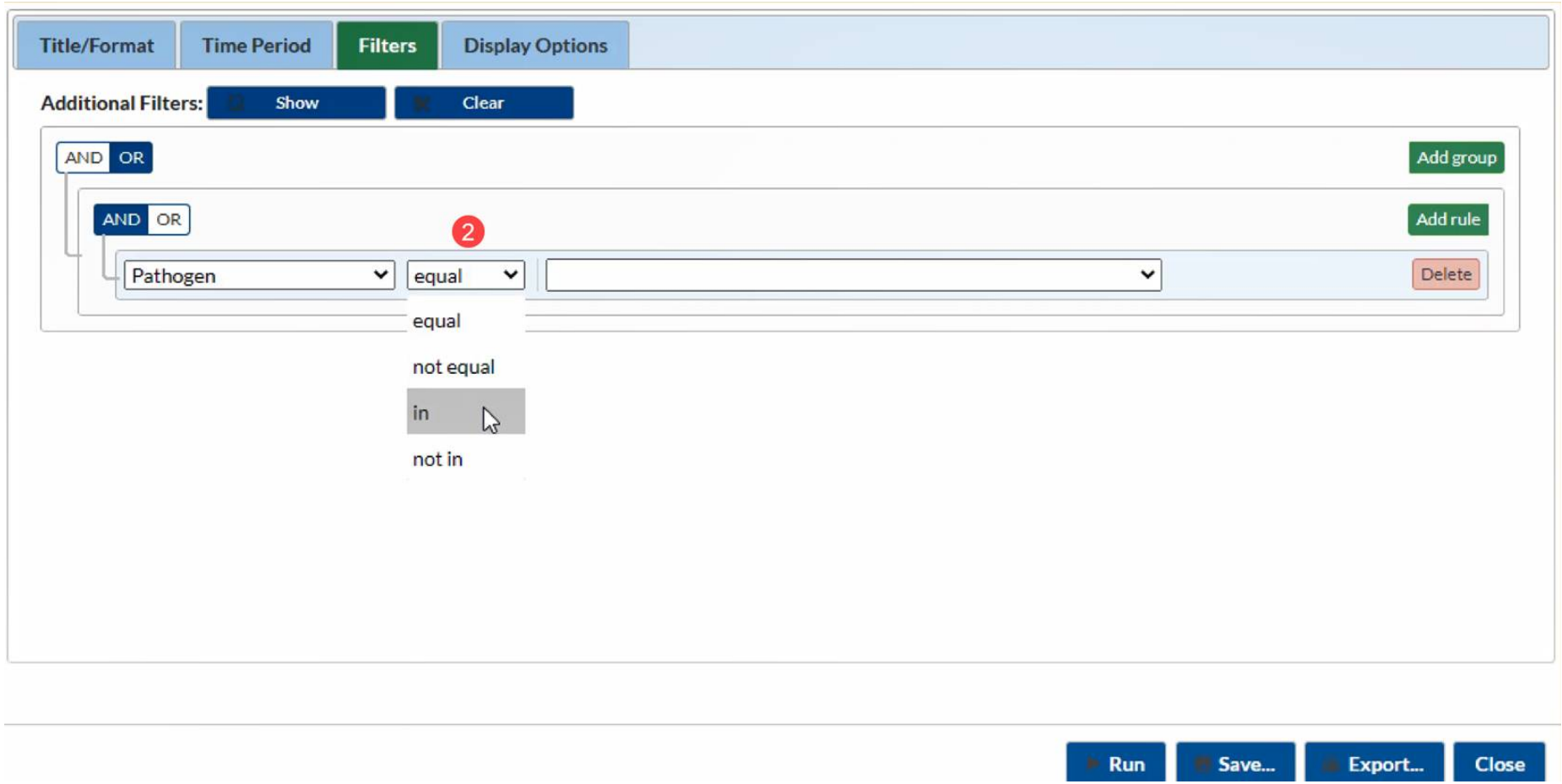

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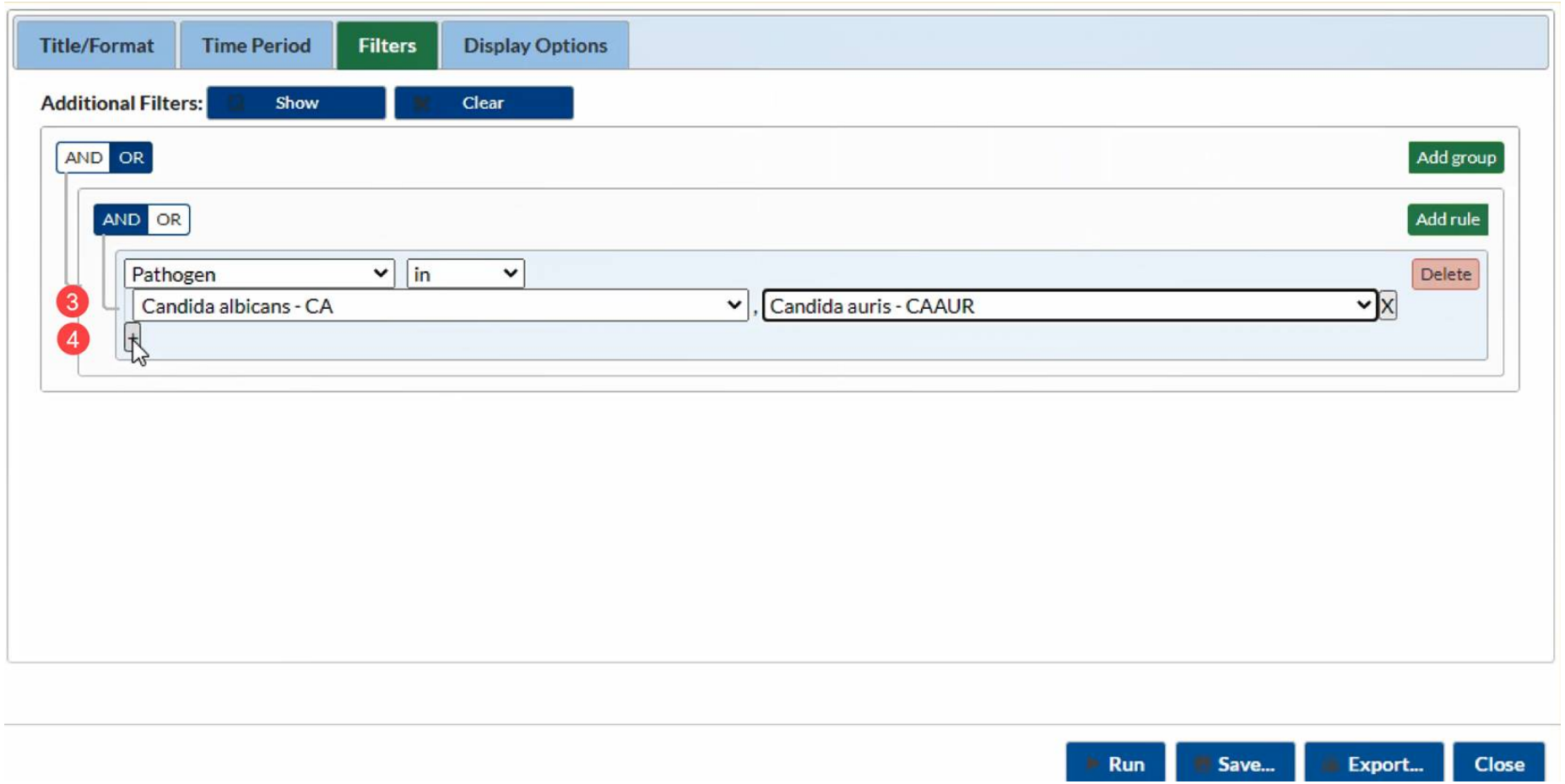

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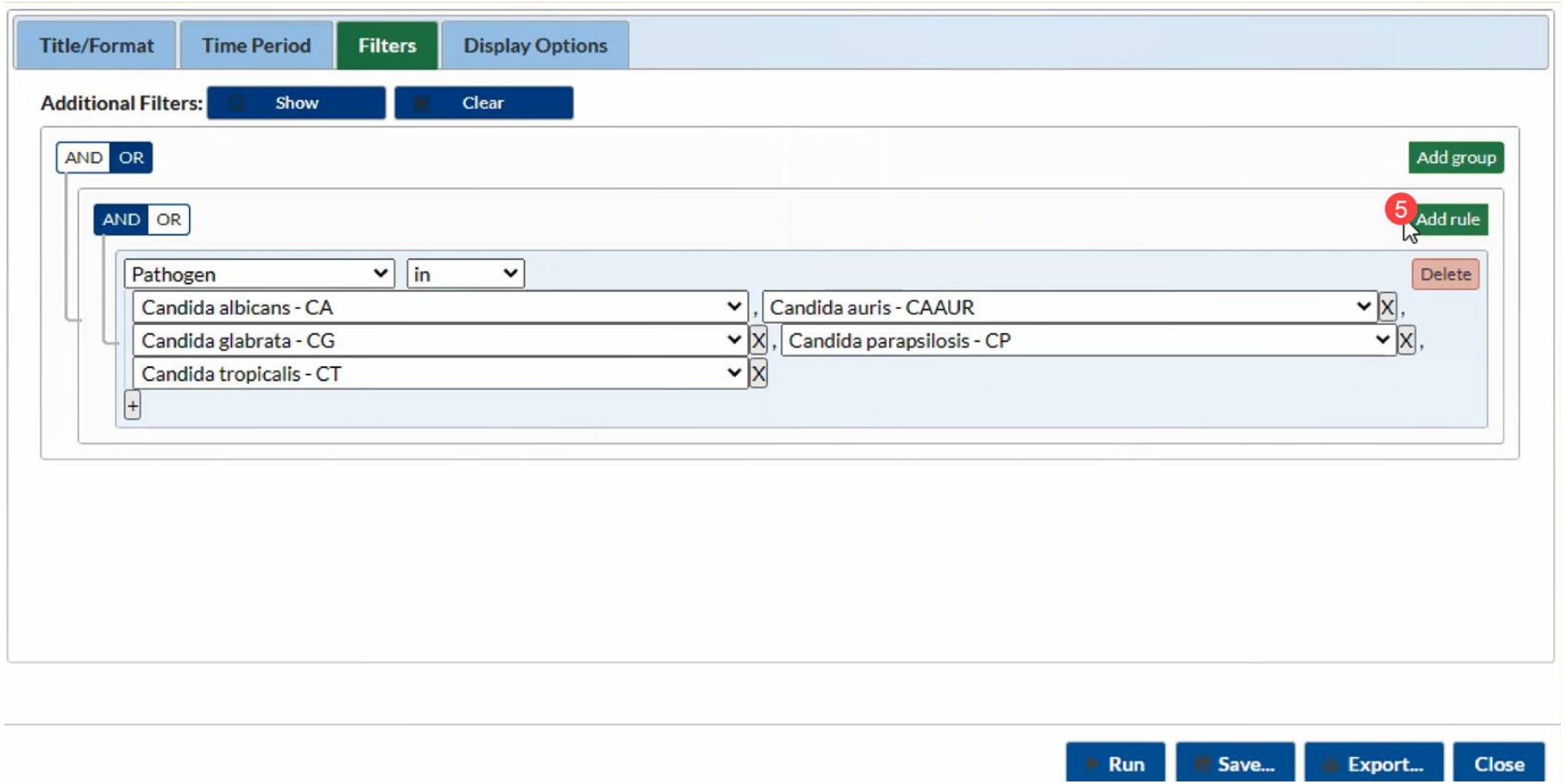
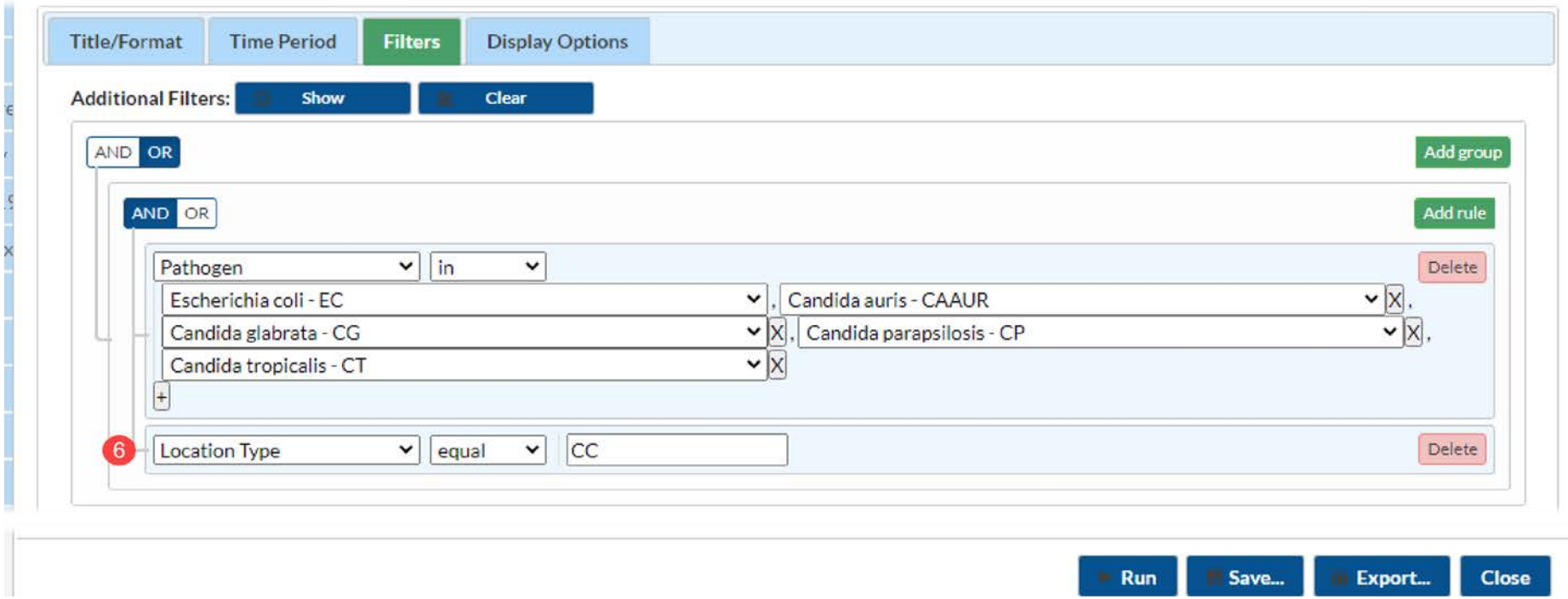
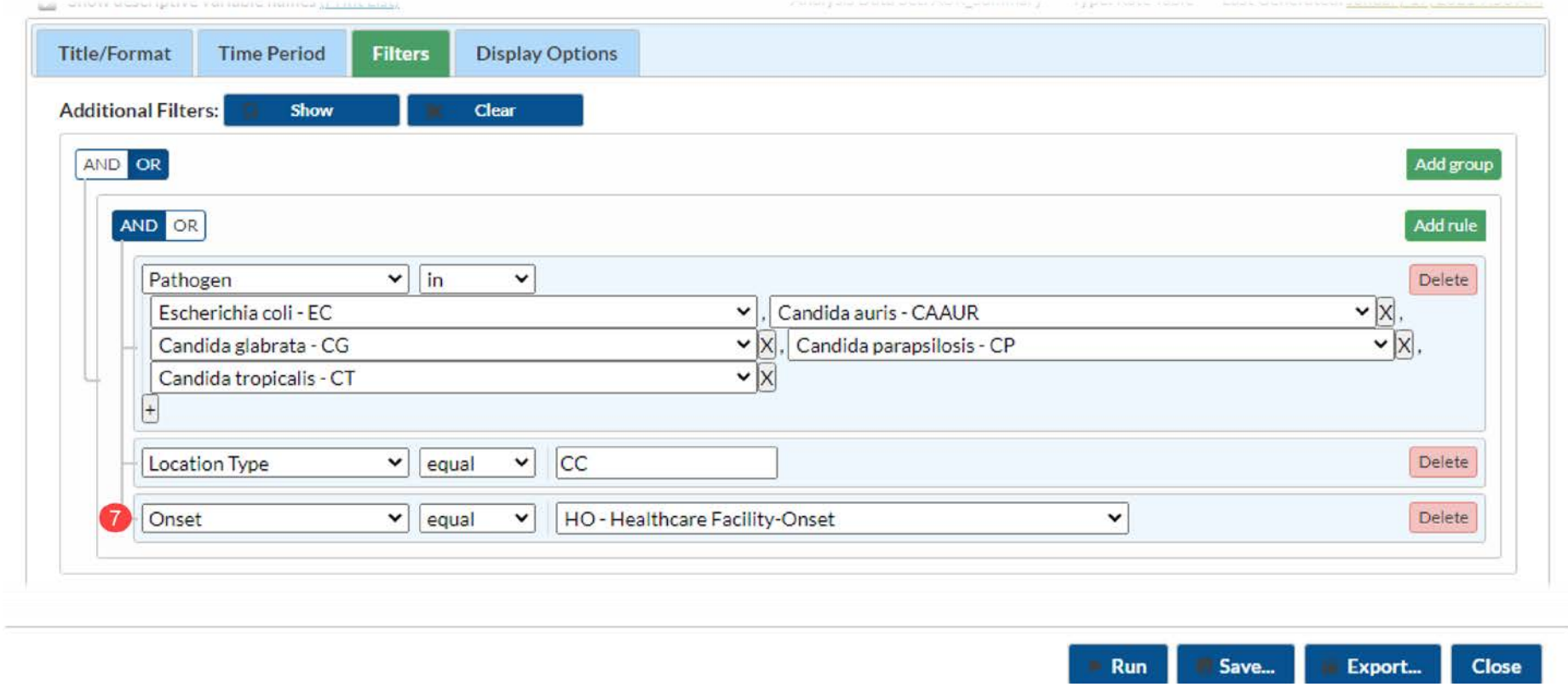


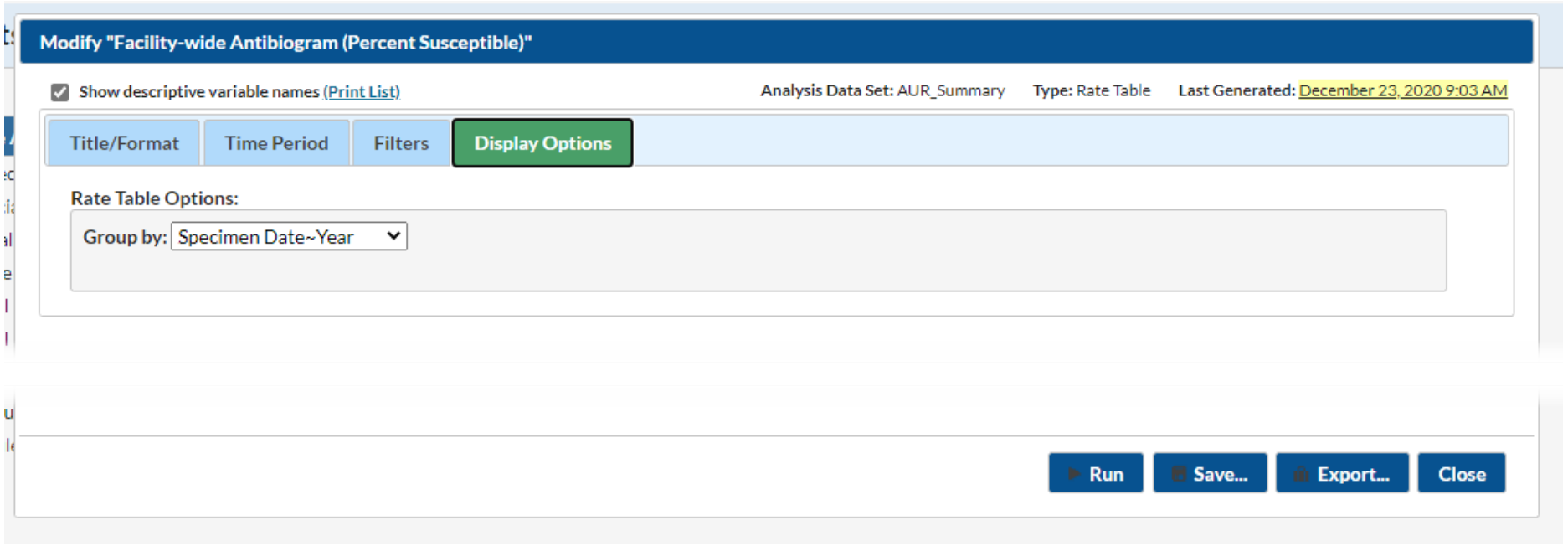
Modifications: Filters



Modifications: Filters



Modifications: Display



Facility-wide Antibiogram: Example output

National Healthcare Safety Network
Candida Antibiogram (Percent Susceptible)
Rate per 100 Isolates
As of: January 8, 2021 at 9:35 AM
Date Range: AUR_SUMMARY SpecimenDateYr 2020 to 2020
if (((Pathogen IN (CA, CAAUR, CG, CP, CT)) AND (onset = HO) AND (locationType = CC)))

orgID=33617 CCN=N/A SpecimenDateYr=2020

		Pathogen				
		Fungal				
Drug Class	Drug	Candida auris - CAAUR	Candida albicans - CA	Candida glabrata - CG	Candida parapsilosis - CP	Candida tropicalis - CT
Azoles	FLUCO	.	87.0	91.0	.	.
	ITRA	.	100	100	.	.
	POSAC	.	100	100	.	.
	VORI	.	.	.	.	.
Echinocandins	ANID	.	97.0	100	.	.
	CASPO	.	97.0	100	.	.
	MICA	.	100	100	.	.
Pyrimidine analog	FLUCY	.	100	99.0	.	.

1. Percent susceptible is calculated as the sum of the number of isolates that tested susceptible divided by the number of total isolates tested for that pathogen-drug combination.
2. Percent susceptible is only calculated when at least 30 isolates have been tested for a particular drug. Cells with a missing value "." represent pathogen-drug combinations for which there were less than 30 isolates tested.
3. Cells shaded in grey represent non-valid pathogen/drug combinations. Refer to the AUR protocol for all valid pathogen/drug combinations.

Data contained in this report were last generated on December 24, 2020 at 12:34 PM to include data beginning January 2019 through December 2020 .

Data for example only

Facility-wide Antibiogram: Example output

National Healthcare Safety Network
Candida Antibiogram (Percent Susceptible)
Rate per 100 Isolates

As of: January 8, 2021 at 9:25 AM

Date Range: AUR_SUMMARY SpecimenDateYr 2020 to 2020
if (((Pathogen IN (CA, CAAUR, CG, CP, CT)) AND (onset = HO) AND (locationType = CC)))

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		Pathogen				
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National Healthcare Safety Network
Candida Antibiogram (Percent Susceptible)
Rate per 100 Isolates

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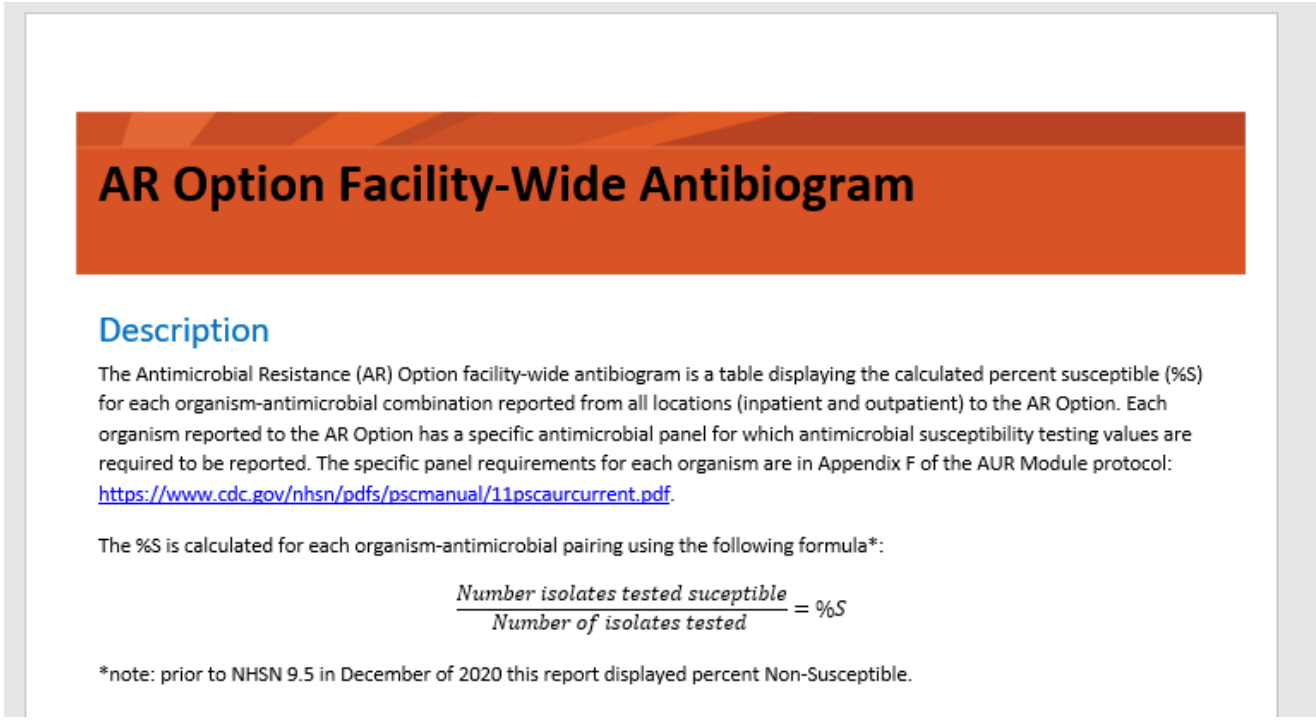
In 2020, among events in critical care locations, 87% of healthcare facility- onset *Candida albicans* and 91% of healthcare facility-onset *Candida glabrata* tested were susceptible to fluconazole.

Data for example only

Quick Reference Guide

- Provides:
  - Details on how to run and modify this analysis report
  - Example modifications and outputs
- Available for your reference on the AUR Module webpage.



AR Option Facility-Wide Antibiogram

Description

The Antimicrobial Resistance (AR) Option facility-wide antibiogram is a table displaying the calculated percent susceptible (%S) for each organism-antimicrobial combination reported from all locations (inpatient and outpatient) to the AR Option. Each organism reported to the AR Option has a specific antimicrobial panel for which antimicrobial susceptibility testing values are required to be reported. The specific panel requirements for each organism are in Appendix F of the AUR Module protocol: https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf.

The %S is calculated for each organism-antimicrobial pairing using the following formula*:

$$\frac{Number\ isolates\ tested\ suceptible}{Number\ of\ isolates\ tested} = \%S$$

*note: prior to NHSN 9.5 in December of 2020 this report displayed percent Non-Susceptible.

Resources for running AR Option reports

- AUR Module Protocol: https://www.cdc.gov/nhsn/PDFs/pscManual/11pscAURcurrent.pdf
- AR Option: Reporting and Analysis – May 2019: https://www.cdc.gov/nhsn/training/patient-safety-component/index.html#anchor_1557767426817
- AR Phenotype Definitions: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/ar-phenotype-definitions-508.pdf
- NHSN Analysis Quick Reference Guides: http://www.cdc.gov/nhsn/PS-Analysis-resources/reference-guides.html

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Additional NHSN training resources:
https://www.cdc.gov/nhsn/training/

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