

External Quality Assessment Scheme

Surveillance for multidrug resistant bacteria Round 1, 2023

5071: MRSA (Methicillin resistant *Staphylococcus aureus*)

5072: VRE (Vancomycin resistant Enterococci)

5073: Multidrug resistant gramnegative rods

Specimens

Please find enclosed 1-3 lyophilized samples (according to your order) S001, S002 and S003, and vials of rehydration fluid, each 0.5 mL.

Caution

The specimens simulate patient samples and should be handled with the same care as patient samples, i.e., as potential transmitters of serious diseases.

Examinations

S001 MRSA culture and/or direct detection from sample

S002 VRE culture and/or direct detection from sample

S003 Culture and/or direct detection from sample of multidrug resistant gramnegative rods

Storage and use

After arrival, the samples should be stored at +2...8 °C.

1. Let the samples and the rehydration fluids warm up to room temperature.
2. Cut the foil packet open at the end where you can feel the thicker part of the loop.
3. Remove the plastic sheath from the loop. Break the loop shaft off from handle directly into the tube containing rehydration fluid (blue cap).
4. Incubate the tube for 30 minutes in +35...37 °C incubator.
5. Check that the black film inside the loop (containing the lyophilized specimen) has dissolved completely.
6. Mix well the contents of the tube and proceed immediately with the examination similar to a patient specimen.

Result reporting

Please enter the results via LabScala (www.labscala.com). If you cannot find your test in the dropdown menu, please contact the EQA coordinator.

Report to the clinician (this section is scored):

For sample S001 (MRSA) the screening result is scored.

For sample S002 (VRE) the screening result, species identification and the reported resistance mechanism are scored. If your test selection does not include the identification of species and/or determination of resistance mechanism, then choose the option "Species identification not in test selection" and/or "Resistance mechanism determination not in test selection" (no loss of scores). When reporting a negative screening result the sections *Species identification* and *Resistance mechanism* will not open on the result form and the scoring is merely based on the screening result.

For sample S003 (multidrug resistant gramnegative rods) the screening result (including the resistance mechanism) and the species identification are scored. If your routine procedure does not include culture/species identification, then kindly choose "Species identification not in test selection" (no loss of scores). When reporting a negative screening result the sections *Species identification* and *Susceptibility tests* will not open on the result form.

2023-02-28

INSTRUCTIONS

Product no. 5071, 5072, 5073

LQ762023011-013/US

UN3373

Subcontracting: Sample pretesting

If the kit is incomplete or contains damaged specimens, please report immediately to info@labquality.fi

The results should be reported no later than
March 27, 2023.

The expected results of the round are published in LabScala in the View reports section by March 29, 2023.

Inquiries

EQA Coordinator

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Susceptibility testing:

Report which guideline is followed in your laboratory for susceptibility testing procedures. As the NORDIC AST breakpoint values are based on the corresponding values published in the EUCAST guideline, the laboratories following NORDIC AST should select EUCAST as their reference group.

For the disk diffusion method, report the inhibitory zone diameter (mm). The value should be between 5 and 55 mm for the result to be accepted in the result processing. For samples S001 and S002 also report the antimicrobial disk content (μg). For the MIC method, report the MIC value as mg/L. Note, that a rounded MIC result is to be reported in addition to the actual MIC result. Only the rounded values are included in the report. Guidance for correct rounding can be found below and is also available in LabScala (click the *i*-button in column "MIC result, rounded"). The rounded MIC value should always be selected from the list on the result form, also when it is the same as the actual obtained MIC result (see examples below guidance table). In the last column report the corresponding SIR interpretation (Sensitive/Intermediate/Resistant). The interpretation should be reported by taking into consideration possible resistance mechanisms of the microbe.

Guidance for the rounding of MIC values

E-test or other MIC test result (mg/L)	Rounded value (mg/L)
<0.002, <0.003, 0.002	0.002
<0.004, <0.006, 0.003, 0.004	0.004
<0.008, <0.012, 0.006, 0.008	0.008
<0.015, <0.016, <0.023, 0.012, 0.015, 0.016	0.016
<0.03, <0.032, <0.047, 0.023, 0.03, 0.032	0.032
<0.06, <0.064, <0.094, 0.047, 0.06, 0.064	0.064
<0.12, <0.125, <0.19, 0.094, 0.12, 0.125	0.125
<0.25, <0.38, 0.19, 0.25	0.25
<0.5, <0.75, 0.38, 0.5	0.5
<1, <1.5, >0.5, 0.75, 1	1
<2, <3, >1, >1.5, 1.5, 2	2
<4, <6, >2, >3, 3, 4	4
<12, <8, >4, >6, 6, 8	8
<16, <24, >12, >8, 12, 16	16
<32, <48, >16, >24, 24, 32	32
<64, <96, >32, >48, 48, 64	64
<128, <192, >64, >96, 128, 96	128
<256, <384, >128, >192, 192, 256	256
<512, <768, >256, >384, 384, 512	512
<1024, <1536, >512, >768, 1024, 768	1024
<2048, >1024, >1536, 1536, 2048	2048

Example 1: Obtained test result is 0.002 mg/L, rounded value is 0.002 mg/L

Example 2: Obtained test result is 0.003 mg/L, rounded value is 0.004 mg/L

Example 1: Obtained test result is >16 mg/L, rounded value is 32 mg/L

For combination antibiotics note the following:

When the used MIC method gives the result of trimethoprim-sulfamethoxazole (used in ratio 1:19) as a common value of both components and not merely as a value of the trimethoprim component (which is 1/20 of the total), you should divide the result with 20 and thereafter round the value according to the table above. Example: the MIC method gives the result >320 mg/L, which is divided by 20 and yields the result >16 mg/L. After the rounding (see table above) the result is reported as 32 mg/L.

When the result for a combination antibiotic (e.g. piperacillin-tazobactam) includes the value of both components, report the MIC value of the actual antibiotic component (in this case piperacillin) merely. Example: Obtained test result is >128/4 mg/L, the non-rounded MIC value is reported as >128 mg/L and the rounded MIC value is 256 mg/L.

We kindly ask the participants to report their growth media (name and manufacturer) in the comment section of the result form. We collect data for the future background registry and dropdown menu, where the laboratory may choose the appropriate option. Thank you for your co-operation!

Surveillance for multidrug resistant bacteria, round 1, 2023.

S001



S002



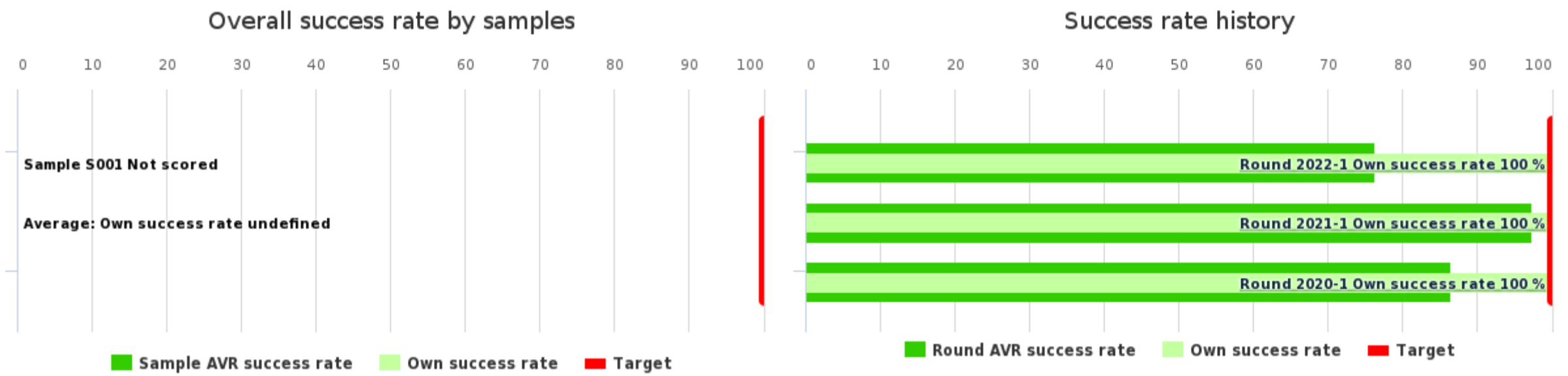
S003



Client report

	No of participants	No of responded participants	Response percentage
Surveillance for multidrug resistant bacteria, MRSA, February, 1-2023	97	93	95.9 %

Summary



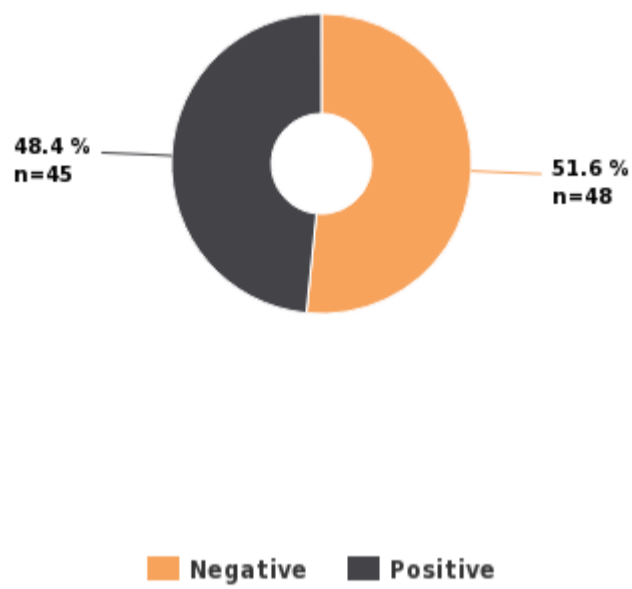
Summary	Own score	Max score	Own success rate	Difference	AVR success rate
Sample S001	-	-	-	-	-
Average:			-	-	-

History	Test nr.	Own success rate	Difference	AVR success rate
Round 2022-1	1	100 %	23.6 %	76.4 %
Round 2021-1	1	100 %	2.7 %	97.3 %
Round 2020-1	1	100 %	13.5 %	86.5 %

Sample S001 | MRSA screening: positive

Sample S001 results	Responded	AVR success rate	Count
	MRSA screening	-	93
	Plate culture	-	119
	Agglutination test	-	18
	Molecular confirmation test (from culture)	-	23
	Direct detection by molecular method (from sample)	-	24

Sample S001 MRSA screening



MRSA SCREENING

Result	Result count	Referred	Not referred	Own score	Max score	Own success rate	Difference	AVR success rate
Negative	48	1	47	-	-	-	-	-
<input checked="" type="radio"/> Positive	45	<input checked="" type="radio"/> 21	24	-	-	-	-	-
Total:	93			-	-	-	-	-

Sample S001 Plate culture

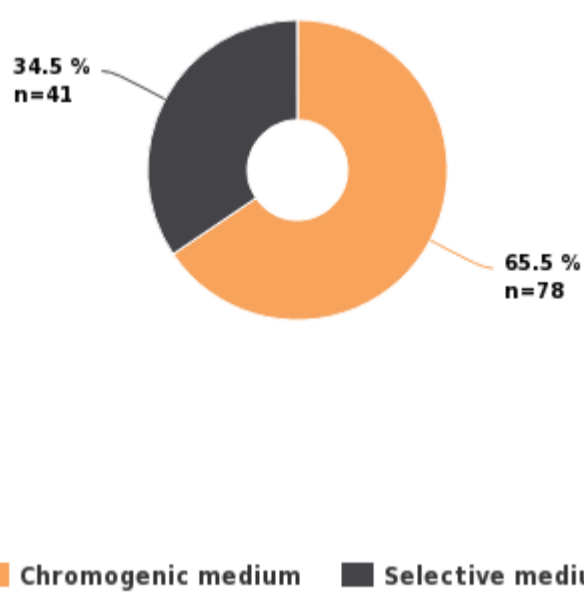
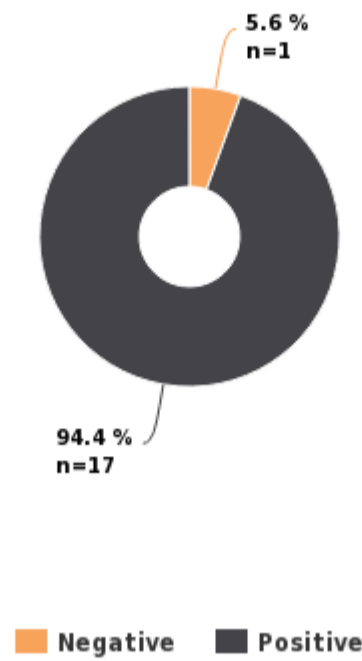


PLATE CULTURE

Method	Method count
<input checked="" type="radio"/> Chromogenic medium	78
Selective medium	41
Total:	119

Sample S001 Agglutination test



AGGLUTINATION TEST

Test	Negative	Positive	Total:
PBP2a Culture Colony Test (Alere)	-	11	11
PBP2a Latex Agglutination test (Oxoid, Thermo Scientific)	1	3	4
Slidex MRSA Detection (bioMerieux)	-	1	1
Staphylect Plus (Oxoid, Thermo Scientific)	-	2	2
Total:	1	17	18

MOLECULAR CONFIRMATION TEST (FROM CULTURE)

Test	mecA+	mecA/C+	mecA/C-	mecC-	Total:
Eazyplex MRSA (Amplex)	2	-	-	1	3
GenomEra MRSA/SA AC (Abacus Diagnostica)	-	1	-	-	1
PCR (In-house)	1	-	-	-	1
Xpert MRSA (Cepheid)	2	-	-	-	2
Xpert MRSA NxG (Cepheid)	-	6	1	-	7
Xpert MRSA/SA BC (Cepheid)	6	1	-	-	7
Xpert MRSA/SA SSTI (Cepheid)	1	-	-	-	1
Xpert SA Nasal Complete (Cepheid)	1	-	-	-	1
Total:	13	8	1	1	23

DIRECT DETECTION BY MOLECULAR METHOD (FROM SAMPLE)

Test	mecA+	mecA/C+	mecA/C-	Total:
Xpert MRSA (Cepheid)	2	-	-	2
Xpert MRSA Gen3 (Cepheid)	-	1	-	1
Xpert MRSA NxG (Cepheid)	-	2	1	3
Xpert MRSA/SA BC (Cepheid)	11	1	-	12
Xpert MRSA/SA SSTI (Cepheid)	1	-	-	1
Xpert SA Nasal Complete (Cepheid)	4	1	-	5
Total:	18	5	1	24

Report Info

PARTICIPANTS

Altogether 97 laboratories from 14 countries participated in this EQA round.

REPORT INFO

On the front page you can see the sample specific success rate which have been calculated from the scores. The reported results and the scores are presented in separate tables. The results are presented in tables as counts and in the pie diagrams as percentages. In general, the expected results are marked with green color. Accepted results may also be indicated with yellow color. Laboratory's own results are indicated with a black radio button . The participant's own success is shown both as scores and as success rates (%) generated from the score values. If you have not reported results, you will get a note: "You have not responded in time, only global report is available." For information on report interpretation and performance evaluation, please see the "EQAS Interpretation guidelines" in LabScala User instructions. In case you have any questions regarding the reports, please contact the EQA Coordinator.

SCORING

The results in the "MRSA screening" part can be scored when at least 60% of the participants have reported the correct/expected result and when there are at least three reported results. The report includes a sample specific scoring summary. Laboratory's scores have been converted to percentage (own success rate, % from maximum scores) with a target at 100%. Own success rate is compared with the success rate of all results.

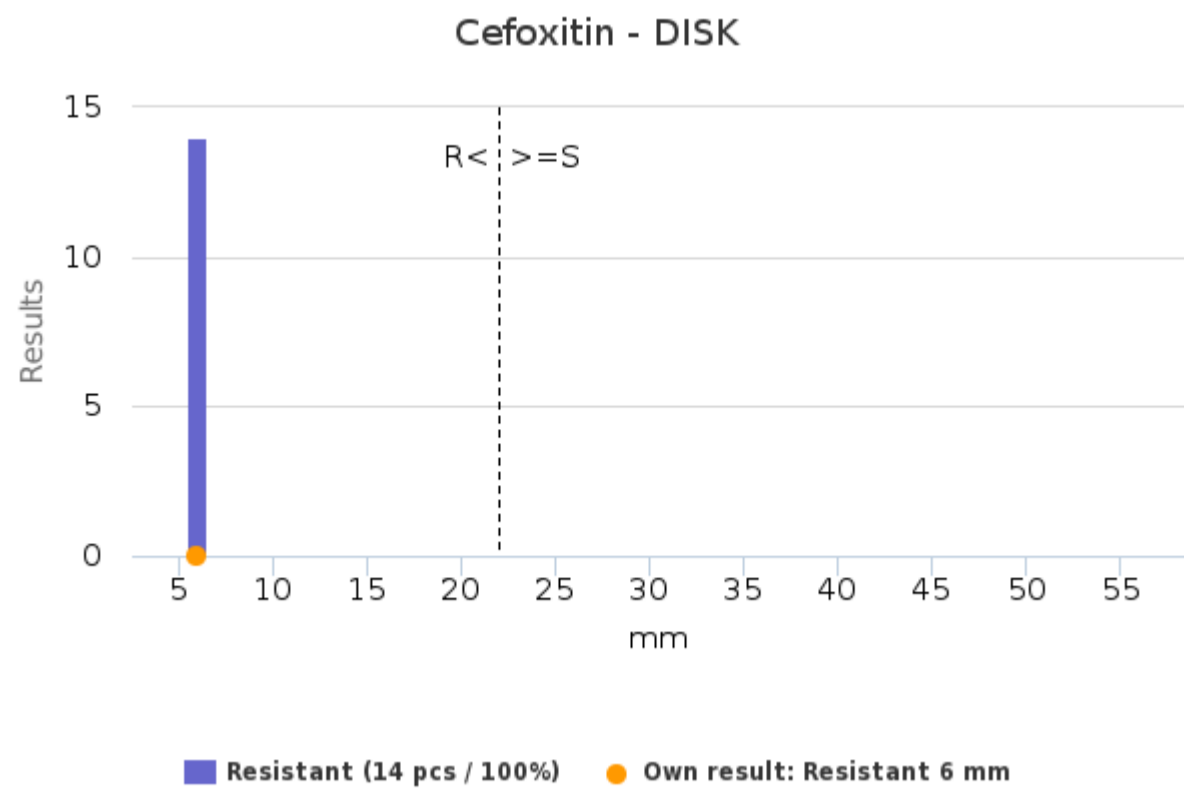
The scoring range is 0-2 points, and the following general rules are followed:
2 points is reached by reporting the expected correct result
1 point is given to results that are partly correct/insufficient regarding the expected finding
0 points is given for an incorrect/false result

Sample S001

Staphylococcus aureus ATCC 700699

Antimicrobial agent	Guideline	DISK							MIC					
		Own result (mm)	x (mm)	sd (mm)	S	I	R	n	Own result (mg/L)	Mo (mg/L)	S	I	R	n
Cefoxitin	CLSI	-	6	1	0 (0%)	0 (0%)	3 (100%)	3	-	8	0 (0%)	0 (0%)	3 (100%)	3
	EUCAST	6 ●	6	0	0 (0%)	0 (0%)	14 (100%) ●	14	-	2048	0 (0%)	0 (0%)	3 (100%)	3
	CA-SFM	-	6	0	0 (0%)	0 (0%)	6 (100%)	6	-	-	0 (0%)	0 (0%)	3 (100%)	3
	All				0 (0%)	0 (0%)	23 (100%)	23			0 (0%)	0 (0%)	9 (100%)	9

Sample S001 | EUCAST



	x	sd	min	max	n
Cefoxitin	6	-	6	6	14

Report info

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The susceptibility testing results are presented for positive screening samples only. The results are shown in laboratory specific summary tables and histograms. Histograms are drawn for each antimicrobial agent if the laboratory's result is included in a group of at least three results. By "group" is meant results which are obtained and interpreted according to the same standard (EUCAST, CLSI or CA-SFM). Laboratory's own results are indicated with a black radio button in the table and an orange dot in the histograms. Average (x) is used as a reference value for disk results and mode (Mo) is used for MIC results.

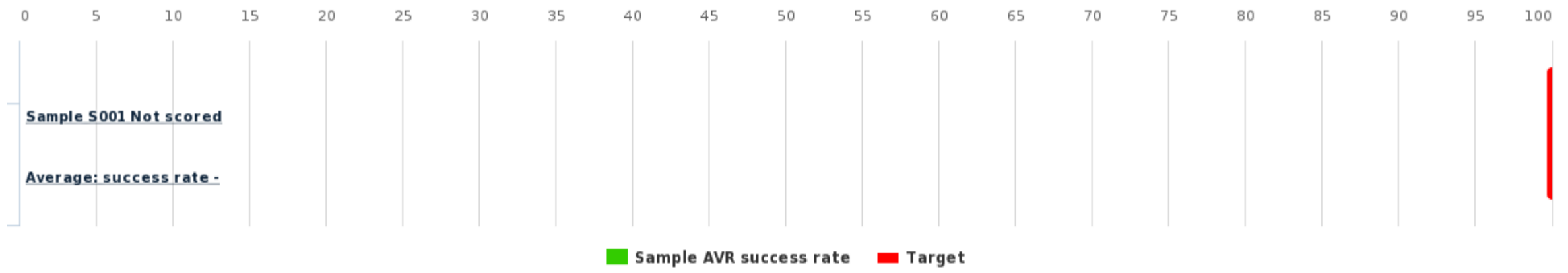
If you have not reported antimicrobial susceptibility testing results you will get a note: "You have not reported antimicrobial susceptibility results, only global report is available." For information on report interpretation and performance evaluation, please see the "EQAS Interpretation guidelines" in LabScala User instructions. In case you have any questions regarding the reports, please contact the EOA Coordinator.

GLOBAL REPORT

	No of participants	No of responded participants	Response percentage
Surveillance for multidrug resistant bacteria, MRSA, February, 1-2023	97	93	95.9 %

Summary

Overall success rate by samples

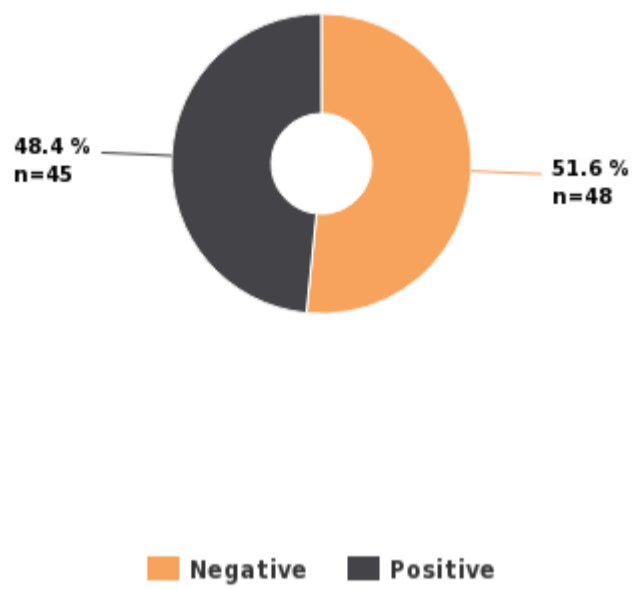


Summary	AVR success rate
Sample S001	-
Average:	-

Sample S001 | MRSA screening: positive

Sample S001 results	Responded	AVR success rate	Count
	MRSA screening	-	93
	Plate culture	-	119
	Agglutination test	-	18
	Molecular confirmation test (from culture)	-	23
	Direct detection by molecular method (from sample)	-	24

Sample S001 MRSA screening



MRSA SCREENING

Result	Result count	Referred	Not referred	AVR success rate	Result Score
Negative	48	1	47	-	-
Positive	45	21	24	-	-
Total:	93				

Sample S001 Plate culture

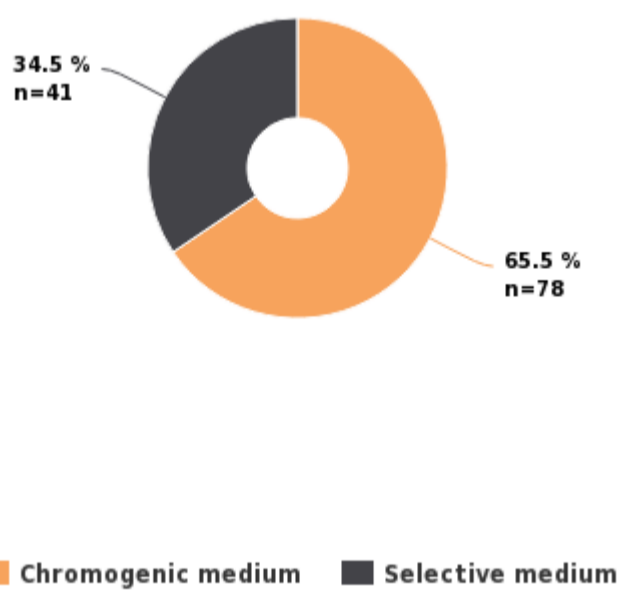
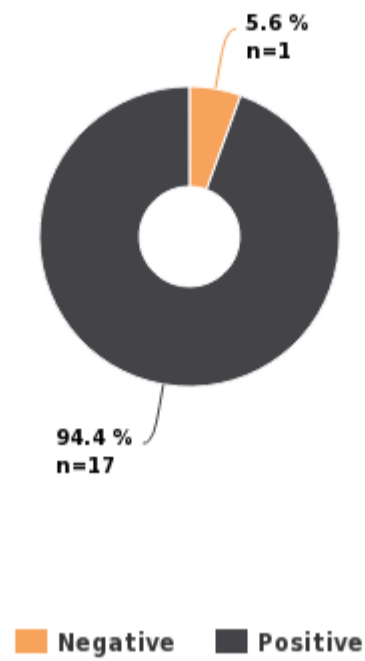


PLATE CULTURE

Method	Method count
Chromogenic medium	78
Selective medium	41
Total:	119

Sample S001 Agglutination test



AGGLUTINATION TEST

Test	Negative	Positive	Total:
PBP2a Culture Colony Test (Alere)	-	11	11
PBP2a Latex Agglutination test (Oxoid, Thermo Scientific)	1	3	4
Slidex MRSA Detection (bioMerieux)	-	1	1
Staphylect Plus (Oxoid, Thermo Scientific)	-	2	2
Total:	1	17	18

MOLECULAR CONFIRMATION TEST (FROM CULTURE)

Test	mecA+	mecA/C+	mecA/C-	mecC-	Total:
Eazyplex MRSA (Amplex)	2	-	-	1	3
GenomEra MRSA/SA AC (Abacus Diagnostica)	-	1	-	-	1
PCR (In-house)	1	-	-	-	1
Xpert MRSA (Cepheid)	2	-	-	-	2
Xpert MRSA NxG (Cepheid)	-	6	1	-	7
Xpert MRSA/SA BC (Cepheid)	6	1	-	-	7
Xpert MRSA/SA SSTI (Cepheid)	1	-	-	-	1
Xpert SA Nasal Complete (Cepheid)	1	-	-	-	1
Total:	13	8	1	1	23

DIRECT DETECTION BY MOLECULAR METHOD (FROM SAMPLE)

Test	mecA+	mecA/C+	mecA/C-	Total:
Xpert MRSA (Cepheid)	2	-	-	2
Xpert MRSA Gen3 (Cepheid)	-	1	-	1
Xpert MRSA NxG (Cepheid)	-	2	1	3
Xpert MRSA/SA BC (Cepheid)	11	1	-	12
Xpert MRSA/SA SSTI (Cepheid)	1	-	-	1
Xpert SA Nasal Complete (Cepheid)	4	1	-	5
Total:	18	5	1	24

Report Info

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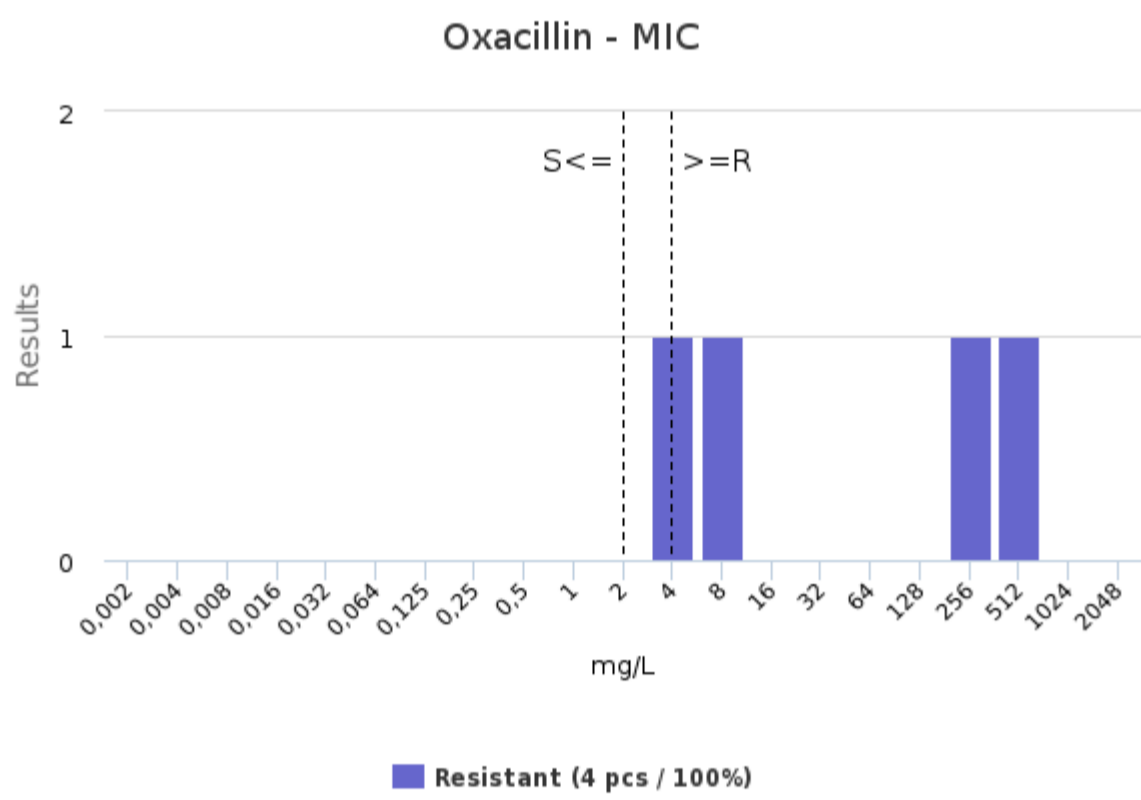
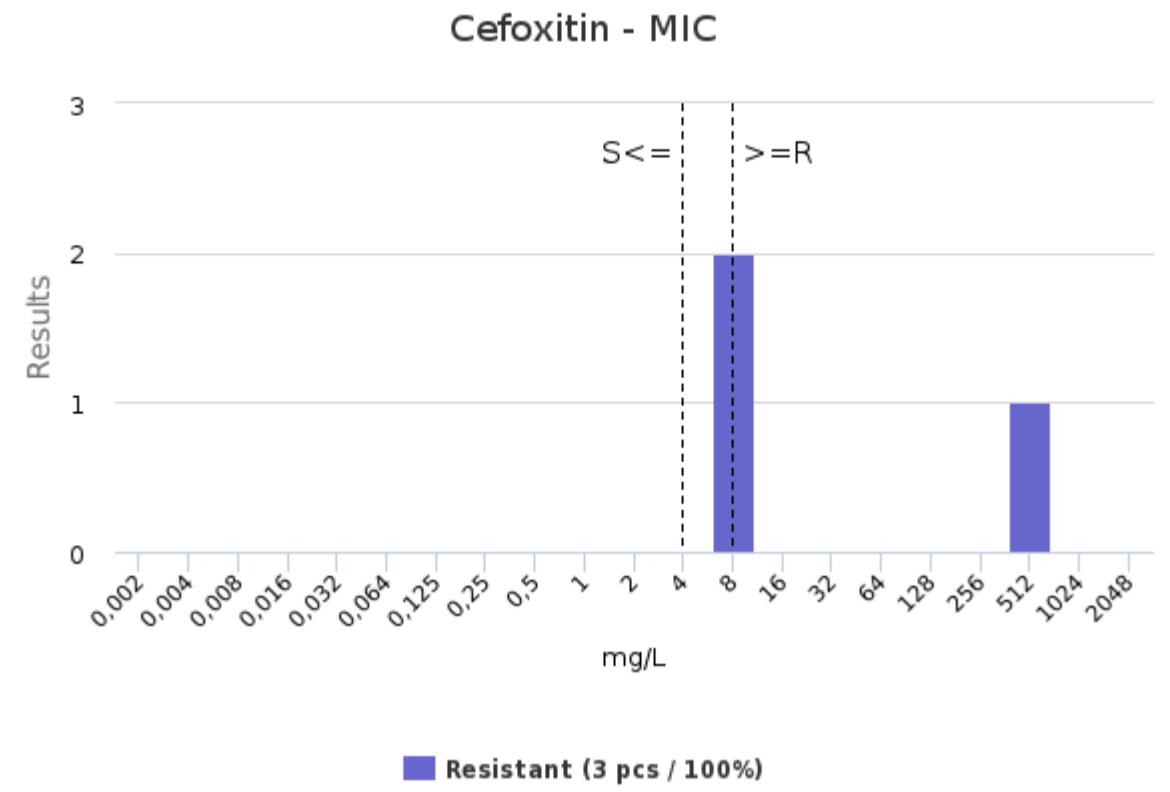
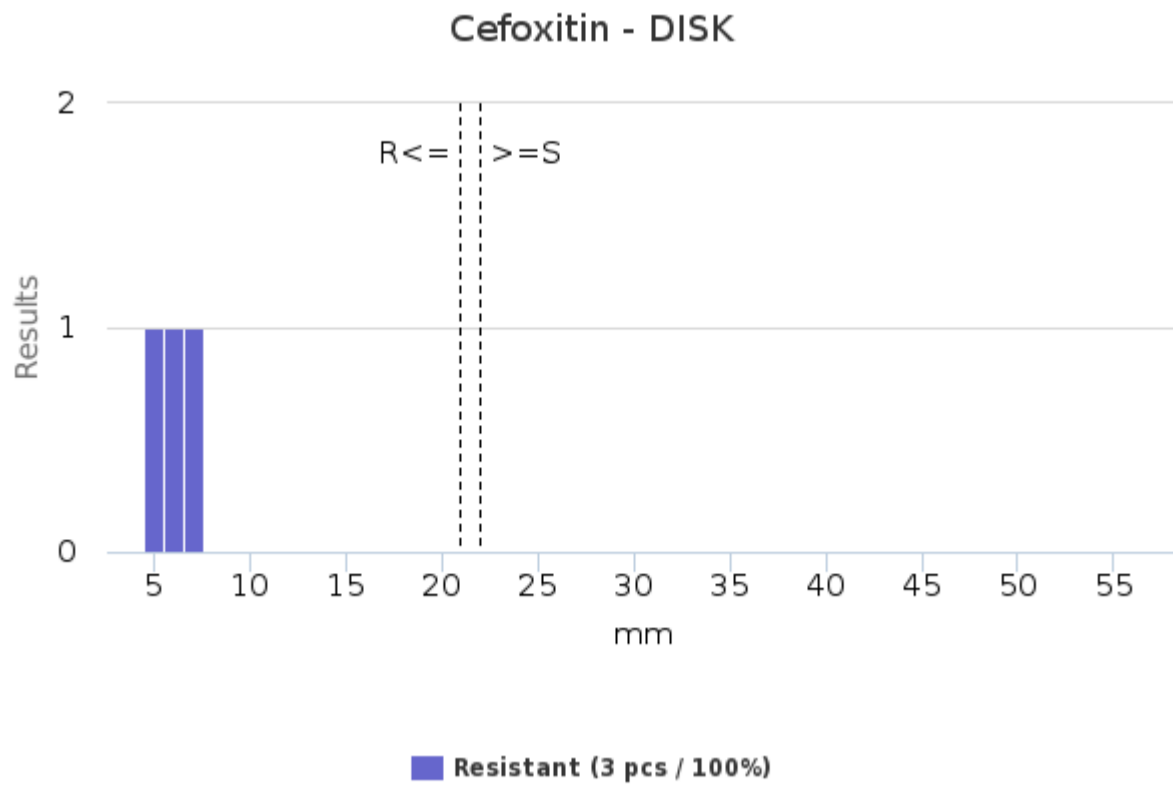
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Sample S001

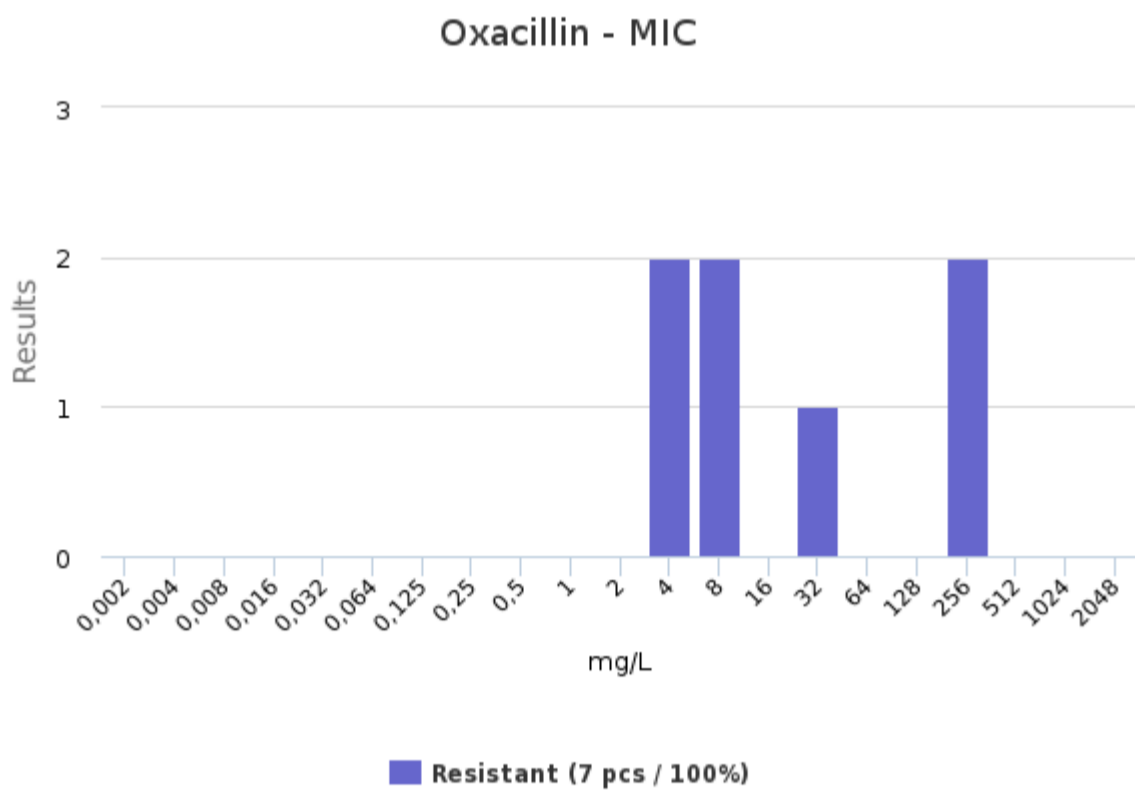
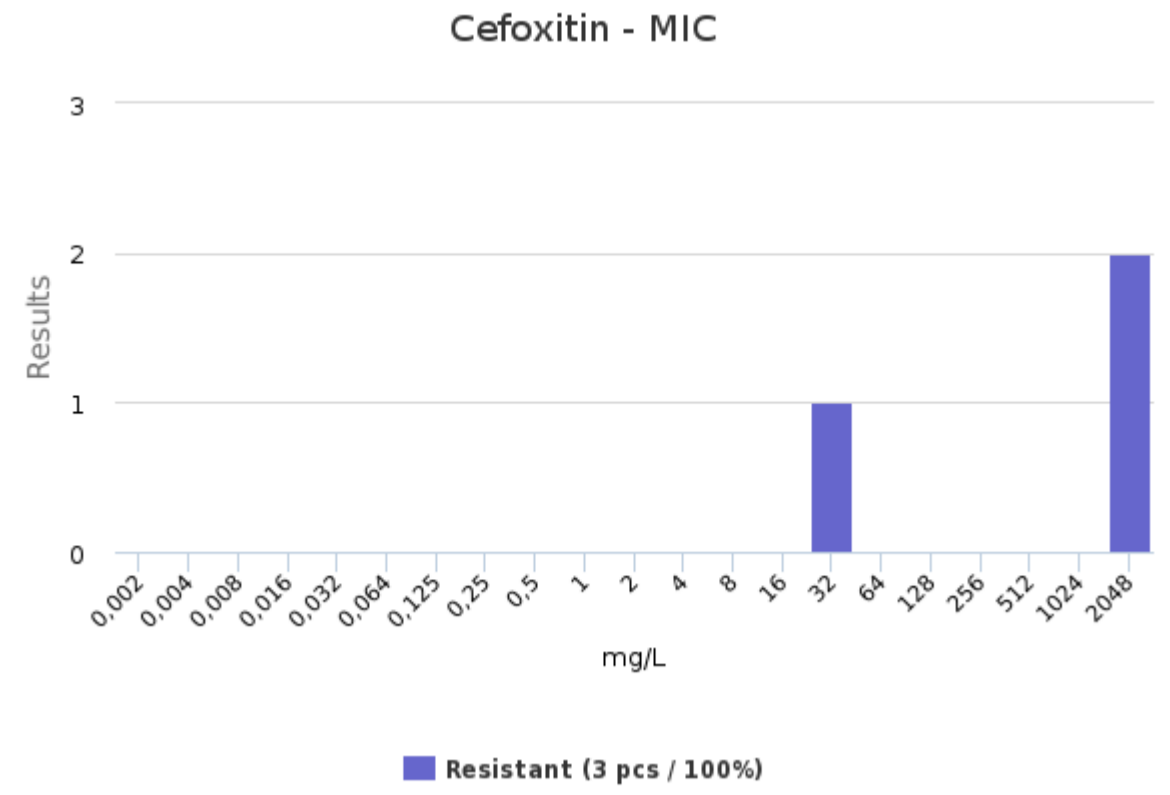
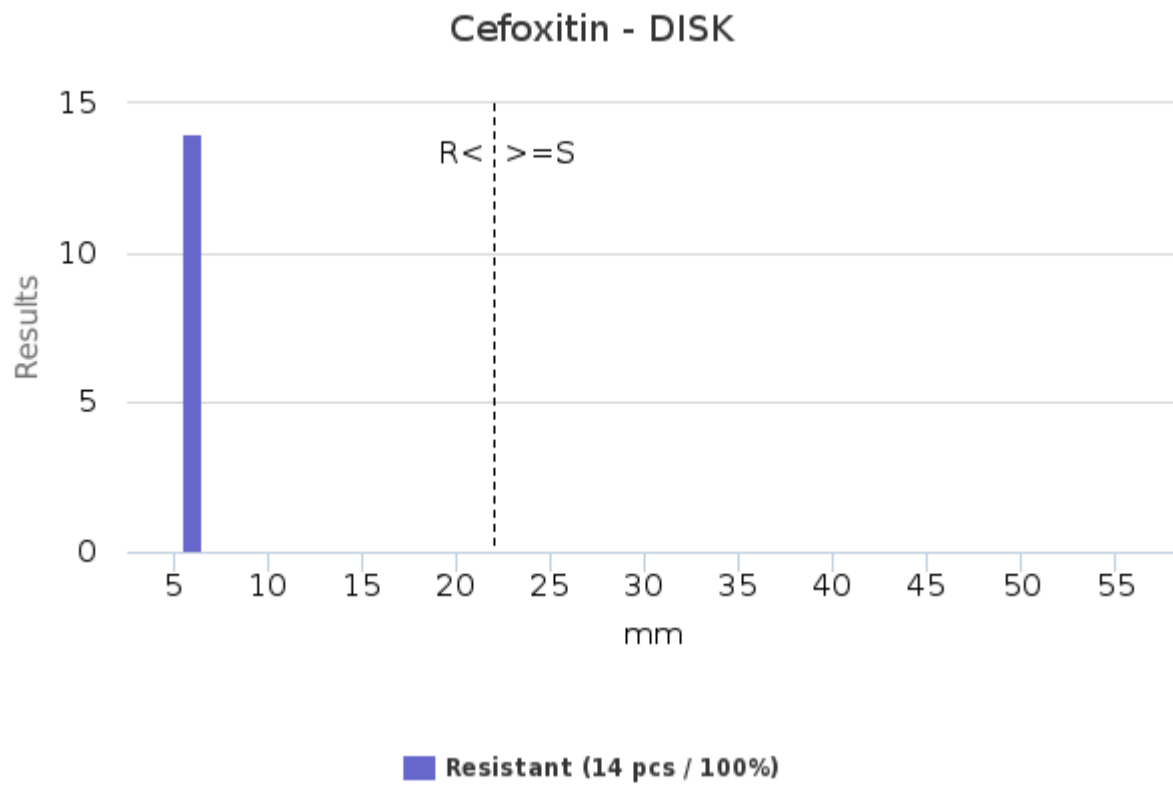
Staphylococcus aureus ATCC 700699

Antimicrobial agent	Guideline	DISK						MIC				
		x (mm)	sd (mm)	S	I	R	n	Mo (mg/L)	S	I	R	n
Cefoxitin	CA-SFM	6	0	0 (0%)	0 (0%)	6 (100%)	6	-	0 (0%)	0 (0%)	3 (100%)	3
	CLSI	6	1	0 (0%)	0 (0%)	3 (100%)	3	8	0 (0%)	0 (0%)	3 (100%)	3
	EUCAST	6	0	0 (0%)	0 (0%)	14 (100%)	14	2048	0 (0%)	0 (0%)	3 (100%)	3
	All			0 (0%)	0 (0%)	23 (100%)	23		0 (0%)	0 (0%)	9 (100%)	9
Oxacillin	CA-SFM	6	-	0 (0%)	0 (0%)	1 (100%)	1	4	0 (0%)	0 (0%)	5 (100%)	5
	CLSI	6	-	0 (0%)	0 (0%)	1 (100%)	1	-	0 (0%)	0 (0%)	4 (100%)	4
	EUCAST	31	-	0 (0%)	0 (0%)	2 (100%)	2	-	0 (0%)	0 (0%)	7 (100%)	7
	All			0 (0%)	0 (0%)	4 (100%)	4		0 (0%)	0 (0%)	16 (100%)	16

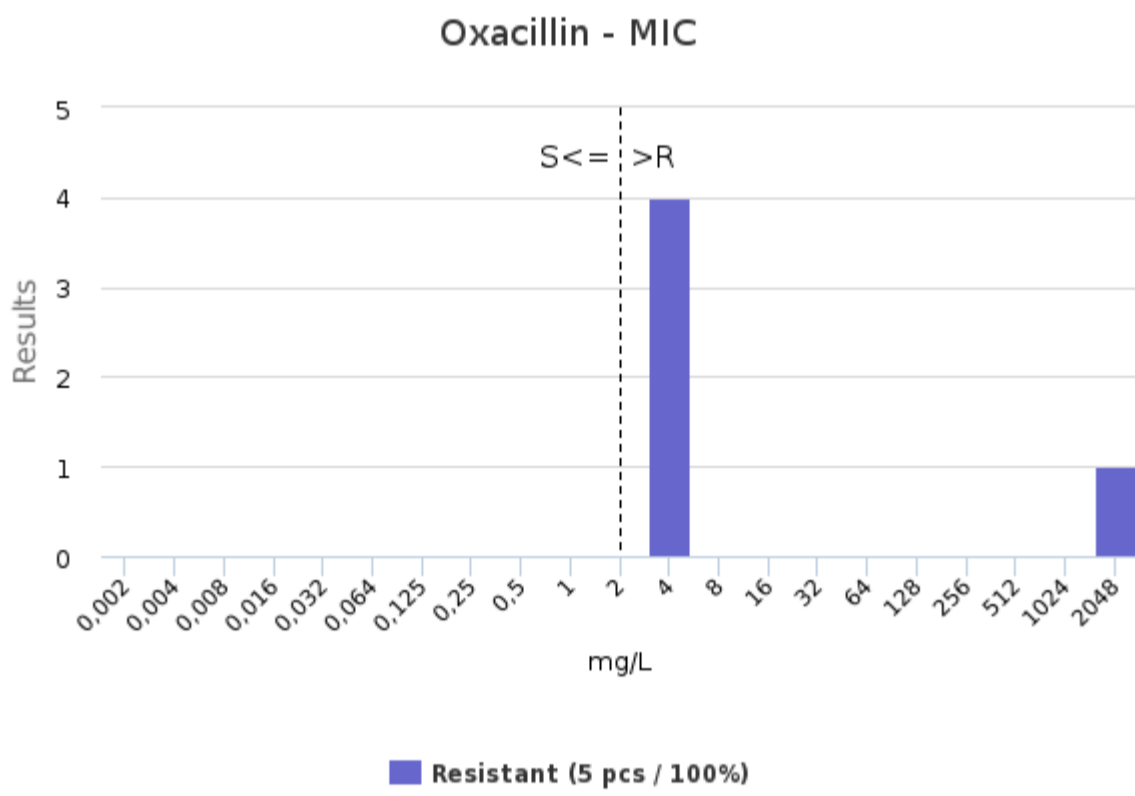
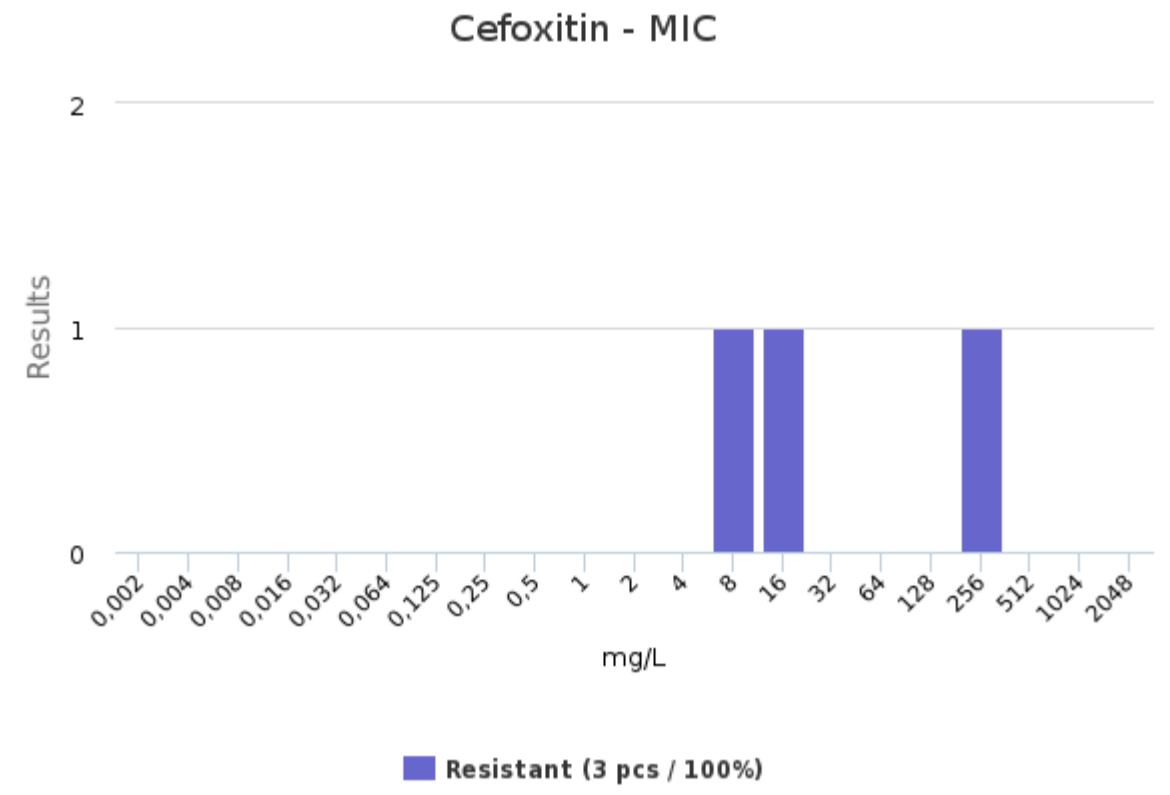
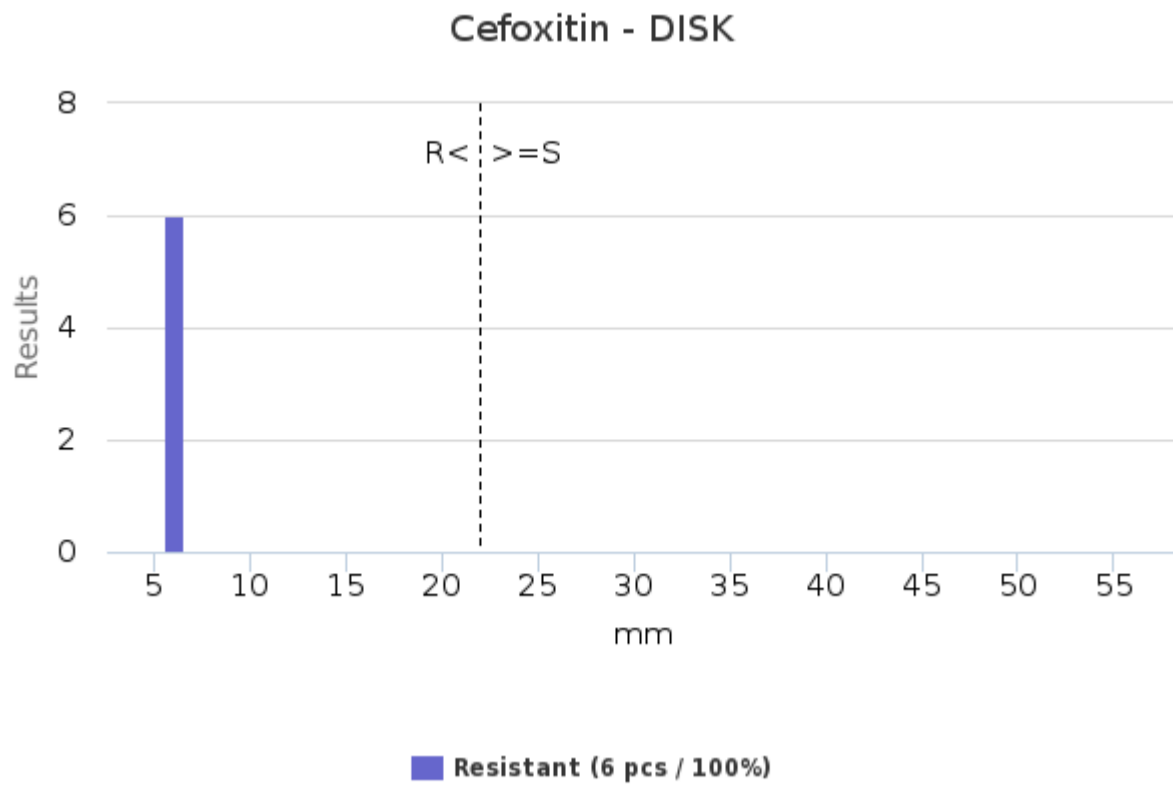
Sample S001 | CLSI



Sample S001 | EUCAST



Sample S001 | CA-SFM



Report info

Participants

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Report info

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External Quality Assessment Scheme

Surveillance for multidrug resistant bacteria, MRSA Round 1, 2023

Specimens

The round included one lyophilized sample. The sample lot was tested in an accredited Finnish reference laboratory and the results were consistent with the certificates provided by the sample manufacturer. Based on the quality controls conducted by the sample material manufacturer, pre-testing and the results obtained in the round, the sample lot is to be considered as homogeneous, stable, and suitable for external quality assessment. The material was sent without temperature control packaging.

The use of samples only for external quality assessment. The consent of Labquality must be requested for the use of the microbial strains contained in the samples for other purposes.

The sample included the following microbes:

Sample S001 (LQ762023011)
Staphylococcus aureus ATCC® 700699™ (MRSA, *mecA*, VISA)
Staphylococcus haemolyticus C020005
Enterococcus faecalis ATCC® 29212™

Expected result: MRSA screening positive

Report info

Please see the description of the data analysis on the last page of the laboratory-specific reports and global reports. It is important to read the Final report first, because it contains important information of the samples and results in each round.

Comments – Expert

The sample contained a *mecA*-positive MRSA strain with reduced susceptibility to vancomycin, accompanied by an oxacillin-susceptible *Staphylococcus haemolyticus* (and a wild-type *E. faecalis*). Evidently the concentration of the MRSA strain was by far lower than intended. Ninety-three laboratories returned their result, and only 45 (48%) reported the expected positive screening result. Some of them reported finding just a single colony. Thus, the round cannot be scored.

Enrichment culture was somewhat beneficial in this case: 60% (18/30) of the laboratories using enrichment reported a positive screening result, contrasted to 41% (24/58) of those that reported not using enrichment culture. However, the difference did not reach statistical significance (chi square test $X^2(1) = 2.75$, $p = 0.097$).

Three laboratories that reported a negative screening had got a (putative) positive PCR result directly from the specimen, two reported a negative PCR result.

Three laboratories are acknowledged for a note on the strain's reduced susceptibility to vancomycin.

Exceptions in scoring

The sample will not be scored (<60 % of the participants reported the expected screening result).

2023-04-18

FINAL REPORT

Product no. 5071

Subcontracting: Sample pretesting

Samples sent	2023-02-28
Round closed	2023-03-27
Expected results	2023-03-29
Final Report	2023-04-18

Request for correction

Typing errors in laboratory's result forms are on laboratory's responsibility. Labquality accepts responsibility only for result processing. Requests must be notified by writing within three weeks from the date of this letter.

Authorized by

EQA Coordinator
Yvonne Björkman
yvonne.bjorkman@labquality.fi

Expert

Kaisu Rantakokko-Jalava, MD, Ph.D.,
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End of report

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