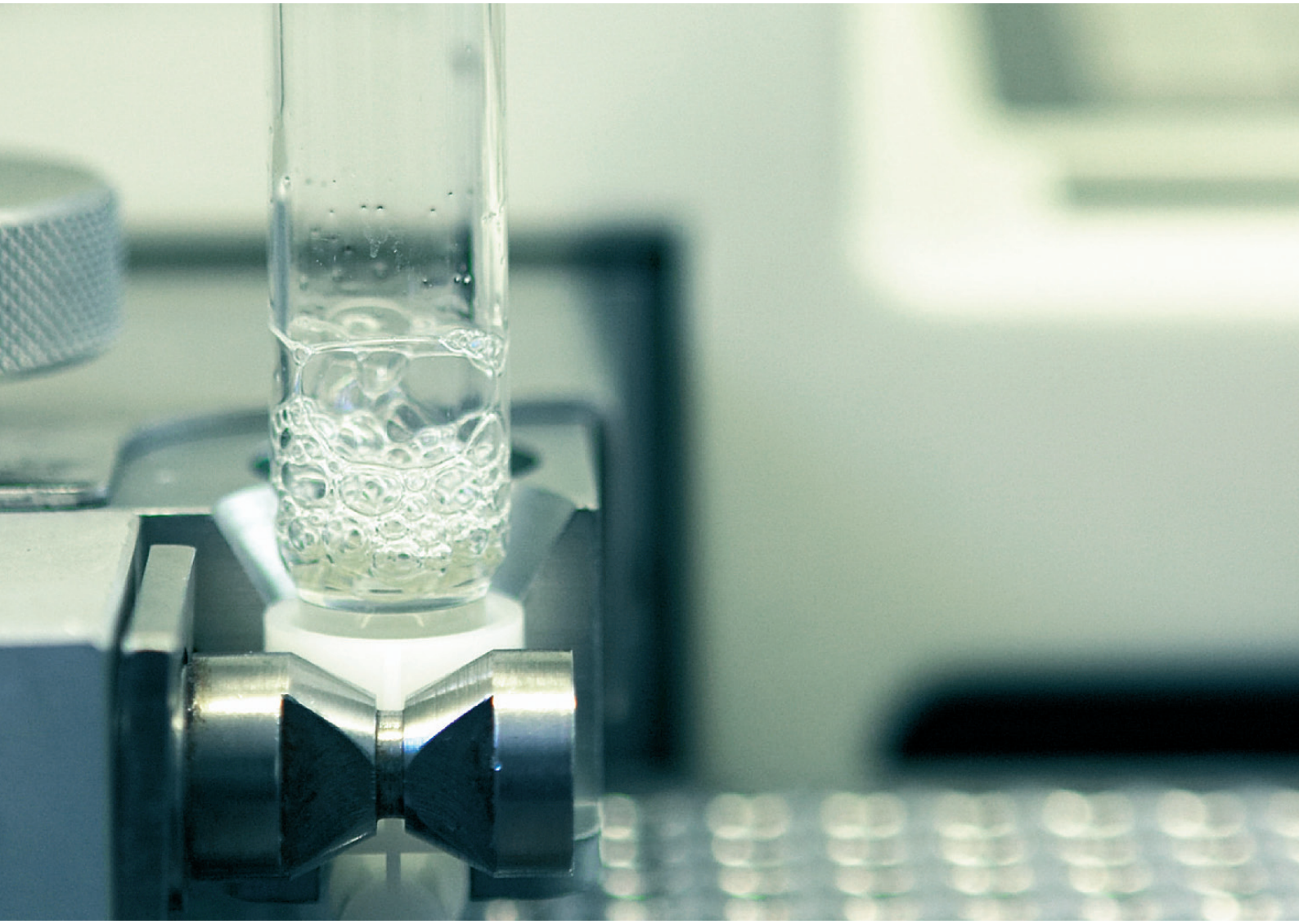
National Food Institute
Technical University of Denmark

The 26th EURL-AR Proficiency Test - Enterococci, Staphylococci and *Escherichia coli* 2019



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The 26th EURL-AR Proficiency Test Enterococci, Staphylococci and *Escherichia coli* - 2019

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Appendices

1. Introduction

This report describes the results of the 26th proficiency test organised by the Technical University of Denmark, National Food Institute (DTU-FOOD) as the EU Reference Laboratory for Antimicrobial Resistance (EURL-AR). This proficiency test focuses on antimicrobial susceptibility testing (AST) of enterococci, staphylococci and *Escherichia coli.* It is the 12th External Quality Assurance System (EQAS) conducted for AST of these microorganisms.

The aim of this EQAS is to: i) monitor the quality of AST results produced by National Reference Laboratories (NRL-AR), ii) identify laboratories which may need assistance to improve their performance in AST, and iii) determine possible topics for future research and collaboration.

When reading this report, please consider:

1) Expected results were generated by performing Minimum Inhibitory Concentration (MIC) determination on two occasions at DTU-FOOD. These results were verified by the United States Food and Drug Administration (FDA), Centre for Veterinary Medicine. Finally, MIC determination was performed at DTU-FOOD after preparation of the agar stab cultures to be shipped to participants to confirm that the vials contained the correct strains with the expected MIC values.

2) The evaluation is based on interpretation of MIC values obtained in agreement with the most recent EUCAST ECOFFs as reported in the Protocol (Appendix 4b).

3) Participants were requested to apply the same method used when generating AST results to be reported to EFSA. This request was made to ensure compliance with the main objective of this EQAS "to assess and improve the comparability of antimicrobial susceptibility data reported to EFSA by the different NRLs", as stated in the protocol (Appendix 4b). Therefore, only results obtained by MIC determination methods were allowed in this EQAS to comply with Decision 2013/652/EU. Thus, the set-up of the database for reporting results did not allow upload of disk diffusion results.

4) Laboratory performance is considered acceptable if there are < 5% deviations from expected results, as previously agreed by the EURL-AR network.

Evaluation of a result as "deviating from the expected interpretation" should be carefully analysed in a self-evaluation procedure performed by individual participants when the EQAS results are disclosed. MIC determination methods have limitations in reproducibility. Thus, on repeated testing, the same strain/antimicrobial combination can result in two MIC values differing by one-fold dilution. If the expected MIC is close to the threshold for categorising the strain as susceptible or resistant, a one-fold dilution difference may result in different interpretations. Since this report evaluates the interpretations of MIC values, some participants may find their results classified as wrong even though the actual MIC measured is only one-fold dilution different from the expected MIC. In these cases (hereafter defined "one-fold dilution issues"), the participants should be confident about the good quality of their AST performance. At the EURL-AR, we strive to select test strains with MIC values distant from the threshold for resistance to avoid these ambiguous situations, though this is not always feasible for all strains and antimicrobial combinations. For this reason, the EURL-AR network unanimously established in 2008 that, if there are less than 75% correct results for a specific strain/antimicrobial combination, these results may be subtracted from the evaluation report after a case by case evaluation to be detailed in the report.

This report is approved in its final version by a technical advisory group composed by

competent representatives from all NRLs who meet yearly at the EURL-AR workshop.

All conclusions presented in this report are publicly available. However, participating laboratories are identified by codes and each code is known only to the corresponding laboratory. The full list of laboratory codes is confidential information known only by relevant representatives of the EURL-AR and the EU Commission.

The EURL-AR is accredited by DANAK as provider of proficiency testing (accreditation no. 516); working with zoonotic pathogens and indicator organisms as bacterial isolates (identification, serotyping and antimicrobial susceptibility testing).

2. Materials and Methods

2.1 Participants in EQAS 2019

A pre-notification to announce the EQAS 2019 on AST of enterococci, staphylococci and *E. coli* (Appendix 1) was sent by e-mail on the 2nd of May 2019 to the designated NRL-AR in the network and to twelve additional laboratories in Denmark, Iceland, Israel, the Netherlands, Northern Ireland, North Macedonia, Norway, Serbia, Spain, Switzerland, Turkey and United Kingdom invited to participate based on participation to previous EQAS iterations and/or affiliation to the EU network.

Participating laboratories represented all 28 EU Member States (MS) and four non-MS (Iceland, North Macedonia, Norway, and Switzerland; Appendix 2 and Figure 1). Only one set of data per MS is included in this report.

2.2 Strains

The eight enterococci, eight staphylococci and eight *E. coli* included in this EQAS were selected among the DTU-FOOD strain collection based on available MIC data. For quality assurance purposes, one strain per each bacterial species has been included in all EQAS iterations performed to date to represent an internal control.

Expected MIC values (Appendix 3) for this EQAS were generated by using Sensititre panels (Trek

Figure 1. Countries colored in red participated to the EURL-AR EQAS on antimicrobial susceptibility testing of enterococci, staphylococci and/or *Escherichia coli*, 2019

Table 1. Panels of antimicrobials for antimicrobial susceptibility testing included in this EURL-AR EQAS 2019 component

Enterococci	Staphylococci	*Escherichia coli* 1st panel	*Escherichia coli* 2nd panel
Ampicillin, AMP	Cefoxitin, FOX	Ampicillin, AMP	Cefepime, FEP
Chloramphenicol, CHL	Chloramphenicol, CHL	Azithromycin, AZI	Cefotaxime + clavulanic acid (F/C)
Ciprofloxacin, CIP	Ciprofloxacin, CIP	Cefotaxime, FOT	Cefotaxime, FOT
Daptomycin, DAP	Clindamycin, CLN	Ceftazidime, TAZ	Cefoxitin, FOX
Erythromycin, ERY	Erythromycin, ERY	Chloramphenicol, CHL	Ceftazidime, TAZ
Gentamicin, GEN	Gentamicin, GEN	Ciprofloxacin, CIP	Ceftazidime+ clavulanic acid (T/C)
Linezolid, LZD	Linezolid, LZD	Colistin, COL	Ertapenem, ETP
Quinupristin-dalfopristin (Synercid), SYN	Mupirocin, MUP	Gentamicin, GEN	Imipenem, IMI
Teicoplanin, TEI	Quinupristin-dalfopristin (Synercid), SYN	Meropenem, MERO	Meropenem, MERO
Tetracycline, TET	Sulfamethoxazole, SMX	Nalidixic acid, NAL	Temocillin, TRM
Tigecycline, TGC	Sulfamethoxazole+Trimethoprim, SXT	Sulfamethoxazole, SMX	
Vancomycin, VAN	Tetracycline, TET	Tetracycline, TET	
	Tiamulin, TIA	Tigecycline, TGC	
	Trimethoprim, TMP	Trimethoprim, TMP	
	Vancomycin, VAN		

Diagnostic Systems) at DTU-FOOD and further verified by the FDA. Results could not be verified by the FDA for: ampicillin and teicoplanin (enterococci); colistin, ertapenem, meropenem, temocillin, trimethoprim and tigecycline (*E. coli*); and cefoxitin, clindamycin, mupirocin, sulfamethoxazole, sulfamethoxazole-trimethoprim, tiamulin and trimethoprim (staphylococci). MICs were further determined at DTU-FOOD after production of agar stab cultures to confirm expected values prior to shipment and to ensure homogeneity of the test cultures.

Reference strains *Enterococcus faecalis* ATCC 29212, *Staphylococcus aureus* ATCC 29213 and *E. coli* ATCC 25922 were provided to new participants with instructions to store and maintain them for quality assurance purposes and future EQAS trials. The expected quality control ranges for the reference strains were retrieved from Clinical and Laboratory Standards Institute (CLSI) in documents M100-29th Ed. (2019) (App. 5).

2.3 Antimicrobials

The panels of antimicrobials recommended for AST in this trial are listed in Table 1.

These antimicrobials represent those defined by the Commission Implementing Decision 2013/652/EU for *E. coli* and enterococci, and those most recently recommended by EFSA for staphylococci.

2.4 Distribution

The bacterial strains were dispatched as agar stab cultures on 3rd of July 2019. These bacterial cultures were shipped in double pack containers (class UN 6.2) as UN3373, biological substances category B according to the International Air

Transport Association (IATA) regulations.

2.5 Procedure

The participants were recommended to keep the agar stab cultures refrigerated until performance of AST. Protocols and all relevant information were uploaded on the EURL-AR website (http://www.eurl-ar.eu) thus being available at any time (Appendix 4). Guidelines for performing AST were set according to the ISO standard, ISO 20776-1 "Clinical laboratory testing and in vitro diagnostic test system – Susceptibility testing of infectious agents and evaluation of performance of antimicrobial susceptibility test devices".

Instructions for interpretation of AST results adhered to the most recent EUCAST ECOFFs, and were provided in the protocol (Appendix 4b: Tables 1, 2 and 3). Participants were invited to categorise the strains as resistant or susceptible using EUCAST epidemiological cut-off (ECOFF) values (www.eucast.org). For interpretation of the results of the *E. coli* 2nd panel (to be tested when a strain displayed resistance to cefotaxime, ceftazidime and/or meropenem in the *E. coli* 1st panel) participants were invited to adhere to recommendations by EFSA (Appendix 4b).

The EURL-AR is aware that there are two types of criteria for interpretation of MIC results: clinical breakpoints and ECOFF values. The terms 'susceptible', 'intermediate' and 'resistant' should be used for classification made in relation to the therapeutic application of antimicrobial agents, whereas bacteria should be reported as 'wild-type' or 'non-wild-type' when reporting data relative to ECOFF values (Schwarz et al., 2010). To simplify the interpretation of results, we maintain the terms susceptible and resistant throughout this report even when referring to wild-type and non-wild-type strains, respectively.

All participants were invited to enter the obtained results into an electronic record sheet at the EURL-AR web-based database designed for this trial. Participants were also encouraged to complete an evaluation form available on the EURL-AR database with the aim to improve future EQAS trials.

The database could be accessed through a secured individual login and password.

The database was closed on 25th November 2019.

After this date, the participants were invited to login again to retrieve an individual database-generated evaluation report.

3. Results and Discussion

In this report, results from 26, 30 and 33 laboratories for enterococci, staphylococci and *E. coli* were evaluated, respectively.

The number of laboratories testing enterococci diminished by two compared to 2018.

The number of laboratories testing staphylococci increased by five compared to 2018 because: i) a higher number of NRLs signed up for this EQAS component, and ii) all participants used the broth microdilution method according to the ISO standard 20776-1, whereas in previous years some laboratories used the agar dilution method and therefore their results were not included in the evaluation report.
The number of laboratories testing *E. coli* increased by one compared to 2018 due to participation of the NRL from Serbia (EU candidate countries).

The participants were invited to report MIC values and categorisation as resistant or susceptible for each strain/antimicrobial

combination. Only the categorisation was evaluated, whereas the MIC values were used as supplementary information.

3.1 Results excluded from the report

The following strain/antimicrobial combinations resulted in ≥ 25% deviations from expected results: ENT-14.1/CHL, ENT-14.6/TGC, ST-14.8/CIP; EC-14.8/IMI. In agreement with the decision by the EURL-AR network these results were carefully evaluated as reported below.

Table 2. Strain/antimicrobial combinations yielding ≥25% deviations from expected results excluded from the report

Strain/Antimicrobial	Expected MIC/int.[1]	Agree[2]	Disagree[3]
ENT-14.1/CHL	64/R	17	9[4]
ENT-14.6/TGC[5]	0.25/S	18	7[6]
ST-14.8/CIP	1/S	20	10[7]
EC-14.8/IMI[8]	1/R	18	13[9]

CHL, chloramphenicol; CIP, ciprofloxacin; IMI, imipenem; TGC, tigecycline.
[1] MIC values are reported in mg/L; int., interpretation. [2]Number of laboratories with expected interpretation. [3]Number of laboratories with interpretation different from expected. [4]Nine laboratories reported MIC=32/S, one laboratory reported MIC=16/S. [5]One laboratory did not report interpretation of the MIC value. [6]Six laboratories reported MIC=0.5/R, one laboratory reported MIC=0.12/R. [7]Nine laboratories reported MIC=2/R, one laboratory reported MIC=8/R. [8]Two laboratories did not report interpretation of the MIC value. [9]Eight laboratories reported MIC=0.5/S, five laboratories reported MIC=0.25/S.

All results regarding the strain/antimicrobial combinations reported in Table 2 were excluded from the report as they mostly represented deviations caused by “one-fold dilution issues” that cannot be considered representative of the ability of the laboratories to perform AST.

3.2 Overall performance

The percentage of results in agreement with those expected ranged from 96.8% (strain ST-14.4) to 100% (strain EC-14.8) (Table 3). The enterococci and *E. coli* trials yielded the highest percentages of correct results (98.7 and 99.5%, respectively) that were ever observed since the EQAS started in 2008. The *S. aureus* trial yielded results in line with those observed in 2018 (98.7% correct results), which are among the best ever obtained in the EURL-AR EQAS iterations.
Thus, the percentage of deviations from the expected results appears to be stably low (around 1%) at least since 2014 (Figure 2). The results for the internal *Enterococcus* sp. control strain were the best ever obtained since the beginning of this EURL-AR EQAS components in 2008 (Figure 2). The results for the *E. coli* control strain were good and fairly stable compared to previous years, whereas the results for the *S. aureus* control strain worsened slightly compared to the results obtained in 2016-2018.

The list of deviations is reported in Appendices 8a, 8b and 8c.

Table 3. Total number (No.) and percentage (%) of antimicrobial susceptibility tests (AST) performed and in agreement with expected (correct) in the EURL-AR EQAS 2019

Strain	No. AST	No. correct	% correct	Strain	No. AST	No. correct	% correct	Strain	No. AST	No. correct	% correct
ENT-14.1	260	257	98,8	ST-14.1	524	520	99,2	EC-14.1	487	486	99,8
ENT-14.2	286	284	99,3	ST-14.2	524	517	98,7	EC-14.2	764	762	99,7
ENT-14.3	312	305	97,8	ST-14.3	524	519	99,0	EC-14.3	764	759	99,3
ENT-14.4	286	285	99,7	ST-14.4	524	507	96,8	EC-14.4	494	487	98,6
ENT-14.5	312	307	98,4	ST-14.5	524	517	98,7	EC-14.5	763	758	99,3
ENT-14.6	286	280	97,9	ST-14.6	524	520	99,2	EC-14.6	764	759	99,3
ENT-14.7	312	310	99,4	ST-14.7	523	522	99,8	EC-14.7	761	759	99,7
ENT-14.8	312	309	99,0	ST-14.8	494	486	98,4	EC-14.8	731	731	100

*ENT, enterococci; ST, *S. aureus* ; EC, *Escherichia coli*.

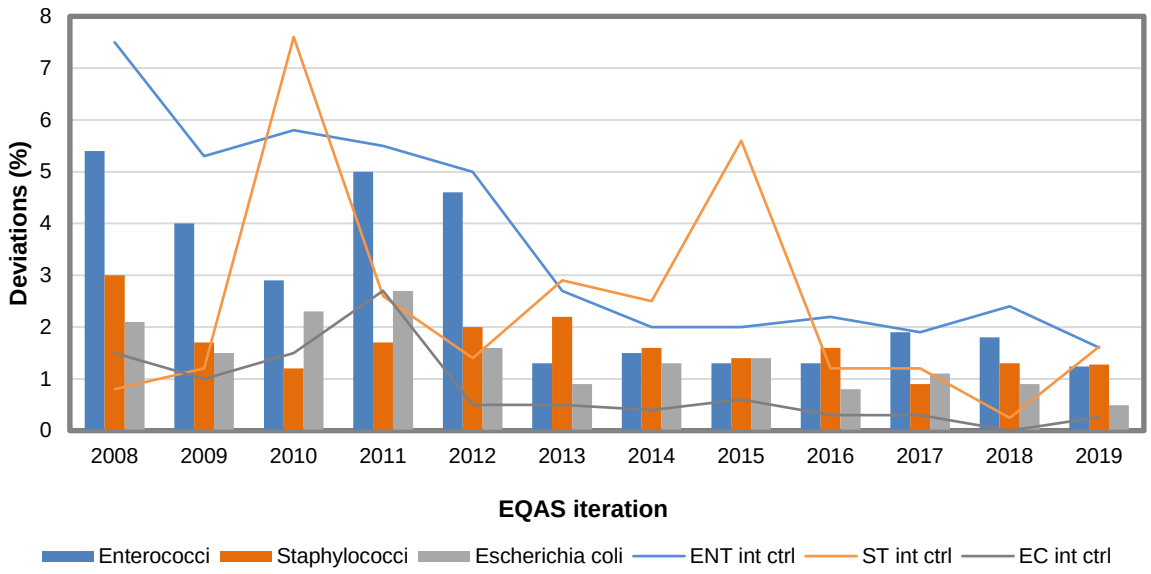

Figure 2. Overall deviations (%) from expected results by EQAS iteration. ENT, enterococci; ST, staphylococci; EC, *Escherichia coli*; int ctrl, internal control.

3.2.1 Enterococci

Twenty-six laboratories (from 24 MS and two non-EU countries) approved results for the enterococci trial.

Strain-based analysis

Deviations ranged from 0.3% (n=1) for ENT-14.4 to 2.2% (n=7) for ENT-14.3 (Figure 3). In strains ENT-14.4, ENT-14.5 and ENT-14.6, all MIC values obtained were in the acceptable range and deviations were due to “one-fold dilution

issues" and/or interpretation of MIC values different from what indicated in the protocol. True technical performance issues, i.e. MIC value outside the acceptable range, were observed only in one or two cases for ENT-14.1, ENT-14.2, ENT-14.3, ENT-14.7 and ENT-14.8 (Figure 3).

Antimicrobial-based analysis

No deviations from expected results were obtained when testing susceptibility to ciprofloxacin and gentamicin (Figure 4). For chloramphenicol and tigecycline, all deviations represented one-fold dilution issues and thus no technical problems in testing susceptibility to these antimicrobials was observed. Also for daptomycin susceptibility testing, no technical issue was identified and the deviations observed were due to the use of a different ECOFF compared to that reported in the protocol. In details, the protocol recommended to interpret daptomycin MIC for *E. faecium* according to the updated EUCAST ECOFF value (MIC = 8 mg/L), which might have created some confusion since the daptomycin ECOFF for *E. faecium* reported in the AMR monitoring legislation (Commission Implementing Decision 2013/652/EU) is the old one (MIC = 4 mg/L). Between one and two deviations that might represent performance issues were observed for ampicillin, erythromycin, linezolid, teicoplanin, tetracycline and vancomycin (Figure 4).

An overview of obtained and expected results is reported in Appendix 7a.

Laboratory-based analysis

Twelve laboratories (46%) reported all results in agreement with those expected (Figure 5). Furthermore, all deviations from six additional laboratories were "one-fold dilution issues" thus indicating that 69.2% of the laboratories participating to this EQAS component had no technical performance issues (Figure 5).

Lab # 12, 17 and 23 had one deviation each. Lab # 12 and 17 reported the MIC value (for vancomycin and quinupristin-dalfopristin, respectively) as expected but interpreted it differently from what indicated in the protocol. This deviation therefore does not represent any issue in performing MIC determination but is likely a consequence of a typo when uploading results to the database. Lab #23 obtained vancomycin MIC two two-fold dilutions below the expected value and classified as vancomyin susceptible one isolate that was expected to exhibit *vanB*-mediated vancomycin resistance.

Lab # 36 and 40 had two deviations each, however in both cases one of such deviation was a one-fold dilution issue. For Lab # 36, the second deviation was due to interpretation of daptomycin MIC value, which was obtained in agreement with the expected value, using a criterium different from what indicated in the protocol, as explained above. Therefore, such deviation is likely the result of miscommunication and does not indicate any performance problem. For Lab # 40, the second deviation was due to obtained linezolid MIC that was two two-fold dilutions lower than expected. This led to classification as linezolid susceptible of an isolate expected to exhibit *optrA*-mediated linezolid resistance.

Lab # 39 had four deviations that indicated performance problems due to obtained MIC being very different from expected MIC. This led the laboratory to classify strain 14.2 as erythromycin and tetracycline resistant, and strain 14.7 as teicoplanin resistant. In all these cases, the expected interpretation was 'susceptible'. Furthermore, this laboratory classified strain 14.8 as ampicillin susceptible, whereas it was expected to be resistant. Nonethless, this laboratory had percentages of deviations within the threshold for acceptable laboratory performance, which is set at 5 % (Figure 5).

Lab # 64 had 9.8 % (n=9) deviations, and thus was considered an outlier. However, only one of these deviations indicated technical problems in

MIC determination. This case concerned strain 14.7, which was scored as linezolid resistant with MIC = 16 mg/L whereas it was expected to be susceptible with MIC = 1 mg/L. Linezolid MIC reading might be difficult due to occurrence of tiny pellets of dubious interpretation (trailing growth) and it is therefore recommended to consult the CLSI document M07-Ed.11th for detailed guidelines on MIC reading when trailing occurs. In the remaining cases scored as deviations, this laboratory obtained MIC that was one-fold dilution different from expected or even as expected but interpreted differently from what indicated in the protocol and in the legislation (Commission Implementing Decision 2013/652/EU). These cases therefore do not represent technical problems in obtaining the correct MIC value, however it is recommended to review the procedure for interpretation of MIC values.

Deviations from expected results obtained by each participant in the enterococci trial are reported in Appendix 8a.

Enterococci species identification

Participants were requested to identify the enterococci species as a mandatory component. The test strains were three *E. faecalis* (ENT-14.1, ENT-14.2 and ENT- 14.4) and five *E. faecium* (ENT-14.3, ENT-14.5, ENT-14.6, ENT-14.7 and ENT-14.8). Enterococci species identification results were uploaded by all participants for a total of 208 results of which 206 (99%) were in agreement with those expected. Two deviations were obtained since Lab # 39 and 40 identified strain 14.4 as *E. faecium* whereas it was *E. faecalis*.

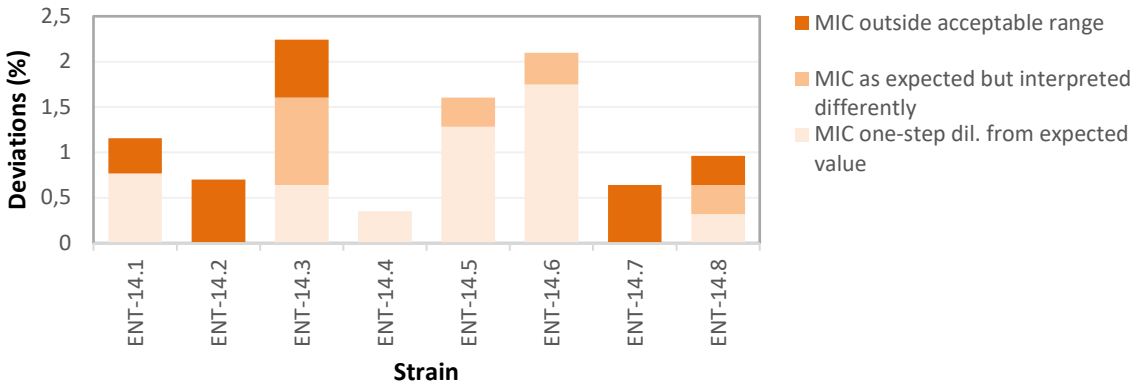

Figure 3. Deviations (%) from expected interpretation of AST result for each *Enterococcus* sp. strain, EURL-AR EQAS 2019. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

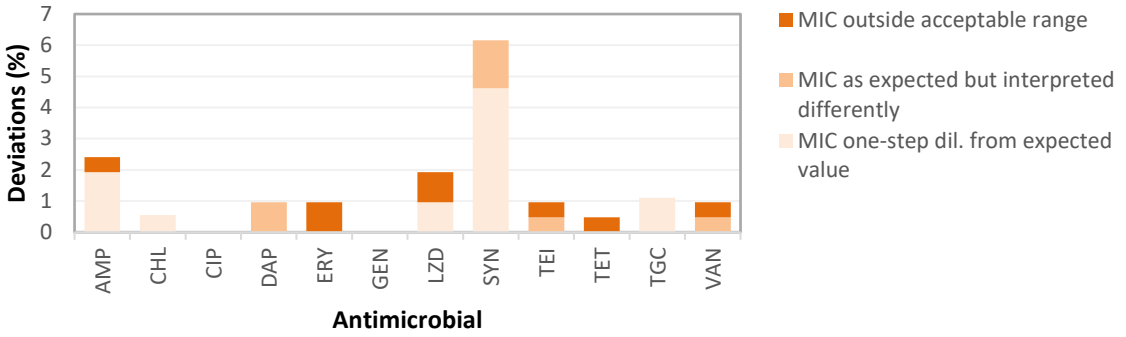

Figure 4. Deviations (%) from expected interpretation of AST results for each antimicrobial. Enterococci component of the EURL-AR EQAS 2019. AMP, ampicillin; CHL, chloramphenicol; CIP, ciprofloxacin; DAP, daptomycin; ERY, erythromycin; GEN, gentamicin; LZD, linezolid; SYN, quinupristin/dalfopristin (synercid); TEI, teicoplanin; TET, tetracycline; TGC, tigecycline; VAN, vancomycin. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

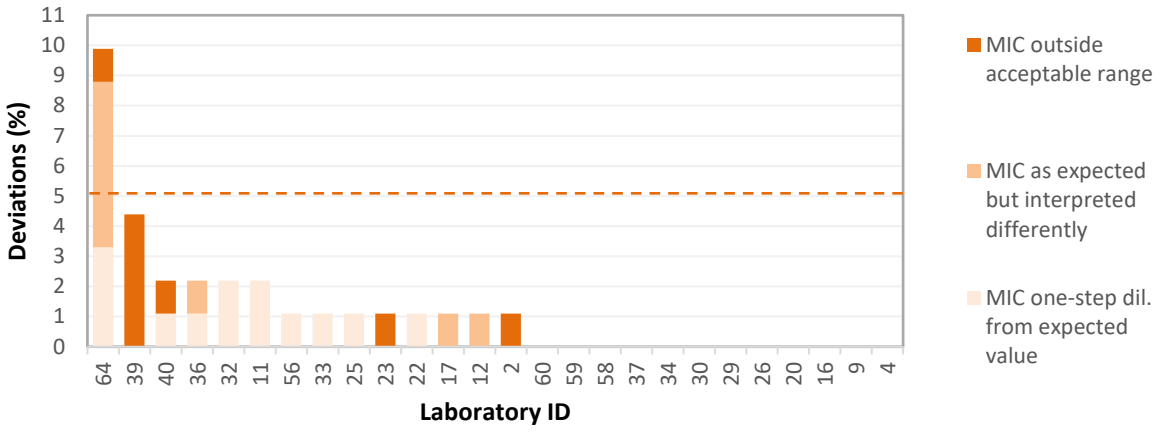

Figure 5. Deviations (%) by participating laboratory in the enterococci trial, EURL-AR EQAS 2019. The dashed line indicates the threshold (5%) for acceptable laboratory performance. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

3.2.2 Staphylococci

Thirty laboratories (from 26 MS and four non-MS) uploaded results for the staphylococci trial.

Strain-based analysis

Deviations ranged from 0.2% (n=1) in ST-14.7 to 3.2% (n=17) in ST-14.4 (Figure 6). In ST-14.7, the deviation observed was a "one-fold dilution issue", thus no technical problems in testing this strain were experienced by any of the laboratories. For each of the remaining strains, between two and five deviations due to observed MIC value outside the acceptable range were observed, which might indicate sporadic occurrence of technical performance issues.

Antimicrobial-based analysis

All (100%) results for kanamycin, linezolid, mupirocin, rifampicin and vancomycin were in agreement with those expected (Figure 7).

The antimicrobials that resulted in highest percentages of deviations were sulfamethoxazole (5.1%), fusidic acid (3.4%) and clindamycin (2.9%) (Figure 7). For sulfamethoxazole, eight out of 12 (66%) deviations indicated performance issues. Sulfamethoxazole MIC reading is challenging as MIC has to be read at the concentration in which there is ≥ 80% reduction in growth compared to the positive control, which may lead to subjective interpretations.

For fusidic acid, six out of eight (75%) deviations represented "one-fold dilution issues", thus indicating overall very minor technical performance problems in testing *S. aureus* susceptibility to this antimicrobial.

For clindamycin, all seven (100%) deviations represented "one-fold dilution issues", thus indicating no technical performance problems in testing *S. aureus* susceptibility to this antimicrobial.

For cefoxitin, which is used for phenotypic detection of MRSA, four deviations were observed and three represented possible performance issues.

An overview of obtained and expected results is reported in Appendix 7b.

Laboratory-based analysis

Twelve laboratories (40%) reported all results in agreement with those expected (Figure 8). Furthermore, all deviations from six additional laboratories were "one-fold dilution issues" thus indicating that 60% of the laboratories participating to this EQAS component had no technical performance issues (Figure 8).

Lab # 2, 18, 31, 34 and 36 had one deviation each. Lab # 18, 34 and 36 reported an incorrect sulfamethoxazole MIC for either ST-14.2 or ST-14.4. Lab # 2 and 31 reported an incorrect MIC for streptomycin/ST-14.5 and ciprofloxacin/ST-14.3, respectively.

Lab # 17 had two deviations, of which one might indicate a performance issue in sulfamethoxazole susceptibility testing of ST-14.8 whereas the other was due to a öne-fold dilution issue".

Lab # 33, 42 and 64 had three deviations each. In Lab # 33, the deviations might indicate performance issues in sulfamethoxazole (ST-14.1 and ST-14..4) and cefoxitin (ST-14.1) MIC determination. In Lab # 42 and 64, one and two deviations due to MIC out of acceptable range were observed for fusidic acid (Lab # 42 in ST-14.3 and Lab # 64 in ST-14.4) and quinupristin-dalfopristin (Lab #64 in ST-14.5). The remaining deviations were due to "one-fold dilution issues" or, in case of Lab # 42, erroneous interpretation of a MIC value obtained as expected.

Lab # 39 had five deviations of which four might indicate issues in cefoxitin and sulfamethoxazole susceptibility testing (ST-14.2), tetracycline

susceptibility testing (ST-14.4) and gentamicin susceptibility testing (ST-14.8), whereas the remaining deviation represents a “one-fold dilution issue”.

Lab # 11 and 45 were considered outliers as they had > 5% deviations. However, for both laboratories, the performance was within the acceptable threshold when disregarding the deviations due to “one-fold dilution issues”. For Lab # 11, a switch between strains ST-14.5 and 14.6 was suspected. For Lab # 45, MIC values outside acceptable range were observed for cefoxitin and ciprofloxacin in ST-14.3, sulfamethoxazole in ST-14.2 and chloramphenicol in ST-14.8. As sulfamethoxazole and chloramphenicol MIC reading are challenging due to incomplete inhibition and trailing growth, respectively, it is recommended to consult the CLSI document M07-Ed.11th for detailed guidelines on reading MIC for these antimicrobials.

Deviations from expected results obtained by each participant in the staphylococci trial are reported in Appendix 8b.

Methicillin-resistant *S. aureus*

Participants were requested to identify the presence/absence of methicillin resistance as a mandatory component. The test strains included: i) six methicillin-resistant *S. aureus* (MRSA) that were ST-14.1 (*mecC*), ST-14.2 (*mecA*), ST-14.5 (*mecA*), ST-14.6 (*mecA*), ST-14.7 (*mecA*) and ST-14.8 (*mecA*); and two methicillin-susceptible *S. aureus* (MSSA) that were ST-14.3 and ST-14.4. All participants except one (Lab # 64) submitted MRSA results, whereas all participants submitted MSSA results, for a total of 234 results. Only one result was incorrect as Lab # 33 did not identify ST-14.1 as MRSA. Interestingly, two laboratories that had deviations in cefoxitin susceptibility testing (Lab # 39 for ST-14.2 and Lab # 45 for ST-14.3 and ST-14.4) performed correct MRSA/MSSA identification. Lab # 45 performed searches for *mecA* and *mecC* and reported results based on molecular findings, whereas Lab # 39 did not describe the procedure used but obtained correct results in all strains.

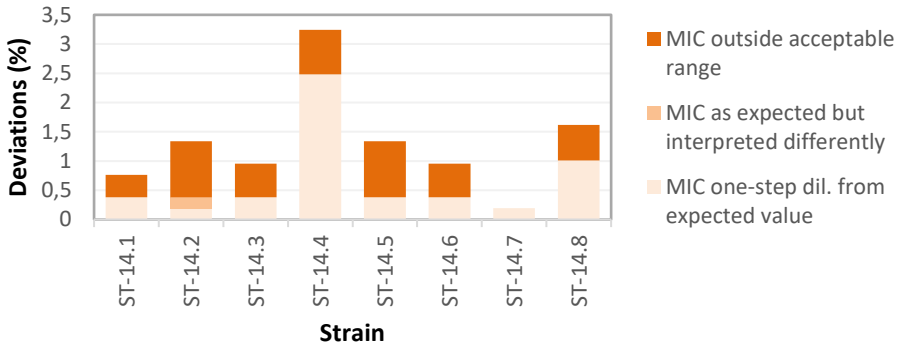

Figure 6. Deviations (%) from expected interpretation of AST results for each *Staphylococcus aureus* strain, EURL-AR EQAS 2019. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

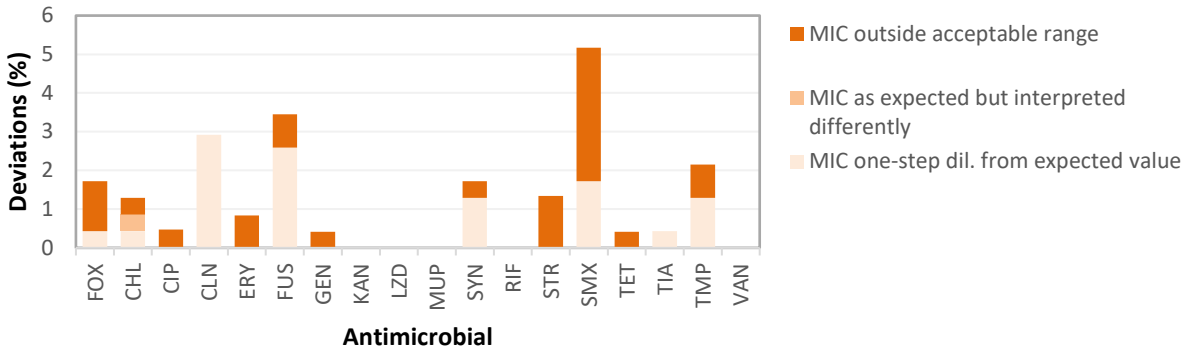

Figure 7. Deviations (%) from expected interpretation of AST results for each antimicrobial. *Staphylococcus aureus* component of the EURL-AR EQAS 2019. FOX, cefoxitin; CHL, chloramphenicol; CIP, ciprofloxacin; CLN, clindamycin; ERY, erythromycin; FUS, fusidic acid; GEN, gentamicin; KAN, kanamycin; LZD, linezolid; MUP, mupirocin; SYN, quinupristin/dalfopristin (synercid); RIF, rifampicin; SMX, sulfamethoxazole; TET, tetracycline; TIA, tiamulin; TMP, trimethoprim; VAN, vancomycin. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

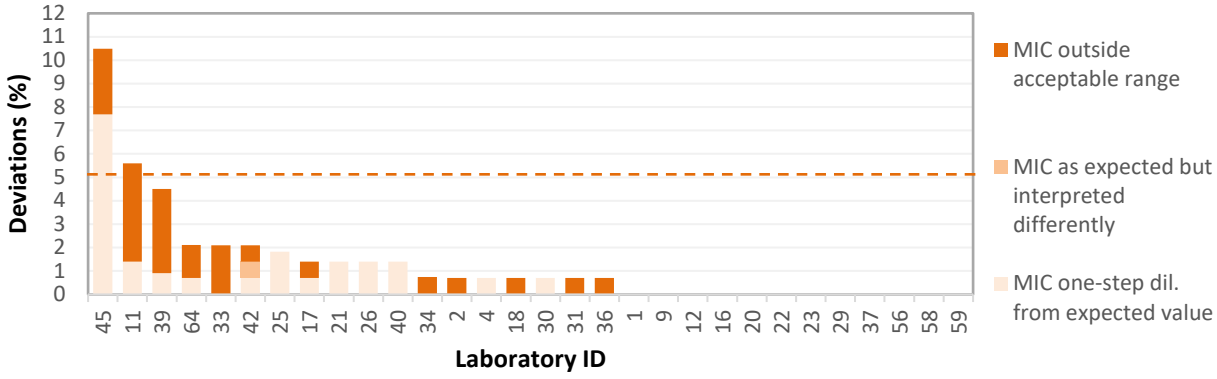

Figure 8. Deviations (%) by participating laboratory in the staphylococci trial, EURL-AR EQAS 2019. The dotted line indicates the threshold for acceptable laboratory performance. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

3.2.3 *Escherichia coli*

Thirty-three laboratories (from 28 MS and five non-MS) uploaded results for the *E. coli* trial.

Strain-based analysis

Deviations ranged from 0% for EC-14.8 to 1.4% (n=7) for EC-14.4 (Figure 9).
For EC-14.1, EC-14.3, EC-14.4 and EC-14.5, most or all deviations were due to "one-fold dilution issues" and to erroneous interpretation (and/or typo when uploading results to the database) of a correctly obtained MIC value. For EC-14.2 and EC-14.6, most or all deviations indicated technical issues in obtaining a MIC value within the acceptable range.

Antimicrobial-based analysis

No deviations from expected results were obtained when testing susceptibility to ampicillin, cefotaxime, cefotaxime/clavulanic acid, ciprofloxacin, colistin, imipenem, sulfamethoxazole, temocillin and trimethoprim (Figure 10). The antimicrobials that resulted in highest percentages of deviations were azithromycin (6 out of 256 results; 2,3%), cefepime (4/205; 1.9%), tigecycline (4/264; 1.5%) and cefoxitin (3/205; 1.4%). For azithromycin and cefoxitin, all deviations were represented by "one-fold dilution issues". For cefepime and tigecycline, half of the deviations were "one-fold dilution issues", and the remaining ones might indicate technical performance problems for cefepime, and technical performance problems and/or erroneous interpretation (and/or typo when uploading results to the database) of a correctly obtained MIC value for tigecycline (Figure 10). Issues in interpretations of MIC values otherwise obtained within the acceptable range constituted the cause of the deviations (2/264) observed for gentamicin. This might have been caused by a distraction and/or a typo when entering results in the database. Although occurring sporadically, all deviations for chloramphenicol (1/264), ertapenem (1/205), meropenem (2/469) and tetracycline (1/264) might indicate technical issues. The deviations for meropenem are of particular concern since such antimicrobial is used for recognizing carbapenemase producers. Deviations were obtained sporadically also for cefotaxime/clavulanic acid (1/127), ceftazidime (1/469) and nalidixic acid (1/264), and they all represented "one-fold dilution issues".

An overview of obtained and expected results is reported in Appendix 7c.

Laboratory-based analysis

All laboratories (100%) performed within the threshold for acceptable laboratory performance (≤5%), which represents an extremely positive outcome of the *E. coli* component of the EURL-AR EQAS 2019.

Eighteen laboratories (54.5%) reported all results in agreement with those expected and (Figure 11). Additional five laboratories had deviations only constituted by "one-fold dilution issues", which shows that in 69.6% of laboratories that participated to this EQAS component there was no issue in performing MIC determination of the eight *E. coli* test strains.

Two laboratories (Lab # 12 and 21; 6.1%) had one deviation each due to erroneous interpretation (and/or a typo when entering results in the database) of a MIC result that was obtained within the acceptable range.

One laboratory (Lab # 4 and 17; 6.1%) had three and two deviations each, respectively. These deviations were either due to "one-fold dilution issues" or due to erroneous interpretation (and/or a typo when entering results in the database) of a MIC result that was obtained within the acceptable range. Thus also in these cases there were no technical problems in measuring the correct MIC value.

Possible technical problems were identified, although sporadically, in six (18.2%)

laboratories, namely Lab # 6, 26, 37, 40, 56 and 64. In Lab # 6, 37, 56 and 64, at least half of the observed deviations were due to “one-fold dilution issues”. Deviations due to MIC value outside the acceptable range were obtained for cefepime (EC-14.7/Lab # 64), ertapenem (EC-14.5/ Lab # 6), tetracycline (EC-14.6/Lab # 56) and tigecycline (EC-14.2/ Lab # 37).

In Lab # 26 and 40, the observed deviations (two in each laboratory) were due to MIC value outside the acceptable range for meropenem (EC-14.6 panel 1 and panel 2/Lab # 26) and cefepime and chloramphenicol (EC-14.3 and EC-14.2, respectively, in Lab # 40).

Deviations from expected results obtained by each participant in the *E. coli* trial are reported in Appendix 8c.

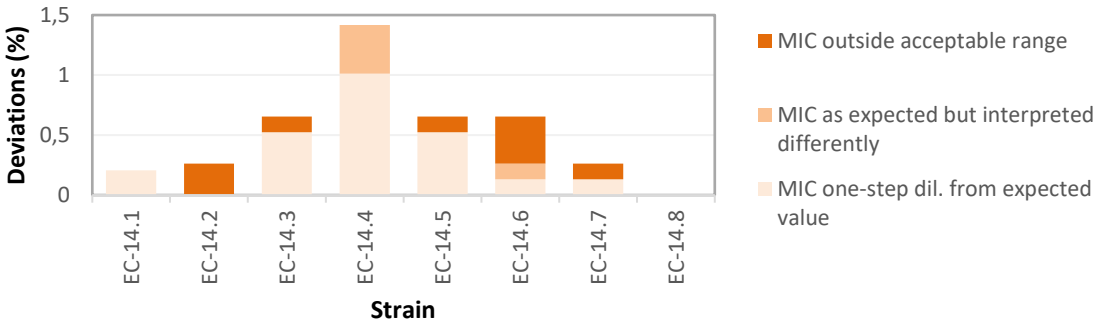

Figure 9. Deviations (%) from expected interpretation of AST results for each *Escherichia coli* strain, EURL-AR EQAS 2019. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

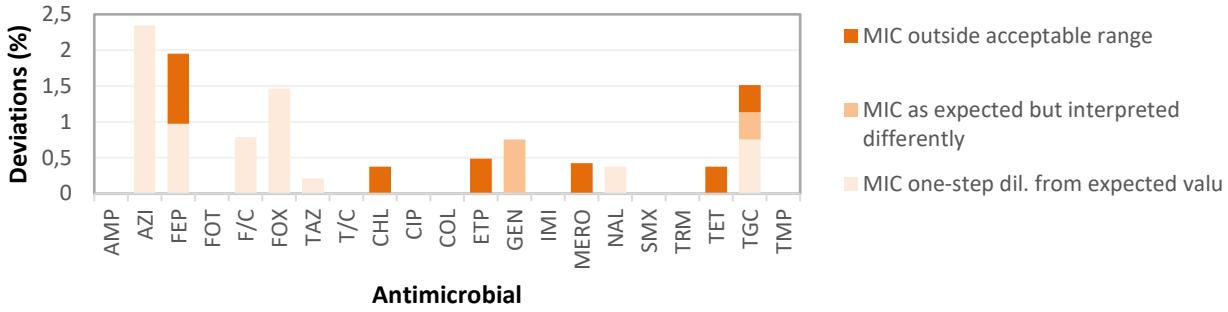

Figure 10. Deviations (%) from expected interpretation of AST results for each antimicrobial. *Escherichia coli* component of the EURL-AR EQAS 2019. AMP, ampicillin; AZI, azithromycin; FEP, cefepime; FOT, cefotaxime; TAZ, ceftazidime; CHL, chloramphenicol; CIP, ciprofloxacin; COL, colistin; ETP, ertapenem; F/C, cefotaxime/clavulanic acid; GEN, gentamicin; IMI, imipenem; MERO, meropenem; NAL, nalidixic acid; SMX, sulfamethoxazole; T/C, ceftazidime/clavulanic acid; TET, tetracycline; TGC, tigecycline; TMP, trimethoprim; TRM, temocillin. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

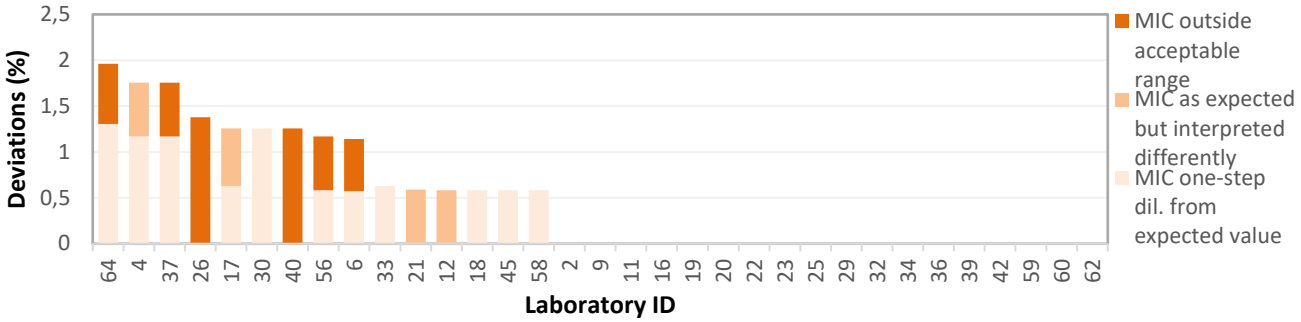

Figure 11. Deviations (%) by participating laboratory in the *Escherichia coli* trial, EURL-AR EQAS 2019. "MIC outside acceptable range" could indicate a technical performance issue, whereas "MIC one-step dilution from expected value" represents a limitation in reproducibility of the MIC method and not a technical performance issue (see text for further details). "MIC as expected but interpreted differently" represents cases of MIC values obtained as expected but interpreted differently from what indicated in the protocol (see text for further details).

Strain code		EC-14.1	EC-14.2	EC-14.3	EC-14.4	EC-14.5	EC-14.6	EC-14.7	EC-14.8
Expected results (based on panel 2 phenotype)		Suscept	AmpC	AmpC	Suscept.	ESBL	Carbapenemase	ESBL	Carbapenemase
Obtained results	ESBL			1/33 (3.1%)		31/33 (94%)		33/33 (100%)	
	AmpC		32/33 (96.9%)	30/33 (90.9%)					
	ESBL + AmpC		1/33 (3.1%)	2/33 (6%)		2/33 (6%)			
	Carbapenemase						32/33 (96.9%)		33/33 (100%)
	Other						1/33 (3.1%)		
	Susceptible	33/33 (100%)			33/33 (100%)				
Genetic background		no beta-lactam resistance gene detected	Mutation in chromosomal *ampC* promoter (C-42T);	Mutation in chromosomal *ampC* promoter (C-42T); bla_{SHV-2} (99.8%)	no beta-lactam resistance gene detected	$bla_{CTX-M-15}$	bla_{VIM-1}; bla_{CMY-13}; bla_{SHV-5}	$bla_{CTX-M-1}$	$bla_{OXA-244}$; $bla_{CTX-M-14}$

Table 4. Expected and obtained classification of beta-lactam resistance phenotype and genetic background of each *Escherichia coli* strain. EURL-AR EOAS 2019.

Beta-lactamase-producing *E. coli*

Participants were requested to detect the production of beta-lactamases and classify the beta-lactam resistance phenotype into Extended-Spectrum Beta-Lactamase (ESBL)/AmpC/carbapenemase production as a mandatory component.

Guidelines for interpretation of the beta-lactam resistance phenotype were specified in the protocol (Appendix 4b) and were in agreement with the latest recommendations by EFSA.

Based on the results of panel 2, in this EQAS, EC-14.2 and EC-14.3 were AmpC producers, EC-14.5 and EC-14.7 were ESBL producers, and EC-14.6 and EC-14.8 were carbapenemase producers. The remaining strains (EC-14.1 and EC-14.4) did not produce any beta-lactamase mediating ESBL/AmpC/carbapenemase phenotype.

All 33 participants uploaded results for this part of the *E. coli* trial. All laboratories identified the strains that produced ESBL/AmpC/carbapenemase and only minor differences from expected results were obtained as follows. EC-14.2 was an AmpC producer and one laboratory (Lab # 64) categorized it as ESBL+AmpC despite obtaining all phenotypic results in agreement with the expected results. Therefore, this laboratory should revise the criteria for ESBL/AmpC categorization. EC-14.3 was an AmpC producer based on panel 2 results but upon genetic analysis it was shown that it also harboured an ESBL-encoding gene. Thus, although the laboratories reporting ESBL+AmpC (Lab # 21 and 64) or ESBL (Lab # 4) did not specify the method used and according to their results from panel 2 they should have chosen the AmpC categorization, it is not wrong to report also the ESBL when considering all available data. However, it is important to emphasize that the results are evaluated based on phenotypes and the genotypic characterization is performed on a voluntary basis. EC-14.5 was expected to be an ESBL but two laboratories (Lab # 6 and 58) categorized it as ESBL+AmpC producer. These two laboratories performed the

categorization correctly based on the results they obtained, lince cefoxitin MIC was one-step dilution above the expected value. Thus, no deviation should be considered in these cases. EC-14.6 was a carbapenemase producer. One laboratory (Lab # 26) did not detect meropenem resistance however it recognized an unusual phenotype and categorized it as "other phenotypes".

3.3 Performance in AST of the quality control strains

Antimicrobial susceptibility test results for the quality control strains were evaluated based on the CLSI quality control ranges (Appendix 5).

3.3.1 *Enterococcus faecalis* ATCC 29212

All 26 participants in the enterococci trial performed AST of *E. faecalis* ATCC 29212 by MIC determination reporting a total of 312 test results, of which 99.3% were within the acceptable range (Table 5). Each of two laboratories (Lab # 39 and 64) obtained one value outside the acceptable range that was one-fold dilution below the lowest value in the acceptable range.

Table 5. Antimicrobial susceptibility testing of *Enterococcus faecalis* ATCC 29212 by MIC determination

Antimicrobial	Proportion outside of range	Below acceptable range	Above acceptable range
Ampicillin	0/26 (0%)	–	–
Chloramphenicol	0/26 (0%)	–	–
Ciprofloxacin	0/26 (0%)	–	–
Daptomycin	1/26 (3.8%)	1	–
Erythromycin	0/26 (0%)	–	–
Gentamicin	0/26 (0%)	–	–
Linezolid	0/26 (0%)	–	–
Quinu/dalfopristin	0/26 (0%)	–	–
Teicoplanin	0/26 (0%)	–	–
Tetracycline	1/26 (3.8%)	1	–
Tigecycline	0/26 (0%)	–	–
Vancomycin	0/26 (0%)	–	–

3.3.2 *Staphylococcus aureus* ATCC 29213

All 30 participants in the staphylococci trial performed AST of *S. aureus* ATCC 29213 by MIC determination reporting a total of 461 test results, of which 99.3% were within the acceptable range (Table 6). One of the deviations observed for penicillin was obtained by Lab # 30 reporting a MIC one-fold dilution below the lowest value of the acceptable range. The second deviation for penicillin was obtained by Lab # 31 reporting a MIC which was two two-fold dilutions above the highest value in the acceptable range. The deviation for sulfamethoxazole was obtained by Lab # 33 reporting a MIC one two-fold dilution above the highest value in the acceptable range.

Table 6. Antimicrobial susceptibility testing of *Staphylococcus aureus* ATCC 29213 by MIC determination

Antimicrobial	Proportion outside of range	Below acceptable range	Above acceptable range
Cefoxitin	0/29 (0%)	–	–
Chloramphenicol	0/29 (0%)	–	–
Ciprofloxacin	0/30 (0%)	–	–
Clindamycin	0/30 (0%)	–	–
Erythromycin	0/30 (0%)	–	–
Fusidic acid	0/27 (0%)	–	–
Gentamicin	0/30 (0%)	–	–
Kanamycin	0/27 (0%)	–	–
Linezolid	0/30 (0%)	–	–
Penicillin	2/27 (7.4%)	1	1
Quinu/dalfopristin	0/29 (0%)	–	–
Rifampicin	0/26 (0%)	–	–
Sulfamethoxazole	1/29 (3.4%)	–	1
Tetracycline	0/30 (0%)	–	–
Trimethoprim	0/29 (0%)	–	–
Vancomycin	0/29 (0%)	–	–

3.3.3 *Escherichia coli* ATCC 25922

All 33 participants in the *E. coli* trial tested *E. coli* ATCC 25922 by MIC determination reporting a total of 638 test results, of which 99.6% were within the acceptable range (Table 7). The deviations for ciprofloxacin and cefoxitin were obtained by Lab # 23 and 64, respectively. Both deviations were due to MIC value on-step dilution above the highest value in the acceptable range.

Further details on test results of quality control

strains are reported in Appendix 6.

Table 7. Antimicrobial susceptibility testing of *Escherichia coli* ATCC 25922 by MIC determination.

Antimicrobial	Proportion outside of range	Below accept. range	Above accept. range
Ampicillin	0/33 (0%)	–	–
Cefotaxime	0/62 (0%)	–	–
Ceftazidime	0/63 (0%)	–	–
Chloramphenicol	0/33 (0%)	–	–
Ciprofloxacin	1/33 (3%)	–	1
Colistin	0/33 (0%)	–	–
Gentamicin	0/33 (0%)	–	–
Meropenem	0/63 (0%)	–	–
Nalidixic acid	0/33 (0%)	–	–
Sulfamethoxazole	0/33 (0%)	–	–
Tetracycline	0/33 (0%)	–	–
Tigecycline	0/33 (0%)	–	–
Trimethoprim	0/33 (0%)	–	–
Cefepime	0/30 (0%)	–	–
Cefoxitin	1/30 (3.3%)	–	1
Ertapenem	0/30 (0%)	–	–
Imipenem	0/30 (0%)	–	–

4. Conclusions

This report presented the results of the EURL-AR EQAS 2019 for *E. coli*, enterococci and staphylococci. This proficiency test evaluated the performance in i) MIC determination and interpretation, ii) enterococci species identification and iii) detection of relevant phenotypes such as methicillin resistance in *S. aureus* and beta-lactam resistance mediated by ESBL/AmpC/carbapenemase in *E. coli*.

Participants invited to this EQAS represent NRL-AR from each EU MS and additional laboratories affiliated to the EURL-AR network including laboratories from non-MS and laboratories other than NRL-AR in MS.

Results from NRL-AR and from one laboratory per non-MS were analysed in this report, leading to a total of 26 (from 24 MS and two non-EU countries), 30 (from 26 MS and four non-MS) and 33 (from 28 MS and five non-MS) sets of results analysed for enterococci, staphylococci and *E. coli*, respectively.

In the MIC determination and interpretation component, one, two and no laboratories obtained more than 5% deviations in the enterococci, staphylococci and *E. coli* trial, respectively. However, when correcting for deviations due to limitations in reproducibility of the MIC method (see below), only one laboratory in the enterococci component was to be considered as underperforming. Most deviations in this laboratory were due to erroneous interpretation of MIC values obtained in agreement with the expected results and therefore it seems plausible that this laboratory could easily troubleshoot the obtained deviations, as detailed further below.

Generally, a notable proportion of deviations was caused by expected MIC values close to the ECOFF. Thus, a one-fold dilution difference from an expected value, which is a limitation of the MIC determination method reproducibility, resulted in different interpretation and was scored as a deviation. This is not indicative of any performance problem. However, it was also possible to identify a few performance issues that could be addressed in a relatively easy way by the involved laboratories. These issues were deviations due to erroneous interpretation of MIC values that were otherwise obtained within the acceptable range. To avoid this kind of deviations, it is recommended to implement quality control procedures such as having two different persons reading the MIC results and the respective interpretations.

It should also be noted that, in a few cases in the enterococci component, interpretation of MIC values was done differently from what reported in the EURL-AR EQAS 2019 protocol but in agreement with what reported in Commission Implementing Decision 2013/652/EU. The protocol reports the current EUCAST ECOFFs whereas the legislation reports the EUCAST ECOFFs from 2014. The occurrence of different ECOFFs creates confusions but it is important to be aware that ECOFFs values change over time following increased amount of data available and improvements in knowledge on antimicrobial resistance. Of note, EUCAST keeps a log of the revisions of the ECOFFs that is easily accessible from the EUCAST home page https://www.eucast.org/mic_and_zone_distributions_and_ecoffs/new_and_revised_ecoffs/

A few deviations were obtained in susceptibility of certain antimicrobials for which MIC reading presents exceptions to the general rule and might be challenging (e.g. sulfamethoxazole and linezolid, among others). Laboratories having issues in measuring MICs of these antimicrobials should consult the CLSI document M07-Ed.11th

for detailed guidelines on MIC reading and are also invited to contact the EURL-AR that will provide assistance for troubleshooting.

Enterococci species identification was performed correctly by all laboratories for nearly all strains indicating overall excellent performance in this EQAS component.

Also detection of methicillin resistance in *S. aureus* was correctly performed by all laboratories for nearly all strains even though cefoxitin MIC determination yielded a few deviations. This suggests that at least some laboratories rely on methods other than cefoxitin MIC testing (e.g. molecular methods and/or latex agglutination methods) for MRSA/MSSA status determination, which appears to be an effective addition to cefoxitin susceptibility testing.

Detection of ESBL/AmpC/carbapenemase production in *E. coli* was correctly performed by the vast majority of laboratories for nearly all strains. Interpretation of the beta-lactam resistance phenotypes presented minor challenges for a few laboratories. The issues identified mainly concerned correct application of the classification system according to the EFSA guidelines and did not suggest occurrence of severe problems in obtaining the correct phenotypic results, with one notable exception due to missed identification of a carbapenemase producer.

Overall, performance in this EQAS was consistent and even improved compared to the performance observed in EURL-AR EQAS iterations since 2014 both regarding total percentage of deviations and number of laboratories with percentage of deviations above the acceptable limit.

As usual, the EURL-AR welcomes suggestions for improvement of future EQAS trials and invites the network to contribute with ideas for newsletters and for training needs, with the overall goal to continuously improve the knowledge and skills of the laboratories involved in the AMR monitoring.

5. References

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EU Reference Laboratory for Antimicrobial Resistance
External Quality Assurance System (EQAS) 2019

DTU Food
National Food Institute

G00-06-001/23.06.2017

EQAS 2019 FOR *E. COLI*, STAPHYLOCOCCI AND ENTEROCOCCI

The EURL-AR announces the launch of another EQAS, thus providing the opportunity for proficiency testing which is considered an essential tool for the generation of reliable laboratory results of consistently good quality.

This EQAS consists of antimicrobial susceptibility testing of eight *E. coli* isolates, eight staphylococci and eight enterococci isolates. Additionally, quality control (QC) strains *E. coli* ATCC 25922 (CCM 3954), *E. faecalis* ATCC 29212 (CCM 4224), and *S. aureus* ATCC 29213 (CCM 4223) will be distributed to new participants.

It is the recipients' responsibility to comply with national legislation, rules and regulation regarding the correct use and handling of the provided strains and to possess the proper equipment and protocols to handle these strains.

This EQAS is specifically for NRL's on antimicrobial resistance (NRL-AR). Laboratories designated to be NRL-AR do not need to sign up to participate but are automatically regarded as participants. You may contact the EQAS-Coordinator if you wish to inform of changes in relation to your level of participation compared to previous years. The EURL-AR will be able to cover the expenses for one parcel only, per EU Member State. Therefore, countries with more than one laboratory registered on the EURL-AR contact-list will be contacted directly to confirm which laboratory will be included for participation free of charge.

The invitation to participate in the proficiency test is extended to additional participants besides official NRLs and to participants from laboratories which are involved in the network but are not designated NRLs (cost for participation will be 100 euro).

TO AVOID DELAY IN SHIPPING THE ISOLATES TO YOUR LABORATORY

The content of the parcel is "UN3373, Biological Substance Category B": Eight *E. coli*, eight staphylococci, eight enterococci and for new participants also the QC strains mentioned above. Please provide the EQAS coordinator with documents or other information that can simplify customs procedures (e.g. specific text that should be written on the proforma invoice). To avoid delays, we kindly ask you to send this information already at this stage.

TIMELINE FOR RESULTS TO BE RETURNED TO THE NATIONAL FOOD INSTITUTE

Shipment of isolates and protocol: The isolates will be shipped in *June* 2019. The protocol for this proficiency test will be available for download from the website (www.eurl-ar.eu).

Submission of results: Results must be submitted to the National Food Institute **no later than *September 30th, 2019*** via the password-protected website.
Upon reaching the deadline, each participating laboratory is kindly asked to enter the password-protected website once again to download an automatically generated evaluation report.
EQAS report: A report summarising and comparing results from all participants will be issued. In the report, laboratories will be presented coded, which ensures full anonymity. The EURL-AR and the EU Commission, only, will have access to un-coded results. The report will be publicly available.
Next EQAS: The next EURL-AR EQAS that we will organise are on isolation of ESBL- and AmpC-producing *E. coli* from caeca and meat samples, which is expected in *September, 2019*, and on antimicrobial susceptibility testing of *Salmonella* and *Campylobacter*, which is expected in *October, 2019*.
Please contact me if you have comments or questions regarding the EQAS.

Sincerely,
Susanne Karlsmose Pedersen
EURL-AR EQAS-Coordinator

Participants in the EURL-AR EQAS on *E. coli* , enterococci and staphylococci 2019

Institute	Country	*E. coli*	Enterococci	*S. aureus*
Austrian Agency for Health and Food Safety	Austria	x	x	x
Sciensano	Belgium	x	x	x
Nacional Diagnostic and Research Veterinary Institute	Bulgaria	x	x	x
Croatian Veterinary Institut	Croatia	x	x	x
Veterinary Services	Cyprus	x	no	no
State Veterinary Institute Praha	Czech Republic	x	x	x
DTU National Food Institute	Denmark	x*	x*	x
Danish Veterinary and Food Administration, DVFA	Denmark	x	x	no
Estonian Veterinary and Food Laboratory	Estonia	x	x	x
Finnish Food Authority	Finland	x	x	x
Agence nationale de sécurité sanitaire ANSES - Fougères LERMVD	France	x	x	x
Federal Institute for Risk Assessment	Germany	x	x	x
Veterinary Laboratory of Chalkis	Greece	x	no	x
Central Agricultural Office Veterinary Diagnostic Directorate	Hungary	x	no	no
Institute for Experimental Pathology at Keldur	Iceland	x	no	x
Central Veterinary Research Laboratory	Ireland	x	x	x
Istituto Zooprofilattico Sperimentale delle Regioni Lazio e Toscana	Italy	x	no	x
Institute of Food Safety, Animal Health and Enviroment "BIOR"	Latvia	x	x	x
National Food and Veterinary Risk Assessment Institute	Lithuania	x	x	x
Laboratoire national de Santé	Luxembourg	x	x	x
Public Health Laboratory	Malta	x	x	x
Netherlands Food and Consumer Product Safety Authority (NVWA)	Netherlands	x*	x*	x*
Central Veterinary Institute of Wageningen UR	Netherlands	x	x	x
Faculty of Veterinary Medicine - Skopje	North Macedonia	x	x	x
Agri-Food and Biosciences Institute (AFBI)	Northern Ireland	x*	no	no
Veterinærinstituttet	Norway	x	x	x
National Veterinary Research Institute	Poland	x	x	x
Instituto Nacional de Investigação Agrária e Veterinária	Portugal	x	x	x
Institute for Hygiene and Veterinary Public Health	Romania	x*	x*	x*
Institute for Diagnosis and Animal Health	Romania	x	x	x
Scientific Veterinary Institute „Novi Sad“	Serbia	x	no	no
State Veterinary and Food Institute (SVFI)	Slovakia	x	x	x
National Veterinary Institute	Slovenia	x	x	x
Laboratorio Central de Sanidad Animal de Santa Fe	Spain	no	no	x
Laboratorio Central de Veterinaria	Spain	x	x	no
VISAVET Health Surveillance Center, Complutense University	Spain	x*	x*	x*
Centro Nacional de Alimentación (AECOSAN)	Spain	x*	no	no
National Veterinary Institute, SVA	Sweden	x	x	x
Vetsuisse Faculty Bern, Institute of Veterinary Bacteriology	Switzerland	x	no	x
Animal & Plant Health Agency	United Kingdom	x	x	x

*Submitted results were not included in the present report (only one dataset per country is evaluated)

Color code	
NRL-AR designated by the competent Authority of the Member State	
not NRL-AR enrolled by the EURL-AR	
Not EU Member	

Strain ID	Species	Antimicrobial	Operator	Value	Interpretation
EURL ENT 14.1	*E. faecalis*	**AMP**	=	1	S
EURL ENT 14.1	*E. faecalis*	**CHL**	=	64	R
EURL ENT 14.1	*E. faecalis*	**CIP**	=	1	S
EURL ENT 14.1	*E. faecalis*	**DAP**	=	2	S
EURL ENT 14.1	*E. faecalis*	**ERY**	>	128	R
EURL ENT 14.1	*E. faecalis*	**GEN**	<=	8	S
EURL ENT 14.1	*E. faecalis*	**LZD**	=	8	R
EURL ENT 14.1	*E. faecalis*	**Q-D**	=	16	NA
EURL ENT 14.1	*E. faecalis*	**TEI**	<=	0.5	S
EURL ENT 14.1	*E. faecalis*	**TET**	>	128	R
EURL ENT 14.1	*E. faecalis*	**TIG**	=	0.5	S
EURL ENT 14.1	*E. faecalis*	**VAN**	=	2	S
EURL ENT 14.2	*E. faecalis*	**AMP**	=	1	S
EURL ENT 14.2	*E. faecalis*	**CHL**	<=	4	S
EURL ENT 14.2	*E. faecalis*	**CIP**	=	0.5	S
EURL ENT 14.2	*E. faecalis*	**DAP**	=	1	S
EURL ENT 14.2	*E. faecalis*	**ERY**	<=	1	S
EURL ENT 14.2	*E. faecalis*	**GEN**	<=	8	S
EURL ENT 14.2	*E. faecalis*	**LZD**	=	1	S
EURL ENT 14.2	*E. faecalis*	**Q-D**	=	8	NA
EURL ENT 14.2	*E. faecalis*	**TEI**	<=	0.5	S
EURL ENT 14.2	*E. faecalis*	**TET**	<=	1	S
EURL ENT 14.2	*E. faecalis*	**TIG**	=	0.25	S
EURL ENT 14.2	*E. faecalis*	**VAN**	=	2	S
EURL ENT 14.3	*E. faecium*	**AMP**	>	64	R
EURL ENT 14.3	*E. faecium*	**CHL**	<=	4	S
EURL ENT 14.3	*E. faecium*	**CIP**	>	16	R
EURL ENT 14.3	*E. faecium*	**DAP**	=	8	S
EURL ENT 14.3	*E. faecium*	**ERY**	=	2	S
EURL ENT 14.3	*E. faecium*	**GEN**	<=	8	S
EURL ENT 14.3	*E. faecium*	**LZD**	=	2	S
EURL ENT 14.3	*E. faecium*	**Q-D**	=	4	S
EURL ENT 14.3	*E. faecium*	**TEI**	<=	0.5	S
EURL ENT 14.3	*E. faecium*	**TET**	=	32	R
EURL ENT 14.3	*E. faecium*	**TIG**	=	0.25	S
EURL ENT 14.3	*E. faecium*	**VAN**	=	16	R
EURL ENT 14.4	*E. faecalis*	**AMP**	<=	0.5	S
EURL ENT 14.4	*E. faecalis*	**CHL**	<=	4	S
EURL ENT 14.4	*E. faecalis*	**CIP**	=	16	R
EURL ENT 14.4	*E. faecalis*	**DAP**	=	1	S
EURL ENT 14.4	*E. faecalis*	**ERY**	>	128	R
EURL ENT 14.4	*E. faecalis*	**GEN**	>	1024	R
EURL ENT 14.4	*E. faecalis*	**LZD**	=	1	S
EURL ENT 14.4	*E. faecalis*	**Q-D**	=	8	NA
EURL ENT 14.4	*E. faecalis*	**TEI**	<=	0.5	S
EURL ENT 14.4	*E. faecalis*	**TET**	=	64	R
EURL ENT 14.4	*E. faecalis*	**TIG**	=	0.25	S
EURL ENT 14.4	*E. faecalis*	**VAN**	=	2	S
EURL ENT 14.5	*E. faecium*	**AMP**	=	4	S

EURL ENT 14.5	*E. faecium*	**CHL**	<=	4	S
EURL ENT 14.5	*E. faecium*	**CIP**	=	0.5	S
EURL ENT 14.5	*E. faecium*	**DAP**	=	2	S
EURL ENT 14.5	*E. faecium*	**ERY**	=	2	S
EURL ENT 14.5	*E. faecium*	**GEN**	<=	8	S
EURL ENT 14.5	*E. faecium*	**LZD**	=	2	S
EURL ENT 14.5	*E. faecium*	**Q-D**	=	4	S
EURL ENT 14.5	*E. faecium*	**TEI**	=	64	R
EURL ENT 14.5	*E. faecium*	**TET**	=	64	R
EURL ENT 14.5	*E. faecium*	**TIG**	=	0.25	S
EURL ENT 14.5	*E. faecium*	**VAN**	>	128	R
EURL ENT 14.6	*E. faecium*	**AMP**	<=	0.5	S
EURL ENT 14.6	*E. faecium*	**CHL**	=	64	R
EURL ENT 14.6	*E. faecium*	**CIP**	=	1	S
EURL ENT 14.6	*E. faecium*	**DAP**	=	4	S
EURL ENT 14.6	*E. faecium*	**ERY**	>	128	R
EURL ENT 14.6	*E. faecium*	**GEN**	>	1024	R
EURL ENT 14.6	*E. faecium*	**LZD**	=	4	S
EURL ENT 14.6	*E. faecium*	**Q-D**	=	8	R
EURL ENT 14.6	*E. faecium*	**TEI**	<=	0.5	S
EURL ENT 14.6	*E. faecium*	**TET**	=	128	R
EURL ENT 14.6	*E. faecium*	**TIG**	=	0.25	S
EURL ENT 14.6	*E. faecium*	**VAN**	<=	1	S
EURL ENT 14.7	*E. faecium*	**AMP**	>	64	R
EURL ENT 14.7	*E. faecium*	**CHL**	=	8	S
EURL ENT 14.7	*E. faecium*	**CIP**	>	16	R
EURL ENT 14.7	*E. faecium*	**DAP**	=	2	S
EURL ENT 14.7	*E. faecium*	**ERY**	>	128	R
EURL ENT 14.7	*E. faecium*	**GEN**	>	1024	R
EURL ENT 14.7	*E. faecium*	**LZD**	=	1	S
EURL ENT 14.7	*E. faecium*	**Q-D**	=	8	R
EURL ENT 14.7	*E. faecium*	**TEI**	=	1	S
EURL ENT 14.7	*E. faecium*	**TET**	=	128	R
EURL ENT 14.7	*E. faecium*	**TIG**	=	0.25	S
EURL ENT 14.7	*E. faecium*	**VAN**	<=	1	S
EURL ENT 14.8	*E. faecium*	**AMP**	>	64	R
EURL ENT 14.8	*E. faecium*	**CHL**	<=	4	S
EURL ENT 14.8	*E. faecium*	**CIP**	>	16	R
EURL ENT 14.8	*E. faecium*	**DAP**	=	1	S
EURL ENT 14.8	*E. faecium*	**ERY**	<=	1	S
EURL ENT 14.8	*E. faecium*	**GEN**	<=	8	S
EURL ENT 14.8	*E. faecium*	**LZD**	=	1	S
EURL ENT 14.8	*E. faecium*	**Q-D**	=	4	S
EURL ENT 14.8	*E. faecium*	**TEI**	<=	0.5	S
EURL ENT 14.8	*E. faecium*	**TET**	<=	1	S
EURL ENT 14.8	*E. faecium*	**TIG**	=	0.12	S
EURL ENT 14.8	*E. faecium*	**VAN**	<=	1	S

AMP	Ampicillin
CHL	Chloramphenicol
CIP	Ciprofloxacin
DAP	Daptomycin
ERY	Erythomycin
GEN	Gentamicin
LZD	Linezolid
Q-D	Quinupristin-Dalfopristin
TEI	Teicoplanin
TET	Tetracycline
TIG	Tigecycline
VAN	Vancomycin

Strain ID	Species	Antimicrobial	Operator	Value	Interpretation
EURL ST 14.1	*Staphylococcus aureus*	**CHL**	=	8	S
EURL ST 14.1	*Staphylococcus aureus*	**CIP**	<=	0.25	S
EURL ST 14.1	*Staphylococcus aureus*	**CLN**	<=	0.12	S
EURL ST 14.1	*Staphylococcus aureus*	**ERY**	=	0.5	S
EURL ST 14.1	*Staphylococcus aureus*	**FOX**	=	16	R
EURL ST 14.1	*Staphylococcus aureus*	**FUS**	<=	0.5	S
EURL ST 14.1	*Staphylococcus aureus*	**GEN**	<=	1	S
EURL ST 14.1	*Staphylococcus aureus*	**KAN**	<=	4	S
EURL ST 14.1	*Staphylococcus aureus*	**LZD**	=	2	S
EURL ST 14.1	*Staphylococcus aureus*	**MUP**	<=	0.5	S
EURL ST 14.1	*Staphylococcus aureus*	**PEN**	=	2	NA
EURL ST 14.1	*Staphylococcus aureus*	**Q-D**	<=	0.5	S
EURL ST 14.1	*Staphylococcus aureus*	**RIF**	<=	0.016	S
EURL ST 14.1	*Staphylococcus aureus*	**SMX**	<=	64	S
EURL ST 14.1	*Staphylococcus aureus*	**STR**	<=	4	S
EURL ST 14.1	*Staphylococcus aureus*	**TET**	<=	0.5	S
EURL ST 14.1	*Staphylococcus aureus*	**TIA**	=	1	S
EURL ST 14.1	*Staphylococcus aureus*	**TMP**	<=	2	S
EURL ST 14.1	*Staphylococcus aureus*	**VAN**	<=	1	S
EURL ST 14.2	*Staphylococcus aureus*	**CHL**	=	8	S
EURL ST 14.2	*Staphylococcus aureus*	**CIP**	<=	0.25	S
EURL ST 14.2	*Staphylococcus aureus*	**CLN**	<=	0.12	S
EURL ST 14.2	*Staphylococcus aureus*	**ERY**	=	0.5	S
EURL ST 14.2	*Staphylococcus aureus*	**FOX**	=	16	R
EURL ST 14.2	*Staphylococcus aureus*	**FUS**	<=	0.5	S
EURL ST 14.2	*Staphylococcus aureus*	**GEN**	<=	1	S
EURL ST 14.2	*Staphylococcus aureus*	**KAN**	<=	4	S
EURL ST 14.2	*Staphylococcus aureus*	**LZD**	=	2	S
EURL ST 14.2	*Staphylococcus aureus*	**MUP**	<=	0.5	S
EURL ST 14.2	*Staphylococcus aureus*	**PEN**	>	2	NA
EURL ST 14.2	*Staphylococcus aureus*	**Q-D**	<=	0.5	S
EURL ST 14.2	*Staphylococcus aureus*	**RIF**	<=	0.016	S
EURL ST 14.2	*Staphylococcus aureus*	**SMX**	>	512	R
EURL ST 14.2	*Staphylococcus aureus*	**STR**	=	8	S
EURL ST 14.2	*Staphylococcus aureus*	**TET**	<=	0.5	S
EURL ST 14.2	*Staphylococcus aureus*	**TIA**	<=	0.5	S
EURL ST 14.2	*Staphylococcus aureus*	**TMP**	<=	2	S
EURL ST 14.2	*Staphylococcus aureus*	**VAN**	<=	1	S
EURL ST 14.3	*Staphylococcus aureus*	**CHL**	=	8	S
EURL ST 14.3	*Staphylococcus aureus*	**CIP**	=	0.5	S
EURL ST 14.3	*Staphylococcus aureus*	**CLN**	<=	0.12	S
EURL ST 14.3	*Staphylococcus aureus*	**ERY**	=	0.5	S
EURL ST 14.3	*Staphylococcus aureus*	**FOX**	=	2	S
EURL ST 14.3	*Staphylococcus aureus*	**FUS**	<=	0.5	S
EURL ST 14.3	*Staphylococcus aureus*	**GEN**	<=	1	S
EURL ST 14.3	*Staphylococcus aureus*	**KAN**	<=	4	S
EURL ST 14.3	*Staphylococcus aureus*	**LZD**	=	2	S
EURL ST 14.3	*Staphylococcus aureus*	**MUP**	<=	0.5	S
EURL ST 14.3	*Staphylococcus aureus*	**PEN**	<=	0.12	NA

EURL ST 14.3	*Staphylococcus aureus*	**Q-D**	**<=**	0.5	S
EURL ST 14.3	*Staphylococcus aureus*	**RIF**	**<=**	0.016	S
EURL ST 14.3	*Staphylococcus aureus*	**SMX**	**<=**	64	S
EURL ST 14.3	*Staphylococcus aureus*	**STR**	**<=**	4	S
EURL ST 14.3	*Staphylococcus aureus*	**TET**	**<=**	0.5	S
EURL ST 14.3	*Staphylococcus aureus*	**TIA**	**=**	1	S
EURL ST 14.3	*Staphylococcus aureus*	**TMP**	**<=**	2	S
EURL ST 14.3	*Staphylococcus aureus*	**VAN**	**<=**	1	S
EURL ST 14.4	*Staphylococcus aureus*	**CHL**	**=**	8	S
EURL ST 14.4	*Staphylococcus aureus*	**CIP**	**=**	0.5	S
EURL ST 14.4	*Staphylococcus aureus*	**CLN**	**=**	0.25	S
EURL ST 14.4	*Staphylococcus aureus*	**ERY**	**=**	0.5	S
EURL ST 14.4	*Staphylococcus aureus*	**FOX**	**=**	4	S
EURL ST 14.4	*Staphylococcus aureus*	**FUS**	**<=**	0.5	S
EURL ST 14.4	*Staphylococcus aureus*	**GEN**	**<=**	1	S
EURL ST 14.4	*Staphylococcus aureus*	**KAN**	**<=**	4	S
EURL ST 14.4	*Staphylococcus aureus*	**LZD**	**=**	2	S
EURL ST 14.4	*Staphylococcus aureus*	**MUP**	**<=**	0.5	S
EURL ST 14.4	*Staphylococcus aureus*	**PEN**	**>**	2	NA
EURL ST 14.4	*Staphylococcus aureus*	**Q-D**	**=**	1	S
EURL ST 14.4	*Staphylococcus aureus*	**RIF**	**<=**	0.016	S
EURL ST 14.4	*Staphylococcus aureus*	**SMX**	**<=**	64	S
EURL ST 14.4	*Staphylococcus aureus*	**STR**	**=**	8	S
EURL ST 14.4	*Staphylococcus aureus*	**TET**	**>**	16	R
EURL ST 14.4	*Staphylococcus aureus*	**TIA**	**=**	4	R
EURL ST 14.4	*Staphylococcus aureus*	**TMP**	**<=**	2	S
EURL ST 14.4	*Staphylococcus aureus*	**VAN**	**<=**	1	S
EURL ST 14.5	*Staphylococcus aureus*	**CHL**	**=**	8	S
EURL ST 14.5	*Staphylococcus aureus*	**CIP**	**<=**	0.25	S
EURL ST 14.5	*Staphylococcus aureus*	**CLN**	**>**	4	R
EURL ST 14.5	*Staphylococcus aureus*	**ERY**	**=**	0.5	S
EURL ST 14.5	*Staphylococcus aureus*	**FOX**	**=**	16	R
EURL ST 14.5	*Staphylococcus aureus*	**FUS**	**<=**	0.5	S
EURL ST 14.5	*Staphylococcus aureus*	**GEN**	**<=**	1	S
EURL ST 14.5	*Staphylococcus aureus*	**KAN**	**<=**	4	S
EURL ST 14.5	*Staphylococcus aureus*	**LZD**	**=**	2	S
EURL ST 14.5	*Staphylococcus aureus*	**MUP**	**<=**	0.5	S
EURL ST 14.5	*Staphylococcus aureus*	**PEN**	**>**	2	NA
EURL ST 14.5	*Staphylococcus aureus*	**Q-D**	**=**	2	R
EURL ST 14.5	*Staphylococcus aureus*	**RIF**	**<=**	0.016	S
EURL ST 14.5	*Staphylococcus aureus*	**SMX**	**<=**	64	S
EURL ST 14.5	*Staphylococcus aureus*	**STR**	**>**	32	R
EURL ST 14.5	*Staphylococcus aureus*	**TET**	**>**	16	R
EURL ST 14.5	*Staphylococcus aureus*	**TIA**	**>**	4	R
EURL ST 14.5	*Staphylococcus aureus*	**TMP**	**>**	32	R
EURL ST 14.5	*Staphylococcus aureus*	**VAN**	**<=**	1	S
EURL ST 14.6	*Staphylococcus aureus*	**CHL**	**=**	8	S
EURL ST 14.6	*Staphylococcus aureus*	**CIP**	**<=**	0.25	S
EURL ST 14.6	*Staphylococcus aureus*	**CLN**	**>**	4	R
EURL ST 14.6	*Staphylococcus aureus*	**ERY**	**>**	8	R

EURL ST 14.6	*Staphylococcus aureus*	**FOX**	=	16	R
EURL ST 14.6	*Staphylococcus aureus*	**FUS**	<=	0.5	S
EURL ST 14.6	*Staphylococcus aureus*	**GEN**	<=	1	S
EURL ST 14.6	*Staphylococcus aureus*	**KAN**	<=	4	S
EURL ST 14.6	*Staphylococcus aureus*	**LZD**	<=	1	S
EURL ST 14.6	*Staphylococcus aureus*	**MUP**	<=	0.5	S
EURL ST 14.6	*Staphylococcus aureus*	**PEN**	>	2	NA
EURL ST 14.6	*Staphylococcus aureus*	**Q-D**	>	4	R
EURL ST 14.6	*Staphylococcus aureus*	**RIF**	<=	0.016	S
EURL ST 14.6	*Staphylococcus aureus*	**SMX**	<=	64	S
EURL ST 14.6	*Staphylococcus aureus*	**STR**	<=	4	S
EURL ST 14.6	*Staphylococcus aureus*	**TET**	>	16	R
EURL ST 14.6	*Staphylococcus aureus*	**TIA**	>	4	R
EURL ST 14.6	*Staphylococcus aureus*	**TMP**	<=	2	S
EURL ST 14.6	*Staphylococcus aureus*	**VAN**	<=	1	S
EURL ST 14.7	*Staphylococcus aureus*	**CHL**	=	64	R
EURL ST 14.7	*Staphylococcus aureus*	**CIP**	=	8	R
EURL ST 14.7	*Staphylococcus aureus*	**CLN**	<=	0.12	S
EURL ST 14.7	*Staphylococcus aureus*	**ERY**	<=	0.25	S
EURL ST 14.7	*Staphylococcus aureus*	**FOX**	=	8	R
EURL ST 14.7	*Staphylococcus aureus*	**FUS**	<=	0.5	S
EURL ST 14.7	*Staphylococcus aureus*	**GEN**	<=	1	S
EURL ST 14.7	*Staphylococcus aureus*	**KAN**	<=	4	S
EURL ST 14.7	*Staphylococcus aureus*	**LZD**	<=	1	S
EURL ST 14.7	*Staphylococcus aureus*	**MUP**	<=	0.5	S
EURL ST 14.7	*Staphylococcus aureus*	**PEN**	>	2	NA
EURL ST 14.7	*Staphylococcus aureus*	**Q-D**	<=	0.5	S
EURL ST 14.7	*Staphylococcus aureus*	**RIF**	<=	0.016	S
EURL ST 14.7	*Staphylococcus aureus*	**SMX**	<=	64	S
EURL ST 14.7	*Staphylococcus aureus*	**STR**	>	32	R
EURL ST 14.7	*Staphylococcus aureus*	**TET**	>	16	R
EURL ST 14.7	*Staphylococcus aureus*	**TIA**	=	1	S
EURL ST 14.7	*Staphylococcus aureus*	**TMP**	<=	2	S
EURL ST 14.7	*Staphylococcus aureus*	**VAN**	<=	1	S
EURL ST 14.8	*Staphylococcus aureus*	**CHL**	=	8	S
EURL ST 14.8	*Staphylococcus aureus*	**CIP**	=	1	S
EURL ST 14.8	*Staphylococcus aureus*	**CLN**	<=	0.12	S
EURL ST 14.8	*Staphylococcus aureus*	**ERY**	<=	0.25	S
EURL ST 14.8	*Staphylococcus aureus*	**FOX**	=	16	R
EURL ST 14.8	*Staphylococcus aureus*	**FUS**	<=	0.5	S
EURL ST 14.8	*Staphylococcus aureus*	**GEN**	>	16	R
EURL ST 14.8	*Staphylococcus aureus*	**KAN**	>	64	R
EURL ST 14.8	*Staphylococcus aureus*	**LZD**	<=	1	S
EURL ST 14.8	*Staphylococcus aureus*	**MUP**	<=	0.5	S
EURL ST 14.8	*Staphylococcus aureus*	**PEN**	>	2	NA
EURL ST 14.8	*Staphylococcus aureus*	**Q-D**	<=	0.5	S
EURL ST 14.8	*Staphylococcus aureus*	**RIF**	>	0.5	R
EURL ST 14.8	*Staphylococcus aureus*	**SMX**	=	256	R
EURL ST 14.8	*Staphylococcus aureus*	**STR**	>	32	R
EURL ST 14.8	*Staphylococcus aureus*	**TET**	>	16	R

EURL ST 14.8	*Staphylococcus aureus*	**TIA**	**=**	1	S
EURL ST 14.8	*Staphylococcus aureus*	**TMP**	**<=**	2	S
EURL ST 14.8	*Staphylococcus aureus*	**VAN**	**<=**	1	S

CHL	Chloramphenicol
CIP	Ciprofloxacin
CLN	Clindamycin
ERY	Erythromycin
FOX	Cefoxitin
FUS	Fusidic acid
GEN	Gentamicin
KAN	Kanamycin
LZD	Linezolid
MUP	Mupirocin
PEN	Penicillin
Q-D	Quinupristin-Dalfopristin
RIF	Rifampicin
SMX	Sulfamthoxazole
STR	Streptomycin
TET	Tetracycline
TIA	Tiamulin
TMP	Trimethoprim
VAN	Vancomycin

Strain ID	Species	Antimicrobial	Operator	Value	Interpretation	Panel
EURL EC 14.1	*Escherichia coli*	**AMP**	=	4	S	Panel1
EURL EC 14.1	*Escherichia coli*	**AZI**	=	8	S	Panel1
EURL EC 14.1	*Escherichia coli*	**CHL**	=	16	S	Panel1
EURL EC 14.1	*Escherichia coli*	**CIP**	<=	0.015	S	Panel1
EURL EC 14.1	*Escherichia coli*	**COL**	<=	1	S	Panel1
EURL EC 14.1	*Escherichia coli*	**FOT**	<=	0.25	S	Panel1
EURL EC 14.1	*Escherichia coli*	**GEN**	=	1	S	Panel1
EURL EC 14.1	*Escherichia coli*	**MER**	<=	0.03	S	Panel1
EURL EC 14.1	*Escherichia coli*	**NAL**	<=	4	S	Panel1
EURL EC 14.1	*Escherichia coli*	**SMX**	=	16	S	Panel1
EURL EC 14.1	*Escherichia coli*	**TAZ**	<=	0.5	S	Panel1
EURL EC 14.1	*Escherichia coli*	**TET**	=	4	S	Panel1
EURL EC 14.1	*Escherichia coli*	**TIG**	=	0.5	S	Panel1
EURL EC 14.1	*Escherichia coli*	**TMP**	<=	0.25	S	Panel1
EURL EC 14.1	*Escherichia coli*	**ETP**	<=	0.015	S	Panel2
EURL EC 14.1	*Escherichia coli*	**FEP**	<=	0.06	S	Panel2
EURL EC 14.1	*Escherichia coli*	**FOT**	<=	0.25	S	Panel2
EURL EC 14.1	*Escherichia coli*	**FOT+CL**	<=	0.06	S	Panel2
EURL EC 14.1	*Escherichia coli*	**FOX**	=	4	S	Panel2
EURL EC 14.1	*Escherichia coli*	**IMI**	<=	0.12	S	Panel2
EURL EC 14.1	*Escherichia coli*	**MER**	<=	0.03	S	Panel2
EURL EC 14.1	*Escherichia coli*	**TAZ**	=	0.5	S	Panel2
EURL EC 14.1	*Escherichia coli*	**TAZ+CL**	=	0.25	S	Panel2
EURL EC 14.1	*Escherichia coli*	**TRM**	=	8	S	Panel2
EURL EC 14.2	*Escherichia coli*	**AMP**	>	64	R	Panel1
EURL EC 14.2	*Escherichia coli*	**AZI**	=	64	R	Panel1
EURL EC 14.2	*Escherichia coli*	**CHL**	=	128	R	Panel1
EURL EC 14.2	*Escherichia coli*	**CIP**	=	>8	R	Panel1
EURL EC 14.2	*Escherichia coli*	**COL**	<=	1	S	Panel1
EURL EC 14.2	*Escherichia coli*	**FOT**	=	2	R	Panel1
EURL EC 14.2	*Escherichia coli*	**GEN**	=	2	S	Panel1
EURL EC 14.2	*Escherichia coli*	**MER**	<=	0.03	S	Panel1
EURL EC 14.2	*Escherichia coli*	**NAL**	>	128	R	Panel1
EURL EC 14.2	*Escherichia coli*	**SMX**	>	1024	R	Panel1
EURL EC 14.2	*Escherichia coli*	**TAZ**	=	4	R	Panel1
EURL EC 14.2	*Escherichia coli*	**TET**	>	64	R	Panel1
EURL EC 14.2	*Escherichia coli*	**TIG**	=	0.5	S	Panel1
EURL EC 14.2	*Escherichia coli*	**TMP**	>	32	R	Panel1
EURL EC 14.2	*Escherichia coli*	**ETP**	=	0.03	S	Panel2
EURL EC 14.2	*Escherichia coli*	**FEP**	=	0.12	S	Panel2
EURL EC 14.2	*Escherichia coli*	**FOT**	=	2	R	Panel2
EURL EC 14.2	*Escherichia coli*	**FOT+CL**	=	1	R	Panel2
EURL EC 14.2	*Escherichia coli*	**FOX**	=	16	R	Panel2
EURL EC 14.2	*Escherichia coli*	**IMI**	=	0.25	S	Panel2
EURL EC 14.2	*Escherichia coli*	**MER**	<=	0.03	S	Panel2
EURL EC 14.2	*Escherichia coli*	**TAZ**	=	4	R	Panel2
EURL EC 14.2	*Escherichia coli*	**TAZ+CL**	=	4	R	Panel2
EURL EC 14.2	*Escherichia coli*	**TRM**	=	8	S	Panel2
EURL EC 14.3	*Escherichia coli*	**AMP**	>	64	R	Panel1

EURL EC 14.3	*Escherichia coli*	**AZI**	=	4	S	Panel1
EURL EC 14.3	*Escherichia coli*	**CHL**	=	128	R	Panel1
EURL EC 14.3	*Escherichia coli*	**CIP**	=	8	R	Panel1
EURL EC 14.3	*Escherichia coli*	**COL**	<=	1	S	Panel1
EURL EC 14.3	*Escherichia coli*	**FOT**	=	2	R	Panel1
EURL EC 14.3	*Escherichia coli*	**GEN**	=	1	S	Panel1
EURL EC 14.3	*Escherichia coli*	**MER**	<=	0.03	S	Panel1
EURL EC 14.3	*Escherichia coli*	**NAL**	>	128	R	Panel1
EURL EC 14.3	*Escherichia coli*	**SMX**	=	>1024	R	Panel1
EURL EC 14.3	*Escherichia coli*	**TAZ**	=	8	R	Panel1
EURL EC 14.3	*Escherichia coli*	**TET**	=	64	R	Panel1
EURL EC 14.3	*Escherichia coli*	**TIG**	=	0.5	S	Panel1
EURL EC 14.3	*Escherichia coli*	**TMP**	>	32	R	Panel1
EURL EC 14.3	*Escherichia coli*	**ETP**	=	0.03	S	Panel2
EURL EC 14.3	*Escherichia coli*	**FEP**	=	0.5	R	Panel2
EURL EC 14.3	*Escherichia coli*	**FOT**	=	2	R	Panel2
EURL EC 14.3	*Escherichia coli*	**FOT+CL**	=	1	R	Panel2
EURL EC 14.3	*Escherichia coli*	**FOX**	=	16	R	Panel2
EURL EC 14.3	*Escherichia coli*	**IMI**	=	0.25	S	Panel2
EURL EC 14.3	*Escherichia coli*	**MER**	<=	0.03	S	Panel2
EURL EC 14.3	*Escherichia coli*	**TAZ**	=	8	R	Panel2
EURL EC 14.3	*Escherichia coli*	**TAZ+CL**	=	4	R	Panel2
EURL EC 14.3	*Escherichia coli*	**TRM**	=	8	S	Panel2
EURL EC 14.4	*Escherichia coli*	**AMP**	>	64	R	Panel1
EURL EC 14.4	*Escherichia coli*	**AZI**	=	32	R	Panel1
EURL EC 14.4	*Escherichia coli*	**CHL**	=	128	R	Panel1
EURL EC 14.4	*Escherichia coli*	**CIP**	=	4	R	Panel1
EURL EC 14.4	*Escherichia coli*	**COL**	=	16	R	Panel1
EURL EC 14.4	*Escherichia coli*	**FOT**	<=	0.25	S	Panel1
EURL EC 14.4	*Escherichia coli*	**GEN**	=	1	S	Panel1
EURL EC 14.4	*Escherichia coli*	**MER**	<=	0.03	S	Panel1
EURL EC 14.4	*Escherichia coli*	**NAL**	>	128	R	Panel1
EURL EC 14.4	*Escherichia coli*	**SMX**	>	1024	R	Panel1
EURL EC 14.4	*Escherichia coli*	**TAZ**	<=	0.5	S	Panel1
EURL EC 14.4	*Escherichia coli*	**TET**	>	64	R	Panel1
EURL EC 14.4	*Escherichia coli*	**TIG**	=	0.5	S	Panel1
EURL EC 14.4	*Escherichia coli*	**TMP**	>	32	R	Panel1
EURL EC 14.4	*Escherichia coli*	**ETP**	<=	0.015	S	Panel2
EURL EC 14.4	*Escherichia coli*	**FEP**	<=	0.06	S	Panel2
EURL EC 14.4	*Escherichia coli*	**FOT**	<=	0.25	S	Panel2
EURL EC 14.4	*Escherichia coli*	**FOT+CL**	<=	0.06	S	Panel2
EURL EC 14.4	*Escherichia coli*	**FOX**	=	4	S	Panel2
EURL EC 14.4	*Escherichia coli*	**IMI**	<=	0.12	S	Panel2
EURL EC 14.4	*Escherichia coli*	**MER**	<=	0.03	S	Panel2
EURL EC 14.4	*Escherichia coli*	**TAZ**	<=	0.25	S	Panel2
EURL EC 14.4	*Escherichia coli*	**TAZ+CL**	<=	0.12	S	Panel2
EURL EC 14.4	*Escherichia coli*	**TRM**	=	4	S	Panel2
EURL EC 14.5	*Escherichia coli*	**AMP**	>	64	R	Panel1
EURL EC 14.5	*Escherichia coli*	**AZI**	=	8	S	Panel1
EURL EC 14.5	*Escherichia coli*	**CHL**	<=	8	S	Panel1

EURL EC 14.5	*Escherichia coli*	**CIP**	=	1	R	Panel1
EURL EC 14.5	*Escherichia coli*	**COL**	<=	1	S	Panel1
EURL EC 14.5	*Escherichia coli*	**FOT**	>	4	R	Panel1
EURL EC 14.5	*Escherichia coli*	**GEN**	=	2	S	Panel1
EURL EC 14.5	*Escherichia coli*	**MER**	<=	0.03	S	Panel1
EURL EC 14.5	*Escherichia coli*	**NAL**	=	8	S	Panel1
EURL EC 14.5	*Escherichia coli*	**SMX**	>	1024	R	Panel1
EURL EC 14.5	*Escherichia coli*	**TAZ**	=	8	R	Panel1
EURL EC 14.5	*Escherichia coli*	**TET**	=	64	R	Panel1
EURL EC 14.5	*Escherichia coli*	**TIG**	<=	0.25	S	Panel1
EURL EC 14.5	*Escherichia coli*	**TMP**	>	32	R	Panel1
EURL EC 14.5	*Escherichia coli*	**ETP**	=	0.03	S	Panel2
EURL EC 14.5	*Escherichia coli*	**FEP**	=	32	R	Panel2
EURL EC 14.5	*Escherichia coli*	**FOT**	>	64	R	Panel2
EURL EC 14.5	*Escherichia coli*	**FOT+CL**	=	0.12	S	Panel2
EURL EC 14.5	*Escherichia coli*	**FOX**	=	8	S	Panel2
EURL EC 14.5	*Escherichia coli*	**IMI**	<=	0.12	S	Panel2
EURL EC 14.5	*Escherichia coli*	**MER**	<=	0.03	S	Panel2
EURL EC 14.5	*Escherichia coli*	**TAZ**	=	16	R	Panel2
EURL EC 14.5	*Escherichia coli*	**TAZ+CL**	=	0.25	S	Panel2
EURL EC 14.5	*Escherichia coli*	**TRM**	=	16	S	Panel2
EURL EC 14.6	*Escherichia coli*	**AMP**	>	64	R	Panel1
EURL EC 14.6	*Escherichia coli*	**AZI**	=	16	S	Panel1
EURL EC 14.6	*Escherichia coli*	**CHL**	<=	8	S	Panel1
EURL EC 14.6	*Escherichia coli*	**CIP**	>	8	R	Panel1
EURL EC 14.6	*Escherichia coli*	**COL**	<=	1	S	Panel1
EURL EC 14.6	*Escherichia coli*	**FOT**	>	4	R	Panel1
EURL EC 14.6	*Escherichia coli*	**GEN**	=	8	R	Panel1
EURL EC 14.6	*Escherichia coli*	**MER**	=	16	R	Panel1
EURL EC 14.6	*Escherichia coli*	**NAL**	>	128	R	Panel1
EURL EC 14.6	*Escherichia coli*	**SMX**	>	1024	R	Panel1
EURL EC 14.6	*Escherichia coli*	**TAZ**	>	8	R	Panel1
EURL EC 14.6	*Escherichia coli*	**TET**	<=	2	S	Panel1
EURL EC 14.6	*Escherichia coli*	**TIG**	=	0.5	S	Panel1
EURL EC 14.6	*Escherichia coli*	**TMP**	>	32	R	Panel1
EURL EC 14.6	*Escherichia coli*	**ETP**	=	2	R	Panel2
EURL EC 14.6	*Escherichia coli*	**FEP**	>	32	R	Panel2
EURL EC 14.6	*Escherichia coli*	**FOT**	>	64	R	Panel2
EURL EC 14.6	*Escherichia coli*	**FOT+CL**	>	64	R	Panel2
EURL EC 14.6	*Escherichia coli*	**FOX**	>	64	R	Panel2
EURL EC 14.6	*Escherichia coli*	**IMI**	=	8	R	Panel2
EURL EC 14.6	*Escherichia coli*	**MER**	=	8	R	Panel2
EURL EC 14.6	*Escherichia coli*	**TAZ**	>	128	R	Panel2
EURL EC 14.6	*Escherichia coli*	**TAZ+CL**	>	128	R	Panel2
EURL EC 14.6	*Escherichia coli*	**TRM**	>	128	R	Panel2
EURL EC 14.7	*Escherichia coli*	**AMP**	>	64	R	Panel1
EURL EC 14.7	*Escherichia coli*	**AZI**	=	8	S	Panel1
EURL EC 14.7	*Escherichia coli*	**CHL**	<=	8	S	Panel1
EURL EC 14.7	*Escherichia coli*	**CIP**	<=	0.015	S	Panel1
EURL EC 14.7	*Escherichia coli*	**COL**	<=	1	S	Panel1

EURL EC 14.7	*Escherichia coli*	**FOT**	>	4	R	Panel1
EURL EC 14.7	*Escherichia coli*	**GEN**	=	1	S	Panel1
EURL EC 14.7	*Escherichia coli*	**MER**	<=	0.03	S	Panel1
EURL EC 14.7	*Escherichia coli*	**NAL**	<=	4	S	Panel1
EURL EC 14.7	*Escherichia coli*	**SMX**	<=	8	S	Panel1
EURL EC 14.7	*Escherichia coli*	**TAZ**	=	4	R	Panel1
EURL EC 14.7	*Escherichia coli*	**TET**	<=	2	S	Panel1
EURL EC 14.7	*Escherichia coli*	**TIG**	<=	0.25	S	Panel1
EURL EC 14.7	*Escherichia coli*	**TMP**	<=	0.25	S	Panel1
EURL EC 14.7	*Escherichia coli*	**ETP**	<=	0.015	S	Panel2
EURL EC 14.7	*Escherichia coli*	**FEP**	>	32	R	Panel2
EURL EC 14.7	*Escherichia coli*	**FOT**	>	64	R	Panel2
EURL EC 14.7	*Escherichia coli*	**FOT+CL**	<=	0.06	S	Panel2
EURL EC 14.7	*Escherichia coli*	**FOX**	=	4	S	Panel2
EURL EC 14.7	*Escherichia coli*	**IMI**	<=	0.12	S	Panel2
EURL EC 14.7	*Escherichia coli*	**MER**	<=	0.03	S	Panel2
EURL EC 14.7	*Escherichia coli*	**TAZ**	=	4	R	Panel2
EURL EC 14.7	*Escherichia coli*	**TAZ+CL**	=	0.25	S	Panel2
EURL EC 14.7	*Escherichia coli*	**TRM**	<=	4	S	Panel2
EURL EC 14.8	*Escherichia coli*	**AMP**	>	64	R	Panel1
EURL EC 14.8	*Escherichia coli*	**AZI**	=	8	S	Panel1
EURL EC 14.8	*Escherichia coli*	**CHL**	>	128	R	Panel1
EURL EC 14.8	*Escherichia coli*	**CIP**	=	0.03	S	Panel1
EURL EC 14.8	*Escherichia coli*	**COL**	<=	1	S	Panel1
EURL EC 14.8	*Escherichia coli*	**FOT**	>	4	R	Panel1
EURL EC 14.8	*Escherichia coli*	**GEN**	=	1	S	Panel1
EURL EC 14.8	*Escherichia coli*	**MER**	=	2	R	Panel1
EURL EC 14.8	*Escherichia coli*	**NAL**	<=	4	S	Panel1
EURL EC 14.8	*Escherichia coli*	**SMX**	>	1024	R	Panel1
EURL EC 14.8	*Escherichia coli*	**TAZ**	=	8	R	Panel1
EURL EC 14.8	*Escherichia coli*	**TET**	>	64	R	Panel1
EURL EC 14.8	*Escherichia coli*	**TIG**	=	0.5	S	Panel1
EURL EC 14.8	*Escherichia coli*	**TMP**	>	32	R	Panel1
EURL EC 14.8	*Escherichia coli*	**ETP**	>	2	R	Panel2
EURL EC 14.8	*Escherichia coli*	**FEP**	>	32	R	Panel2
EURL EC 14.8	*Escherichia coli*	**FOT**	>	64	R	Panel2
EURL EC 14.8	*Escherichia coli*	**FOT+CL**	=	16	R	Panel2
EURL EC 14.8	*Escherichia coli*	**FOX**	=	64	R	Panel2
EURL EC 14.8	*Escherichia coli*	**IMI**	=	1	R	Panel2
EURL EC 14.8	*Escherichia coli*	**MER**	=	2	R	Panel2
EURL EC 14.8	*Escherichia coli*	**TAZ**	=	8	R	Panel2
EURL EC 14.8	*Escherichia coli*	**TAZ+CL**	=	2	R	Panel2
EURL EC 14.8	*Escherichia coli*	**TRM**	=	128	R	Panel2

AMP	Ampicillin
AZI	Azithromycin
CHL	Chloramphenicol
CIP	Ciprofloxacin
COL	Colistin
FOT	Cefotaxime
GEN	Gentamicin
MER	Meropenem
NAL	Nalidixic acid
SMX	Sulfamethoxazole
TAZ	Ceftazidime
TET	Tetracycline
TIG	Tigecycline
TMP	Trimethoprim
ETP	Ertapenem
FEP	Cefepime
FOT+CL	Cefotaxime+Clavulanic acid
FOX	Cefoxitin
IMI	Imipenem
TAZ+CL	Ceftazidime+Clavulanic acid
TRM	Temocillin

DTU Fødevareinstituttet
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G00-06-001/23.06.2017

Welcome letter

EURL-AR External Quality Assurance System 2019
Escherichia coli, staphylococci and enterococci

Id: xxx

Lyngby, 28th June 2019

Dear XX,

Please find enclosed the bacterial strains for the EURL-AR EQAS 2019: eight *E. coli*, eight *S. aureus* and eight *Enterococcus* spp. Upon arrival to your laboratory, the strains should be stored in a dark place at 4°C for stabs, and in a dark and cool place for freeze-dried strains.

On the EURL-AR-website (www.eurl-ar.eu) the following documents relevant for this EURL-AR EQAS are available:

- Protocol for antimicrobial susceptibility testing of *E. coli*, staphylococci and enterococci and test forms for reporting results
- Instructions for Opening and Reviving Lyophilised Cultures
- Subculture and Maintenance of Quality Control Strains

We ask you to test these *E. coli, S. aureus* and *Enterococcus* spp. strains for antimicrobial susceptibility. Detailed description of the procedures to follow for antimicrobial susceptibility testing and for entering your results into the interactive web database can be found in the protocol. For accessing the database, you need this username and password.

Your username: xxx

Your password: xxx

Please keep this document
Your username and password will not appear in other documents

Results should be submitted to the database no later than **30th September 2019**.

Please acknowledge receipt of this parcel immediately upon arrival to vabo@food.dtu.dk.
Do not hesitate to contact me for further information.

Yours sincerely,

Susanne Karlsmose Pedersen
EURL-AR EQAS-Coordinator

EU Reference Laboratory for Antimicrobial Resistance
External Quality Assurance System (EQAS) 2019

DTU Food
National Food Institute

PROTOCOL

For antimicrobial susceptibility testing of *Escherichia coli*, enterococci and staphylococci

1 INTRODUCTION

The organisation and implementation of an External Quality Assurance System (EQAS) on antimicrobial susceptibility testing (AST) of *E. coli*, enterococci and staphylococci is among the tasks of the EU Reference Laboratory for Antimicrobial Resistance (EURL-AR). The EC/Ent/Staph EQAS 2019 will include AST of eight *Escherichia coli*, eight enterococci and eight staphylococci strains and AST of reference strains *E. coli* ATCC 25922 (CCM 3954), *E. faecalis* ATCC 29212 (CCM 4224), and *S. aureus* ATCC 29213 (CCM 4223).

The reference strains are included in the parcel only for new participants of the EQAS who did not receive them previously. The reference strains are original CERTIFIED cultures provided free of charge, and should be used for future internal quality control for antimicrobial susceptibility testing in your laboratory. The reference strains will not be included in the years to come. Therefore, please take proper care of these strains. Handle and maintain them as suggested in the manual 'Subculture and Maintenance of QC Strains' available on the EURL-AR website (see www.eurl-ar.eu).

Various aspects of the proficiency test scheme may from time to time be subcontracted. When subcontracting occurs it is placed with a competent subcontractor and the National Food Institute is responsible to the scheme participants for the subcontractor's work.

2 OBJECTIVES

This EQAS aims to support laboratories to assess and, if necessary, to improve the quality of results obtained for AST of bacteria of food- and animal-origin, with special regard to *E. coli*, enterococci and staphylococci. Further objectives are to evaluate and improve the comparability of surveillance data on antimicrobial susceptibility of *E. coli*, enterococci and staphylococci reported to EFSA by different laboratories.

3 OUTLINE OF THE EC/ENT/STAPH EQAS 2019

3.1 Shipping, receipt and storage of strains

In June 2019, the National Reference Laboratories for Antimicrobial Resistance (NRL-AR) will receive a parcel containing eight *E. coli*, eight enterococci and eight staphylococci strains from the DTU National Food Institute. This parcel will also contain reference strains, but only for participants who did not receive them previously.

All strains belong to UN3373, Biological substance, category B. Extended-spectrum beta-lactamase (ESBL)-producing strains as well as carbapenemase-producing strains and methicillin-resistant *Staphylococcus aureus* (MRSA) will be included in the selected material.

It is the recipients' responsibility to comply with national legislation, rules and regulation regarding the correct use and handling of the provided strains and to possess the proper equipment and protocols to handle these strains. The reference strains are shipped lyophilised, while the test strains are stab cultures. On arrival, the stab cultures must be subcultured, and all cultures should be adequately stored until testing. A suggested procedure for reconstitution of the lyophilised reference strains is presented below.

3.2 Suggested procedure for reconstitution of the lyophilised reference strains

Please refer to the document 'Instructions for opening and reviving lyophilised cultures' reported on the EURL-AR-website (see www.eurl-ar.eu).

3.3 Antimicrobial susceptibility testing

Participants should perform minimum inhibitory concentration (MIC) determination using the methods stated in the Commission Implementing Decision 2013/652/EU (international reference method ISO standard 20776-1:2006). For staphylococci, MIC methods should be used as well, according to the EFSA recommendations and the antimicrobials to test are those stated under the EFSA technical specifications (see Table 3). **Results should be produced according to the**

laboratory's routine procedures for antimicrobial susceptibility testing by MIC determination. For interpretation of the results, please use the cut-off values listed in Tables 1, 2, 3 and 4 in this document. These values (except where indicated) represent the current epidemiological cut-off values developed by EUCAST (www.eucast.org), and allow categorisation of bacterial isolates into two categories: resistant and susceptible. A categorisation as intermediate is not accepted**.**

Participants will not be allowed to use disk diffusion as the current regulation and recommendations only focus on MIC determination.

3.3.1 *E. coli*

Table 1. Antimicrobials recommended for AST of *Escherichia coli* and interpretive criteria according to table 1 in Commission Implementing Decision 2013/652/EU

Antimicrobials for *E. coli*	MIC (µg/mL) **R is >**
Ampicillin, AMP	8
Azithromycin, AZI	16*
Cefotaxime, FOT	0.25
Ceftazidime, TAZ	0.5
Chloramphenicol, CHL	16
Ciprofloxacin, CIP	0.064
Colistin, COL	2
Gentamicin, GEN	2
Meropenem, MERO	0.125
Nalidixic acid, NAL	16
Sulfamethoxazole, SMX	64
Tetracycline, TET	8
Tigecycline, TGC	0.5
Trimethoprim, TMP	2

* Tentative ECOFF

Beta-lactam resistance

Confirmatory tests for ESBL/AmpC/Carbapenemase production are mandatory on all strains resistant to cefotaxime (FOT), ceftazidime (TAZ) and/or meropenem (MERO) and should be performed by testing the second panel of antimicrobials (Table 2 in this document corresponding to Table 4 in Commission Implementing Decision 2013/652/EU).

Table 2. Antimicrobials recommended for additional AST of *Escherichia coli* resistant to cefotaxime, ceftazidime and/or meropenem and interpretive criteria according to table 4 in Commission Implementing Decision 2013/652/EU

Antimicrobials for *E. coli*	MIC (µg/mL) **R is >**
Cefepime, FEP	0.125
Cefotaxime, FOT	0.25
Cefotaxime + clavulanic acid (F/C)	0.25
Cefoxitin, FOX	8
Ceftazidime, TAZ	0.5
Ceftazidime+ clavulanic acid (T/C)	0.5
Ertapenem, ETP	0.064*
Imipenem, IMI	0.5
Meropenem, MERO	0.125
Temocillin, TRM	>32*

*Tentative ECOFF

Confirmatory test for ESBL production requires use of both cefotaxime (FOT) and ceftazidime (TAZ) alone and in combination with a β-lactamase inhibitor (clavulanic acid). Synergy is defined as a ≥ 3 twofold concentration decrease in an MIC for either antimicrobial agent tested in combination with clavulanic acid vs. the MIC of the agent when tested alone (MIC FOT : FOT/CL or TAZ : TAZ/CL ratio ≥ 8) (CLSI M100 Table 3A, Tests for ESBLs). The presence of synergy indicates ESBL production.

Confirmatory test for carbapenemase production requires the testing of meropenem (MERO).

Detection of AmpC-type beta-lactamases can be performed by testing the bacterium for susceptibility to cefoxitin (FOX). Resistance to FOX could indicate the presence of an AmpC-type beta-lactamase.

The classification of the phenotypic beta-lactam resistance results should be based on the most recent EFSA recommendations (see the Appendix to this protocol). It is important to notice that two cut-off values apply for cefotaxime and ceftazidime: the EUCAST cut-off values (ECOFFs: FOT>0.25 and TAZ>0.5), which are those used to define R/S, and the screening cut-off values (FOT>1 and TAZ>1), which are those applied to categorise bacterial phenotypes as ESBL, AmpC, carbapenemase, etc. based on panel 2 results (see Appendix). The screening cut-off values are higher than the ECOFF values to increase sensitivity and specificity.

3.3.2 Enterococci

Table 3. Antimicrobials recommended for AST of *Enterococcus* spp. and interpretive criteria according to table 3 in Commission Implementing Decision 2013/652/EU

Antimicrobials for enterococci	MIC (µg/mL) **R is >** *E. faecium*	MIC (µg/mL) **R is >** *E. faecalis*
Ampicillin, AMP	4	4
Chloramphenicol, CHL	32	32
Ciprofloxacin, CIP	4	4
Daptomycin, DAP	8	4
Erythromycin, ERY	4	4
Gentamicin, GEN	32	32
Linezolid, LZD	4	4
Quinupristin-dalfopristin (Synercid), SYN	4*	Intrinsically resistant
Teicoplanin, TEI	2	2
Tetracycline, TET	4	4
Tigecycline, TGC	0.25	0.5
Vancomycin, VAN	4	4

*DANMAP 2009 (www.danmap.org)

Identification of *Enterococcus* spp.

Species identification of enterococci must be performed by the NRLs using in-house methods or adopting the protocol available on the EURL-AR website under: www.eurl-ar.eu/233-protocols.htm.

3.3.3 Staphylococci

Table 4. Antimicrobials recommended for AST of *Staphylococcus aureus* and interpretive criteria according to EFSA technical specifications (EFSA Journal 2012;10(10):2897)

Antimicrobials for *S. aureus*	MIC (µg/mL) **R is >**
Cefoxitin, FOX	4
Chloramphenicol, CHL	16
Ciprofloxacin, CIP	1
Clindamycin, CLN	0.25
Erythromycin, ERY	1
Fusidic acid, FUS	0.5
Gentamicin, GEN	2
Kanamycin, KAN	8
Linezolid, LZD	4
Mupirocin, MUP	1
Penicillin, PEN	na
Quin.-Dalf. (Synercid), SYN	1
Rifampicin, RIF	0.032
Streptomycin, STR	16
Sulfamethoxazole, SMX	128
Tetracycline, TET	1
Tiamulin (TIA)	2
Trimethoprim, TMP	2
Vancomycin, VAN	2

na, not available

Identification of MRSA

Confirmation of *mec*A and/or *mecC* presence is mandatory in this EQAS and should be performed by the NRLs using in-house methods or adopting the protocol available on the EURL-AR website at www.eurl-ar.eu/233-protocols.htm. Results should be uploaded as 'positive' or 'negative'.

4 REPORTING OF RESULTS AND EVALUATION

Please write your results in the test forms, and enter your results into the interactive web database. In addition, we kindly ask you to report in the database the tested MIC range for the staphylococci tests (for this organism only, as it is not included in the Commission Implementing Decision 2013/652/EU). Finally, if **you did not use the cut-off values recommended in the protocol for interpretation of *Staphylococcus* AST results**, please report the breakpoints used in the database.

4.1 General recommendations for data upload

We recommend reading carefully the description reported in paragraph 5 before entering your results in the web database. **Results must be submitted no later than September 30th, 2019.** After the deadline when all participants have uploaded results, you will be able to login to the database once again, and to view and print an automatically generated report evaluating your results. Results in agreement with the expected interpretation are categorised as 'correct', while results deviating from the expected interpretation are categorised as 'incorrect'.

If you experience difficulties in entering your results, please contact us directly.

Results will be summarised in a report which will be publicly available. Only MIC-results obtained by broth microdilution will be included in the report. All data will be presented with laboratory codes. A laboratory code is known to the individual laboratory, whereas the complete list of laboratories and their codes is confidential and known only to the EURL-AR and the EU Commission. All conclusions will be public.

If you have questions, please do not hesitate to contact the EQAS Coordinator:

Susanne Karlsmose Pedersen
National Food Institute
Technical University of Denmark
Kemitorvet, Building 204, DK-2800 Lyngby

Denmark

Tel: +45 3588 6601
E-mail: suska@food.dtu.dk

5 HOW TO ENTER RESULTS IN THE INTERACTIVE DATABASE

As the EURL-AR EQAS database is undergoing major changes, instructions on how to submit results for evaluation will be provided as soon as the database has been validated. Information will be sent via email to the EURL-AR EQAS participants.

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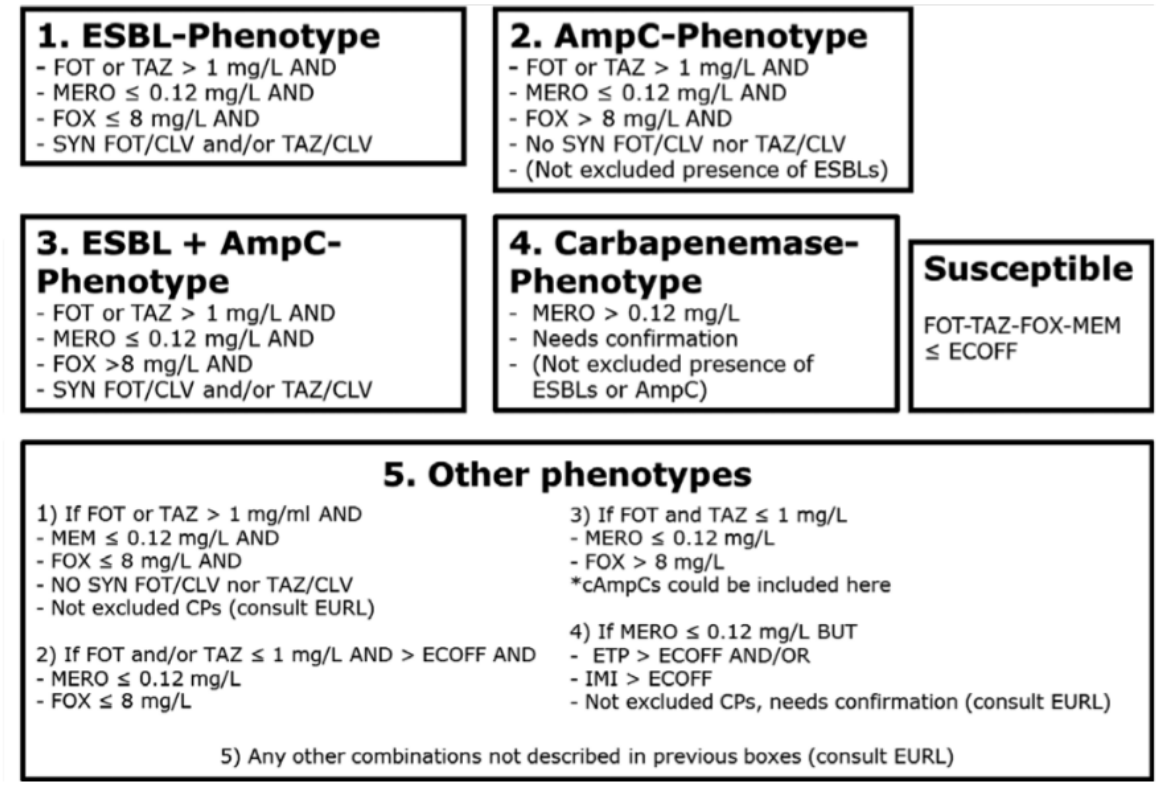
APPENDIX

Criteria for interpretation of *Escherichia coli*, panel 2 results



Please refer to: EFSA (European Food Safety Authority) and ECDC (European Centre for Disease Prevention and Control), 2019. The European Union summary report on antimicrobial resistance in zoonotic and indicator bacteria from humans, animals and food in 2017. EFSA Journal 2019;17 (2):5598, 278 pp. https://doi.org/10.2903/j.efsa.2019.5598 (page 41).

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European Union Reference Laboratory Antimicrobial Resistance

Antimicrobial susceptibility testing of *Escherichia coli*, enterococci and staphylococci

TEST FORMS

Name:
Name of laboratory:
Name of institute:
City:
Country:
E-mail:
Fax:

Comments:

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TEST FORMS METHODS – Enterococci

- Which method did you use for antimicrobial susceptibility testing of *enterococci* in this EQAS:
  - ☐ MIC – Broth microdilution
  - ☐ MIC – Agar dilution (not evaluated in the final report)

- Which standard(s)/guideline(s) do you use when performing AST?
  - ☐ CLSI
  - ☐ EUCAST
  - ☐ ISO 20776-1:2006
  - ☐ TREK

- Which incubation conditions do you use? °C/ h

- Which solvent was used for the preparation of the 0.5 McFarland solution?
  - ☐ Water
  - ☐ Saline
  - ☐ Mueller Hinton broth

- Please describe how you prepared the inoculum:
  The inoculum was prepared by adding µl of 0.5 McFarland solution to ml MH broth

- What is the expected inoculum concentration (e.g. $1*10^5$ CFU/ml)? CFU/ml

Comments or additional information:

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TEST FORMS METHODS – Staphylococci

- Which method did you use for antimicrobial susceptibility testing of *S. aureus* in this EQAS:
  - ☐ MIC – Broth microdilution
  - ☐ MIC – Agar dilution (not evaluated in the final report)

- Which standard(s)/guideline(s) do you use when performing AST?
  - ☐ CLSI
  - ☐ EUCAST
  - ☐ ISO 20776-1:2006
  - ☐ TREK

- Which incubation conditions do you use? °C/ h

- Which solvent was used for the preparation of the 0.5 McFarland solution?
  - ☐ Water
  - ☐ Saline
  - ☐ Mueller Hinton broth

- Please describe how you prepared the inoculum:
  The inoculum was prepared by adding µl of 0.5 McFarland solution to ml MH broth

- What is the expected inoculum concentration (e.g. $1*10^5$ CFU/ml)? CFU/ml

Comments or additional information:

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TEST FORMS METHODS – *Escherichia coli*

- Which method did you use for antimicrobial susceptibility testing of *E. coli* in this EQAS:
  - ☐ MIC – Broth microdilution
  - ☐ MIC – Agar dilution (not evaluated in the final report)

- Which standard(s)/guideline(s) do you use when performing AST?
  - ☐ CLSI
  - ☐ EUCAST
  - ☐ ISO 20776-1:2006
  - ☐ TREK

- Which incubation conditions do you use? °C/ h

- Which solvent was used for the preparation of the 0.5 McFarland solution?
  - ☐ Water
  - ☐ Saline
  - ☐ Mueller Hinton broth

- Please describe how you prepared the inoculum:
  The inoculum was prepared by adding µl of 0.5 McFarland solution to ml MH broth

- What is the expected inoculum concentration (e.g. $1*10^5$ CFU/ml)? CFU/ml

Comments or additional information:

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TEST FORM - Enterococci

Strain	Antimicrobial	Results and interpretation		
		≤ >	MIC-value (µg/ml)	S / R
Enterococci EURL ENT. 14.X ☐ *E. faecium* ☐ *E. faecalis*	Ampicillin, AMP			
	Chloramphenicol, CHL			
	Ciprofloxacin, CIP			
	Daptomycin, DAP			
	Erythromycin, ERY			
	Gentamicin, GEN			
	Linezolid, LZD			
	Quin.-Dalf. (Synercid), SYN			
	Teicoplanin, TEI			
	Tetracycline, TET			
	Tigecycline, TGC			
	Vancomycin, VAN			

Strain	Antimicrobial	Results and interpretation		
		≤ >	MIC-value (µg/ml)	S / R
Enterococci EURL ENT. 14.X ☐ *E. faecium* ☐ *E. faecalis*	Ampicillin, AMP			
	Chloramphenicol, CHL			
	Ciprofloxacin, CIP			
	Daptomycin, DAP			
	Erythromycin, ERY			
	Gentamicin, GEN			
	Linezolid, LZD			
	Quin.-Dalf. (Synercid), SYN			
	Teicoplanin, TEI			
	Tetracycline, TET			
	Tigecycline, TGC			
	Vancomycin, VAN			

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TEST FORM - Enterococci

Antimicrobial susceptibility testing of reference strain *Enterococcus faecalis* ATCC 29212

Antimicrobial	MIC-value (µg/ml)
Ampicillin, AMP	
Chloramphenicol, CHL	
Ciprofloxacin, CIP	
Daptomycin, DAP	
Erythromycin, ERY	
Gentamicin, GEN	
Linezolid, LZD	
Quinupristin-Dalfopristin (Synercid), SYN	
Teicoplanin, TEI	
Tetracycline, TET	
Tigecycline, TIG	
Vancomycin, VAN	

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TEST FORMS - Staphylococci

Strain	Antimicrobial	Results and interpretation		
		≤ >	MIC-value (µg/ml)	S / R
S. aureus EURL ST 14.X	Cefoxitin, FOX			
	Chloramphenicol, CHL			
	Ciprofloxacin, CIP			
	Clindamycin, CLN			
	Erythromycin, ERY			
	Fusidic acid, FUS			
	Gentamicin, GEN			
	Kanamycin, KAN			
	Linezolid, LZD			
	Mupirocin, MUP			
	Penicillin, PEN			
	Quin.-Dalf. (Synercid), SYN			
	Rifampicin, RIF			
	Streptomycin, STR			
	Sulfamethoxazole, SMX			
	Tetracycline, TET			
	Tiamulin (TIA)			
	Trimethoprim, TMP			
	Vancomycin, VAN			

Methicillin resistance (MRSA)	☐ Positive ☐ Negative

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TEST FORM - Staphylococci

Antimicrobial susceptibility testing of reference strain *S. aureus* ATCC 29213 (MIC)

Antimicrobial	MIC-value (µg/ml)
Cefoxitin, FOX	
Chloramphenicol, CHL	
Ciprofloxacin, CIP	
Clindamycin, CLN	
Erythromycin, ERY	
Fusidic acid, FUS	
Gentamicin, GEN	
Kanamycin, KAN	
Linezolid, LZD	
Mupirocin, MUP	
Penicillin, PEN	
Quin.-Dalf. (Synercid), SYN	
Rifampicin, RIF	
Streptomycin, STR	
Sulfamethoxazole, SMX	
Tetracycline, TET	
Tiamulin (TIA)	
Trimethoprim, TMP	
Vancomycin, VAN	

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TEST FORM – *E. coli*

Strain	Antimicrobial	Results and interpretation		
		≤ >	MIC-value (µg/ml)	S / R
E. coli EURL EC 14.X	Ampicillin, AMP			
	Azithromycin, AZT			
	Cefotaxime, FOT			
	Ceftazidime, TAZ			
	Chloramphenicol, CHL			
	Ciprofloxacin CIP			
	Colistin, COL			
	Gentamicin, GEN			
	Meropenem, MERO			
	Nalidixic acid, NAL			
	Sulfamethoxazole, SMX			
	Tetracycline, TET			
	Tigecycline, TGC			
	Trimethoprim, TMP			

All strains resistant to cefotaxime (FOT), ceftazidime (TAZ) and/or meropenem (MERO) should be tested in the second panel for confirmatory tests for ESBL/AmpC/carbapenemase production. See further description of confirmatory tests in the protocol section '*3.3.1 E. coli*'.

Strain	Antimicrobial	Results and interpretation		
		≤ >	MIC-value (µg/ml)	S / R
E. coli EURL EC 14.X	Cefepime, FEP			
	Cefotaxime, FOT			
	Cefotaxime + clavulanic acid (F/C)			
	Cefoxitin, FOX			
	Ceftazidime, TAZ			
	Ceftazidime+ clavulanic acid (T/C)			
	Ertapenem, ETP			
	Imipenem, IMI			
	Meropenem, MERO			
	Temocillin, TRM			

Interpretation of PANEL 2 results:

☐ ESBL phenotype
☐ ESBL+AmpC phenotype
☐ AmpC phenotype
☐ Carbapenemase phenotype
☐ Other phenotypes
☐ Susceptible (to panel 2 antimicrobials)

Comments (include optional genotype or other results):

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TEST FORM – *E. coli*

Antimicrobial susceptibility testing of reference strain *E. coli* ATCC 25922

	Antimicrobial	MIC-value (µg/ml)
1st panel	Ampicillin, AMP	
	Azithromycin, AZT	
	Cefotaxime, FOT	
	Ceftazidime, TAZ	
	Chloramphenicol, CHL	
	Ciprofloxacin, CIP	
	Colistin, COL	
	Gentamicin, GEN	
	Meropenem, MERO	
	Nalidixic acid, NAL	
	Sulfamethoxazole, SMX	
	Tetracycline, TET	
	Tigecycline, TGC	
	Trimethoprim, TMP	
2nd panel	Cefepime, FEP	
	Cefotaxime, FOT	
	Cefotaxime + clavulanic acid (F/C)	
	Cefoxitin, FOX	
	Ceftazidime, TAZ	
	Ceftazidime+ clavulanic acid (T/C)	
	Ertapenem, ETP	
	Imipenem, IMI	
	Meropenem, MERO	
	Temocillin, TRM	

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INSTRUCTIONS FOR OPENING AND REVIVING LYOPHILISED CULTURES

Instructions adjusted from Czech Collection of Microorganisms (CCM) document 'Instructions for Opening and Reviving of Freeze-Dried Bacteria and Fungi' available on http://www.sci.muni.cz.

Lyophilised cultures are supplied in vacuum-sealed ampoules. Care should be taken in opening the ampoule. All instructions given below should be followed closely to ensure the safety of the person who opens the ampoule and to prevent contamination of the culture.

a. Check the number of the culture on the label inside the ampoule
b. Make a file cut on the ampoule near the middle of the plug (see Figure 1)
c. Disinfect the ampoule with alcohol-dampened gauze or alcohol-dampened cotton wool from just below the plug to the pointed end
d. Apply a red-hot glass rod to the file cut to crack the glass and allow air to enter slowly into the ampoule
e. Remove the pointed end of the ampoule into disinfectant
f. Add about 0.3 ml appropriate broth to the dried suspension using a sterile Pasteur pipette and mix carefully to avoid creating aerosols. Transfer the contents to one or more suitable solid and /or liquid media
g. Incubate the inoculated medium at appropriate conditions for several days
h. Autoclave or disinfect effectively the used Pasteur pipette, the plug and all the remains of the original ampoule before discarding

Notes:

- Cultures should be grown on media and under conditions as recommended in the CCM catalogue (see http://www.sci.muni.cz)
- Cultures may need at least one subculturing before they can be optimally used in experiments
- Unopened ampoules should be kept in a dark and cool place!

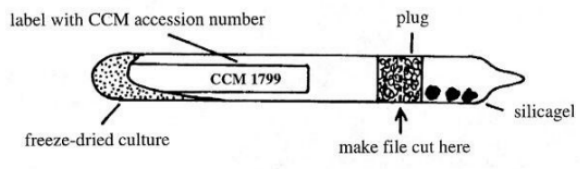

Figure 1: from CCM document 'Instructions for Opening and Reviving of Freeze-Dried Bacteria and Fungi' available on http://www.sci.muni.cz

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SUBCULTURE AND MAINTENANCE OF QUALITY CONTROL STRAINS

1.1 Purpose

Improper storage and repeated subculturing of bacteria can produce alterations in antimicrobial susceptibility test results. The Clinical and Laboratory Standards Institute (CLSI, formerly NCCLS) has published a guideline for Quality Control (QC) stock culture maintenance to ensure consistent antimicrobial susceptibility test results.

1.2 References

M100-S24, January 2014 (Performance Standards for Antimicrobial Susceptibility Testing)

M7-A9, January 2012 (Methods for Dilution Antimicrobial Susceptibility Test for Bacteria That Grow Aerobically; Approved Standard)

1.3 Definition of Terms

Reference Culture: A reference culture is a microorganism preparation that is acquired from a culture type collection.

Reference Stock Culture: A reference stock culture is a microorganism preparation that is derived from a reference culture. Guidelines and standards outline how reference stock cultures must be processed and stored.

Working Stock Cultures: A working stock culture is growth derived from a reference stock culture. Guidelines and standards outline how working stock cultures must be processed and how often they can be subcultured.

Subcultures (Passages): A subculture is simply the transfer of established microorganism growth on media to fresh media. The subsequent growth on the fresh media constitutes a subculture or passage. Growing a reference culture or reference stock culture from its preserved status (frozen or lyophilized) is not a subculture. The preserved microorganism is not in a stage of established growth until it is thawed or hydrated and grown for the first time

1.4 Important Considerations

- Do not use disc diffusion strains for MIC determination.
- Obtain QC strains from a reliable source such as ATCC
- CLSI requires that QC be performed either on the same day or weekly (only after 30 day QC validation)
- Any changes in materials or procedure must be validated with QC before implemented
- For example: Agar and broth methods may give different QC ranges for drugs such as glycopeptides, aminoglycosides and macrolides
- Periodically perform colony counts to check the inoculum preparation procedure

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- Ideally, test values should be in the middle of the acceptable range
- Graphing QC data points over time can help identify changes in data helpful for troubleshooting problems

1.5 Storage of Reference Strains

Preparation of stock cultures

- Use a suitable stabilizer such as 50% fetal calf serum in broth, 10-15% glycerol in tryptic soy broth, defibrinated sheep blood or skim milk to prepare multiple aliquots.
- Store at -20°C, -70°C or liquid nitrogen. (Alternatively, freeze dry.)
- Before using rejuvenated strains for QC, subculture to check for purity and viability.

Working cultures

- Set up on agar slants with appropriate medium, store at 4-8°C and subculture weekly.
- Replace the working strain with a stock culture at least monthly.
- If a change in the organisms inherent susceptibility occurs, obtain a fresh stock culture or a new strain from a reference culture collection e.g. ATCC.

1.6 Frequency of Testing

Weekly vs. daily testing

Weekly testing is possible if the lab can demonstrate satisfactory performance with daily testing as follows:

- Documentation showing reference strain results from 30 consecutive test days were within the acceptable range.
- For each antimicrobial/organism combination, no more than 3 out of 30 MIC values may be outside the acceptable range.

When the above are fulfilled, each quality control strain may be tested once a week and whenever any reagent component is changed.

Corrective Actions

If an MIC is outside the range in weekly testing, corrective action is required as follows:

- Repeat the test if there is an obvious error e.g. wrong strain or incubation conditions used
- If there is no obvious error, return to daily control testing

The problem is considered resolved only after the reference strain is tested for 5 consecutive days and each drug/organism result is within specification on each day.

If the problem cannot be resolved, continue daily testing until the errors are identified.

Repeat the 30 days validation before resuming weekly testing.

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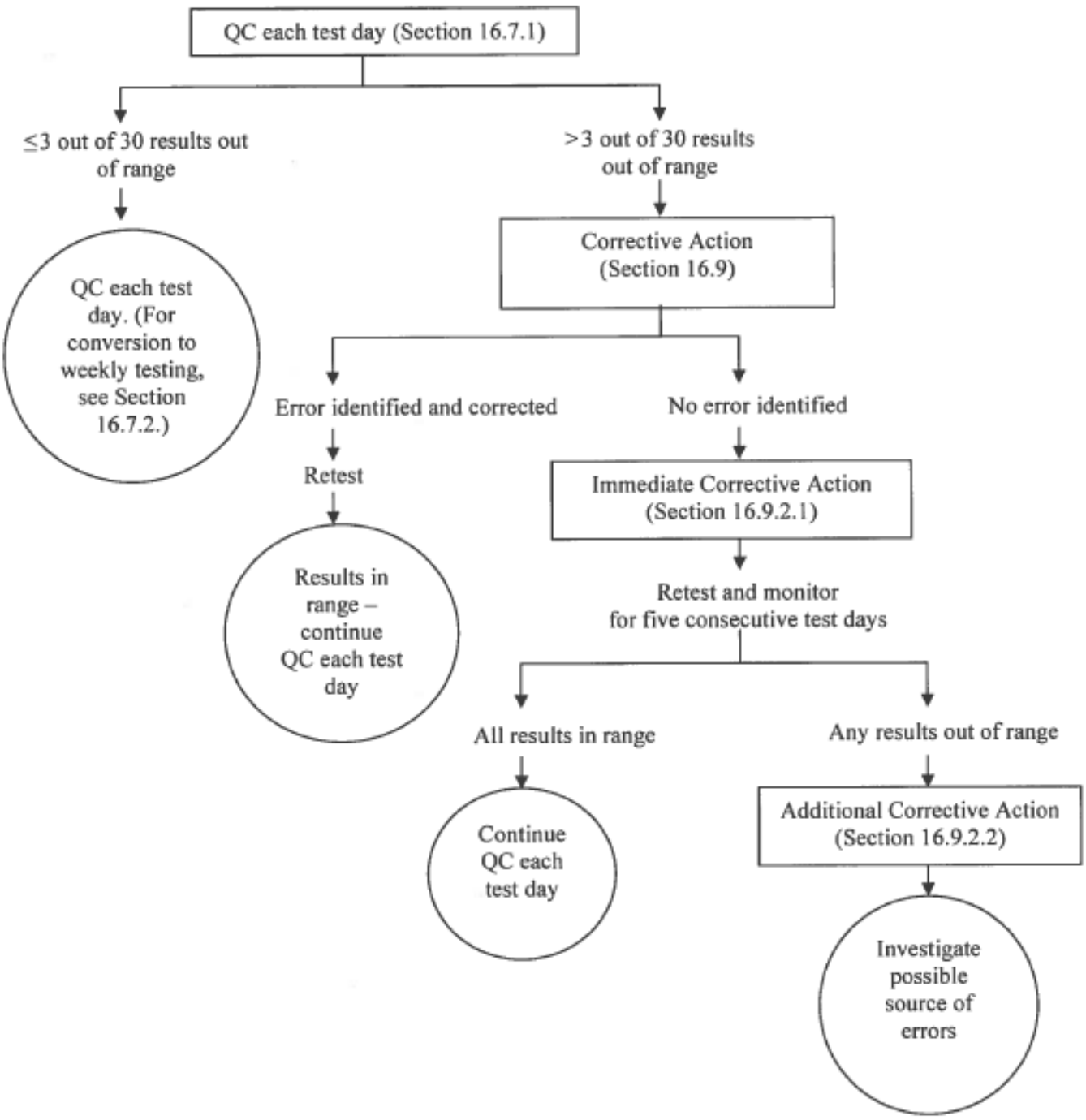
DAILY MIC QC CHART

Appendix A. Quality Control Protocol Flow Charts

Quality Control (QC) Protocol: Daily Testing



Reference: CLSI M7-A9, page 46

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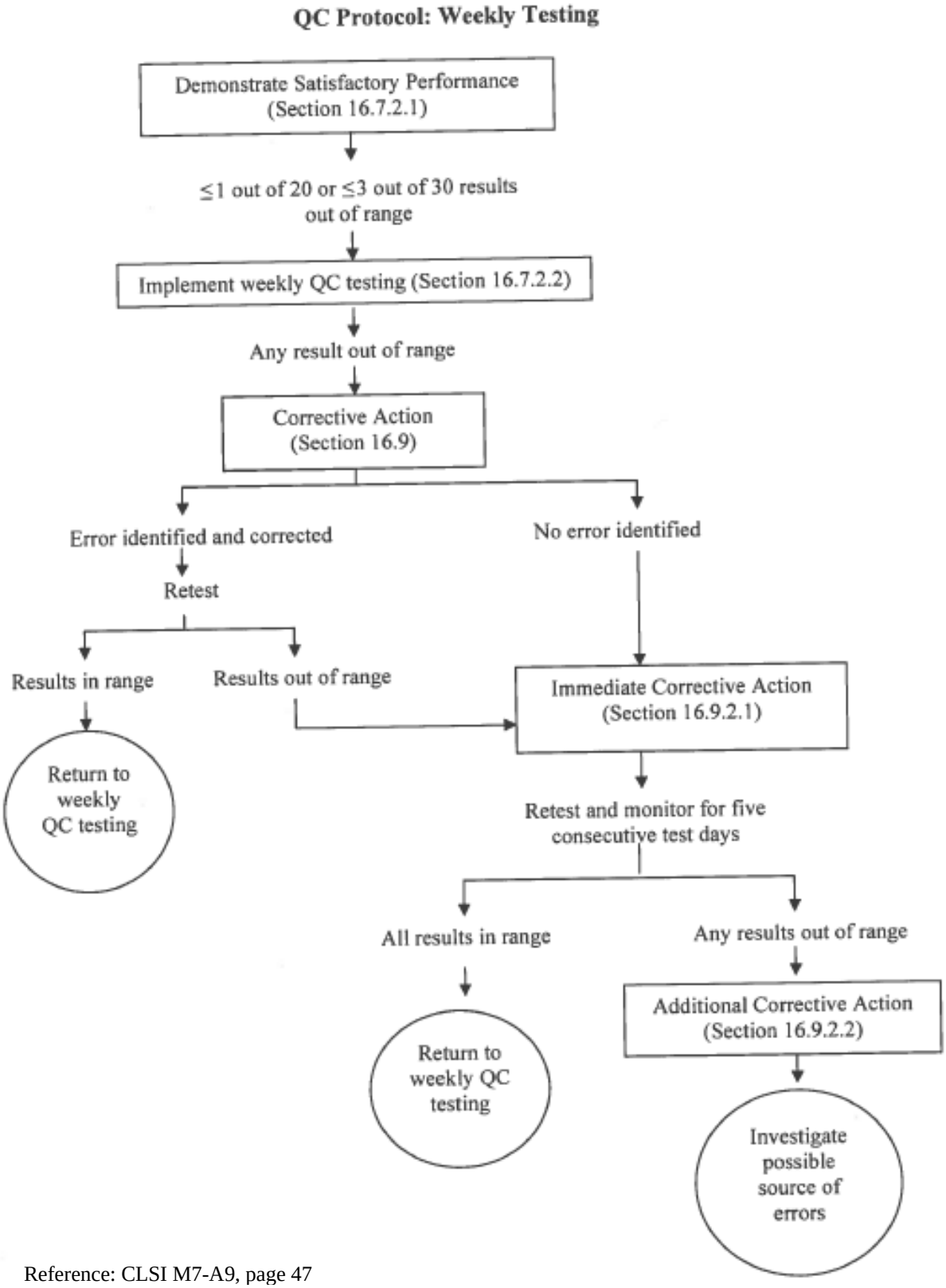
Appendix A. (Continued)



Reference: CLSI M7-A9, page 47

Enterococcus faecalis **ATCC 29212**

Antimicrobial	**Abbreviation**	**Acceptable range**	
		Min	Max
Ampicillin	AMP	0,5	2
Chloramphenicol	CHL	4	16
Ciprofloxacin	CIP	0,25	2
Daptomycin	DAP	1	4
Erythromycin	ERY	1	4
Gentamicin	GEN	4	16
Linezolid	LZD	1	4
Quinupristin-dalfopristin	SYN	2	8
Teicoplanin	TEI	0,25	1
Tetracycline	TET	8	32
Tigecycline	TGC	0,03	0,12
Vancomycin	VAN	1	4

***Staphylococcus aureus* ATCC 29213**

Antimicrobial	**Abbreviation**	**Acceptable range**	
		Min	Max
Cefoxitin	FOX	1	4
Chloramphenicol	CHL	2	16
Ciprofloxacin	CIP	0,12	0,5
Clindamycin	CLN	0,06	0,25
Erythromycin	ERY	0,25	1
Fusidic acid	FUS	0,06	0,25
Gentamicin	GEN	0,12	1
Kanamycin	KAN	1	4
Linezolid	LZD	1	4
Mupirocin	MUP	NA	NA
Penicillin	PEN	0,25	2
Quinopristin-dalfopristin	SYN	0,25	1
Rifampicin	RIF	0,004	0,016
Streptomycin	STR	NA	NA
Sulfamethoxazole	SMX	32	128
Tetracycline	TET	0,12	1
Tiamulin	TIA	NA	NA
Trimethoprim	TMP	1	4
Vancomycin	VAN	0,5	2

NA, not available

***Escherichia coli* ATCC 25922**

Panel	Antimicrobial	Abbreviation	Acceptable range	
			Min	Max
Panel 1	Ampicillin	AMP	2	8
Panel 1	Azithromycin	AZI	NA	NA
Panel 1	Cefotaxime	FOT	0,03	0,12
Panel 1	Ceftazidime	TAZ	0,06	0,5
Panel 1	Chloramphenicol	CHL	2	8
Panel 1	Ciprofloxacin	CIP	0,004	0,016
Panel 1	Colistin	COL	0,25	2
Panel 1	Gentamicin	GEN	0,25	1
Panel 1	Meropenem	MER	0,008	0,06
Panel 1	Nalidixic acid	NAL	1	4
Panel 1	Sulfamethoxazole	SMX	8	32
Panel 1	Tetracycline	TET	0,5	2
Panel 1	Tigecycline	TGC	0,03	0,25
Panel 1	Trimethoprim	TMP	0,5	2
Panel 2	Cefepime	FEP	0,016	0,12
Panel 2	Cefotaxime/clavulanic acid	F/C	NA	NA
Panel 2	Cefotaxime	FOT	0,03	0,12
Panel 2	Cefoxitin	FOX	2	8
Panel 2	Ceftazidime	TAZ	0,06	0,5
Panel 2	Ceftazidime/clavulanic acid	T/C	NA	NA
Panel 2	Ertapenem	ETP	0,004	0,016
Panel 2	Imipenem	IMI	0,06	0,25
Panel 2	Meropenem	MER	0,008	0,06
Panel 2	Temocillin	TRM	NA	NA

NA, not available

Reference strain results - *E. faecalis* ATCC 29212

Lab ID	Antimicrobial	Operator to obtained value	Obtained value	Min Value	Max Value	Score
2	Ampicillin	=	1	0.5	2	1
2	Chloramphenicol	=	8	4	16	1
2	Ciprofloxacin	=	1	0.25	2	1
2	Daptomycin	=	2	1	4	1
2	Erythromycin	=	4	1	4	1
2	Gentamicin	<=	8	4	16	1
2	Linezolid	=	2	1	4	1
2	Quinupristin-dalfopristin	=	8	2	8	1
2	Teicoplanin	<=	0.5	0.25	1	1
2	Tetracycline	=	32	8	32	1
2	Tigecycline	=	0.06	0.03	0.12	1
2	Vancomycin	=	2	1	4	1
4	Ampicillin	=	2	0.5	2	1
4	Chloramphenicol	=	8	4	16	1
4	Ciprofloxacin	=	2	0.25	2	1
4	Daptomycin	=	2	1	4	1
4	Erythromycin	=	2	1	4	1
4	Gentamicin	<=	8	4	16	1
4	Linezolid	=	2	1	4	1
4	Quinupristin-dalfopristin	=	8	2	8	1
4	Teicoplanin	<=	0.5	0.25	1	1
4	Tetracycline	=	32	8	32	1
4	Tigecycline	=	0.12	0.03	0.12	1
4	Vancomycin	=	2	1	4	1
9	Ampicillin	=	1	0.5	2	1
9	Chloramphenicol	=	8	4	16	1
9	Ciprofloxacin	=	1	0.25	2	1
9	Daptomycin	=	2	1	4	1
9	Erythromycin	=	2	1	4	1
9	Gentamicin	<=	8	4	16	1
9	Linezolid	=	2	1	4	1
9	Quinupristin-dalfopristin	=		2	8	
9	Teicoplanin	<=	0.5	0.25	1	1
9	Tetracycline	=	16	8	32	1
9	Tigecycline	=	0.06	0.03	0.12	1
9	Vancomycin	=	4	1	4	1
11	Ampicillin	=	1	0.5	2	1
11	Chloramphenicol	=	8	4	16	1
11	Ciprofloxacin	=	0.5	0.25	2	1
11	Daptomycin	=	1	1	4	1
11	Erythromycin	=	4	1	4	1
11	Gentamicin	<=	8	4	16	1
11	Linezolid	=	1	1	4	1
11	Quinupristin-dalfopristin	=	4	2	8	1
11	Teicoplanin	<=	0.5	0.25	1	1
11	Tetracycline	=	16	8	32	1
11	Tigecycline	=	0.06	0.03	0.12	1
11	Vancomycin	=	2	1	4	1
12	Ampicillin	=	1	0.5	2	1
12	Chloramphenicol	=	8	4	16	1
12	Ciprofloxacin	=	1	0.25	2	1

12	Daptomycin	=	2	1	4	1
12	Erythromycin	=	2	1	4	1
12	Gentamicin	<=	8	4	16	1
12	Linezolid	=	2	1	4	1
12	Quinupristin-dalfopristin	=	8	2	8	1
12	Teicoplanin	<=	0.5	0.25	1	1
12	Tetracycline	=	32	8	32	1
12	Tigecycline	=	0.12	0.03	0.12	1
12	Vancomycin	=	4	1	4	1
16	Ampicillin	=	2	0.5	2	1
16	Chloramphenicol	=	8	4	16	1
16	Ciprofloxacin	=	1	0.25	2	1
16	Daptomycin	=	4	1	4	1
16	Erythromycin	=	4	1	4	1
16	Gentamicin	=	16	4	16	1
16	Linezolid	=	2	1	4	1
16	Quinupristin-dalfopristin	=	8	2	8	1
16	Teicoplanin	<=	0.5	0.25	1	1
16	Tetracycline	=	32	8	32	1
16	Tigecycline	=	0.12	0.03	0.12	1
16	Vancomycin	=	4	1	4	1
17	Ampicillin	=	1	0.5	2	1
17	Chloramphenicol	=	8	4	16	1
17	Ciprofloxacin	=	0.5	0.25	2	1
17	Daptomycin	=	1	1	4	1
17	Erythromycin	<=	1	1	4	1
17	Gentamicin	<=	8	4	16	1
17	Linezolid	=	1	1	4	1
17	Quinupristin-dalfopristin	=	4	2	8	1
17	Teicoplanin	<=	0.5	0.25	1	1
17	Tetracycline	=	16	8	32	1
17	Tigecycline	=	0.12	0.03	0.12	1
17	Vancomycin	=	2	1	4	1
20	Ampicillin	=	1	0.5	2	1
20	Chloramphenicol	=	8	4	16	1
20	Ciprofloxacin	=	1	0.25	2	1
20	Daptomycin	=	4	1	4	1
20	Erythromycin	<=	1	1	4	1
20	Gentamicin	<=	8	4	16	1
20	Linezolid	=	2	1	4	1
20	Quinupristin-dalfopristin	=	8	2	8	1
20	Teicoplanin	<=	0.5	0.25	1	1
20	Tetracycline	=	16	8	32	1
20	Tigecycline	=	0.12	0.03	0.12	1
20	Vancomycin	=	2	1	4	1
22	Ampicillin	=	2	0.5	2	1
22	Chloramphenicol	=	8	4	16	1
22	Ciprofloxacin	=	1	0.25	2	1
22	Daptomycin	=	2	1	4	1
22	Erythromycin	=	2	1	4	1
22	Gentamicin	<=	8	4	16	1
22	Linezolid	=	2	1	4	1
22	Quinupristin-dalfopristin	=	4	2	8	1

22	Teicoplanin	<=	0.5	0.25	1	1
22	Tetracycline	=	16	8	32	1
22	Tigecycline	=	0.12	0.03	0.12	1
22	Vancomycin	=	2	1	4	1
23	Ampicillin	<=	0.5	0.5	2	1
23	Chloramphenicol	<=	4	4	16	1
23	Ciprofloxacin	=	0.5	0.25	2	1
23	Daptomycin	=	1	1	4	1
23	Erythromycin	=	2	1	4	1
23	Gentamicin	<=	8	4	16	1
23	Linezolid	=	1	1	4	1
23	Quinupristin-dalfopristin	=	4	2	8	1
23	Teicoplanin	<=	0.5	0.25	1	1
23	Tetracycline	=	16	8	32	1
23	Tigecycline	<=	0.03	0.03	0.12	1
23	Vancomycin	<=	1	1	4	1
25	Ampicillin	=	2	0.5	2	1
25	Chloramphenicol	=	8	4	16	1
25	Ciprofloxacin	=	1	0.25	2	1
25	Daptomycin	=	4	1	4	1
25	Erythromycin	=	2	1	4	1
25	Gentamicin	=	16	4	16	1
25	Linezolid	=	2	1	4	1
25	Quinupristin-dalfopristin	=	8	2	8	1
25	Teicoplanin	<=	0.5	0.25	1	1
25	Tetracycline	=	32	8	32	1
25	Tigecycline	=	0.12	0.03	0.12	1
25	Vancomycin	=	4	1	4	1
26	Ampicillin	=	1	0.5	2	1
26	Chloramphenicol	=	8	4	16	1
26	Ciprofloxacin	=	0.5	0.25	2	1
26	Daptomycin	=	1	1	4	1
26	Erythromycin	=	2	1	4	1
26	Gentamicin	<=	8	4	16	1
26	Linezolid	=	2	1	4	1
26	Quinupristin-dalfopristin	=	8	2	8	1
26	Teicoplanin	<=	0.5	0.25	1	1
26	Tetracycline	=	16	8	32	1
26	Tigecycline	=	0.12	0.03	0.12	1
26	Vancomycin	<=	1	1	4	1
29	Ampicillin	=	1	0.5	2	1
29	Chloramphenicol	=	8	4	16	1
29	Ciprofloxacin	=	1	0.25	2	1
29	Daptomycin	=	2	1	4	1
29	Erythromycin	=	4	1	4	1
29	Gentamicin	<=	8	4	16	1
29	Linezolid	=	2	1	4	1
29	Quinupristin-dalfopristin	=		2	8	
29	Teicoplanin	<=	0.5	0.25	1	1
29	Tetracycline	=	32	8	32	1
29	Tigecycline	=	0.12	0.03	0.12	1
29	Vancomycin	=	2	1	4	1
30	Ampicillin	=	1	0.5	2	1

30	Chloramphenicol	<=	4	4	16	1
30	Ciprofloxacin	=	1	0.25	2	1
30	Daptomycin	=	2	1	4	1
30	Erythromycin	<=	1	1	4	1
30	Gentamicin	<=	8	4	16	1
30	Linezolid	=	2	1	4	1
30	Quinupristin-dalfopristin	=	8	2	8	1
30	Teicoplanin	<=	0.5	0.25	1	1
30	Tetracycline	=	32	8	32	1
30	Tigecycline	=	0.12	0.03	0.12	1
30	Vancomycin	=	2	1	4	1
32	Ampicillin	=	1	0.5	2	1
32	Chloramphenicol	=	8	4	16	1
32	Ciprofloxacin	=	1	0.25	2	1
32	Daptomycin	=	1	1	4	1
32	Erythromycin	<=	1	1	4	1
32	Gentamicin	=	16	4	16	1
32	Linezolid	=	1	1	4	1
32	Quinupristin-dalfopristin	=	4	2	8	1
32	Teicoplanin	<=	0.5	0.25	1	1
32	Tetracycline	=	16	8	32	1
32	Tigecycline	<=	0.03	0.03	0.12	1
32	Vancomycin	=	2	1	4	1
33	Ampicillin	=	1	0.5	2	1
33	Chloramphenicol	=	8	4	16	1
33	Ciprofloxacin	=	0.5	0.25	2	1
33	Daptomycin	=	2	1	4	1
33	Erythromycin	=	4	1	4	1
33	Gentamicin	<=	8	4	16	1
33	Linezolid	=	2	1	4	1
33	Quinupristin-dalfopristin	=	8	2	8	1
33	Teicoplanin	<=	0.5	0.25	1	1
33	Tetracycline	=	16	8	32	1
33	Tigecycline	=	0.06	0.03	0.12	1
33	Vancomycin	=	2	1	4	1
34	Ampicillin	=	1	0.5	2	1
34	Chloramphenicol	=	8	4	16	1
34	Ciprofloxacin	=	1	0.25	2	1
34	Daptomycin	=	4	1	4	1
34	Erythromycin	=	4	1	4	1
34	Gentamicin	=	16	4	16	1
34	Linezolid	=	2	1	4	1
34	Quinupristin-dalfopristin	=	8	2	8	1
34	Teicoplanin	<=	0.5	0.25	1	1
34	Tetracycline	=	32	8	32	1
34	Tigecycline	=	0.12	0.03	0.12	1
34	Vancomycin	=	4	1	4	1
36	Ampicillin	=	1	0.5	2	1
36	Chloramphenicol	=	8	4	16	1
36	Ciprofloxacin	=	1	0.25	2	1
36	Daptomycin	=	2	1	4	1
36	Erythromycin	=	2	1	4	1
36	Gentamicin	=	16	4	16	1

36	Linezolid	=	2	1	4	1
36	Quinupristin-dalfopristin	=	8	2	8	1
36	Teicoplanin	<=	0.5	0.25	1	1
36	Tetracycline	=	32	8	32	1
36	Tigecycline	=	0.12	0.03	0.12	1
36	Vancomycin	=	2	1	4	1
37	Ampicillin	=	1	0.5	2	1
37	Chloramphenicol	=	8	4	16	1
37	Ciprofloxacin	=	1	0.25	2	1
37	Daptomycin	=	2	1	4	1
37	Erythromycin	=	2	1	4	1
37	Gentamicin	<=	8	4	16	1
37	Linezolid	=	2	1	4	1
37	Quinupristin-dalfopristin	=	8	2	8	1
37	Teicoplanin	<=	0.5	0.25	1	1
37	Tetracycline	=	32	8	32	1
37	Tigecycline	=	0.12	0.03	0.12	1
37	Vancomycin	=	4	1	4	1
39	Ampicillin	=	1	0.5	2	1
39	Chloramphenicol	=	8	4	16	1
39	Ciprofloxacin	=	0.5	0.25	2	1
39	Daptomycin	=	0.5	1	4	0
39	Erythromycin	=	2	1	4	1
39	Gentamicin	<=	8	4	16	1
39	Linezolid	=	2	1	4	1
39	Quinupristin-dalfopristin	=	8	2	8	1
39	Teicoplanin	<=	0.5	0.25	1	1
39	Tetracycline	=	16	8	32	1
39	Tigecycline	=	0.12	0.03	0.12	1
39	Vancomycin	<=	1	1	4	1
40	Ampicillin	=	1	0.5	2	1
40	Chloramphenicol	=	4	4	16	1
40	Ciprofloxacin	=	0.5	0.25	2	1
40	Daptomycin	=	1	1	4	1
40	Erythromycin	=	1	1	4	1
40	Gentamicin	=	16	4	16	1
40	Linezolid	=	1	1	4	1
40	Quinupristin-dalfopristin	=		2	8	
40	Teicoplanin	=	0.5	0.25	1	1
40	Tetracycline	=	8	8	32	1
40	Tigecycline	=	0.06	0.03	0.12	1
40	Vancomycin	=	2	1	4	1
56	Ampicillin	=	1	0.5	2	1
56	Chloramphenicol	=	8	4	16	1
56	Ciprofloxacin	=	0.5	0.25	2	1
56	Daptomycin	=	1	1	4	1
56	Erythromycin	=	2	1	4	1
56	Gentamicin	<=	8	4	16	1
56	Linezolid	=	2	1	4	1
56	Quinupristin-dalfopristin	=	4	2	8	1
56	Teicoplanin	<=	0.5	0.25	1	1
56	Tetracycline	=	8	8	32	1
56	Tigecycline	=	0.06	0.03	0.12	1

56	Vancomycin	<=	1	1	4	1
58	Ampicillin	=	1	0.5	2	1
58	Chloramphenicol	=	8	4	16	1
58	Ciprofloxacin	=	1	0.25	2	1
58	Daptomycin	=	2	1	4	1
58	Erythromycin	<=	1	1	4	1
58	Gentamicin	<=	8	4	16	1
58	Linezolid	=	2	1	4	1
58	Quinupristin-dalfopristin	=	8	2	8	1
58	Teicoplanin	<=	0.5	0.25	1	1
58	Tetracycline	=	16	8	32	1
58	Tigecycline	=	0.12	0.03	0.12	1
58	Vancomycin	=	2	1	4	1
59	Ampicillin	=	1	0.5	2	1
59	Chloramphenicol	=	8	4	16	1
59	Ciprofloxacin	=	1	0.25	2	1
59	Daptomycin	=	1	1	4	1
59	Erythromycin	=	2	1	4	1
59	Gentamicin	<=	8	4	16	1
59	Linezolid	=	2	1	4	1
59	Quinupristin-dalfopristin	=	4	2	8	1
59	Teicoplanin	<=	0.5	0.25	1	1
59	Tetracycline	=	32	8	32	1
59	Tigecycline	=	0.12	0.03	0.12	1
59	Vancomycin	<=	1	1	4	1
60	Ampicillin	=	2	0.5	2	1
60	Chloramphenicol	=	8	4	16	1
60	Ciprofloxacin	=	1	0.25	2	1
60	Daptomycin	=	2	1	4	1
60	Erythromycin	=	2	1	4	1
60	Gentamicin	<=	8	4	16	1
60	Linezolid	=	2	1	4	1
60	Quinupristin-dalfopristin	=	8	2	8	1
60	Teicoplanin	<=	0.5	0.25	1	1
60	Tetracycline	=	16	8	32	1
60	Tigecycline	=	0.125	0.03	0.12	0
60	Vancomycin	=	4	1	4	1
64	Ampicillin	=	1	0.5	2	1
64	Chloramphenicol	=	8	4	16	1
64	Ciprofloxacin	=	0.5	0.25	2	1
64	Daptomycin	=	1	1	4	1
64	Erythromycin	=	2	1	4	1
64	Gentamicin	<=	8	4	16	1
64	Linezolid	=	2	1	4	1
64	Quinupristin-dalfopristin	=	4	2	8	1
64	Teicoplanin	<=	0.5	0.25	1	1
64	Tetracycline	=	2	8	32	0
64	Tigecycline	=	0.06	0.03	0.12	1
64	Vancomycin	=	2	1	4	1

Reference strain results - *S. aureus* ATCC 29213

Lab ID	Antimicrobial	Operator to obtained value	Obtained value	Min Value	Max Value	Score
1	Cefoxitin	=	4	1	4	1
1	Chloramphenicol	=	8	2	16	1
1	Ciprofloxacin	<=	0.25	0.12	0.5	1
1	Clindamycin	<=	0.12	0.06	0.25	1
1	Erythromycin	=	0.5	0.25	1	1
1	Fusidic acid	<=	0.5	0.06	0.25	1
1	Gentamicin	<=	1	0.12	1	1
1	Kanamycin	<=	4	1	4	1
1	Linezolid	=	2	1	4	1
1	Mupirocin	<=	0.5	NA	NA	
1	Penicillin	=	2	0.25	2	1
1	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
1	Rifampicin	<=	0.016	0.004	0.016	1
1	Streptomycin	=	16	NA	NA	
1	Sulfamethoxazole	<=	64	32	128	1
1	Tetracycline	<=	0.5	0.12	1	1
1	Tiamulin	=	1	NA	NA	
1	Trimethoprim	<=	2	1	4	1
1	Vancomycin	<=	1	0.5	2	1
2	Cefoxitin	=	4	1	4	1
2	Chloramphenicol	=	8	2	16	1
2	Ciprofloxacin	<=	0.25	0.12	0.5	1
2	Clindamycin	<=	0.12	0.06	0.25	1
2	Erythromycin	=	0.5	0.25	1	1
2	Fusidic acid	<=	0.5	0.06	0.25	1
2	Gentamicin	<=	1	0.12	1	1
2	Kanamycin	<=	4	1	4	1
2	Linezolid	=	2	1	4	1
2	Mupirocin	<=	0.5	NA	NA	
2	Penicillin	=	0.25	0.25	2	1
2	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
2	Rifampicin	<=	0.016	0.004	0.016	1
2	Streptomycin	<=	4	NA	NA	
2	Sulfamethoxazole	<=	64	32	128	1
2	Tetracycline	<=	0.5	0.12	1	1
2	Tiamulin	<=	0.5	NA	NA	
2	Trimethoprim	<=	2	1	4	1
2	Vancomycin	<=	1	0.5	2	1
4	Cefoxitin	=	4	1	4	1
4	Chloramphenicol	=	8	2	16	1
4	Ciprofloxacin	<=	0.25	0.12	0.5	1
4	Clindamycin	<=	0.12	0.06	0.25	1
4	Erythromycin	=	0.5	0.25	1	1
4	Fusidic acid	<=	0.5	0.06	0.25	1
4	Gentamicin	<=	1	0.12	1	1
4	Kanamycin	<=	4	1	4	1
4	Linezolid	=	2	1	4	1
4	Mupirocin	<=	0.5	NA	NA	
4	Penicillin	=	0.5	0.25	2	1
4	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
4	Rifampicin	<=	0.016	0.004	0.016	1

4	Streptomycin	=	8	NA	NA	
4	Sulfamethoxazole	<=	64	32	128	1
4	Tetracycline	<=	0.5	0.12	1	1
4	Tiamulin	=	1	NA	NA	
4	Trimethoprim	<=	2	1	4	1
4	Vancomycin	<=	1	0.5	2	1
9	Cefoxitin	=	2	1	4	1
9	Chloramphenicol	<=	4	2	16	1
9	Ciprofloxacin	<=	0.25	0.12	0.5	1
9	Clindamycin	<=	0.12	0.06	0.25	1
9	Erythromycin	=	0.5	0.25	1	1
9	Fusidic acid	=		0.06	0.25	
9	Gentamicin	<=	1	0.12	1	1
9	Kanamycin	=	2	1	4	1
9	Linezolid	=	2	1	4	1
9	Mupirocin	=		NA	NA	
9	Penicillin	=	1	0.25	2	1
9	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
9	Rifampicin	=		0.004	0.016	
9	Streptomycin	=		NA	NA	
9	Sulfamethoxazole	<=	64	32	128	1
9	Tetracycline	<=	0.5	0.12	1	1
9	Tiamulin	<=	0.5	NA	NA	
9	Trimethoprim	<=	2	1	4	1
9	Vancomycin	<=	1	0.5	2	1
11	Cefoxitin	=	4	1	4	1
11	Chloramphenicol	=	8	2	16	1
11	Ciprofloxacin	<=	0.25	0.12	0.5	1
11	Clindamycin	<=	0.12	0.06	0.25	1
11	Erythromycin	=	0.5	0.25	1	1
11	Fusidic acid	<=	0.5	0.06	0.25	1
11	Gentamicin	<=	1	0.12	1	1
11	Kanamycin	<=	4	1	4	1
11	Linezolid	<=	1	1	4	1
11	Mupirocin	<=	0.5	NA	NA	
11	Penicillin	=	0.5	0.25	2	1
11	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
11	Rifampicin	<=	0.016	0.004	0.016	1
11	Streptomycin	<=	4	NA	NA	
11	Sulfamethoxazole	<=	64	32	128	1
11	Tetracycline	<=	0.5	0.12	1	1
11	Tiamulin	<=	0.5	NA	NA	
11	Trimethoprim	=	4	1	4	1
11	Vancomycin	<=	1	0.5	2	1
12	Cefoxitin	=	4	1	4	1
12	Chloramphenicol	=	8	2	16	1
12	Ciprofloxacin	=	0.25	0.12	0.5	1
12	Clindamycin	<=	0.12	0.06	0.25	1
12	Erythromycin	=	0.5	0.25	1	1
12	Fusidic acid	<=	0.25	0.06	0.25	1
12	Gentamicin	=	0.25	0.12	1	1
12	Kanamycin	<=	4	1	4	1
12	Linezolid	=	2	1	4	1

12	Mupirocin	<=	0.5	NA	NA	
12	Penicillin	=	1	0.25	2	1
12	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
12	Rifampicin	<=	0.016	0.004	0.016	1
12	Streptomycin	<=	4	NA	NA	
12	Sulfamethoxazole	<=	64	32	128	1
12	Tetracycline	<=	0.5	0.12	1	1
12	Tiamulin	<=	0.5	NA	NA	
12	Trimethoprim	=	1	1	4	1
12	Vancomycin	<=	1	0.5	2	1
16	Cefoxitin	=	4	1	4	1
16	Chloramphenicol	=	8	2	16	1
16	Ciprofloxacin	<=	0.25	0.12	0.5	1
16	Clindamycin	<=	0.12	0.06	0.25	1
16	Erythromycin	=	0.5	0.25	1	1
16	Fusidic acid	<=	0.5	0.06	0.25	1
16	Gentamicin	<=	1	0.12	1	1
16	Kanamycin	<=	4	1	4	1
16	Linezolid	=	2	1	4	1
16	Mupirocin	<=	0.5	NA	NA	
16	Penicillin	=	0.25	0.25	2	1
16	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
16	Rifampicin	<=	0.016	0.004	0.016	1
16	Streptomycin	<=	4	NA	NA	
16	Sulfamethoxazole	<=	64	32	128	1
16	Tetracycline	<=	0.5	0.12	1	1
16	Tiamulin	<=	0.5	NA	NA	
16	Trimethoprim	<=	2	1	4	1
16	Vancomycin	<=	1	0.5	2	1
17	Cefoxitin	=	2	1	4	1
17	Chloramphenicol	<=	4	2	16	1
17	Ciprofloxacin	<=	0.25	0.12	0.5	1
17	Clindamycin	<=	0.12	0.06	0.25	1
17	Erythromycin	<=	0.25	0.25	1	1
17	Fusidic acid	<=	0.5	0.06	0.25	1
17	Gentamicin	<=	1	0.12	1	1
17	Kanamycin	<=	4	1	4	1
17	Linezolid	<=	1	1	4	1
17	Mupirocin	<=	0.5	NA	NA	
17	Penicillin	=	2	0.25	2	1
17	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
17	Rifampicin	<=	0.016	0.004	0.016	1
17	Streptomycin	<=	4	NA	NA	
17	Sulfamethoxazole	<=	64	32	128	1
17	Tetracycline	<=	0.5	0.12	1	1
17	Tiamulin	<=	0.5	NA	NA	
17	Trimethoprim	<=	2	1	4	1
17	Vancomycin	<=	1	0.5	2	1
18	Cefoxitin	=	4	1	4	1
18	Chloramphenicol	<=	4	2	16	1
18	Ciprofloxacin	=	0.5	0.12	0.5	1
18	Clindamycin	<=	0.12	0.06	0.25	1
18	Erythromycin	=	0.5	0.25	1	1

18	Fusidic acid	<=	0.5	0.06	0.25	1
18	Gentamicin	<=	1	0.12	1	1
18	Kanamycin	<=	4	1	4	1
18	Linezolid	<=	1	1	4	1
18	Mupirocin	<=	0.5	NA	NA	
18	Penicillin	=	1	0.25	2	1
18	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
18	Rifampicin	<=	0.016	0.004	0.016	1
18	Streptomycin	=	8	NA	NA	
18	Sulfamethoxazole	<=	64	32	128	1
18	Tetracycline	<=	0.5	0.12	1	1
18	Tiamulin	<=	0.5	NA	NA	
18	Trimethoprim	<=	2	1	4	1
18	Vancomycin	<=	1	0.5	2	1
20	Cefoxitin	=	4	1	4	1
20	Chloramphenicol	=	8	2	16	1
20	Ciprofloxacin	<=	0.25	0.12	0.5	1
20	Clindamycin	<=	0.12	0.06	0.25	1
20	Erythromycin	=	0.5	0.25	1	1
20	Fusidic acid	<=	0.5	0.06	0.25	1
20	Gentamicin	<=	1	0.12	1	1
20	Kanamycin	<=	4	1	4	1
20	Linezolid	=	4	1	4	1
20	Mupirocin	<=	0.5	NA	NA	
20	Penicillin	=	0.5	0.25	2	1
20	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
20	Rifampicin	<=	0.016	0.004	0.016	1
20	Streptomycin	=	8	NA	NA	
20	Sulfamethoxazole	<=	64	32	128	1
20	Tetracycline	=	1	0.12	1	1
20	Tiamulin	=	1	NA	NA	
20	Trimethoprim	<=	2	1	4	1
20	Vancomycin	<=	1	0.5	2	1
21	Cefoxitin	=	4	1	4	1
21	Chloramphenicol	=	8	2	16	1
21	Ciprofloxacin	=	0.05	0.12	0.5	1
21	Clindamycin	<=	0.12	0.06	0.25	1
21	Erythromycin	=	0.5	0.25	1	1
21	Fusidic acid	<=	0.5	0.06	0.25	1
21	Gentamicin	<=	1	0.12	1	1
21	Kanamycin	<=	4	1	4	1
21	Linezolid	=	2	1	4	1
21	Mupirocin	<=	0.5	NA	NA	
21	Penicillin	=	0.25	0.25	2	1
21	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
21	Rifampicin	<=	0.016	0.004	0.016	1
21	Streptomycin	=	4	NA	NA	
21	Sulfamethoxazole	<=	64	32	128	1
21	Tetracycline	<=	0.5	0.12	1	1
21	Tiamulin	<=	0.5	NA	NA	
21	Trimethoprim	<=	2	1	4	1
21	Vancomycin	<=	1	0.5	2	1
22	Cefoxitin	=	4	1	4	1

22	Chloramphenicol	=	8	2	16	1
22	Ciprofloxacin	<=	0.25	0.12	0.5	1
22	Clindamycin	<=	0.12	0.06	0.25	1
22	Erythromycin	=	0.5	0.25	1	1
22	Fusidic acid	<=	0.5	0.06	0.25	1
22	Gentamicin	<=	1	0.12	1	1
22	Kanamycin	<=	4	1	4	1
22	Linezolid	=	2	1	4	1
22	Mupirocin	<=	0.5	NA	NA	
22	Penicillin	=	0.5	0.25	2	1
22	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
22	Rifampicin	<=	0.016	0.004	0.016	1
22	Streptomycin	<=	4	NA	NA	
22	Sulfamethoxazole	<=	64	32	128	1
22	Tetracycline	<=	0.5	0.12	1	1
22	Tiamulin	<=	0.5	NA	NA	
22	Trimethoprim	<=	2	1	4	1
22	Vancomycin	<=	1	0.5	2	1
23	Cefoxitin	=	4	1	4	1
23	Chloramphenicol	=	8	2	16	1
23	Ciprofloxacin	<=	0.25	0.12	0.5	1
23	Clindamycin	<=	0.12	0.06	0.25	1
23	Erythromycin	=	0.5	0.25	1	1
23	Fusidic acid	=		0.06	0.25	
23	Gentamicin	<=	1	0.12	1	1
23	Kanamycin	=		1	4	
23	Linezolid	=	2	1	4	1
23	Mupirocin	<=	0.5	NA	NA	
23	Penicillin	=		0.25	2	
23	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
23	Rifampicin	=		0.004	0.016	
23	Streptomycin	=		NA	NA	
23	Sulfamethoxazole	<=	64	32	128	1
23	Tetracycline	<=	0.5	0.12	1	1
23	Tiamulin	<=	0.5	NA	NA	
23	Trimethoprim	<=	2	1	4	1
23	Vancomycin	<=	1	0.5	2	1
25	Cefoxitin	=		1	4	
25	Chloramphenicol	=		2	16	
25	Ciprofloxacin	<=	0.5	0.12	0.5	1
25	Clindamycin	<=	0.25	0.06	0.25	1
25	Erythromycin	=	1	0.25	1	1
25	Fusidic acid	<=	0.25	0.06	0.25	1
25	Gentamicin	<=	0.5	0.12	1	1
25	Kanamycin	=		1	4	
25	Linezolid	=	4	1	4	1
25	Mupirocin	=		NA	NA	
25	Penicillin	=		0.25	2	
25	Quinupristin-dalfopristin	=		0.25	1	
25	Rifampicin	=		0.004	0.016	
25	Streptomycin	=		NA	NA	
25	Sulfamethoxazole	=		32	128	
25	Tetracycline	=	1	0.12	1	1

25	Tiamulin	=		NA	NA	
25	Trimethoprim	=		1	4	
25	Vancomycin	=		0.5	2	
26	Cefoxitin	=	4	1	4	1
26	Chloramphenicol	=	8	2	16	1
26	Ciprofloxacin	<=	0.25	0.12	0.5	1
26	Clindamycin	<=	0.12	0.06	0.25	1
26	Erythromycin	=	0.5	0.25	1	1
26	Fusidic acid	<=	0.5	0.06	0.25	1
26	Gentamicin	<=	1	0.12	1	1
26	Kanamycin	<=	4	1	4	1
26	Linezolid	=	2	1	4	1
26	Mupirocin	<=	0.5	NA	NA	
26	Penicillin	=	0.5	0.25	2	1
26	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
26	Rifampicin	<=	0.016	0.004	0.016	1
26	Streptomycin	<=	4	NA	NA	
26	Sulfamethoxazole	<=	64	32	128	1
26	Tetracycline	<=	0.5	0.12	1	1
26	Tiamulin	=	1	NA	NA	
26	Trimethoprim	<=	2	1	4	1
26	Vancomycin	<=	1	0.5	2	1
29	Cefoxitin	=	4	1	4	1
29	Chloramphenicol	=	8	2	16	1
29	Ciprofloxacin	<=	0.25	0.12	0.5	1
29	Clindamycin	<=	0.12	0.06	0.25	1
29	Erythromycin	=	0.5	0.25	1	1
29	Fusidic acid	<=	0.5	0.06	0.25	1
29	Gentamicin	<=	1	0.12	1	1
29	Kanamycin	<=	4	1	4	1
29	Linezolid	=	2	1	4	1
29	Mupirocin	=		NA	NA	
29	Penicillin	=	0.5	0.25	2	1
29	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
29	Rifampicin	<=	0.016	0.004	0.016	1
29	Streptomycin	=		NA	NA	
29	Sulfamethoxazole	<=	64	32	128	1
29	Tetracycline	<=	0.5	0.12	1	1
29	Tiamulin	=		NA	NA	
29	Trimethoprim	<=	2	1	4	1
29	Vancomycin	<=	1	0.5	2	1
30	Cefoxitin	=	4	1	4	1
30	Chloramphenicol	=	8	2	16	1
30	Ciprofloxacin	<=	0.25	0.12	0.5	1
30	Clindamycin	=	0.25	0.06	0.25	1
30	Erythromycin	=	0.5	0.25	1	1
30	Fusidic acid	<=	0.5	0.06	0.25	1
30	Gentamicin	<=	1	0.12	1	1
30	Kanamycin	<=	4	1	4	1
30	Linezolid	=	2	1	4	1
30	Mupirocin	<=	0.5	NA	NA	
30	Penicillin	<=	0.12	0.25	2	0
30	Quinupristin-dalfopristin	<=	0.5	0.25	1	1

30	Rifampicin	<=	0.016	0.004	0.016	1
30	Streptomycin	=	8	NA	NA	
30	Sulfamethoxazole	<=	64	32	128	1
30	Tetracycline	=	1	0.12	1	1
30	Tiamulin	<=	0.5	NA	NA	
30	Trimethoprim	<=	2	1	4	1
30	Vancomycin	<=	1	0.5	2	1
31	Cefoxitin	<=	4	1	4	1
31	Chloramphenicol	<=	16	2	16	1
31	Ciprofloxacin	=	0.25	0.12	0.5	1
31	Clindamycin	<=	0.25	0.06	0.25	1
31	Erythromycin	<=	0.5	0.25	1	1
31	Fusidic acid	<=	0.5	0.06	0.25	1
31	Gentamicin	<=	2	0.12	1	1
31	Kanamycin	<=	8	1	4	1
31	Linezolid	=	2	1	4	1
31	Mupirocin	<=	0.5	NA	NA	
31	Penicillin	=	8	0.25	2	0
31	Quinupristin-dalfopristin	<=	1	0.25	1	1
31	Rifampicin	<=	0.032	0.004	0.016	1
31	Streptomycin	<=	16	NA	NA	
31	Sulfamethoxazole	<=	128	32	128	1
31	Tetracycline	<=	1	0.12	1	1
31	Tiamulin	<=	2	NA	NA	
31	Trimethoprim	<=	2	1	4	1
31	Vancomycin	<=	2	0.5	2	1
33	Cefoxitin	=	4	1	4	1
33	Chloramphenicol	=	8	2	16	1
33	Ciprofloxacin	=	0.5	0.12	0.5	1
33	Clindamycin	<=	0.12	0.06	0.25	1
33	Erythromycin	=	0.5	0.25	1	1
33	Fusidic acid	<=	0.5	0.06	0.25	1
33	Gentamicin	<=	1	0.12	1	1
33	Kanamycin	<=	4	1	4	1
33	Linezolid	=	2	1	4	1
33	Mupirocin	<=	0.5	NA	NA	
33	Penicillin	=	1	0.25	2	1
33	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
33	Rifampicin	<=	0.016	0.004	0.016	1
33	Streptomycin	=	8	NA	NA	
33	Sulfamethoxazole	=	256	32	128	0
33	Tetracycline	<=	0.5	0.12	1	1
33	Tiamulin	=	1	NA	NA	
33	Trimethoprim	<=	2	1	4	1
33	Vancomycin	<=	1	0.5	2	1
34	Cefoxitin	=	4	1	4	1
34	Chloramphenicol	=	8	2	16	1
34	Ciprofloxacin	<=	0.25	0.12	0.5	1
34	Clindamycin	<=	0.12	0.06	0.25	1
34	Erythromycin	=	0.5	0.25	1	1
34	Fusidic acid	<=	0.5	0.06	0.25	1
34	Gentamicin	<=	1	0.12	1	1
34	Kanamycin	<=	4	1	4	1

34	Linezolid	=	2	1	4	1
34	Mupirocin	=		NA	NA	
34	Penicillin	=	0.5	0.25	2	1
34	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
34	Rifampicin	<=	0.016	0.004	0.016	1
34	Streptomycin	<=	4	NA	NA	
34	Sulfamethoxazole	<=	64	32	128	1
34	Tetracycline	<=	0.5	0.12	1	1
34	Tiamulin	=	1	NA	NA	
34	Trimethoprim	<=	2	1	4	1
34	Vancomycin	<=	1	0.5	2	1
36	Cefoxitin	=	4	1	4	1
36	Chloramphenicol	=	8	2	16	1
36	Ciprofloxacin	=	0.5	0.12	0.5	1
36	Clindamycin	<=	0.12	0.06	0.25	1
36	Erythromycin	=	0.5	0.25	1	1
36	Fusidic acid	<=	0.5	0.06	0.25	1
36	Gentamicin	<=	1	0.12	1	1
36	Kanamycin	<=	4	1	4	1
36	Linezolid	<=	1	1	4	1
36	Mupirocin	<=	0.5	NA	NA	
36	Penicillin	=	0.5	0.25	2	1
36	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
36	Rifampicin	<=	0.016	0.004	0.016	1
36	Streptomycin	<=	4	NA	NA	
36	Sulfamethoxazole	<=	64	32	128	1
36	Tetracycline	<=	0.5	0.12	1	1
36	Tiamulin	=	1	NA	NA	
36	Trimethoprim	<=	2	1	4	1
36	Vancomycin	<=	1	0.5	2	1
37	Cefoxitin	=	2	1	4	1
37	Chloramphenicol	=	8	2	16	1
37	Ciprofloxacin	<=	0.25	0.12	0.5	1
37	Clindamycin	<=	0.12	0.06	0.25	1
37	Erythromycin	=	0.5	0.25	1	1
37	Fusidic acid	<=	0.5	0.06	0.25	1
37	Gentamicin	<=	1	0.12	1	1
37	Kanamycin	<=	4	1	4	1
37	Linezolid	=	2	1	4	1
37	Mupirocin	<=	0.5	NA	NA	
37	Penicillin	=	0.5	0.25	2	1
37	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
37	Rifampicin	<=	0.016	0.004	0.016	1
37	Streptomycin	=	8	NA	NA	
37	Sulfamethoxazole	<=	64	32	128	1
37	Tetracycline	<=	0.5	0.12	1	1
37	Tiamulin	=	1	NA	NA	
37	Trimethoprim	<=	2	1	4	1
37	Vancomycin	<=	1	0.5	2	1
39	Cefoxitin	=	2	1	4	1
39	Chloramphenicol	=	8	2	16	1
39	Ciprofloxacin	<=	0.25	0.12	0.5	1
39	Clindamycin	<=	0.12	0.06	0.25	1

39	Erythromycin	=	0.5	0.25	1	1
39	Fusidic acid	=		0.06	0.25	
39	Gentamicin	<=	1	0.12	1	1
39	Kanamycin	=		1	4	
39	Linezolid	=	2	1	4	1
39	Mupirocin	<=	0.5	NA	NA	
39	Penicillin	=		0.25	2	
39	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
39	Rifampicin	=		0.004	0.016	
39	Streptomycin	=		NA	NA	
39	Sulfamethoxazole	<=	64	32	128	1
39	Tetracycline	<=	0.5	0.12	1	1
39	Tiamulin	=	1	NA	NA	
39	Trimethoprim	<=	2	1	4	1
39	Vancomycin	<=	1	0.5	2	1
40	Cefoxitin	=	2	1	4	1
40	Chloramphenicol	=	8	2	16	1
40	Ciprofloxacin	=	0.25	0.12	0.5	1
40	Clindamycin	=	0.12	0.06	0.25	1
40	Erythromycin	=	0.5	0.25	1	1
40	Fusidic acid	=	0.25	0.06	0.25	1
40	Gentamicin	=	1	0.12	1	1
40	Kanamycin	=	4	1	4	1
40	Linezolid	=	2	1	4	1
40	Mupirocin	=	0.25	NA	NA	
40	Penicillin	=	0.5	0.25	2	1
40	Quinupristin-dalfopristin	=	1	0.25	1	1
40	Rifampicin	=	0.016	0.004	0.016	1
40	Streptomycin	=		NA	NA	
40	Sulfamethoxazole	=	64	32	128	1
40	Tetracycline	=	0.5	0.12	1	1
40	Tiamulin	=	0.5	NA	NA	
40	Trimethoprim	=	2	1	4	1
40	Vancomycin	=	1	0.5	2	1
42	Cefoxitin	=	4	1	4	1
42	Chloramphenicol	=	8	2	16	1
42	Ciprofloxacin	<=	0.25	0.12	0.5	1
42	Clindamycin	<=	0.12	0.06	0.25	1
42	Erythromycin	=	0.5	0.25	1	1
42	Fusidic acid	<=	0.5	0.06	0.25	1
42	Gentamicin	<=	1	0.12	1	1
42	Kanamycin	<=	4	1	4	1
42	Linezolid	=	4	1	4	1
42	Mupirocin	<=	0.5	NA	NA	
42	Penicillin	=	1	0.25	2	1
42	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
42	Rifampicin	<=	0.016	0.004	0.016	1
42	Streptomycin	=	8	NA	NA	
42	Sulfamethoxazole	<=	64	32	128	1
42	Tetracycline	<=	0.5	0.12	1	1
42	Tiamulin	=	1	NA	NA	
42	Trimethoprim	<=	2	1	4	1
42	Vancomycin	<=	1	0.5	2	1

45	Cefoxitin	=	4	1	4	1
45	Chloramphenicol	=	8	2	16	1
45	Ciprofloxacin	=	0.5	0.12	0.5	1
45	Clindamycin	<=	0.12	0.06	0.25	1
45	Erythromycin	<=	0.25	0.25	1	1
45	Fusidic acid	<=	0.5	0.06	0.25	1
45	Gentamicin	<=	1	0.12	1	1
45	Kanamycin	<=	4	1	4	1
45	Linezolid	=	4	1	4	1
45	Mupirocin	<=	0.5	NA	NA	
45	Penicillin	=	0.5	0.25	2	1
45	Quinupristin-dalfopristin	=	1	0.25	1	1
45	Rifampicin	<=	0.016	0.004	0.016	1
45	Streptomycin	<=	4	NA	NA	
45	Sulfamethoxazole	<=	64	32	128	1
45	Tetracycline	=	1	0.12	1	1
45	Tiamulin	<=	0.5	NA	NA	
45	Trimethoprim	<=	2	1	4	1
45	Vancomycin	<=	1	0.5	2	1
56	Cefoxitin	=	1	1	4	1
56	Chloramphenicol	=	8	2	16	1
56	Ciprofloxacin	<=	0.25	0.12	0.5	1
56	Clindamycin	<=	0.12	0.06	0.25	1
56	Erythromycin	<=	0.25	0.25	1	1
56	Fusidic acid	<=	0.5	0.06	0.25	1
56	Gentamicin	<=	1	0.12	1	1
56	Kanamycin	<=	4	1	4	1
56	Linezolid	=	2	1	4	1
56	Mupirocin	<=	0.5	NA	NA	
56	Penicillin	=	0.5	0.25	2	1
56	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
56	Rifampicin	<=	0.016	0.004	0.016	1
56	Streptomycin	<=	4	NA	NA	
56	Sulfamethoxazole	<=	64	32	128	1
56	Tetracycline	<=	0.5	0.12	1	1
56	Tiamulin	=	1	NA	NA	
56	Trimethoprim	<=	2	1	4	1
56	Vancomycin	<=	1	0.5	2	1
58	Cefoxitin	=	4	1	4	1
58	Chloramphenicol	=	8	2	16	1
58	Ciprofloxacin	<=	0.25	0.12	0.5	1
58	Clindamycin	<=	0.12	0.06	0.25	1
58	Erythromycin	=	0.5	0.25	1	1
58	Fusidic acid	<=	0.5	0.06	0.25	1
58	Gentamicin	<=	1	0.12	1	1
58	Kanamycin	<=	4	1	4	1
58	Linezolid	=	2	1	4	1
58	Mupirocin	<=	0.5	NA	NA	
58	Penicillin	=	0.25	0.25	2	1
58	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
58	Rifampicin	<=	0.016	0.004	0.016	1
58	Streptomycin	<=	4	NA	NA	
58	Sulfamethoxazole	<=	64	32	128	1

58	Tetracycline	<=	0.5	0.12	1	1
58	Tiamulin	<=	0.5	NA	NA	
58	Trimethoprim	<=	2	1	4	1
58	Vancomycin	<=	1	0.5	2	1
59	Cefoxitin	=	4	1	4	1
59	Chloramphenicol	=	8	2	16	1
59	Ciprofloxacin	=	0.5	0.12	0.5	1
59	Clindamycin	<=	0.12	0.06	0.25	1
59	Erythromycin	=	0.5	0.25	1	1
59	Fusidic acid	<=	0.5	0.06	0.25	1
59	Gentamicin	<=	1	0.12	1	1
59	Kanamycin	<=	4	1	4	1
59	Linezolid	=	2	1	4	1
59	Mupirocin	<=	0.5	NA	NA	
59	Penicillin	=	0.5	0.25	2	1
59	Quinupristin-dalfopristin	<=	0.5	0.25	1	1
59	Rifampicin	<=	0.016	0.004	0.016	1
59	Streptomycin	=	8	NA	NA	
59	Sulfamethoxazole	<=	64	32	128	1
59	Tetracycline	<=	0.5	0.12	1	1
59	Tiamulin	=	1	NA	NA	
59	Trimethoprim	<=	2	1	4	1
59	Vancomycin	<=	1	0.5	2	1
64	Cefoxitin	=	2	1	4	1
64	Chloramphenicol	=	8	2	16	1
64	Ciprofloxacin	=	0.25	0.12	0.5	1
64	Clindamycin	=	0.12	0.06	0.25	1
64	Erythromycin	=	0.5	0.25	1	1
64	Fusidic acid	=	0.25	0.06	0.25	1
64	Gentamicin	=	1	0.12	1	1
64	Kanamycin	=	4	1	4	1
64	Linezolid	=	2	1	4	1
64	Mupirocin	=	0.25	NA	NA	
64	Penicillin	=	0.5	0.25	2	1
64	Quinupristin-dalfopristin	=	1	0.25	1	1
64	Rifampicin	=	0.016	0.004	0.016	1
64	Streptomycin	=		NA	NA	
64	Sulfamethoxazole	=	64	32	128	1
64	Tetracycline	=	0.5	0.12	1	1
64	Tiamulin	=	0.5	NA	NA	
64	Trimethoprim	=	2	1	4	1
64	Vancomycin	=	1	0.5	2	1

Reference strain results - *E. coli* ATCC 25922

Lab ID	Panel	Antimicrobial	Operator to obtained value	Obtained value	Min Value	Max Value	Score
2	1	Ampicillin	=	4	2	8	1
2	1	Azithromycin	=	4	NA	NA	
2	1	Cefotaxime	<=	0.25	0.03	0.12	1
2	1	Ceftazidime	<=	0.5	0.06	0.5	1
2	1	Chloramphenicol	<=	8	2	8	1
2	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
2	1	Colistin	<=	1	0.25	2	1
2	1	Gentamicin	<=	0.5	0.25	1	1
2	1	Meropenem	<=	0.03	0.008	0.06	1
2	1	Nalidixic acid	<=	4	1	4	1
2	1	Sulfamethoxazole	=	32	8	32	1
2	1	Tetracycline	<=	2	0.5	2	1
2	1	Tigecycline	<=	0.25	0.03	0.25	1
2	1	Trimethoprim	=	1	0.5	2	1
2	2	Cefepime	<=	0.06	0.016	0.12	1
2	2	Cefotaxime	<=	0.25	0.03	0.12	1
2	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
2	2	Cefoxitin	=	4	2	8	1
2	2	Ceftazidime	<=	0.25	0.06	0.5	1
2	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
2	2	Ertapenem	<=	0.015	0.004	0.016	1
2	2	Imipenem	<=	0.25	0.06	0.25	1
2	2	Meropenem	<=	0.03	0.008	0.06	1
2	2	Temocillin	=	8	NA	NA	
4	1	Ampicillin	=	4	2	8	1
4	1	Azithromycin	=	4	NA	NA	
4	1	Cefotaxime	<=	0.25	0.03	0.12	1
4	1	Ceftazidime	<=	0.5	0.06	0.5	1
4	1	Chloramphenicol	<=	8	2	8	1
4	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
4	1	Colistin	<=	1	0.25	2	1
4	1	Gentamicin	<=	0.5	0.25	1	1
4	1	Meropenem	<=	0.03	0.008	0.06	1
4	1	Nalidixic acid	<=	4	1	4	1
4	1	Sulfamethoxazole	=	32	8	32	1
4	1	Tetracycline	<=	2	0.5	2	1
4	1	Tigecycline	<=	0.25	0.03	0.25	1
4	1	Trimethoprim	=	1	0.5	2	1
4	2	Cefepime	<=	0.06	0.016	0.12	1
4	2	Cefotaxime	<=	0.25	0.03	0.12	1
4	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
4	2	Cefoxitin	=	4	2	8	1
4	2	Ceftazidime	<=	0.25	0.06	0.5	1
4	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
4	2	Ertapenem	<=	0.015	0.004	0.016	1
4	2	Imipenem	<=	0.12	0.06	0.25	1
4	2	Meropenem	<=	0.03	0.008	0.06	1
4	2	Temocillin	=	16	NA	NA	
6	1	Ampicillin	=	8	2	8	1
6	1	Azithromycin	=	4	NA	NA	
6	1	Cefotaxime	<=	0.25	0.03	0.12	1
6	1	Ceftazidime	<=	0.5	0.06	0.5	1
6	1	Chloramphenicol	<=	8	2	8	1
6	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
6	1	Colistin	<=	1	0.25	2	1
6	1	Gentamicin	<=	0.5	0.25	1	1

6	1	Meropenem	<=	0.03	0.008	0.06	1
6	1	Nalidixic acid	<=	4	1	4	1
6	1	Sulfamethoxazole	=	32	8	32	1
6	1	Tetracycline	<=	2	0.5	2	1
6	1	Tigecycline	<=	0.25	0.03	0.25	1
6	1	Trimethoprim	=	0.5	0.5	2	1
6	2	Cefepime	=	0.12	0.016	0.12	1
6	2	Cefotaxime	<=	0.25	0.03	0.12	1
6	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
6	2	Cefoxitin	=	4	2	8	1
6	2	Ceftazidime	<=	0.25	0.06	0.5	1
6	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
6	2	Ertapenem	<=	0.015	0.004	0.016	1
6	2	Imipenem	=	0.25	0.06	0.25	1
6	2	Meropenem	<=	0.03	0.008	0.06	1
6	2	Temocillin	=	8	NA	NA	
9	1	Ampicillin	=	4	2	8	1
9	1	Azithromycin	=		NA	NA	
9	1	Cefotaxime	=		0.03	0.12	
9	1	Ceftazidime	<=	0.5	0.06	0.5	1
9	1	Chloramphenicol	<=	8	2	8	1
9	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
9	1	Colistin	<=	1	0.25	2	1
9	1	Gentamicin	<=	0.5	0.25	1	1
9	1	Meropenem	<=	0.03	0.008	0.06	1
9	1	Nalidixic acid	<=	4	1	4	1
9	1	Sulfamethoxazole	=	16	8	32	1
9	1	Tetracycline	<=	2	0.5	2	1
9	1	Tigecycline	<=	0.25	0.03	0.25	1
9	1	Trimethoprim	=	1	0.5	2	1
9	2	Cefepime	=	0.06	0.016	0.12	1
9	2	Cefotaxime	<=	0.25	0.03	0.12	1
9	2	Cefotaxime/clavulanic acid	=		NA	NA	
9	2	Cefoxitin	=	4	2	8	1
9	2	Ceftazidime	<=	0.25	0.06	0.5	1
9	2	Ceftazidime/clavulanic acid	=		NA	NA	
9	2	Ertapenem	<=	0.015	0.004	0.016	1
9	2	Imipenem	<=	0.12	0.06	0.25	1
9	2	Meropenem	<=	0.03	0.008	0.06	1
9	2	Temocillin	=		NA	NA	
11	1	Ampicillin	=	4	2	8	1
11	1	Azithromycin	=	4	NA	NA	
11	1	Cefotaxime	<=	0.25	0.03	0.12	1
11	1	Ceftazidime	<=	0.5	0.06	0.5	1
11	1	Chloramphenicol	<=	8	2	8	1
11	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
11	1	Colistin	<=	1	0.25	2	1
11	1	Gentamicin	<=	0.5	0.25	1	1
11	1	Meropenem	<=	0.03	0.008	0.06	1
11	1	Nalidixic acid	<=	4	1	4	1
11	1	Sulfamethoxazole	<=	8	8	32	1
11	1	Tetracycline	<=	2	0.5	2	1
11	1	Tigecycline	<=	0.25	0.03	0.25	1
11	1	Trimethoprim	=	0.5	0.5	2	1
11	2	Cefepime	=	0.12	0.016	0.12	1
11	2	Cefotaxime	<=	0.25	0.03	0.12	1
11	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
11	2	Cefoxitin	=	2	2	8	1

11	2	Ceftazidime	<=	0.25	0.06	0.5	1
11	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
11	2	Ertapenem	<=	0.015	0.004	0.016	1
11	2	Imipenem	<=	0.12	0.06	0.25	1
11	2	Meropenem	<=	0.03	0.008	0.06	1
11	2	Temocillin	=	32	NA	NA	
12	1	Ampicillin	=	4	2	8	1
12	1	Azithromycin	=	4	NA	NA	
12	1	Cefotaxime	<=	0.25	0.03	0.12	1
12	1	Ceftazidime	<=	0.5	0.06	0.5	1
12	1	Chloramphenicol	<=	8	2	8	1
12	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
12	1	Colistin	<=	1	0.25	2	1
12	1	Gentamicin	<=	0.5	0.25	1	1
12	1	Meropenem	<=	0.03	0.008	0.06	1
12	1	Nalidixic acid	<=	4	1	4	1
12	1	Sulfamethoxazole	=	16	8	32	1
12	1	Tetracycline	<=	2	0.5	2	1
12	1	Tigecycline	<=	0.25	0.03	0.25	1
12	1	Trimethoprim	=	0.5	0.5	2	1
12	2	Cefepime	<=	0.06	0.016	0.12	1
12	2	Cefotaxime	<=	0.25	0.03	0.12	1
12	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
12	2	Cefoxitin	=	2	2	8	1
12	2	Ceftazidime	<=	0.25	0.06	0.5	1
12	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
12	2	Ertapenem	<=	0.015	0.004	0.016	1
12	2	Imipenem	<=	0.12	0.06	0.25	1
12	2	Meropenem	<=	0.03	0.008	0.06	1
12	2	Temocillin	=	16	NA	NA	
16	1	Ampicillin	=	4	2	8	1
16	1	Azithromycin	=	4	NA	NA	
16	1	Cefotaxime	<=	0.25	0.03	0.12	1
16	1	Ceftazidime	<=	0.5	0.06	0.5	1
16	1	Chloramphenicol	<=	8	2	8	1
16	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
16	1	Colistin	<=	1	0.25	2	1
16	1	Gentamicin	=	1	0.25	1	1
16	1	Meropenem	<=	0.03	0.008	0.06	1
16	1	Nalidixic acid	<=	4	1	4	1
16	1	Sulfamethoxazole	=	16	8	32	1
16	1	Tetracycline	<=	2	0.5	2	1
16	1	Tigecycline	<=	0.25	0.03	0.25	1
16	1	Trimethoprim	=	0.5	0.5	2	1
16	2	Cefepime	<=	0.06	0.016	0.12	1
16	2	Cefotaxime	<=	0.25	0.03	0.12	1
16	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
16	2	Cefoxitin	=	4	2	8	1
16	2	Ceftazidime	<=	0.25	0.06	0.5	1
16	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
16	2	Ertapenem	<=	0.015	0.004	0.016	1
16	2	Imipenem	<=	0.12	0.06	0.25	1
16	2	Meropenem	<=	0.03	0.008	0.06	1
16	2	Temocillin	=	16	NA	NA	
17	1	Ampicillin	=	8	2	8	1
17	1	Azithromycin	=	4	NA	NA	
17	1	Cefotaxime	<=	0.25	0.03	0.12	1
17	1	Ceftazidime	<=	0.5	0.06	0.5	1

17	1	Chloramphenicol	<=	8	2	8	1
17	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
17	1	Colistin	<=	1	0.25	2	1
17	1	Gentamicin	<=	0.5	0.25	1	1
17	1	Meropenem	<=	0.03	0.008	0.06	1
17	1	Nalidixic acid	<=	4	1	4	1
17	1	Sulfamethoxazole	=	16	8	32	1
17	1	Tetracycline	<=	2	0.5	2	1
17	1	Tigecycline	<=	0.25	0.03	0.25	1
17	1	Trimethoprim	=	0.5	0.5	2	1
17	2	Cefepime	<=	0.06	0.016	0.12	1
17	2	Cefotaxime	<=	0.25	0.03	0.12	1
17	2	Cefotaxime/clavulanic acid	=	0.25	NA	NA	
17	2	Cefoxitin	=	4	2	8	1
17	2	Ceftazidime	<=	0.25	0.06	0.5	1
17	2	Ceftazidime/clavulanic acid	<=	0.06	NA	NA	
17	2	Ertapenem	<=	0.015	0.004	0.016	1
17	2	Imipenem	<=	0.12	0.06	0.25	1
17	2	Meropenem	<=	0.03	0.008	0.06	1
17	2	Temocillin	=	32	NA	NA	
18	1	Ampicillin	=	4	2	8	1
18	1	Azithromycin	=	8	NA	NA	
18	1	Cefotaxime	<=	0.25	0.03	0.12	1
18	1	Ceftazidime	<=	0.5	0.06	0.5	1
18	1	Chloramphenicol	<=	8	2	8	1
18	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
18	1	Colistin	<=	1	0.25	2	1
18	1	Gentamicin	<=	0.5	0.25	1	1
18	1	Meropenem	=	0.06	0.008	0.06	1
18	1	Nalidixic acid	<=	4	1	4	1
18	1	Sulfamethoxazole	=	16	8	32	1
18	1	Tetracycline	<=	2	0.5	2	1
18	1	Tigecycline	<=	0.25	0.03	0.25	1
18	1	Trimethoprim	=	0.5	0.5	2	1
18	2	Cefepime	<=	0.06	0.016	0.12	1
18	2	Cefotaxime	<=	0.25	0.03	0.12	1
18	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
18	2	Cefoxitin	=	4	2	8	1
18	2	Ceftazidime	<=	0.25	0.06	0.5	1
18	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
18	2	Ertapenem	<=	0.015	0.004	0.016	1
18	2	Imipenem	<=	0.12	0.06	0.25	1
18	2	Meropenem	<=	0.03	0.008	0.06	1
18	2	Temocillin	=	4	NA	NA	
19	1	Ampicillin	=	4	2	8	1
19	1	Azithromycin	=	4	NA	NA	
19	1	Cefotaxime	<=	0.25	0.03	0.12	1
19	1	Ceftazidime	<=	0.5	0.06	0.5	1
19	1	Chloramphenicol	<=	8	2	8	1
19	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
19	1	Colistin	<=	1	0.25	2	1
19	1	Gentamicin	<=	0.5	0.25	1	1
19	1	Meropenem	<=	0.03	0.008	0.06	1
19	1	Nalidixic acid	<=	4	1	4	1
19	1	Sulfamethoxazole	=	32	8	32	1
19	1	Tetracycline	<=	2	0.5	2	1
19	1	Tigecycline	<=	0.25	0.03	0.25	1
19	1	Trimethoprim	=	0.5	0.5	2	1

19	2	Cefepime	<=	0.06	0.016	0.12	1
19	2	Cefotaxime	<=	0.25	0.03	0.12	1
19	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
19	2	Cefoxitin	=	4	2	8	1
19	2	Ceftazidime	=	0.5	0.06	0.5	1
19	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
19	2	Ertapenem	<=	0.015	0.004	0.016	1
19	2	Imipenem	<=	0.12	0.06	0.25	1
19	2	Meropenem	<=	0.03	0.008	0.06	1
19	2	Temocillin	=	16	NA	NA	
20	1	Ampicillin	=	4	2	8	1
20	1	Azithromycin	=	4	NA	NA	
20	1	Cefotaxime	<=	0.25	0.03	0.12	1
20	1	Ceftazidime	<=	0.5	0.06	0.5	1
20	1	Chloramphenicol	<=	8	2	8	1
20	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
20	1	Colistin	<=	1	0.25	2	1
20	1	Gentamicin	<=	0.5	0.25	1	1
20	1	Meropenem	<=	0.03	0.008	0.06	1
20	1	Nalidixic acid	<=	4	1	4	1
20	1	Sulfamethoxazole	=	32	8	32	1
20	1	Tetracycline	<=	2	0.5	2	1
20	1	Tigecycline	<=	0.25	0.03	0.25	1
20	1	Trimethoprim	=	0.5	0.5	2	1
20	2	Cefepime	<=	0.06	0.016	0.12	1
20	2	Cefotaxime	<=	0.25	0.03	0.12	1
20	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
20	2	Cefoxitin	=	4	2	8	1
20	2	Ceftazidime	<=	0.25	0.06	0.5	1
20	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
20	2	Ertapenem	<=	0.015	0.004	0.016	1
20	2	Imipenem	<=	0.12	0.06	0.25	1
20	2	Meropenem	<=	0.03	0.008	0.06	1
20	2	Temocillin	=	8	NA	NA	
21	1	Ampicillin	=	4	2	8	1
21	1	Azithromycin	=	4	NA	NA	
21	1	Cefotaxime	<=	0.25	0.03	0.12	1
21	1	Ceftazidime	<=	0.5	0.06	0.5	1
21	1	Chloramphenicol	<=	8	2	8	1
21	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
21	1	Colistin	<=	1	0.25	2	1
21	1	Gentamicin	<=	0.5	0.25	1	1
21	1	Meropenem	<=	0.03	0.008	0.06	1
21	1	Nalidixic acid	<=	4	1	4	1
21	1	Sulfamethoxazole	=	32	8	32	1
21	1	Tetracycline	<=	2	0.5	2	1
21	1	Tigecycline	<=	0.25	0.03	0.25	1
21	1	Trimethoprim	=	0.5	0.5	2	1
21	2	Cefepime	<=	0.06	0.016	0.12	1
21	2	Cefotaxime	<=	0.25	0.03	0.12	1
21	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
21	2	Cefoxitin	=	4	2	8	1
21	2	Ceftazidime	<=	0.25	0.06	0.5	1
21	2	Ceftazidime/clavulanic acid	<=	0.25	NA	NA	
21	2	Ertapenem	<=	0.015	0.004	0.016	1
21	2	Imipenem	<=	0.12	0.06	0.25	1
21	2	Meropenem	<=	0.03	0.008	0.06	1
21	2	Temocillin	=	8	NA	NA	

22	1	Ampicillin	=	4	2	8	1
22	1	Azithromycin	=	4	NA	NA	
22	1	Cefotaxime	<=	0.25	0.03	0.12	1
22	1	Ceftazidime	<=	0.5	0.06	0.5	1
22	1	Chloramphenicol	<=	8	2	8	1
22	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
22	1	Colistin	<=	1	0.25	2	1
22	1	Gentamicin	<=	0.5	0.25	1	1
22	1	Meropenem	<=	0.03	0.008	0.06	1
22	1	Nalidixic acid	<=	4	1	4	1
22	1	Sulfamethoxazole	=	16	8	32	1
22	1	Tetracycline	<=	2	0.5	2	1
22	1	Tigecycline	<=	0.25	0.03	0.25	1
22	1	Trimethoprim	=	0.5	0.5	2	1
22	2	Cefepime	<=	0.06	0.016	0.12	1
22	2	Cefotaxime	<=	0.25	0.03	0.12	1
22	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
22	2	Cefoxitin	=	2	2	8	1
22	2	Ceftazidime	<=	0.25	0.06	0.5	1
22	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
22	2	Ertapenem	<=	0.015	0.004	0.016	1
22	2	Imipenem	=	0.25	0.06	0.25	1
22	2	Meropenem	<=	0.03	0.008	0.06	1
22	2	Temocillin	=	16	NA	NA	
23	1	Ampicillin	=	2	2	8	1
23	1	Azithromycin	<=	2	NA	NA	
23	1	Cefotaxime	<=	0.25	0.03	0.12	1
23	1	Ceftazidime	<=	0.5	0.06	0.5	1
23	1	Chloramphenicol	<=	8	2	8	1
23	1	Ciprofloxacin	=	0.03	0.004	0.016	0
23	1	Colistin	<=	1	0.25	2	1
23	1	Gentamicin	<=	0.5	0.25	1	1
23	1	Meropenem	<=	0.03	0.008	0.06	1
23	1	Nalidixic acid	<=	4	1	4	1
23	1	Sulfamethoxazole	=	16	8	32	1
23	1	Tetracycline	<=	2	0.5	2	1
23	1	Tigecycline	<=	0.25	0.03	0.25	1
23	1	Trimethoprim	=	0.5	0.5	2	1
23	2	Cefepime	<=	0.06	0.016	0.12	1
23	2	Cefotaxime	<=	0.25	0.03	0.12	1
23	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
23	2	Cefoxitin	=	2	2	8	1
23	2	Ceftazidime	<=	0.25	0.06	0.5	1
23	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
23	2	Ertapenem	<=	0.015	0.004	0.016	1
23	2	Imipenem	<=	0.12	0.06	0.25	1
23	2	Meropenem	<=	0.03	0.008	0.06	1
23	2	Temocillin	<=	0.5	NA	NA	
25	1	Ampicillin	=	4	2	8	1
25	1	Azithromycin	=	4	NA	NA	
25	1	Cefotaxime	<=	0.25	0.03	0.12	1
25	1	Ceftazidime	<=	0.5	0.06	0.5	1
25	1	Chloramphenicol	<=	8	2	8	1
25	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
25	1	Colistin	<=	1	0.25	2	1
25	1	Gentamicin	<=	0.5	0.25	1	1
25	1	Meropenem	<=	0.03	0.008	0.06	1
25	1	Nalidixic acid	<=	4	1	4	1

25	1	Sulfamethoxazole	<=	8	8	32	1
25	1	Tetracycline	<=	2	0.5	2	1
25	1	Tigecycline	<=	0.25	0.03	0.25	1
25	1	Trimethoprim	=	0.5	0.5	2	1
25	2	Cefepime	<=	0.06	0.016	0.12	1
25	2	Cefotaxime	<=	0.25	0.03	0.12	1
25	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
25	2	Cefoxitin	=	2	2	8	1
25	2	Ceftazidime	<=	0.25	0.06	0.5	1
25	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
25	2	Ertapenem	<=	0.015	0.004	0.016	1
25	2	Imipenem	=	0.25	0.06	0.25	1
25	2	Meropenem	<=	0.03	0.008	0.06	1
25	2	Temocillin	=	32	NA	NA	
26	1	Ampicillin	=	4	2	8	1
26	1	Azithromycin	=	4	NA	NA	
26	1	Cefotaxime	<=	0.25	0.03	0.12	1
26	1	Ceftazidime	<=	0.5	0.06	0.5	1
26	1	Chloramphenicol	<=	8	2	8	1
26	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
26	1	Colistin	<=	1	0.25	2	1
26	1	Gentamicin	=	1	0.25	1	1
26	1	Meropenem	<=	0.03	0.008	0.06	1
26	1	Nalidixic acid	<=	4	1	4	1
26	1	Sulfamethoxazole	=	16	8	32	1
26	1	Tetracycline	<=	2	0.5	2	1
26	1	Tigecycline	<=	0.25	0.03	0.25	1
26	1	Trimethoprim	=	0.5	0.5	2	1
26	2	Cefepime	=		0.016	0.12	
26	2	Cefotaxime	=		0.03	0.12	
26	2	Cefotaxime/clavulanic acid	=		NA	NA	
26	2	Cefoxitin	=		2	8	
26	2	Ceftazidime	=		0.06	0.5	
26	2	Ceftazidime/clavulanic acid	=		NA	NA	
26	2	Ertapenem	=		0.004	0.016	
26	2	Imipenem	=		0.06	0.25	
26	2	Meropenem	=		0.008	0.06	
26	2	Temocillin	=		NA	NA	
29	1	Ampicillin	=	8	2	8	1
29	1	Azithromycin	=		NA	NA	
29	1	Cefotaxime	<=	0.25	0.03	0.12	1
29	1	Ceftazidime	<=	0.5	0.06	0.5	1
29	1	Chloramphenicol	=	8	2	8	1
29	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
29	1	Colistin	<=	1	0.25	2	1
29	1	Gentamicin	<=	0.5	0.25	1	1
29	1	Meropenem	<=	0.03	0.008	0.06	1
29	1	Nalidixic acid	<=	4	1	4	1
29	1	Sulfamethoxazole	=	32	8	32	1
29	1	Tetracycline	<=	2	0.5	2	1
29	1	Tigecycline	<=	0.25	0.03	0.25	1
29	1	Trimethoprim	=	0.5	0.5	2	1
29	2	Cefepime	<=	0.06	0.016	0.12	1
29	2	Cefotaxime	<=	0.25	0.03	0.12	1
29	2	Cefotaxime/clavulanic acid	=		NA	NA	
29	2	Cefoxitin	=	4	2	8	1
29	2	Ceftazidime	<=	0.25	0.06	0.5	1
29	2	Ceftazidime/clavulanic acid	=		NA	NA	

29	2	Ertapenem	<=	0.015	0.004	0.016	1
29	2	Imipenem	<=	0.12	0.06	0.25	1
29	2	Meropenem	<=	0.03	0.008	0.06	1
29	2	Temocillin	=		NA	NA	
30	1	Ampicillin	=	8	2	8	1
30	1	Azithromycin	=	4	NA	NA	
30	1	Cefotaxime	<=	0.25	0.03	0.12	1
30	1	Ceftazidime	<=	0.5	0.06	0.5	1
30	1	Chloramphenicol	<=	8	2	8	1
30	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
30	1	Colistin	<=	1	0.25	2	1
30	1	Gentamicin	<=	0.5	0.25	1	1
30	1	Meropenem	<=	0.03	0.008	0.06	1
30	1	Nalidixic acid	<=	4	1	4	1
30	1	Sulfamethoxazole	=	16	8	32	1
30	1	Tetracycline	<=	2	0.5	2	1
30	1	Tigecycline	<=	0.25	0.03	0.25	1
30	1	Trimethoprim	=	1	0.5	2	1
30	2	Cefepime	<=	0.06	0.016	0.12	1
30	2	Cefotaxime	<=	0.25	0.03	0.12	1
30	2	Cefotaxime/clavulanic acid	=	0.12	NA	NA	
30	2	Cefoxitin	=	4	2	8	1
30	2	Ceftazidime	=	0.5	0.06	0.5	1
30	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
30	2	Ertapenem	<=	0.015	0.004	0.016	1
30	2	Imipenem	=	0.25	0.06	0.25	1
30	2	Meropenem	<=	0.03	0.008	0.06	1
30	2	Temocillin	=	16	NA	NA	
32	1	Ampicillin	=	4	2	8	1
32	1	Azithromycin	=	4	NA	NA	
32	1	Cefotaxime	<=	0.25	0.03	0.12	1
32	1	Ceftazidime	<=	0.5	0.06	0.5	1
32	1	Chloramphenicol	<=	8	2	8	1
32	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
32	1	Colistin	<=	1	0.25	2	1
32	1	Gentamicin	<=	0.5	0.25	1	1
32	1	Meropenem	<=	0.03	0.008	0.06	1
32	1	Nalidixic acid	<=	4	1	4	1
32	1	Sulfamethoxazole	=	32	8	32	1
32	1	Tetracycline	<=	2	0.5	2	1
32	1	Tigecycline	<=	0.25	0.03	0.25	1
32	1	Trimethoprim	=	0.5	0.5	2	1
32	2	Cefepime	=	0.06	0.016	0.12	1
32	2	Cefotaxime	<=	0.25	0.03	0.12	1
32	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
32	2	Cefoxitin	=	2	2	8	1
32	2	Ceftazidime	<=	0.25	0.06	0.5	1
32	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
32	2	Ertapenem	<=	0.015	0.004	0.016	1
32	2	Imipenem	<=	0.12	0.06	0.25	1
32	2	Meropenem	<=	0.03	0.008	0.06	1
32	2	Temocillin	=	16	NA	NA	
33	1	Ampicillin	=	4	2	8	1
33	1	Azithromycin	=	8	NA	NA	
33	1	Cefotaxime	<=	0.25	0.03	0.12	1
33	1	Ceftazidime	<=	0.5	0.06	0.5	1
33	1	Chloramphenicol	<=	8	2	8	1
33	1	Ciprofloxacin	<=	0.015	0.004	0.016	1

33	1	Colistin	<=	1	0.25	2	1
33	1	Gentamicin	<=	0.5	0.25	1	1
33	1	Meropenem	<=	0.03	0.008	0.06	1
33	1	Nalidixic acid	<=	4	1	4	1
33	1	Sulfamethoxazole	=	32	8	32	1
33	1	Tetracycline	<=	2	0.5	2	1
33	1	Tigecycline	<=	0.25	0.03	0.25	1
33	1	Trimethoprim	=	1	0.5	2	1
33	2	Cefepime	<=	0.06	0.016	0.12	1
33	2	Cefotaxime	<=	0.25	0.03	0.12	1
33	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
33	2	Cefoxitin	=	2	2	8	1
33	2	Ceftazidime	<=	0.25	0.06	0.5	1
33	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
33	2	Ertapenem	<=	0.015	0.004	0.016	1
33	2	Imipenem	<=	0.12	0.06	0.25	1
33	2	Meropenem	<=	0.03	0.008	0.06	1
33	2	Temocillin	=	16	NA	NA	
34	1	Ampicillin	=	4	2	8	1
34	1	Azithromycin	=	4	NA	NA	
34	1	Cefotaxime	<=	0.25	0.03	0.12	1
34	1	Ceftazidime	<=	0.5	0.06	0.5	1
34	1	Chloramphenicol	<=	8	2	8	1
34	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
34	1	Colistin	<=	1	0.25	2	1
34	1	Gentamicin	<=	0.5	0.25	1	1
34	1	Meropenem	<=	0.03	0.008	0.06	1
34	1	Nalidixic acid	<=	4	1	4	1
34	1	Sulfamethoxazole	=	32	8	32	1
34	1	Tetracycline	<=	2	0.5	2	1
34	1	Tigecycline	<=	0.25	0.03	0.25	1
34	1	Trimethoprim	=	0.5	0.5	2	1
34	2	Cefepime	<=	0.06	0.016	0.12	1
34	2	Cefotaxime	<=	0.25	0.03	0.12	1
34	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
34	2	Cefoxitin	=	4	2	8	1
34	2	Ceftazidime	=	0.5	0.06	0.5	1
34	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
34	2	Ertapenem	<=	0.015	0.004	0.016	1
34	2	Imipenem	<=	0.12	0.06	0.25	1
34	2	Meropenem	<=	0.03	0.008	0.06	1
34	2	Temocillin	=	16	NA	NA	
36	1	Ampicillin	=	4	2	8	1
36	1	Azithromycin	=	8	NA	NA	
36	1	Cefotaxime	<=	0.25	0.03	0.12	1
36	1	Ceftazidime	<=	0.5	0.06	0.5	1
36	1	Chloramphenicol	<=	8	2	8	1
36	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
36	1	Colistin	<=	1	0.25	2	1
36	1	Gentamicin	<=	0.5	0.25	1	1
36	1	Meropenem	<=	0.03	0.008	0.06	1
36	1	Nalidixic acid	<=	4	1	4	1
36	1	Sulfamethoxazole	<=	8	8	32	1
36	1	Tetracycline	<=	2	0.5	2	1
36	1	Tigecycline	<=	0.25	0.03	0.25	1
36	1	Trimethoprim	=	0.5	0.5	2	1
36	2	Cefepime	<=	0.06	0.016	0.12	1
36	2	Cefotaxime	<=	0.25	0.03	0.12	1

36	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
36	2	Cefoxitin	=	4	2	8	1
36	2	Ceftazidime	<=	0.25	0.06	0.5	1
36	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
36	2	Ertapenem	<=	0.015	0.004	0.016	1
36	2	Imipenem	<=	0.12	0.06	0.25	1
36	2	Meropenem	<=	0.03	0.008	0.06	1
36	2	Temocillin	=	16	NA	NA	
37	1	Ampicillin	=	8	2	8	1
37	1	Azithromycin	=	4	NA	NA	
37	1	Cefotaxime	<=	0.25	0.03	0.12	1
37	1	Ceftazidime	<=	0.5	0.06	0.5	1
37	1	Chloramphenicol	<=	8	2	8	1
37	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
37	1	Colistin	<=	1	0.25	2	1
37	1	Gentamicin	<=	0.5	0.25	1	1
37	1	Meropenem	<=	0.03	0.008	0.06	1
37	1	Nalidixic acid	<=	4	1	4	1
37	1	Sulfamethoxazole	=	16	8	32	1
37	1	Tetracycline	<=	2	0.5	2	1
37	1	Tigecycline	<=	0.25	0.03	0.25	1
37	1	Trimethoprim	=	0.5	0.5	2	1
37	2	Cefepime	=		0.016	0.12	
37	2	Cefotaxime	=		0.03	0.12	
37	2	Cefotaxime/clavulanic acid	=		NA	NA	
37	2	Cefoxitin	=		2	8	
37	2	Ceftazidime	=		0.06	0.5	
37	2	Ceftazidime/clavulanic acid	=		NA	NA	
37	2	Ertapenem	=		0.004	0.016	
37	2	Imipenem	=		0.06	0.25	
37	2	Meropenem	=		0.008	0.06	
37	2	Temocillin	=		NA	NA	
39	1	Ampicillin	=	4	2	8	1
39	1	Azithromycin	=	4	NA	NA	
39	1	Cefotaxime	<=	0.25	0.03	0.12	1
39	1	Ceftazidime	<=	0.5	0.06	0.5	1
39	1	Chloramphenicol	<=	8	2	8	1
39	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
39	1	Colistin	<=	1	0.25	2	1
39	1	Gentamicin	=	1	0.25	1	1
39	1	Meropenem	<=	0.03	0.008	0.06	1
39	1	Nalidixic acid	<=	4	1	4	1
39	1	Sulfamethoxazole	=	32	8	32	1
39	1	Tetracycline	<=	2	0.5	2	1
39	1	Tigecycline	<=	0.25	0.03	0.25	1
39	1	Trimethoprim	=	0.5	0.5	2	1
39	2	Cefepime	<=	0.06	0.016	0.12	1
39	2	Cefotaxime	<=	0.25	0.03	0.12	1
39	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
39	2	Cefoxitin	=	4	2	8	1
39	2	Ceftazidime	<=	0.05	0.06	0.5	1
39	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
39	2	Ertapenem	<=	0.015	0.004	0.016	1
39	2	Imipenem	<=	0.12	0.06	0.25	1
39	2	Meropenem	<=	0.03	0.008	0.06	1
39	2	Temocillin	=	16	NA	NA	
40	1	Ampicillin	=	2	2	8	1
40	1	Azithromycin	=		NA	NA	

40	1	Cefotaxime	=	0.12	0.03	0.12	1
40	1	Ceftazidime	=	0.5	0.06	0.5	1
40	1	Chloramphenicol	=	8	2	8	1
40	1	Ciprofloxacin	=	0.015	0.004	0.016	1
40	1	Colistin	=	1	0.25	2	1
40	1	Gentamicin	=	0.5	0.25	1	1
40	1	Meropenem	=	0.03	0.008	0.06	1
40	1	Nalidixic acid	=	4	1	4	1
40	1	Sulfamethoxazole	=	16	8	32	1
40	1	Tetracycline	=	2	0.5	2	1
40	1	Tigecycline	=	0.25	0.03	0.25	1
40	1	Trimethoprim	=	0.5	0.5	2	1
40	2	Cefepime	=	0.06	0.016	0.12	1
40	2	Cefotaxime	=	0.12	0.03	0.12	1
40	2	Cefotaxime/clavulanic acid	=		NA	NA	
40	2	Cefoxitin	=	4	2	8	1
40	2	Ceftazidime	=	0.5	0.06	0.5	1
40	2	Ceftazidime/clavulanic acid	=		NA	NA	
40	2	Ertapenem	=	0.015	0.004	0.016	1
40	2	Imipenem	=	0.25	0.06	0.25	1
40	2	Meropenem	=	0.03	0.008	0.06	1
40	2	Temocillin	=		NA	NA	
42	1	Ampicillin	=	4	2	8	1
42	1	Azithromycin	=	4	NA	NA	
42	1	Cefotaxime	<=	0.25	0.03	0.12	1
42	1	Ceftazidime	<=	0.5	0.06	0.5	1
42	1	Chloramphenicol	<=	8	2	8	1
42	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
42	1	Colistin	<=	1	0.25	2	1
42	1	Gentamicin	<=	0.5	0.25	1	1
42	1	Meropenem	<=	0.03	0.008	0.06	1
42	1	Nalidixic acid	<=	4	1	4	1
42	1	Sulfamethoxazole	=	16	8	32	1
42	1	Tetracycline	<=	2	0.5	2	1
42	1	Tigecycline	<=	0.25	0.03	0.25	1
42	1	Trimethoprim	=	0.5	0.5	2	1
42	2	Cefepime	<=	0.06	0.016	0.12	1
42	2	Cefotaxime	<=	0.25	0.03	0.12	1
42	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
42	2	Cefoxitin	=	2	2	8	1
42	2	Ceftazidime	<=	0.25	0.06	0.5	1
42	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
42	2	Ertapenem	<=	0.015	0.004	0.016	1
42	2	Imipenem	<=	0.12	0.06	0.25	1
42	2	Meropenem	<=	0.03	0.008	0.06	1
42	2	Temocillin	=	16	NA	NA	
45	1	Ampicillin	=	4	2	8	1
45	1	Azithromycin	<=	2	NA	NA	
45	1	Cefotaxime	<=	0.25	0.03	0.12	1
45	1	Ceftazidime	<=	0.5	0.06	0.5	1
45	1	Chloramphenicol	<=	8	2	8	1
45	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
45	1	Colistin	<=	1	0.25	2	1
45	1	Gentamicin	<=	0.5	0.25	1	1
45	1	Meropenem	<=	0.03	0.008	0.06	1
45	1	Nalidixic acid	<=	4	1	4	1
45	1	Sulfamethoxazole	<=	8	8	32	1
45	1	Tetracycline	<=	2	0.5	2	1

45	1	Tigecycline	<=	0.25	0.03	0.25	1
45	1	Trimethoprim	=	1	0.5	2	1
45	2	Cefepime	<=	0.06	0.016	0.12	1
45	2	Cefotaxime	<=	0.25	0.03	0.12	1
45	2	Cefotaxime/clavulanic acid	=	0.12	NA	NA	
45	2	Cefoxitin	=	4	2	8	1
45	2	Ceftazidime	<=	0.25	0.06	0.5	1
45	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
45	2	Ertapenem	<=	0.015	0.004	0.016	1
45	2	Imipenem	=	0.25	0.06	0.25	1
45	2	Meropenem	=	0.06	0.008	0.06	1
45	2	Temocillin	=	16	NA	NA	
56	1	Ampicillin	=	2	2	8	1
56	1	Azithromycin	=	4	NA	NA	
56	1	Cefotaxime	<=	0.25	0.03	0.12	1
56	1	Ceftazidime	<=	0.5	0.06	0.5	1
56	1	Chloramphenicol	<=	8	2	8	1
56	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
56	1	Colistin	<=	1	0.25	2	1
56	1	Gentamicin	<=	0.5	0.25	1	1
56	1	Meropenem	<=	0.03	0.008	0.06	1
56	1	Nalidixic acid	<=	4	1	4	1
56	1	Sulfamethoxazole	=	32	8	32	1
56	1	Tetracycline	<=	2	0.5	2	1
56	1	Tigecycline	<=	0.25	0.03	0.25	1
56	1	Trimethoprim	=	0.5	0.5	2	1
56	2	Cefepime	<=	0.06	0.016	0.12	1
56	2	Cefotaxime	<=	0.25	0.03	0.12	1
56	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
56	2	Cefoxitin	=	4	2	8	1
56	2	Ceftazidime	<=	0.25	0.06	0.5	1
56	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
56	2	Ertapenem	<=	0.015	0.004	0.016	1
56	2	Imipenem	<=	0.12	0.06	0.25	1
56	2	Meropenem	<=	0.03	0.008	0.06	1
56	2	Temocillin	=	2	NA	NA	
58	1	Ampicillin	=	8	2	8	1
58	1	Azithromycin	=	4	NA	NA	
58	1	Cefotaxime	<=	0.25	0.03	0.12	1
58	1	Ceftazidime	<=	0.5	0.06	0.5	1
58	1	Chloramphenicol	<=	8	2	8	1
58	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
58	1	Colistin	<=	1	0.25	2	1
58	1	Gentamicin	<=	0.5	0.25	1	1
58	1	Meropenem	<=	0.03	0.008	0.06	1
58	1	Nalidixic acid	<=	4	1	4	1
58	1	Sulfamethoxazole	=	16	8	32	1
58	1	Tetracycline	<=	2	0.5	2	1
58	1	Tigecycline	<=	0.25	0.03	0.25	1
58	1	Trimethoprim	=	0.5	0.5	2	1
58	2	Cefepime	<=	0.06	0.016	0.12	1
58	2	Cefotaxime	<=	0.25	0.03	0.12	1
58	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
58	2	Cefoxitin	=	2	2	8	1
58	2	Ceftazidime	<=	0.25	0.06	0.5	1
58	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
58	2	Ertapenem	<=	0.015	0.004	0.016	1
58	2	Imipenem	=	0.25	0.06	0.25	1

58	2	Meropenem	<=	0.03	0.008	0.06	1
58	2	Temocillin	=	16	NA	NA	
59	1	Ampicillin	=	4	2	8	1
59	1	Azithromycin	=	4	NA	NA	
59	1	Cefotaxime	<=	0.25	0.03	0.12	1
59	1	Ceftazidime	<=	0.5	0.06	0.5	1
59	1	Chloramphenicol	<=	8	2	8	1
59	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
59	1	Colistin	<=	1	0.25	2	1
59	1	Gentamicin	<=	0.5	0.25	1	1
59	1	Meropenem	<=	0.03	0.008	0.06	1
59	1	Nalidixic acid	<=	4	1	4	1
59	1	Sulfamethoxazole	=	32	8	32	1
59	1	Tetracycline	<=	2	0.5	2	1
59	1	Tigecycline	<=	0.25	0.03	0.25	1
59	1	Trimethoprim	=	0.5	0.5	2	1
59	2	Cefepime	=		0.016	0.12	
59	2	Cefotaxime	=		0.03	0.12	
59	2	Cefotaxime/clavulanic acid	=		NA	NA	
59	2	Cefoxitin	=		2	8	
59	2	Ceftazidime	=		0.06	0.5	
59	2	Ceftazidime/clavulanic acid	=		NA	NA	
59	2	Ertapenem	=		0.004	0.016	
59	2	Imipenem	=		0.06	0.25	
59	2	Meropenem	=		0.008	0.06	
59	2	Temocillin	=		NA	NA	
60	1	Ampicillin	=	4	2	8	1
60	1	Azithromycin	=	4	NA	NA	
60	1	Cefotaxime	<=	0.25	0.03	0.12	1
60	1	Ceftazidime	<=	0.5	0.06	0.5	1
60	1	Chloramphenicol	<=	8	2	8	1
60	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
60	1	Colistin	<=	1	0.25	2	1
60	1	Gentamicin	<=	0.5	0.25	1	1
60	1	Meropenem	<=	0.03	0.008	0.06	1
60	1	Nalidixic acid	<=	4	1	4	1
60	1	Sulfamethoxazole	=	32	8	32	1
60	1	Tetracycline	<=	2	0.5	2	1
60	1	Tigecycline	<=	0.25	0.03	0.25	1
60	1	Trimethoprim	=	0.5	0.5	2	1
60	2	Cefepime	<=	0.06	0.016	0.12	1
60	2	Cefotaxime	<=	0.25	0.03	0.12	1
60	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
60	2	Cefoxitin	=	4	2	8	1
60	2	Ceftazidime	<=	0.25	0.06	0.5	1
60	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
60	2	Ertapenem	<=	0.016	0.004	0.016	1
60	2	Imipenem	=	0.25	0.06	0.25	1
60	2	Meropenem	<=	0.03	0.008	0.06	1
60	2	Temocillin	=	32	NA	NA	
62	1	Ampicillin	=	4	2	8	1
62	1	Azithromycin	=	4	NA	NA	
62	1	Cefotaxime	<=	0.25	0.03	0.12	1
62	1	Ceftazidime	<=	0.5	0.06	0.5	1
62	1	Chloramphenicol	<=	8	2	8	1
62	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
62	1	Colistin	<=	1	0.25	2	1
62	1	Gentamicin	<=	0.5	0.25	1	1

62	1	Meropenem	<=	0.03	0.008	0.06	1
62	1	Nalidixic acid	<=	4	1	4	1
62	1	Sulfamethoxazole	=	16	8	32	1
62	1	Tetracycline	<=	2	0.5	2	1
62	1	Tigecycline	=	0.25	0.03	0.25	1
62	1	Trimethoprim	=	0.5	0.5	2	1
62	2	Cefepime	<=	0.06	0.016	0.12	1
62	2	Cefotaxime	<=	0.25	0.03	0.12	1
62	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
62	2	Cefoxitin	=	2	2	8	1
62	2	Ceftazidime	<=	0.25	0.06	0.5	1
62	2	Ceftazidime/clavulanic acid	=	0.25	NA	NA	
62	2	Ertapenem	<=	0.015	0.004	0.016	1
62	2	Imipenem	<=	0.12	0.06	0.25	1
62	2	Meropenem	<=	0.03	0.008	0.06	1
62	2	Temocillin	=	16	NA	NA	
64	1	Ampicillin	=	4	2	8	1
64	1	Azithromycin	=	8	NA	NA	
64	1	Cefotaxime	<=	0.25	0.03	0.12	1
64	1	Ceftazidime	<=	0.5	0.06	0.5	1
64	1	Chloramphenicol	<=	8	2	8	1
64	1	Ciprofloxacin	<=	0.015	0.004	0.016	1
64	1	Colistin	<=	1	0.25	2	1
64	1	Gentamicin	<=	0.5	0.25	1	1
64	1	Meropenem	<=	0.03	0.008	0.06	1
64	1	Nalidixic acid	<=	4	1	4	1
64	1	Sulfamethoxazole	=	16	8	32	1
64	1	Tetracycline	<=	2	0.5	2	1
64	1	Tigecycline	<=	0.25	0.03	0.25	1
64	1	Trimethoprim	=	0.5	0.5	2	1
64	2	Cefepime	<=	0.06	0.016	0.12	1
64	2	Cefotaxime	<=	0.25	0.03	0.12	1
64	2	Cefotaxime/clavulanic acid	<=	0.06	NA	NA	
64	2	Cefoxitin	=	16	2	8	0
64	2	Ceftazidime	<=	0.25	0.06	0.5	1
64	2	Ceftazidime/clavulanic acid	<=	0.12	NA	NA	
64	2	Ertapenem	<=	0.015	0.004	0.016	1
64	2	Imipenem	<=	0.12	0.06	0.25	1
64	2	Meropenem	<=	0.03	0.008	0.06	1
64	2	Temocillin	<=	0.5	NA	NA	

NA, not available

Enterococci - summary of results

Antimicrobial	EURL ENT-14.1		EURL ENT-14.2		EURL ENT-14.3		EURL ENT-14.4		EURL ENT-14.5		EURL ENT-14.6		EURL ENT-14.7		EURL ENT-14.8	
	Correct	Tested	Correct	Tested	Correct	Tested	Correct	Tested	Correct	Tested	Correct	Tested	Correct	Tested	Correct	Tested
Ampicillin AMP	26	26	26	26	26	26	26	26	22	26	26	26	26	26	25	26
Chloramphenicol CHL	17	26	26	26	26	26	26	26	26	26	25	26	26	26	26	26
Ciprofloxacin CIP	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Daptomycin DAP	26	26	26	26	24	26	26	26	26	26	26	26	26	26	26	26
Erythromycin ERY	26	26	25	26	25	26	26	26	26	26	26	26	26	26	26	26
Gentamicin GEN	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
Linezolid LZD	23	26	26	26	26	26	26	26	26	26	26	26	25	26	26	26
Quinupristin/dalfopristin (Synercid) SYN	0	0	0	0	25	26	0	0	25	26	22	26	26	26	24	26
Teicoplanin TEI	26	26	26	26	26	26	26	26	26	26	25	26	25	26	26	26
Tetracycline TET	26	26	25	26	26	26	26	26	26	26	26	26	26	26	26	26
Tigecycline TGC	26	26	26	26	25	26	25	26	26	26	18	25	26	26	26	26
Vancomycin VAN	26	26	26	26	24	26	26	26	26	26	26	26	26	26	26	26

Excluded from report > 25% deviations)

Antimicrobial	EURL ENT-14.1		EURL ENT-14.2		EURL ENT-14.3		EURL ENT-14.4		EURL ENT-14.5		EURL ENT-14.6		EURL ENT-14.7		EURL ENT-14.8	
	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)	Deviations (no.)	Deviations (%)
Ampicillin AMP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	4,0	15,4	0,0	0,0	0,0	0,0	1,0	3,8
Chloramphenicol CHL	9,0	34,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,8	0,0	0,0	0,0	0,0
Ciprofloxacin CIP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Daptomycin DAP	0,0	0,0	0,0	0,0	2,0	7,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Erythromycin ERY	0,0	0,0	1,0	3,8	1,0	3,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Gentamicin GEN	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Linezolid LZD	3,0	11,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,8	0,0	0,0
Quinupristin/dalfopristin (Synercid) SYN	0,0	0,0	0,0	0,0	1,0	3,8	0,0	0,0	1,0	3,8	4,0	15,4	0,0	0,0	2,0	7,7
Teicoplanin TEI	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,8	1,0	3,8	0,0	0,0
Tetracycline TET	0,0	0,0	1,0	3,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tigecycline TGC	0,0	0,0	0,0	0,0	1,0	3,8	1,0	3,8	0,0	0,0	7,0	28,0	0,0	0,0	0,0	0,0
Vancomycin VAN	0,0	0,0	0,0	0,0	2,0	7,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Excluded from report > 25% deviations)

Staphylococcus aureus **- summary of results**

ANTIMICROBIAL	EURL ST-14.1		EURL ST-14.2		EURL ST-14.3		EURL ST-14.4		EURL ST-14.5		EURL ST-14.6		EURL ST-14.7		EURL ST-14.8	
	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total
Cefoxitin FOX	28	29	28	29	28	29	28	29	29	29	29	29	29	29	29	29
Chloramphenicol CHL	28	29	28	29	29	29	29	29	29	29	29	29	29	29	28	29
Ciprofloxacin CIP	30	30	30	30	28	30	30	30	30	30	30	30	30	30	20	30
Clindamycin CLN	30	30	30	30	30	30	23	30	30	30	30	30	30	30	30	30
Erythromycin ERY	30	30	30	30	30	30	30	30	29	30	29	30	30	30	30	30
Fusidic acid FUS	28	29	28	29	27	29	27	29	28	29	29	29	28	29	29	29
Gentamicin GEN	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30
Kanamycin KAN	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Linezolid LZD	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Mupirocin MUP	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Quinupristin/dalfopristin (Synercid) SYN	29	29	29	29	29	29	27	29	27	29	29	29	29	29	29	29
Rifampicin RIF	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Streptomycin STR	28	28	28	28	28	28	28	28	26	28	27	28	27	27	28	28
Sulfamethoxazole SMX	28	29	25	29	29	29	27	29	29	29	29	29	29	29	24	29
Tetracycline TET	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30
Tiamulin TIA	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	29
Trimethoprim TMP	29	29	29	29	29	29	28	29	28	29	27	29	29	29	28	29
Vancomycin VAN	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29

Excluded from report > 25% deviations)

ANTIMICROBIAL	EURL ST-14.1		EURL ST-14.2		EURL ST-14.3		EURL ST-14.4		EURL ST-14.5		EURL ST-14.6		EURL ST-14.7		EURL ST-14.8	
	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)
Cefoxitin FOX	1,0	3,4	1,0	3,4	1,0	3,4	1,0	3,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Chloramphenicol CHL	1,0	3,4	1,0	3,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,4
Ciprofloxacin CIP	0,0	0,0	0,0	0,0	2,0	6,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	10,0	33,3
Clindamycin CLN	0,0	0,0	0,0	0,0	0,0	0,0	7,0	23,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Erythromycin ERY	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,3	1,0	3,3	0,0	0,0	0,0	0,0
Fusidic acid FUS	1,0	3,4	1,0	3,4	2,0	6,9	2,0	6,9	1,0	3,4	0,0	0,0	1,0	3,4	0,0	0,0
Gentamicin GEN	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,3
Kanamycin KAN	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Linezolid LZD	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Mupirocin MUP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Quinupristin/dalfopristin (Synercid) SYN	0,0	0,0	0,0	0,0	0,0	0,0	2,0	6,9	2,0	6,9	0,0	0,0	0,0	0,0	0,0	0,0
Rifampicin RIF	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Streptomycin STR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,0	7,1	1,0	3,6	0,0	0,0	0,0	0,0
Sulfamethoxazole SMX	1,0	3,4	4,0	13,8	0,0	0,0	2,0	6,9	0,0	0,0	0,0	0,0	0,0	0,0	5,0	17,2
Tetracycline TET	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tiamulin TIA	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Trimethoprim TMP	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,4	1,0	3,4	2,0	6,9	0,0	0,0	1,0	3,4
Vancomycin VAN	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Excluded from report > 25% deviations)

Escherichia coli **- summary of results**

ANTIMICROBIAL	EURL EC-14.1		EURL EC-14.2		EURL EC-14.3		EURL EC-14.4		EURL EC-14.5		EURL EC-14.6		EURL EC-14.7		EURL EC-14.8	
	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total	Correct	Total
Ampicillin AMP	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Azithromycin AZI	32	32	32	32	32	32	27	32	32	32	31	32	32	32	32	32
Cefepime FEP	3	3	33	33	30	33	4	4	33	33	33	33	32	33	33	33
Cefotaxime FOT	36	36	66	66	66	66	37	37	66	66	66	66	66	66	66	66
Cefoxitin FOX	3	3	33	33	32	33	4	4	31	33	33	33	33	33	33	33
Ceftazidime TAZ	36	36	66	66	66	66	37	37	66	66	66	66	65	66	66	66
Chloramphenicol CHL	33	33	32	33	33	33	33	33	33	33	33	33	33	33	33	33
Ciprofloxacin CIP	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Colistin COL	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Ertapenem ETP	3	3	33	33	33	33	4	4	32	33	33	33	33	33	33	33
Gentamicin GEN	33	33	33	33	33	33	31	33	33	33	33	33	33	33	33	33
Imipenem IMI	3	3	33	33	33	33	4	4	33	33	33	33	33	33	18	31
Meropenem MERO	36	36	66	66	66	66	37	37	66	66	64	66	66	66	66	66
Nalidixic acid NAL	33	33	33	33	33	33	33	33	32	33	33	33	33	33	33	33
Sulfamethoxazole SMX	33	33	33	33	33	33	33	33	32	32	33	33	33	33	33	33
Tetracycline TET	33	33	33	33	33	33	33	33	33	33	32	33	33	33	33	33
Tigecycline TGC	32	33	32	33	32	33	33	33	33	33	32	33	33	33	33	33
Trimethoprim TMP	33	33	33	33	33	33	33	33	33	33	33	33	32	32	33	33

Excluded from the report (>25% deviations)

ANTIMICROBIAL	EURL EC-14.1		EURL EC-14.2		EURL EC-14.3		EURL EC-14.4		EURL EC-14.5		EURL EC-14.6		EURL EC-14.7		EURL EC-14.8	
	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)	Deviation (no.)	Deviation (%)
Ampicillin AMP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Azithromycin AZI	0,0	0,0	0,0	0,0	0,0	0,0	5,0	15,6	0,0	0,0	1,0	3,1	0,0	0,0	0,0	0,0
Cefepime FEP	0,0	0,0	0,0	0,0	3,0	9,1	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,0	0,0	0,0
Cefotaxime FOT	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Cefoxitin FOX	0,0	0,0	0,0	0,0	1,0	3,0	0,0	0,0	2,0	6,1	0,0	0,0	0,0	0,0	0,0	0,0
Ceftazidime TAZ	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	1,5	0,0	0,0
Chloramphenicol CHL	0,0	0,0	1,0	3,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Ciprofloxacin CIP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Colistin COL	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Ertapenem ETP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,0	0,0	0,0	0,0	0,0	0,0	0,0
Gentamicin GEN	0,0	0,0	0,0	0,0	0,0	0,0	2,0	6,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Imipenem IMI	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,0	41,9
Meropenem MERO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	2,0	3,0	0,0	0,0	0,0	0,0
Nalidixic acid NAL	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,0	0,0	0,0	0,0	0,0	0,0	0,0
Sulfamethoxazole SMX	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tetracycline TET	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	3,0	0,0	0,0	0,0	0,0
Tigecycline TGC	1,0	3,0	1,0	3,0	1,0	3,0	0,0	0,0	0,0	0,0	1,0	3,0	0,0	0,0	0,0	0,0
Trimethoprim TMP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Excluded from the report (>25% deviations)

Enterococci - deviations

Lab ID	Strain	Antimicrobial	Operator to obtained value	Obtained value	Operator to expected value	Expected value	Obtained Interpretation	Expected Interpretation
2	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
11	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
17	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
23	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
30	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
33	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
40	ENT-14.1	Chloramphenicol	=	16	=	64	S	R
56	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
64	ENT-14.1	Chloramphenicol	=	32	=	64	S	R
11	ENT-14.1	Linezolid	=	4	=	8	S	R
40	ENT-14.1	Linezolid	=	2	=	8	S	R
64	ENT-14.1	Linezolid	=	4	=	8	S	R
39	ENT-14.2	Erythromycin	>	128	<=	1	R	S
39	ENT-14.2	Tetracycline	=	64	<=	1	R	S
36	ENT-14.3	Daptomycin	=	8	=	8	R	S
64	ENT-14.3	Daptomycin	=	8	=	8	R	S
2	ENT-14.3	Erythromycin	=	8	=	2	R	S
64	ENT-14.3	Quinupristin-dalfopristin	=	2	=	4	R	S
32	ENT-14.3	Tigecycline	=	0.5	=	0.25	R	S
12	ENT-14.3	Vancomycin	=	16	=	16	S	R
23	ENT-14.3	Vancomycin	=	4	=	16	S	R
32	ENT-14.4	Tigecycline	=	0.5	=	0.25	R	S
22	ENT-14.5	Ampicillin	=	8	=	4	R	S
25	ENT-14.5	Ampicillin	=	8	=	4	R	S
36	ENT-14.5	Ampicillin	=	8	=	4	R	S
64	ENT-14.5	Ampicillin	=	8	=	4	R	S
64	ENT-14.5	Quinupristin-dalfopristin	=	4	=	4	R	S
64	ENT-14.6	Chloramphenicol	=	32	=	64	S	R
11	ENT-14.6	Quinupristin-dalfopristin	=	4	=	8	S	R
33	ENT-14.6	Quinupristin-dalfopristin	=	4	=	8	S	R
40	ENT-14.6	Quinupristin-dalfopristin	=	4	=	8	S	R
56	ENT-14.6	Quinupristin-dalfopristin	=	4	=	8	S	R
64	ENT-14.6	Teicoplanin	<=	0.5	<=	0.5	R	S
20	ENT-14.6	Tigecycline	=	0.5	=	0.25	R	S
26	ENT-14.6	Tigecycline	=	0.5	=	0.25	R	S
32	ENT-14.6	Tigecycline	=	0.5	=	0.25	R	S
34	ENT-14.6	Tigecycline	=	0.5	=	0.25	R	S
37	ENT-14.6	Tigecycline	=	0.5	=	0.25	R	S
58	ENT-14.6	Tigecycline	=	0.5	=	0.25	R	S
64	ENT-14.6	Tigecycline	=	0.12	=	0.25	R	S
64	ENT-14.7	Linezolid	=	16	=	1	R	S
39	ENT-14.7	Teicoplanin	=	16	=	1	R	S
39	ENT-14.8	Ampicillin	=	4	>	64	S	R
17	ENT-14.8	Quinupristin-dalfopristin	=	4	=	4	R	S
64	ENT-14.8	Quinupristin-dalfopristin	=	2	=	4	R	S

Highlighted in grey: results excluded from the report (>25% deviations)

***Staphylococcus aureus* - deviations**

Lab ID	Strain	Antimicrobial	Operator to obtained value	Obtained value	Operator to expected value	Expected value	Obtained interpretation	Expected Interpretation
33	ST-14.1	Cefoxitin	<=	0.5	=	16	S	R
45	ST-14.1	Chloramphenicol	=	16	=	8	R	S
45	ST-14.1	Fusidic acid	=	1	<=	0.5	R	S
33	ST-14.1	Sulfamethoxazole	=	256	<=	64	R	S
39	ST-14.2	Cefoxitin	=	4	=	16	S	R
42	ST-14.2	Chloramphenicol	=	8	=	8	R	S
45	ST-14.2	Fusidic acid	=	1	<=	0.5	R	S
18	ST-14.2	Sulfamethoxazole	<=	64	>	512	S	R
34	ST-14.2	Sulfamethoxazole	<=	64	>	512	S	R
39	ST-14.2	Sulfamethoxazole	=	128	>	512	S	R
45	ST-14.2	Sulfamethoxazole	=	128	>	512	S	R
45	ST-14.3	Cefoxitin	=	8	=	2	R	S
31	ST-14.3	Ciprofloxacin	>	1	=	0.5	R	S
45	ST-14.3	Ciprofloxacin	=	2	=	0.5	R	S
42	ST-14.3	Fusidic acid	=	2	<=	0.5	R	S
45	ST-14.3	Fusidic acid	=	1	<=	0.5	R	S
45	ST-14.4	Cefoxitin	=	8	=	4	R	S
4	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
21	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
25	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
26	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
40	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
42	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
64	ST-14.4	Clindamycin	=	0.5	=	0.25	R	S
45	ST-14.4	Fusidic acid	=	1	<=	0.5	R	S
64	ST-14.4	Fusidic acid	=	2	<=	0.5	R	S
21	ST-14.4	Quinupristin-dalfopristin	=	2	=	1	R	S
45	ST-14.4	Quinupristin-dalfopristin	=	2	=	1	R	S
33	ST-14.4	Sulfamethoxazole	>	512	<=	64	R	S
36	ST-14.4	Sulfamethoxazole	>	512	<=	64	R	S
39	ST-14.4	Tetracycline	<=	0.5	>	16	S	R
11	ST-14.4	Tiamulin	=	2	=	4	S	R
39	ST-14.4	Trimethoprim	=	4	<=	2	R	S
11	ST-14.5	Erythromycin	>	8	=	0.5	R	S
45	ST-14.5	Fusidic acid	=	1	<=	0.5	R	S
17	ST-14.5	Quinupristin-dalfopristin	=	1	=	2	S	R
64	ST-14.5	Quinupristin-dalfopristin	<=	0.5	=	2	S	R
2	ST-14.5	Streptomycin	<=	4	>	32	S	R
11	ST-14.5	Streptomycin	<=	4	>	32	S	R
11	ST-14.5	Trimethoprim	<=	2	>	32	S	R
11	ST-14.6	Erythromycin	<=	0.25	>	8	S	R
11	ST-14.6	Streptomycin	>	32	<=	4	R	S
11	ST-14.6	Trimethoprim	>	32	<=	2	R	S
40	ST-14.6	Trimethoprim	=	4	<=	2	R	S
45	ST-14.7	Fusidic acid	=	1	<=	0.5	R	S
45	ST-14.8	Chloramphenicol	=	32	=	8	R	S
2	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
4	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
17	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
20	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
25	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
26	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
34	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
37	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
42	ST-14.8	Ciprofloxacin	=	2	=	1	R	S
45	ST-14.8	Ciprofloxacin	=	8	=	1	R	S
39	ST-14.8	Gentamicin	<=	1	>	16	S	R
11	ST-14.8	Sulfamethoxazole	=	128	=	256	S	R
17	ST-14.8	Sulfamethoxazole	<=	64	=	256	S	R
26	ST-14.8	Sulfamethoxazole	=	128	=	256	S	R

30	ST-14.8	Sulfamethoxazole	=	128	=	256	S	R
45	ST-14.8	Sulfamethoxazole	=	128	=	256	S	R
45	ST-14.8	Trimethoprim	=	4	<=	2	R	S

Highlighted in grey: results excluded from the report (>25% deviations)

***Escherichia coli* - deviations**

Lab ID	Strain	Panel	Antimicrobial	Operator to obtained value	Obtained value	Operator to expected value	Expected value	Obtained Interpretation	Expected Interpretation
37	EC-14.1	1	Tigecycline	=	1	=	0.5	R	S
40	EC-14.2	1	Chloramphenicol	<=	8	=	128	S	R
37	EC-14.2	1	Tigecycline	=	2	=	0.5	R	S
37	EC-14.3	1	Tigecycline	=	1	=	0.5	R	S
4	EC-14.3	2	Cefepime	=	0.25	=	0.5	S	R
30	EC-14.3	2	Cefepime	=	0.25	=	0.5	S	R
40	EC-14.3	2	Cefepime	=	0.12	=	0.5	S	R
4	EC-14.3	2	Cefoxitin	=	8	=	16	S	R
30	EC-14.4	1	Azithromycin	=	16	=	32	S	R
33	EC-14.4	1	Azithromycin	=	16	=	32	S	R
45	EC-14.4	1	Azithromycin	=	16	=	32	S	R
56	EC-14.4	1	Azithromycin	=	16	=	32	S	R
64	EC-14.4	1	Azithromycin	=	16	=	32	S	R
12	EC-14.4	1	Gentamicin	<=	0.5	=	1	R	S
17	EC-14.4	1	Gentamicin	=	1	=	1	R	S
17	EC-14.5	1	Nalidixic acid	=	16	=	8	R	S
21	EC-14.5	2	Cefotaxime/clavulanic acid	<=	0.06	=	0.12	R	S
6	EC-14.5	2	Cefoxitin	=	16	=	8	R	S
58	EC-14.5	2	Cefoxitin	=	16	=	8	R	S
6	EC-14.5	2	Ertapenem	=	0.12	=	0.03	R	S
64	EC-14.6	1	Azithromycin	=	32	=	16	R	S
26	EC-14.6	1	Meropenem	=	0.12	=	16	S	R
56	EC-14.6	1	Tetracycline	=	64	<=	2	R	S
4	EC-14.6	1	Tigecycline	<=	0.25	=	0.5	R	S
26	EC-14.6	2	Meropenem	=	0.12	=	8	S	R
64	EC-14.7	2	Cefepime	<=	0.06	>	32	S	R
18	EC-14.7	2	Ceftazidime	=	8	=	4	S	R
4	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
16	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
19	EC-14.8	2	Imipenem	=	0.25	=	1	S	R
20	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
21	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
26	EC-14.8	2	Imipenem	=	0.25	=	1	S	R
30	EC-14.8	2	Imipenem	=	0.25	=	1	S	R
33	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
34	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
36	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
42	EC-14.8	2	Imipenem	=	0.25	=	1	S	R
58	EC-14.8	2	Imipenem	=	0.5	=	1	S	R
62	EC-14.8	2	Imipenem	=	0.25	=	1	S	R

Highlighted in grey: results excluded from the report (>25% deviations)

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