

CDS performance in UKNEQAS

Pratibha James

What is UKNEQAS

- **United Kingdom National External Quality Assurance Service which enrolls participants from both UK and Non-UK laboratories.**
- **Currently 521 laboratories from 31 European and 32 non-European countries participate in UKNEQAS.**
- **Of which 421 follow the EUCAST, 78 CLSI, 17 BSAC and one each of CDS, CRG, NWGA and SRGA.**

Aim of participation in UKNEQAS

- **Demonstrates to CDS users a commitment to quality (as per NATA requirements for an IVD).**
- **Provides educational stimulus to improvement.**
- **Facilitates comparison of CDS with EUCAST and CLSI methods.**

Specimen : 4347*Escherichia coli*

Reference Lab	ISO MIC mg/L		Result		Breakpoints	
	1	2	EUCAST	CLSI	EUCAST	CLSI
Amikacin	2	4	S	S	S≤8 R>16	S≤16 R≥64
Amoxicillin	≥32	≥32	R	R	S≤8 R>8	infer from amp
Amoxicillin-clavulanic acid	16	16	R	I	S≤8 R>8	S≤8 R≥32
Ampicillin	≥32	≥32	R	R	S≤8 R>8	S≤8 R≥32
Cefotaxime	0.06	0.06	S	S	S≤1 R>2	S≤1 R≥4
Ceftazidime	0.25	0.25	S	S	S≤1 R>4	S≤4 R≥16
Ceftriaxone	0.06	0.06	S	S	S≤1 R>2	S≤1 R≥4
Cefuroxime	8	8	S	S	S≤8 R>8	S≤8 R≥32
Ciprofloxacin	<0.015	<0.015	S	S	S≤0.25 R>0.5	S≤1 R≥4
Colistin	<0.25	<0.25	S	-	S≤2 R>2	
Ertapenem	<0.015	<0.015	S	S	S≤0.5 R>1	S≤0.5 R≥2
Gentamicin	1	1	S	S	S≤2 R>4	S≤4 R≥16
Imipenem	0.12	0.25	S	S	S≤2 R>8	S≤1 R≥4
Meropenem	0.03	0.03	S	S	S≤2 R>8	S≤1 R≥4
Piperacillin-tazobactam	2	2	S	S	S≤8 R>16	S≤16 R≥128
Tigecycline	0.25	0.25	S	-	S≤1 R>2	
Tobramycin	1	1	S	S	S≤2 R>4	S≤4 R≥16
ESBL	Neg	Neg				
AmpC	Neg	Neg				
Carbapenemase	Neg	Neg				

Amikacin - specimen 4347

Intended result : susceptible

Your guideline :

Result by guideline

	S	I	R	% concordance
score	2	1	0	
BSAC	14	0	0	100
EUCAST	387	1	1	99.5
CLSI	80	0	0	100
NWGA	1	0	0	100
SRGA	1	0	0	100
All	484	1	1	99.6
AU	1	0	0	100.0

UKNEQAS Scoring

- **Four point scoring system:**

Correct 2

Partially correct 1

Wrong 0

Grossly misleading -1

- **Scoring system is implemented when 80% or more of the 100 best performing laboratories(over the previous year) report a correct result.**

UKNEQAS Scoring

Reference results EUCAST/CLSI	Concordance	Score
S/S	Combined S and I \geq 80%	S: score 2 I: score 1 R: score 0
S/S	Combined S and I <80%	Not scored

UKNEQAS Scoring

Reference results EUCAST/CLSI	Concordance	Score
R/R	Combined R and I \geq 80%	S: score -1 I: score 1 R: score 2
R/I	Combined R and I <80%	Not scored


UKNEQAS Scoring

Intended result	Reported result		
	Susceptible	Intermediate	Resistant
S	2	1	0
I	1	2	1
R	-1	1	2

CDS Laboratory enrolment

- Enrolled since Sep 2016.
- Two isolates received every month.
- Available currently are results of 18 distributions.

Performance

Culture isolate	No of antibiotics tested	No of times tested	Concordance(%)
Staphylococcus sp	13	09	95.6
Streptococcus sp	04	03	100
Enterococcus sp	05	04	95
Enterobacteriaceae	14	12	96.7
Pseudomonas sp	09	04	88.2 
Haemophilus sp	07	02	100

Acinetobacter haemolyticus and Stenotrophomonas maltophilia tested once each.

 In 2/4 100% agreement, 2/4 - Not scored or score 0 results

Drug Bug discordance: score -1

- **Amoxicillin- clavulanic acid for Enterobacteriaceae- In agreement with CLSI and disagreement with EUCAST**

CDS and CLSI use a 2:1 ratio of the drug combination. While EUCAST uses a fixed concentration of clavulanic acid.

Appendix 2

Published evidence on comparability of CLSI and EUCAST susceptibility testing standards
 (PubMed search, August 2016; search criteria in title: "CLSI versus EUCAST" and "CLSI EUCAST").

Reference	Comparison	Relevant findings
Kassim et al., 2016 [1]	CLSI versus EUCAST interpretation comparison for <i>E. coli</i> , <i>S. aureus</i> and <i>P. aeruginosa</i>	High concordance for many bug-drug combinations. Low for amoxicillin-clavulanate and cefepime against <i>E. coli</i> .
Diez-Aguilar et al., 2015 [2]	Comparison of results obtained by the EUCAST and CLSI methods for <i>E. coli</i> for amoxicillin-clavulanate	Significant disagreement in susceptibility interpretation using fixed clavulanate concentrations (EUCAST) versus the 2:1 clavulanate ratio (CLSI)
Cağan Aktaş et al., 2014 [1]	Fosfomycin susceptibility interpretations for ESBL-producing <i>E. coli</i>	Only small differences between CLSI and EUCAST in fosfomycin susceptibility rates
Imöhl et al., 2014 [4]	Penicillin susceptibility of <i>Streptococcus pneumoniae</i> with different breakpoints	No difference between CLSI and EUCAST in %NS for meningitis isolates. Significant difference for non-meningitis isolates
Hegstad et al., 2014 [5]	Detection of low-and medium-level Van-B enterococci	Both EUCAST disk diffusion and CLSI agar screening methods performed acceptably. The CLSI agar screen requires careful monitoring of vancomycin concentrations
Hombach et al., 2013 [6]	ESBL- and AmpC –producing Enterobacteriaceae	Using 2013 CLSI and EUCAST breakpoints, there were significant differences in rates of resistance for cefepime, ceftazidime and cefotaxime
Hombach et al., 2013 [7]	Multidrug resistance rates in Gram-negative rods	Multidrug resistant rates increased after application of EUCAST 2011 interpretive criteria compared to CLSI 2009 criteria
Hombach et al., 2013 [8]	Impact of "intermediate" interpretive category on test errors	Applying EUCAST guidelines, significant rates of major and very major errors were demonstrated for all drug/species combinations without an "intermediate" range

Performance of EUCAST and CLSI approaches for co-amoxiclav susceptibility testing conditions for clinical categorization of a collection of *Escherichia coli* isolates with characterized resistance phenotypes

María Díez-Aguilar^{1,2}, María-Isabel Morosini^{1,2}, Lorena López-Cerero^{2,3}, Álvaro Pascual^{2,3}, Jorge Calvo^{2,4}, Luis Martínez-Martínez^{2,4,5}, Francesc Marco^{2,6}, Jordi Vila^{2,6}, Adriana Ortega^{2,7}, Jesús Oteo^{2,7} and Rafael Cantón^{1,2*}

RESEARCH

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Comparison of Clinical Laboratory Standards Institute and European Committee on Antimicrobial Susceptibility Testing guidelines for the interpretation of antibiotic susceptibility at a University teaching hospital in Nairobi, Kenya: a cross-sectional study

Ali Kassim^{*}, Geoffrey Omuse, Zul Premji and Gunturu Revathi

Drug Bug discordance: score -1

Teicoplanin for *S. haemolyticus* and *E. faecalis* - Disagreement with both EUCAST and CLSI.

These were the only resistant isolates sent by UKNEQAS.

Quality check initiated.

Drug Bug discordance: score -1

Tobramycin for *A. haemolyticus* - Disagreement with both EUCAST and CLSI.

Performance was excellent with score 2 for all the other four resistant isolates sent by UKNEQAS –*Ps. aeruginosa*(Jan 2018), *P. mirabilis*(July 2017), *K. pneumoniae* (Nov 2016) & *K. pneumoniae* (Nov 2017).

Drug Bug discordance: Not scored or 0 or -1

Tigecycline for Enterobacteriaceae - Discordance between EUCAST and CLSI. No available CLSI breakpoint.

Quality check initiated.

Conclusion

- **Proves that the CDS method adheres to quality .**
- **Facilitated in undertaking quality checks – Teicoplanin, Tigecycline.**
- **Assisted in demonstrating that the CDS method is on par with the EUCAST and CLSI methods.**

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