EUCAST
EUROPEAN COMMITTEE ON ANTIMICROBIAL SUSCEPTIBILITY TESTING
European Society of Clinical Microbiology and Infectious Diseases

Antimicrobial susceptibility testing with EUCAST breakpoints and methods

External quality assessment

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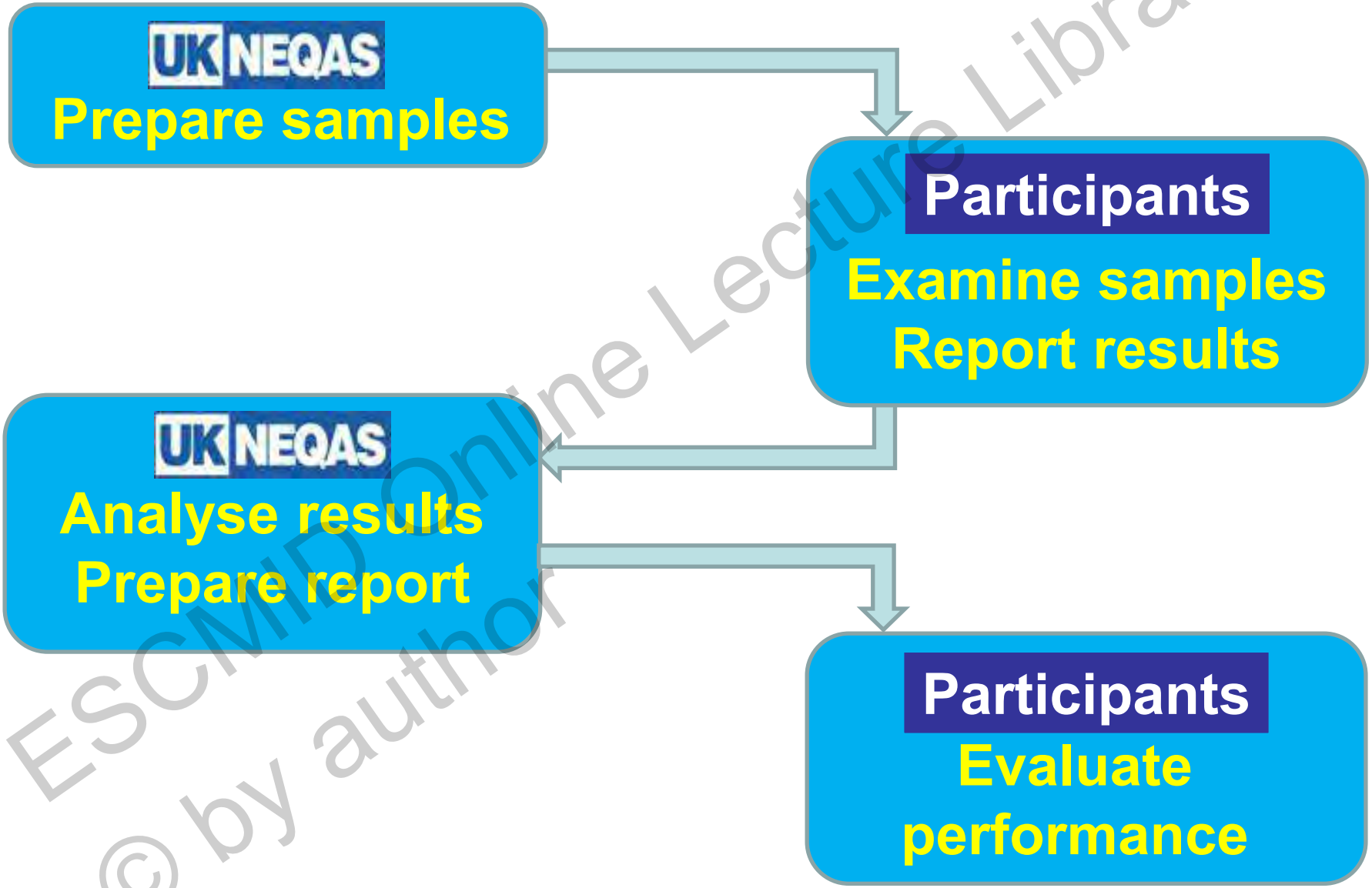
External Quality Assessment (EQA, proficiency testing)

The challenge of laboratory procedures with specimens of known but undisclosed content

The EQA process (UK NEQAS)



Benefits of EQA in antimicrobial susceptibility testing

For the individual laboratory:

- Independent assessment of performance
- Assessment of performance over time
- Comparison with other laboratories
- Highlights problem areas
- Gives practical experience of difficult tests and uncommon resistances
- Performance indicator for accreditation

Benefits of EQA in antimicrobial susceptibility testing

Wider benefits:

- Provides background information and discussion of problem tests
- Performance related to guidelines and methods
- (International differences highlighted)

“Limitations” of EQA in antimicrobial susceptibility testing

- Number of specimens distributed is small
- May be considered inappropriate to send some organisms
- Specimens do not reflect routine isolates
- Laboratories may not treat specimens as routine

Results may be affected by breakpoint guidelines used

E. faecalis specimen 0138 vancomycin MIC 8-16 mg/L (VanB)

Guideline	Breakpoints (mg/L)		Percent reporting		
	S≤	R>	S	I	R
EUCAST (n=316)	4	4	5.1	1.9	93.0
CLSI (n=314)	4	16	10.2	35.0	54.8

UKNEQAS

Enterobacter cloacae 1797
piperacillin-tazobactam MIC 64 mg/L

Guideline	Breakpoints (mg/L)		Percent reporting		
	S≤	R>	S	I	R
EUCAST (n=502)	8	16	1.0	5.4	93.6
CLSI (n=115)	16	64	9.5	30.0	63.5

Guidelines are not always followed

S. aureus specimen 0185 mupirocin MIC 4-16 mg/L

Guideline	Breakpoints (mg/L)		Percent reporting		
	S≤	R>	S	I	R
EUCAST (n=248)	1	256	13.3	34.3	52.4
CLSI (n=208)	256	256	19.2	11.1	69.7

- 75% of 93 labs reporting R and using CLSI breakpoints with automated systems reported MICs >8 or ≥8 mg/L and therefore cannot distinguish high and low-level resistance
- CLSI disk diffusion method requires 200µg disk
  22 used 5µg disk and 20 reported R
- BSAC disk diffusion method requires MIC if resistant with 5µg disk
  56/69 using 5µg disk reported R, suggesting MIC was not tested

S. aureus specimen 1495 fusidic acid MIC 16 mg/L

Guideline	Breakpoints (mg/L)		Percent reporting		
	S≤	R>	S	I	R
EUCAST (n=459)	1	1	0.7	0.8	98.5
CLSI (n=119)	-	-	4.2	53.8	42.0

Performance may be affected by the method used

E. faecalis specimen 0138 vancomycin MIC 8-16 mg/L (VanB)

EUCAST resistant, CLSI intermediate

Method	Percent reporting		
	S	I	R
Automated (n=333)	3.9	6.2	89.9
MIC (n=71)	2.8	13.9	83.3
Disk diffusion (n=262)	15.5	11.6	72.9

E. coli specimen 1842
piperacillin-tazobactam MIC 32-≧128 mg/L

EUCAST resistant, CLSI intermediate-resistant

Method	Percent reporting		
	S	I	R
Automated (n=283)	74.6	8.1	17.3
MIC (n=44)	63.6	18.2	18.2
Disk diffusion (n=211)	28.0	33.2	38.8

Borderline susceptibility reduces the reliability of results

E. coli specimen 1842 amikacin MIC 8-16 mg/L

Guideline	Breakpoints (mg/L)		Percent reporting		
	S≤	R>	S	I	R
EUCAST (n=356)	8	16	39.8	56.8	3.4
CLSI (n=100)	16	64	69.0	20.0	11.0

Uncertainty in guidelines leads to variable reporting

Uncertainty in reporting *S. pneumoniae* specimen 1887 benzylpenicillin MIC 0.25-0.5 mg/L

"Intermediate" to penicillin
Resistant if from meningitis
Susceptible if from pneumonia

Reporting	Percent reporting		
	S	I	R
Pneumonia (n=531)	46.3	49.7	4.0
Meningitis (n=525)	3.1	4.0	92.9

Uncertainty in reporting dissociated (MLS_B-inducible) resistance to clindamycin in *S. aureus*

Clindamycin MIC 0.12-0.5 mg/L (S)
Resistance induced by erythromycin

Year	Specimen	Percent reporting		
		S	I	R
2008	8983 (n=606)	30.5	1.2	68.3
2013	1495 (n=601)	8.7	0	91.3

…. and some resistances are just difficult to detect

S. aureus specimen 1699 vancomycin MIC 4 mg/L

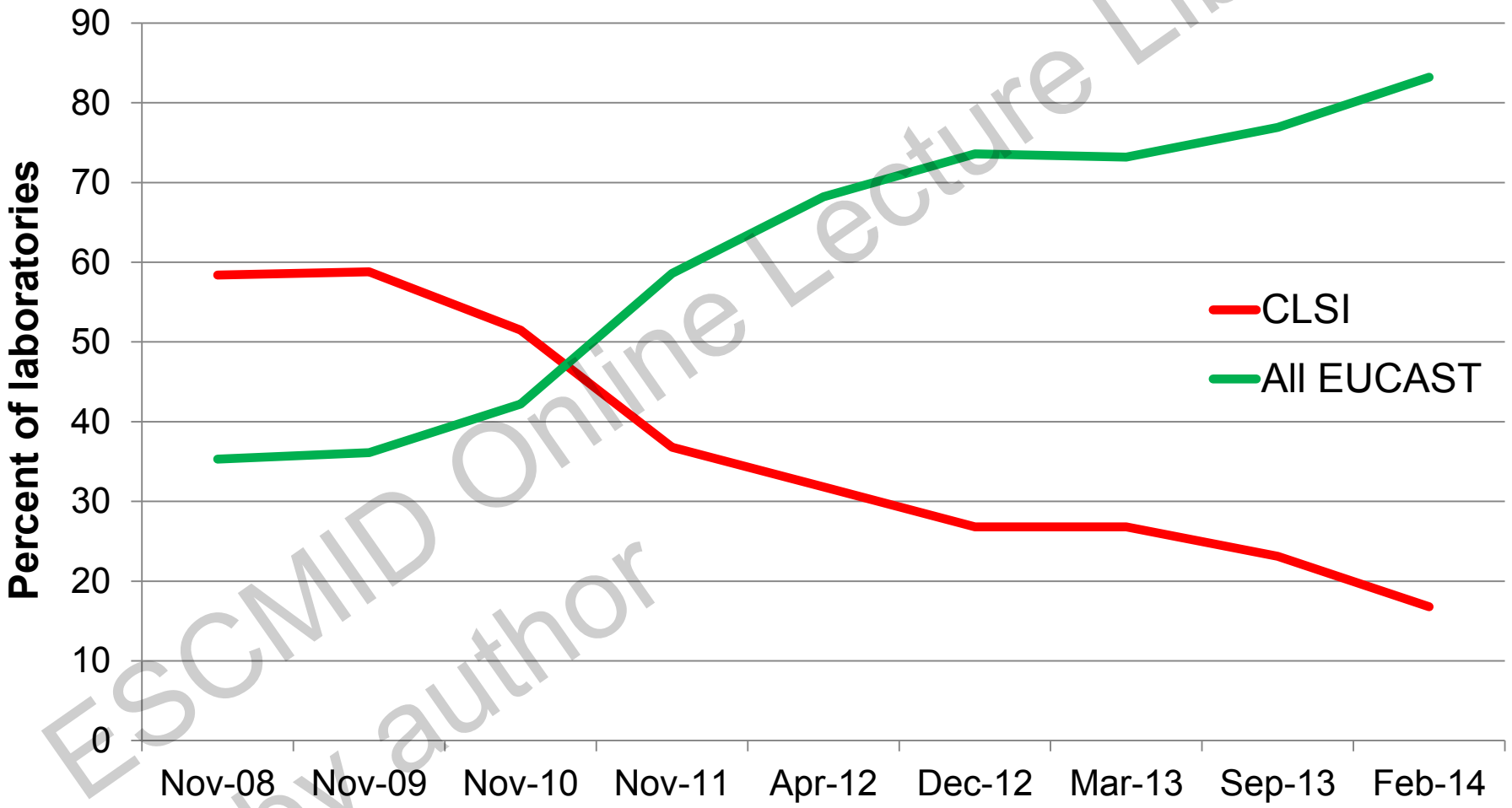
Guideline	Breakpoints (mg/L)		Percent reporting		
	S≤	R>	S	I	R
EUCAST (n=356)	2	2	53.1	1.7	45.2
CLSI (n=150)	2	8	59.4	35.3	5.3

Method	Percent reporting		
	S	I	R
Automated (n=284)	65.5	7.0	27.5
MIC (n=131)	35.9	11.4	52.7
Disk diffusion (n=29)	82.8	3.4	13.8

UKNEQAS

Use of breakpoint guidelines is changing

Breakpoints used by participants in UK NEQAS



External quality assessment -summary

- EQA provides valuable data on performance for individual laboratories
- In general, performance is good for most organism-agent combinations
- Performance can be linked to guidelines and methods used for some tests
- Discrepancies more common when:
  - Differences between guidelines
  - Failure to follow guidelines
  - Susceptibility borderline
  - Confusion over reporting
  - Tests are difficult
- There is a marked trend towards use of EUCAST breakpoints