The 2010 antimicrobial susceptibility testing external quality assessment exercise organised for EARS-Net participants

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INTRODUCTION

The United Kingdom National External Quality Assessment Service for Microbiology (UK NEQAS) provides external quality assessment (EQA) for antimicrobial susceptibility testing to the European Antimicrobial Resistance Surveillance Network (EARS-Net - formerly EARSS) laboratories. In 2010, the annual EQA exercise was the first distribution in collaboration with European Centre for Disease Prevention and Control (ECDC) but the ninth in succession to EARS-Net laboratories.

Antimicrobial resistance is a major topic in the public health arena across Europe.

Countries that participated in the EARS-Net 2010 EQA exercise:

Austria
Bosnia & Herzegovina
Belgium
Bulgaria
Cyprus
Czech
Germany
Denmark
Estonia
Spain
Finland
France
Greece
Croatia
Hungary
Ireland
Iceland
Italy
Lithuania
Luxembourg
Latvia
Malta
Netherlands
Norway
Poland
Portugal
Romania
Sweden
Slovenia
Turkey
United Kingdom

PURPOSE

The objectives of these EQA exercises are:

- to assess the ability of participating laboratories to identify antimicrobial resistance of clinical and public health importance
- to determine the accuracy of antimicrobial susceptibility test results reported by individual laboratories
- to assess the comparability of results between laboratories and countries and thus justify the pooling and comparison of routinely collected antimicrobial susceptibility test data across Europe

METHODS

An analysis was carried out on the performance of participants in the quality assessment exercise. Participation was invited from 872 laboratories in 30 countries and results were returned by 769 laboratories. The organisms distributed were one each of *Klebsiella pneumoniae, Escherichia coli, Streptococcus pneumoniae, Enterococcus faecium*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Participants' results for identification and susceptibility testing were assessed.

RESULTS

- The level of performance with these quality assessment specimens was generally high; with over 95% concordance with the intended results for most organism-antimicrobial agent combinations.
- There were no significant problems with the *S. pneumoniae* (penicillin S, ciprofloxacin R, erythromycin R) or the *S. aureus* (ST 239, multi-resistant).
- Data is presented of some of the general findings and some of the discrepancies highlighted.
- Where country specific data are shown this has been anonymised.

Results for identification were very good. The correct identification was reported by 96-99% of laboratories for all the organisms in the exercise. Chart 1 shows the correct identification related to method.

Chart 1: Correct identification results by method

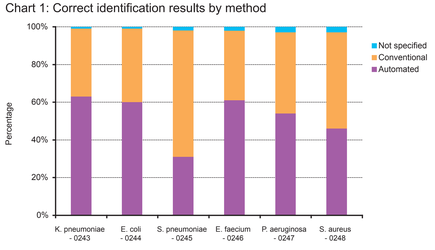
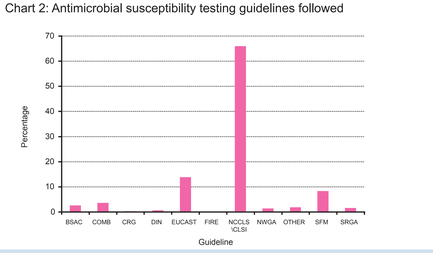


Chart 2 shows the antimicrobial susceptibility testing guidelines followed by the EARS-Net participants. Note that BSAC, CRG, DIN, NWGA, SFM, SRGA guidelines all follow EUCAST.

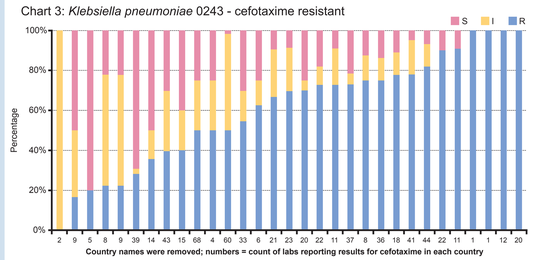
Chart 2: Antimicrobial susceptibility testing guidelines followed



Specimen 0243 – *K. pneumoniae*

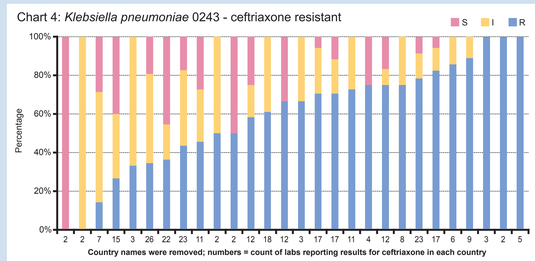
This isolate had a plasmid mediated AmpC beta-lactamase. Participant reporting of susceptibility to cephalosporins was variable. Over all the methods / guidelines used by participant laboratories the percentage results for cefotaxime were: susceptible (S), 20.1%; intermediate (I), 18.5% and resistant (R) 61.4% – Chart 3 shows results for cefotaxime related to country

Chart 3: *Klebsiella pneumoniae* 0243 - cefotaxime resistant



Overall results for ceftriaxone were S 16.1%, I 24.6%, R 59.3%; Chart 4 shows results for ceftriaxone related to country.

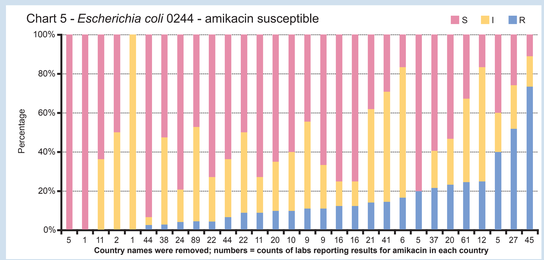
Chart 4: *Klebsiella pneumoniae* 0243 - ceftriaxone resistant



0244 – *E. coli*

The *E. coli* was borderline in susceptibility to amikacin (MIC 8 -16 mg/L) and participants' results were variable (51.4% S, 31.7% I, 16.9% R). Chart 5 shows results related to country

Chart 5 - *Escherichia coli* 0244 - amikacin susceptible



0246 – *E. faecium*

The *E. faecium* had *van*A-mediated low-level teicoplanin resistance (MIC 8mg/L) and results were more variable among participants using CLSI guidelines than those following EUCAST guidelines. Chart 6 shows results related to country and Chart 7 the results related to guidelines followed.

Chart 6: *Enterococcus faecium* 0246 - teicoplanin resistant by EUCAST, susceptible by CLSI

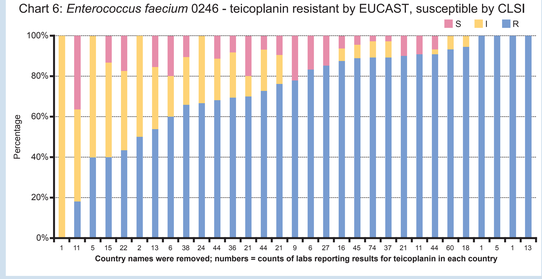
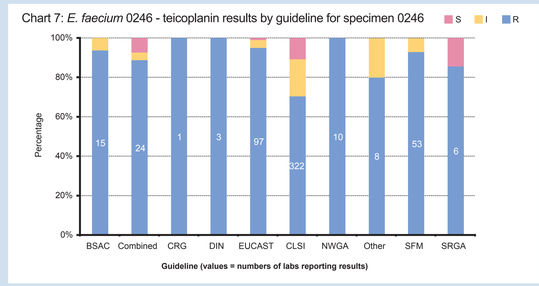


Chart 7: *E. faecium* 0246 - teicoplanin results by guideline for specimen 0246



0247 – *P. aeruginosa*

The *P. aeruginosa* was borderline in susceptibility to piperacillin-tazobactam and more variability in reporting was seen among CLSI users. Chart 8 shows the overall results related to country and Chart 9 shows the guideline differences.

Chart 8: *Pseudomonas aeruginosa* 0247 - piperacillin/tazobactam resistant by EUCAST, susceptible by CLSI

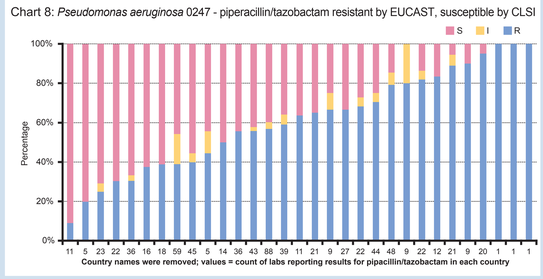
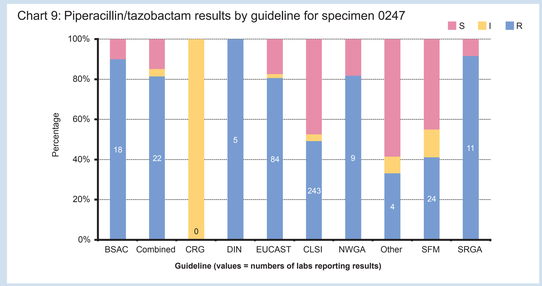


Chart 9: Piperacillin/tazobactam results by guideline for specimen 0247



CONCLUSIONS

- Participant concordance for identification of the organisms was very good.
- Clear differences in reporting seen where breakpoints and interpretation differ between guidelines.
- Variation in interpretation is seen with strain/antimicrobial agent combinations that have borderline MIC values.
- EQA is a valuable tool in the quality assurance of antimicrobial susceptibility testing and indicates the validity of comparing collated data between laboratories in resistance surveillance studies. In this exercise concordance between participating laboratories was high except where there was borderline susceptibility or where there were different breakpoints in the guidelines used, resulting in discrepancies in susceptibility test results.

ACKNOWLEDGEMENTS

We are grateful to all the EARS-Net participants for taking part and providing the data for this exercise. We thank the reference laboratories that confirmed the identification and the intended results for the organisms distributed. Also many thanks to all the staff at UK NEQAS that helped deliver this EQA exercise.

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