



EXTERNAL QUALITY ASSESSMENT (EQA) FOR MICROBIOLOGY – PARTICIPANT PERFORMANCE WITH THE GENERAL BACTERIOLOGY SCHEME OVER THE LAST 10 YEARS

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Aim

- To analyse and summarise participants' performance in external quality assessment (EQA) distributions of general bacteriology schemes for the isolation, identification and susceptibility testing of bacterial pathogens over the last ten years.

Introduction

- UK NEQAS for Microbiology has been providing an EQA service for more than 30 years
- More than 1500 laboratories from over 30 countries regularly participate in the microbiology schemes covering bacteriology, virology, mycology, parasitology and molecular testing
- Specimens in the General Bacteriology schemes contain common bacterial pathogens and occasionally include isolates associated with emerging infections and recognised resistance mechanisms
- EQA is primarily educational but enables laboratories to assess the quality of their routine diagnostic testing algorithms for common bacterial pathogens, and for uncommon and imported isolates
- EQA monitors and evaluates internal quality assurance procedures
- UK NEQAS schemes are accredited (Clinical Pathology Association Co. Ltd CPA)

Methods

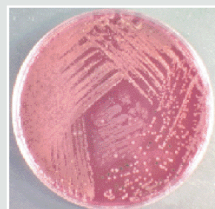
External quality assessment of general bacteriology, antimicrobial susceptibility testing and AAFB smears was performed by over 750 participating laboratories. The frequency of distribution of the schemes is:

Scheme	No. specimens per distribution	No. distributions per year
General bacteriology	3	12
Antimicrobial susceptibility	2	12
AAFB smears	4	3

Results

General bacteriology

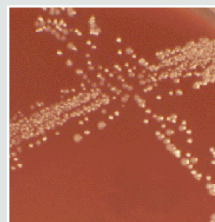
- Overall, participant performance in the General Bacteriology scheme for the last 10 years has been consistently high with success rates over >96% (fig 1) for most common pathogens
- Performance with specimens containing *N. gonorrhoeae*, *Y. enterocolitica* and *C. jejuni* has been less consistent over time (fig 2)
- 28 specimens contained two pathogens. Performance with specimens containing more than one pathogen has been variable (fig 3). Specimens containing at least one anaerobe had the highest failure rates



Salmonella sp
and *Shigella* sp.



Mixed anaerobes
(With permission, Anaerobe Reference Laboratory, Cardiff, UK)



Staphylococcus aureus and
Bacteroides fragilis

Figure 1: Participant performance with general bacteriology specimens over the last 10 years

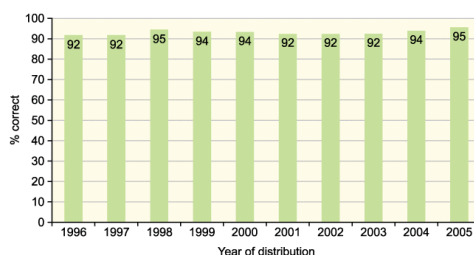


Figure 2: Participant performance with *C. jejuni*, *Y. enterocolitica* and *N. gonorrhoeae*

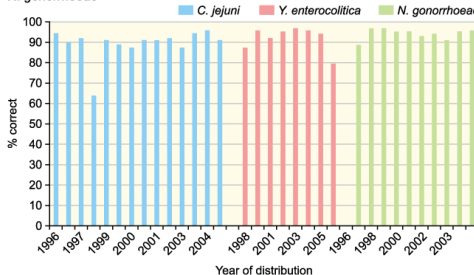
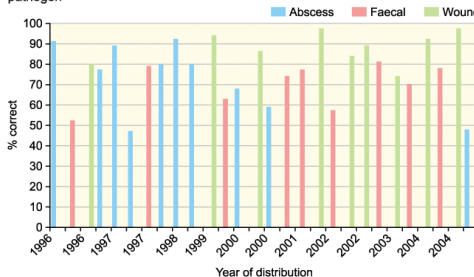
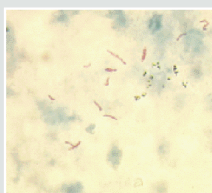


Figure 3: Participant performance with specimens containing more than one pathogen

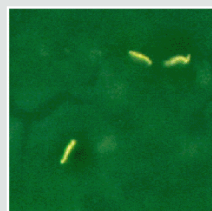


AAFB smears

- Performance in the acid alcohol bacilli scheme (AF) over the last 10 years shows consistently high performance (98%) with AAFB positive smears
- Performance with AAFB negative smears has shown a false positive result rate of between 1% and 7%



Acid alcohol fast bacilli
(Ziehl Neelson stain)



Acid alcohol fast bacilli
(Auramine stain)

Antimicrobial susceptibility

- Over the last 10 years performance with specimens for antimicrobial susceptibility testing has been consistently high (94%)
- Recent performance for *Streptococcus pneumoniae* with erythromycin and tetracycline (not shown) was continuously high with success rates of >95%. However, for cefotaxime, ceftazidime and penicillin, success rates varied (fig 4). For strains that had intermediate susceptibility to penicillin, interpretation of results appeared to be a problematic
- For some isolates of *E. coli*, lack of concordance with results for ampicillin, cefotaxime, ceftazidime, piperacillin/tazobactam and in the detection of extended beta-lactamases (ESBLs) has highlighted where problems exist in test methods and/or interpretation of results (fig 5)
- With *S. aureus* success rates for some isolates for penicillin and oxacillin were lower than expected (fig. 6)

Figure 4: Participant performance with *Streptococcus pneumoniae*

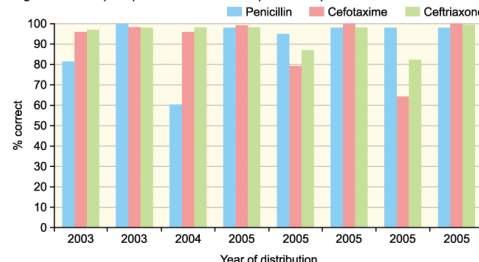


Figure 5: Participant performance with *Escherichia coli*

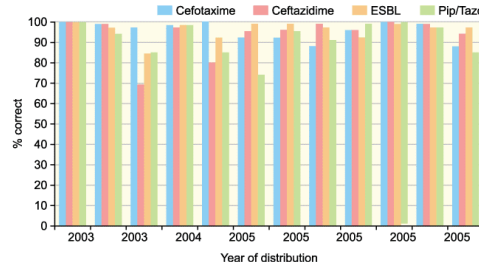
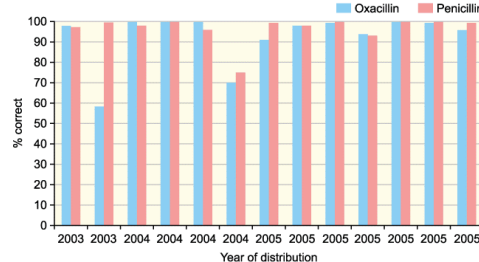


Figure 6: Participant performance with *Staphylococcus aureus*



Conclusion

- There were no significant problems in the isolation and identification of common pathogens, or the detection of AAFB in smears
- Participants found that specimens containing anaerobes, or more than one pathogen, were more challenging
- Where there was a lack of concordance with susceptibility testing performance this was often associated with isolates with MICs and zone sizes approaching the breakpoint, or resistant mechanisms that are difficult to detect with routine methods e.g. heterogenous resistance in *S. aureus*
- Performance with detection of ESBLs in *E. coli* has improved over the time but performance with piperacillin/tazobactam is still variable.

