Routine susceptibility testing: selection bias, sensitivity, specificity and performance related to MIC

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METHODS - BSAC Resistance Surveillance Project:

• 32 hospital laboratories contributed clinically significant isolates from blood (2008 & 2009) and respiratory infections (RTI, 2008/09), with their local results.
• Two central laboratories (one for RTI, one for blood) re-tested isolates by the BSAC agar dilution MIC method with BSAC/EUCAST breakpoints.
• Local and central results were compared separately for RTI and blood isolates.
• Excluded organism-agent combinations with fewer than 25 local test results.

RESULTS - SELECTION BIAS

• Incomplete (potentially selective) testing was more widespread for blood isolates (51%) than for RTI (6%) but centrally-measured MICs differed by less than 0.1 dilutions overall between cases that were tested locally and those that were not.
• Overall differences in susceptibility (S) between locally tested and untreated isolates were small: 16.7 vs. 18.0% were non-susceptible (NS) by central test in RTI, and 13.1 vs. 12.8% NS in blood infections.

CONCLUSIONS - SELECTION

• Approximately 20% of all non-susceptible isolates were wrongly reported as susceptible in local tests, with potential clinical implications.
• Nonetheless, used for surveillance, local test results somewhat overestimate the extent of non-susceptibility since it is uncommon and so false NS results outnumber false S.