The Exeter Experience—Introducing MicroScan WalkAway 96 and autoSCAN-4

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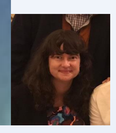


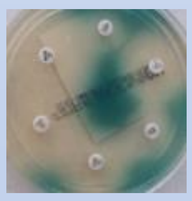
Introduction

The MicroScan (Beckman Coulter) AST system is based on microbroth dilution and covers an extensive range of antimicrobial agents tailored to specific organism groups. After inoculation, panels are incubated and read on the WalkAway 96 instrument. Alternatively, individual reads can be performed using the autoSCAN-4 instrument. The system interprets the MIC results according to EUCAST /CLSI guidelines by using the LabPro expert rules, which can also be tailored to specific user requirements.

Objectives

- To evaluate the MicroScan WalkAway 96 and AutoScan-4 instruments for performing automated AST by comparing to current methods.
- To assess the impact in a Clinical Microbiology department of a regional hospital with daily Urine MC+S sample testing 250-300 per/day).
- Assess impact of using isolates from selective agars as not validated by Beckman Coulter.
- To adopt the system initially for urine samples and evaluate the feasibility to extend across the department.

Microbroth Vs Disc diffusion

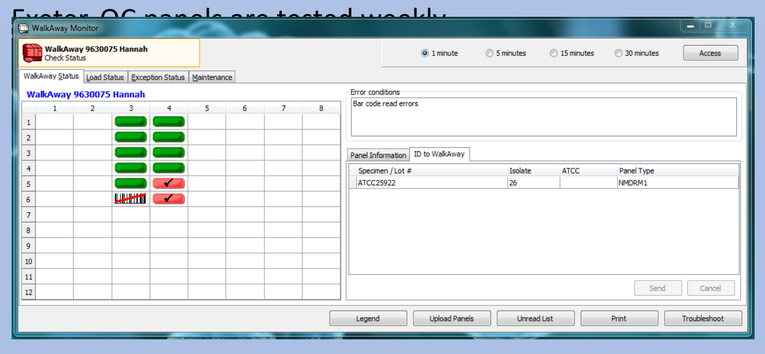


Methods

All isolates (342 isolates) tested were sub cultured prior to testing with either methodology with an 18-24 hr incubation at 35C, 5% CO2. A range of selective agars were also compared for effect.

Disc Diffusion AST - Confluent lawns of growth were produced using inoculum of 0.5McFarland standard. We followed EUCAST recommendations for isolate selection, plating and incubation. Results were manually recorded and interpreted using zone size template guides

MicroScan System — Inoculum suspensions for each isolate were prepared either using the Prompt Inoculation or standardised turbidity method. Panels were incubated at 35 ±1 C and either read using the WalkAway or autoSCAN system. This evaluation involved MicroScan Dried panels NMDRM1, PM-STA 36, PM-E 37, NM-NF50 and MicroStrep Plus 6 panel. Interpretations were based on MIC results in combination with expert rule base as adapted at the Microbiology department in Exeter. QC panels are tested weekly.



Quality Control Strains: Staphylococcus aureus ATCC 29212 and 12493, Enterococcus faecalis ATCC 29213 and 51299 , Escherichia coli 25922 , Klebsiella pneumoniae 13438, 700603, Streptococcus pneumoniae ATCC 49619, Pseudomonas aeruginosa ATCC 27853

Data analysis– Results were based on an interpretation Match or No Match basis, from which a % concordance was calculated.

Guideline Interpretation – The department predominantly uses EUCAST guidelines with a small amount of CLSI guidelines in areas where no EUCAST interpretations are available. This is implemented for both disc and MicroScan systems

Results and Discussion

Using Selective agars

UTI media/ versus CBA (58 isolates)	
Total Matching results	1975
Total Mismatch	82
% Correlating results	96.01

An important part of feasibility testing for the department was to verify that we were going to be able to select colonies from currently used selective medias across the department. Brilliance UTI Agar (Oxoid) and Columbia Blood Agar (Oxoid) provided high % agreement in interpretations allowing us to test this further as we extended to systemic testing with other medias such as Staph Strep agar (96.6% concordance) Staph Brilliance (98.1% concordance) and Brilliance MRSA agar (99.3 % concordance) which also produced high concordance in interpretations when selected against Columbia Blood Agar (Oxoid).

Microbroth versus Disc Diffusion

	NMDRM Urine versus DISC (121 isolates)	Non Fermenter NF50 versus DISC/NMDRM1 panel (45 isolates)	ENT/STRB Urine E37 versus disc (35 isolates)	Staph PM36 versus disc (110 isolates)	MicroStrep versus Disc (31 isolates)
Total Match	1158	334	131	757	162
Total Mismatch	68	10	1	21	9
%Interpretation concordance	94.4	97.0	99.2	97.2	94.7

- >90% interpretation concordance seen for all panel types compared to EUCAST Disc Diffusion testing

Microscan	Disc
Total STAAU tested: 496 Total Gent R :74 MIC>≥4: 17 MIC =4: 9 MIC =2: 48	Total STAAU tested: 397 Total Gent R: 12 % of STAAU R Gent : 3.02
Total R by CLSI – 26 Total R by EUCAST - 74	(STAAU – Staphylococcus aureus)
% of STAAU R Gent : 14.92	

- Minor differences seen for Mecillinam (Coliforms) and Gentamicin (Staphylococcus aureus) which both saw increases in resistance reported (higher rate of resistance).
- These increases were accepted by our clinical team and aided by the EUCAST caveat that for DD testing colonies in the zone should be ignored (MEL) which from the principles of Microbroth is not possible.
- An increase in Gentamicin resistance of Staphylococcus aureus reported has also been noted in other laboratories, who have performed additional explanation work to demonstrate elevated MICs through E test/Strip testing. At time of testing, EUCAST breakpoint for resistance >1 whereas CLSI is ≥4.

Conclusion and Next Steps

- **High concordance (>94.0%) for interpretations between MicroScan and Disc diffusion**
- **Minimal effect seen using a range of selective agars**
- **MicroScan provided greater range of MIC results after 24hr compared to disk diffusion**
- **Expert rules assisted correct interpretations according to EUCAST/CLSI guidelines and may reduce errors during manual data entry**
- **Improved knowledge and understanding of antibiotic theory for staff.**
- **EUCAST Breakpoints updates Jan 2022 – Change Gentamicin breakpoint for Staphylococcus- Sensitive ≤ 2.**

The department has successfully now introduced the routine testing of Staphylococcal and Coliform/ Pseudomonas isolates through the MicroScan Walkaway across the systemic section. It is hoped over the coming months to introduce of Beta Haemolytic Streptococci and S. pneumoniae using the MicroStrep 6 panel.