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Paper Poster Session
Diagnosing gastrointestinal tract infection

Rapid detection of colonization of multiple nosocomial infections utilizing the NATEXpert®, a novel molecular microarray system

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Background: Hospital-acquired infections (HAI) are a leading cause of morbidity and mortality worldwide. Screening for colonization of HAI in patients at risk, followed by appropriate isolation and/or de-colonization has proven to be successful in dramatically lowering contamination rates in hospitals and nursing homes. Current screening methods range from none to classical culturing techniques and use of PCR-based methods. These methods suffer from prolonged time to result (culture) and limited coverage of pathogen/resistance mechanisms (PCR). Savyon Diagnostics has recently been engaged with development of a Hospital Admission Panel, a new approach in which the major nosocomial infections are simultaneously screened for colonization during urgent or elective admission within up to 90 minutes. The panel includes *Staphylococcus aureus* (MRSA), vancomycin-resistant Enterococci (VRE), carbapenem-resistant Enterobacteriaceae (CRE) (KPC, NDM1, OXA48, VIM and IMP) and *Clostridium difficile*, all together 14 targets. The test utilizes the NATEXpert system, a novel rapid molecular microarray-based technology, which is sample-to result fully automated with high multiplexing capacity. The aim of this work is to demonstrate the potential utility of the newly developed test in controlling effectively the major known nosocomial infections during hospital admission.

Material/methods: Samples were introduced into the NATEXpert system and run through a fully automated process, which includes sample lysis, DNA extraction, specific target amplification, microarray detection and data analysis, in a sequential form. All the process was carried out in the designated disposable cartridge which contained all the necessary reagents in a ready-to-use mode. The microarray was pre-activated with specifically designed capture oligonucleotides, and the amplicons generated in the amplification reaction were electronically addressed to discrete loci on the microarray. Detection was achieved through specific fluorescent reporter oligonucleotides, following hybridization on the microarray with respective amplicon sequences. The results were presented within 90 minutes from sample load and were compared to their original characterization, which was carried out by conventional culture or real-time PCR in the samples providing laboratory.

Results: Overall 93 samples were received and all were in agreement with their original real-time PCR characterization. These samples included: 14 MRSA, 16 VRE, 18 KPC, 8 VIM, 13 OXA48, 15 NDM, 1 IMP, and 8 *Clostridium difficile*. The analysis provided clear results about the identity of all the tested pathogens and antibiotic resistance.

Conclusions: The currently presented panel is aimed to be a proper response to the need to reduce and manage nosocomial infections, and specifically MRSA, VRE, CRE and *Clostridium difficile*. This is efficiently enabled due to the use of the NATEXpert platform, in particular its high multiplexing capabilities, a feature which is unique compared to other systems intended for singular sample tests. The short and fully automated sample-to-result system makes it an advantageous tool in HAI management.