

Rapid identification of health care-associated infections with an integrated fluorescence anisotropy system

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Healthcare-associated infections (HAIs) and drug-resistant pathogens have become a major healthcare issue with millions of reported cases every year. Advanced diagnostics would allow clinicians to more quickly determine the most effective treatment, reduce the empirical use of broad-spectrum antimicrobials, and facilitate enrollment in new antibiotic treatments. Here we present a new integrated system, PAD (polarization anisotropy diagnostics), for rapid bacterial detection with a focus on HAI pathogens. The PAD utilizes changes of fluorescence anisotropy when detection probes recognize target bacterial nucleic acids. The technology is inherently robust against environmental noise, and economically scalable for parallel measurements. The assay is fast (2 hours) and performed on-site in a single tube format. When applied to clinical samples from interventional procedures, PAD determined the overall bacterial burden, differentiated HAI bacterial species, and identified drug resistance and virulence status. The PAD system holds promise as a powerful tool for near-patient, rapid HAI testing.