

## CONCISE COMMUNICATION

## The Role of an Antimicrobial Stewardship Team in the Use of Rapid Diagnostic Testing in Acute Care: An Official Position Statement of the Society of Infectious Diseases Pharmacists

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Rapid diagnostic technologies can assist Antimicrobial Stewardship Programs (ASPs) in achieving the goals of reducing unnecessary antimicrobial exposure and optimizing patient care. The Society of Infectious Diseases Pharmacists supports all members of the ASP team as essential components of optimal use of these technologies for management of antibiotic prescribing and cost-reduction strategies.

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Excessive antimicrobial use is a serious patient safety concern because overuse of antibiotics enhances the risk for *Clostridium difficile* infections, antimicrobial resistance, and mortality. The goal of antimicrobial stewardship programs (ASPs) is to reduce unnecessary antimicrobial exposure, thus improving patient outcomes. Antimicrobial stewardship programs, now a requirement of The Joint Commission, recommend several strategies to achieve this goal. Rapid molecular diagnostics for infectious diseases (ID) is one such strategy. These technologies dramatically reduce the time to pathogen identification, thus allowing for rapid cessation or ‘targeting’ of antibiotic therapy to the most effective agent. These technologies are not as impactful if they are implemented without a team to drive their utility, as was demonstrated in a meta-analysis showing a reduction in mortality, decrease in time to effective therapy, and decrease in length of stay with rapid diagnostics plus an ASP, compared to rapid diagnostics alone for bloodstream infections.<sup>1</sup> Moreover, several studies have also demonstrated a significant cost savings in addition to patient care when rapid diagnostics are included in the ASP.<sup>2–4</sup> The Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA) guidelines for developing an institutional ASP lists an ID physician and a clinical pharmacist with ID training as core team members, while inclusion of a clinical microbiologist, infection control professional, and hospital epidemiologist would be optimal.<sup>5</sup> Centers for Disease Control and Prevention (CDC) further supports this with their

checklist for core elements of an ASP by listing the previously mentioned staff members as nonrequired yet key personnel in a successful program.<sup>6</sup> The Society of Infectious Diseases Pharmacists (SIDP) supports the ASP team as an essential component of optimizing use of rapid diagnostic technologies for the management of antibiotic prescribing. Physician and pharmacist core leaders add complementary and unique expertise valuable to implementation and successful utilization of rapid diagnostic testing.

### COLLABORATION WITH THE MICROBIOLOGY TEAM

The inception of rapid diagnostic utilization at any facility requires interprofessional collaboration with microbiology personnel. As with many other processes for implementation, there are multiple phases to planning. These can be broken down into 3 steps: (1) pre-implementation, (2) real-time use, and (3) post-implementation. To gauge rapid molecular diagnostic needs of the hospital in the pre-implementation planning phase, there must be coordination between the ASP pharmacist and physician with microbiology laboratory personnel.<sup>7</sup> Factors that determine technological needs include, but are not limited to, hospital bed size, patient acuity, hospital and community resistance patterns, and empiric antibiotic utilization. For example, hospitals with high rates of blood culture contamination leading to unnecessary use of vancomycin may have clinical and economic benefits by rapidly distinguishing between *Staphylococcus aureus* and coagulase-negative staphylococci.<sup>8</sup> The ASP team should work with the laboratory to obtain and analyze data regarding potential molecular diagnostic utilization (eg, number of results per week) to create the most effective microbiology-to-ASP communication workflow. The unique training available for ASP pharmacists on application of antibiotic susceptibility testing results, clinical utility of antibiotics, and rapid diagnostic technology creates a well-rounded team with the microbiology laboratory to coordinate actionable interventions based on rapid results.<sup>9</sup>

### COMMUNICATION WITH THE PRIMARY TEAM

Effective communication between the ASP team and primary medical providers is key to ensuring that information from various technologies is utilized in an appropriate and effective manner. The ASP pharmacist and physician champion play a vital role in creating education for hospital providers to familiarize them with the new technology and its impact on patient care. Additionally, ASP team members should collaborate to ensure that results from the microbiology laboratory are reported in a clear, interpretable manner for all practitioners. Finally, ASPs can facilitate prompt action based on results by communicating patient-level guidance directly with

prescribers when a new rapid diagnostic is first implemented. Education of providers is a critical step to maintaining the success of ASP specific initiatives.

#### BARRIERS TO IMPLEMENTATION AND METHODS TO OVERCOME THEM

Implementing rapid diagnostic technology is not without barriers, such as lack of trained personnel and program funding. While rapid diagnostic testing is highly reliable and becoming widely available, tests remain costly. Known clinical demand and appropriate infrastructure are necessary for hospitals to realize full and worthwhile returns on investment. The initial step in justifying rapid diagnostics involves collaboration between the ASP team and the clinical microbiology laboratory to identify and quantify the expected clinical and economic impact based on targeted pathogen(s) local prevalence and resistance rates, number of patient cases, logistics, and costs associated with testing. If a need exists, communication for transmitting testing results must be clearly mapped out and piloted to ensure that improvements in patient care are attainable. Collaboration between laboratory staff, information technology, ASP, infection control, and medical staff is essential to ensuring that the identified opportunity translates to change in clinical practice.

#### QUALITY METRICS

Identifying metrics to assess the impact of rapid molecular diagnostics on patient care is an essential means of demonstrating value to leadership and providing analysis of opportunities for improvement as required by The Joint Commission for ASPs. Evaluating new technologies with metrics related to clinical outcomes may also prove beneficial in convincing providers of their value to increase buy-in and the use of these results in real time. Several metrics have been used to evaluate the effects of rapid diagnostics, including improvements in patient care, such as reduction in time to appropriate therapy and reduction in mortality. Cost savings metrics should include direct cost savings and evaluation of reduced costs for infection control, pharmaceuticals, and reduction in additional laboratory tests. In addition, the use of rapid diagnostics could be correlated with surrogate metrics, including reduced length of stay and reduced antibiotic consumption.<sup>1,10</sup> Quality metrics are often measured during the post-implementation phase and must be periodically reassessed as the program continues.

#### CONTINUING EDUCATION

The ASP team can positively impact patient care through use of rapid diagnostic technologies. However, this field is frequently changing, with new methods continuously on the horizon. To adapt to the needs of healthcare services advocated by the CDC and the IDSA/SHEA, the ASP team must stay abreast of these new technologies.<sup>11</sup> A recent publication highlighted more familiarity with rapid diagnostic tools

specifically among pharmacists with formal ID training.<sup>9</sup> However, the full ASP team also needs this knowledge. Thus, education during advance degree training should be incorporated.<sup>7,12</sup> Additionally, continuing education courses that focus on rapid diagnostic technologies should be offered to all ASP team members to support up-to-date knowledge in this rapidly changing field.<sup>9,13</sup>

#### RECOMMENDATIONS AND FUTURE DIRECTIONS

Improving patient outcomes and safety is of primary importance to ASPs. Rapid diagnostic technologies can greatly assist in optimizing care for patients with infectious diseases when paired with active involvement of the ASP.<sup>1</sup> It is crucial that information be acted upon, and the ASP team can drive this through collaboration with the microbiology and primary medical teams. Continuing education, informally and formally, will become vital to ensuring that medical providers are able to appropriately utilize such technologies to streamline a patient's care plan guided by ASP recommendations. The ASP pharmacist and physician may act as repositories of knowledge assisting in implementation of rapid diagnostic technology, improvement of communication between microbiology to medical providers, and interpretation of results, thus optimizing patient care.

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