PIONEERING DIAGNOSTICS

BIOMÉRIEUX

AMR IS THE PROBLEM. ASP IS THE SOLUTION.

Katherine Perez, PharmD, BCIDP
Director, Antimicrobial Stewardship

Antimicrobial resistance (AMR) is among the leading global public health challenges of our time and has most recently been exacerbated by the ongoing COVID-19 pandemic. Antimicrobial stewardship is the best mitigation strategy healthcare systems can implement to address the detriment of AMR while optimizing patient care. The purpose of an antimicrobial stewardship program (ASP) is to develop, implement, and evaluate effective and sustainable interventions that improve antimicrobial use.[1]

The importance of ASPs in the US has been enhanced primarily by the Presidential Advisory Council on Combatting Antibiotic-Resistant Bacteria (CARB) in 2014.[2] In response to these landmark recommendations, healthcare accreditation agencies, including The Joint Commission, and the Centers for Medicare and Medicaid Services (CMS) issued recommendations and rules for hospitals to implement ASP as a condition of participation.[3] The CDC developed core elements for successful stewardship programs to help hospitals achieve compliance.

CDC's Seven Core Elements

1. Leadership Commitment
2. Accountability
3. Pharmacy Expertise
4. Action
5. Tracking
6. Reporting
7. Education

According to the CDC, roughly 89% of US acute care hospitals with ASPs have self-reported implementing all seven core elements. Most often, implementation efforts are lacking for tracking, reporting, and education, representing a major lack of access to the data.

In 2020, the National Action Plan for CARB presented an update to the initial plan with evidence-based, coordinated actions for the US government to take between 2020 and 2025 and includes a call to CDC and CMS to further define criteria for ASP requirements.[4] Notably, the plan outlines several "data development" objectives that aim to develop new or improved data infrastructure, collection, and analysis options. Efforts highlight the need to improve adherence to the "FAIR" (Findability, Accessibility, Interoperability, and Reusability) principles for data management and stewardship.[5] Healthcare systems will be challenged with providing rapid, accurate, and comprehensive access to antibiotic-resistant isolates, integrated data sources, and up-to-date analytics tools to combat AMR.

"Stewardship programs are essential to improving patient outcomes and patient safety, preserving the efficacy of existing antibiotics, and reducing resistance and health care costs."

Christine Ginocchio, PhD, MT
VP Global Medical Affairs, bioMérieux and BioFire Diagnostics
Member, Presidential Advisory Council on Combating Antibiotic Resistant Bacteria

As the largest in vitro diagnostics company committed to antimicrobial resistance, bioMérieux's integrated approach drives sustainable momentum for the future of stewardship programs. bioMérieux takes a proactive partnership-driven approach to combat AMR. We help organizations like yours maximize the power of diagnostics and analytics to detect, identify, and guide treatment for drug-resistant infections. We help healthcare systems capture the value of ASPs with tools that enhance data application, collaborative communication and decision making.

STEWARDSHIP STARTS WITH DIAGNOSTICS

It all starts with a test. Optimizing the laboratory work flow to activate fast, actionable diagnostic tools to support responsible use of antimicrobials at each decision point. Implementation of rapid and innovative diagnostic tests for identification and characterization of antibiotic resistant bacteria and distinguishing between viral or bacterial infections are essential to reducing unnecessary use of antibiotics, a major cause of AMR.[6]

With real-time detection and ASP intervention, clinicians would be able to identify infecting pathogens and resistance factors within hours, rather than days, and use the knowledge to tailor treatment to each individual patient. Partnership between the laboratory and the ASP, with or without rapid diagnostics, has demonstrated improved clinical and economic outcomes for patients and healthcare systems.[7]

Respiratory infections, meningitis and encephalitis, and bloodstream infections are among the most problematic and deadly when appropriate therapy is delayed. Rapid diagnostics for these disease states have demonstrated clear patient care benefits and reductions in healthcare costs. When used in tandem with ASP, solutions like PCR testing directly from clinical specimens can optimize the initiation and duration of antimicrobial therapy, the length of inpatient stay, reduce patient mortality, and time spent in isolation for a patient.[8] The CDC highlighted the importance of this collaboration in the most recent Core Elements for Antimicrobial Stewardship Programs by calling out specific, evidence-based actions hospitals can take today. Partnerships between the laboratory and the ASP can impact patient care by:

- Providing the proper use of tests and the flow of results. Prospective audit and feedback of new culture or rapid diagnostic results to reduce the time needed to discontinue, narrow, or escalate antibiotic therapy as appropriate
- Helping optimize empiric antibiotic prescribing by creating and interpreting antibiograms and selective reporting of antimicrobial susceptibility testing in a way that supports optimal antibiotic use and is consistent with hospital treatment guidelines
- Determining the impact of new susceptibility interpretive criteria will have on antibiotic use
- Streamlining communication with clinicians when changes in laboratory testing practices may impact clinical decision making

MEASURING SUCCESS: TANGIBLES

At their core, ASPs are quality improvement initiatives. Valid and reliable measurements are necessary to reflect and assess the impact of ASP on patient safety, care optimization, and AMR. Access to data is crucial. Laboratory diagnostics provide tangible and actionable results that often provide the initial trigger for ASP interventions. ASP quality indicators can elevate the tremendous value the laboratory brings to patient care. ASP quality indicators are categorized as process, outcome, and balancing measures.

- Process measures gauge whether applied interventions are heading in the intended direction and can be assessed for their congruence with outcome measures
- Outcome measures should be specific to the interventions implemented – syndromic based
- Balancing measures are necessary for systematic monitoring – to ensure that improvement in one aspect or area of care does not inadvertently or negatively impact another

Leveraging IT capabilities and software solutions to illustrate baseline performance gives ASPs the time to focus, identify key quality metrics tailored for your hospital, and monitor the effects of changes as they are made. bioMérieux continues to develop new IT solutions that not only enhance work in the lab, but integrate data from other hospital sources (electronic medical record, pharmacy, laboratory) to drive the day-to-day patient care initiatives. bioMérieux is dedicating expertise and resources to ensure healthcare providers are seeing clinically meaningful information so they can confidently deliver care.

- ACTION
  - » Improve medication management with high medical value biomarkers (i.e., PCT) for antibiotic initiation, monitoring, and de-escalation. Supported by one-day antibiotic susceptibility testing
  - » Integrating novel rapid diagnostic testing into clinical practice provides opportunities to enhance antimicrobial prescribing by examining how diagnostic testing is ordered, performed, and reported with ASP coordination
  - » Interactive analysis of diagnostic and drug utilization
- TRACKING
  - » Slow the spread of MDRO and support surveillance with faster detection and ID/AST
  - » Track resistance trends and Healthcare associated infections (HAIs) in real time
- REPORTING
  - » Monitor and optimize antimicrobial therapy to improve patient outcomes and reduced hospital costs
  - » Interactive dashboard reporting format for stakeholders to evaluate the process and outcome of testing on patient care to identify potential unintended consequences, costs, effects on AMR rates, and opportunities to enhance the value of diagnostics
- EDUCATION
  - » Gather the data needed to educate clinicians on what results mean and how they can take action
  - » Easily share data with your organization's stakeholders to demonstrate impact
  - » Provide institutional adherence to best practices for continuous improvement

"The ease of reliable data transmission between systems, revolutionizes antimicrobial stewardship and transforms the antibiogram to be automated and dynamic."

John Hurst, PharmD, BCIDP
bioMérieux Senior Director of Antimicrobial Stewardship, US

MEASURING SUCCESS: INTANGIBLES

As a leader in the field of in vitro diagnostics, infectious diseases, and antimicrobial stewardship, bioMérieux is the trusted partner that supports today's healthcare systems need to confidently deliver improved clinical and economic outcomes by supporting stewardship programs. With a deep expertise in microbiology and infectious diseases, our collaborative-consulting approach for laboratory and stewardship initiatives help our partners understand their processes, navigate implementation, streamline operations, improve productivity, then visualize, analyze, and apply data to support positive patient outcomes. Our partnership approach reveals best practices that can improve patient care and contribute to economically sustainable healthcare systems by creating ways to keep costs under control. This allows you to accelerate stewardship with customized and executable plans that improve efficiency and drive cross-departmental impact.

PARTNER WITH US.

Let bioMérieux help propel your antimicrobial stewardship program forward.

As a diagnostic leader in antimicrobial stewardship, we optimize the continuum of care with a comprehensive and complete solution to combat AMR in your healthcare system. Partners can choose one element or integrate all of them to discover relevant, on-time insights and tangible opportunities that can propel their antimicrobial stewardship program forward.

About the author:
Katherine Perez, PharmD, BCIDP Director, Antimicrobial Stewardship bioMérieux–Doctor of Pharmacy degree from the University of Texas College of Pharmacy in Austin, Texas in 2010. Completed a postdoctoral pharmacy practice residency in a combined program at University Health System Hospital and the Pharmacotherapy Education and Research Center at the University of Texas Health Science Center in San Antonio, Texas followed by a specialty residency in infectious diseases pharmacotherapy at Houston Methodist Hospital, Houston, Texas. BCIDP board certified in infectious diseases pharmacotherapy by the Board of Pharmaceutical Specialties.

Currently member of several professional associations including American College of Clinical Pharmacy (ACCP), Society of Infectious Diseases Pharmacists (SIDP), Infectious Diseases Society of America (IDSA), Houston Infectious Diseases Network (HIDN), Making a Difference in Infectious Diseases Pharmacotherapy (MAD-ID), and the American Society of Health-System Pharmacists (ASHP). Areas of research interest include antimicrobial resistance, rapid diagnostics, bacterial bloodstream infections, and antimicrobial stewardship.

About bioMérieux

Pioneering Diagnostics

A world leader in the field of in vitro diagnostics for more than 55 years, bioMérieux is present in 44 countries and serves more than 160 countries with the support of a large network of distributors. In 2019, revenues reached €2.7 billion, with over 90% of sales outside of France.

bioMérieux provides diagnostic solutions (systems, reagents, software and services) which determine the source of disease and contamination to improve patient health and ensure consumer safety. Its products are mainly used for diagnosing infectious diseases. They are also used for detecting microorganisms in agri-food, pharmaceutical and cosmetic products.

REFERENCES:

1. Resources from the Joint IDSA-SHEA-PIDS Task Force on Antimicrobial Stewardship https://www.idsociety.org/clinical-practice/antimicrobial-stewardship2/antimicrobial-stewardship/
2. https://obamawhitehouse.archives.gov/sites/default/files/docs/national_action_plan_for_combating_antibotic-resistant_bacteria.pdf
3. Centers for Medicare and Medicaid Services. Medicare and Medicaid Programs; Regulatory Provisions To Promote Program Efficiency, Transparency, and Burden Reduction; Fire Safety Requirements for Certain Dialysis Facilities; Hospital and Critical Access Hospital (CAH) Changes To Promote Innovation, Flexibility, and Improvement in Patient Careexternal icon. https://www.federalregister.gov/documents/2019/09/30/2019-20736/
4. https://www.cdc.gov/drugresistance/us-activities/national-action-plan.html
5. Wilkinson, M. D. et al. The FAIR Guiding Principles for scientific data management and stewardship. Sci. Data 3:160018 doi: 10.1038/sdata.2016.18 (2016).
6. Diagnostic Tests Can Stem the Threat of Antimicrobial Resistance: Infectious Disease Professionals Can Help Dana Trevas, Angela M Caliendo, Kimberly Hanson, Jaclyn Levy, Christine C Ginocchio for the Infectious Diseases Society of America Clinical Infectious Diseases, Volume 72, Issue 11, 1 June 2021, Pages e893–e900, https://doi.org/10.1093/cid/ciaa1527
7. Bonine NG,et al. Impact of Delayed Appropriate Antibiotic Therapy on Patient Outcomes by Antibiotic Resistance Status From Serious Gram-negative Bacterial Infections. Am J Med Sci. 2019 Feb;357(2):103-110.
8. Interplay between Rapid Diagnostic Tests and Antimicrobial Stewardship Programs among Patients with Bloodstream and Other Severe Infections Maya Beganovic 1, Erin K McCreary 2, Monica V Mahoney 3, Brandon Dionne 4 5, Daniel A Green 6, Tristan T Timbrook 7•DOI: 10.1373/jalm.2018.026450.