Survey of Expert Opinion on Antibiotic Stewardship Programs
From APUA Scientific Advisory Board

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Summary:
Experts from APUA’s Scientific Advisory Board agree that there are both perceptual and technical obstacles to effective implementation of antibiotic stewardship programs (ASPs) in healthcare facilities. Primary requirements are more streamlined technology to coordinate intra- and inter-hospital ASP efforts, and high sensitivity rapid-culture diagnostic tests to a) differentiate between viral and bacterial infections and b) pinpoint pathogen specificity and susceptibility/resistance to drugs. It takes significant support from IT, microbiology labs, and all divisions of hospital staff to address those needs. However, it can be difficult to convince hospital administration to take on those expenses when they don’t see a direct return on investment. Also, many practitioners and administrators prefer to use the broadest-spectrum antibiotic for fear of poor outcomes or malpractice suits.

California is a model in implementing statewide stewardship programs to address ESBLs and CRE threats in acute-care and long-term care facilities. It is also crucial for ASPs to foster collaboration among the different types of care facilities, as more patients undergo multiple transfers between facilities over the course of their care. The Centers for Disease Control and Prevention and publications like Clinical Infectious Diseases and Infection Control and Hospital Epidemiology also provide a wealth of resources on ASP implementation at various stages.

Hard-hitting educational campaigns which demonstrate the importance, and the extensive potential benefits, of ASPs will facilitate getting hospital administration and state departments of health on board with establishing these much-needed programs.

What is the greatest challenge to establishing an effective ASP in a U.S. healthcare institution?

- The biggest obstacle may be the lack of informatics management tools that let an ASP team see who is prescribing what, for what indications, with alerts for deviations from guidelines.
- The greatest challenge is resources. Hospital administration wants to see a return on investment, but it is so difficult to quantify in financial terms the advantages of prudent antimicrobial use. One can show a decline in antibiotic utilization costs, but that doesn’t really
reflect the goal of ASPs, which is to improve the appropriateness of antimicrobial use, not to save money.

- There are multiple challenges, but the greatest is the **perception that there are greater risks** (inadequate therapy resulting in poor outcomes and malpractice suits) in using **appropriate therapy** than in either a “wait and see” or more targeted approach to real or suspected infections. Other challenges include:
  - **Marketing imbalance** (i.e. much more spent on promoting inappropriate use than on promoting rational use),
  - **Lack of financial incentives** to use more appropriate therapies, and
  - **Delay in appropriate diagnoses**.

**What types of supports (educational, technological) are most needed by institutions introducing an ASP?**

- Technological support is helpful, but only if the ASP team members have **protected time** to adequately utilize this technology and **act on its reports**.
- Institutions need to:
  - **Establish budgets and reimbursements** (to hospitals and to physicians) that are based on appropriate use,
  - **Eliminate malpractice fears** related to appropriate use that does not result in cures,
  - **Decrease turn-around-time for culture and sensitivity results**,
  - **Promote more scientific, evidence-based protocols** including PK/PD modeling techniques.
- Facilities vary considerably as to their resources and management commitment to ASP. A major limiting factor has been **IT support**. Another issue has been **staffing** and competing responsibilities – the IPs, pharmacists and laboratory personnel who are involved in ASPs are also responsible for an expanding number of other duties.

**What do you consider the best set of guidelines or existing resources for setting up an ASP?**

- The “**IDSA and SHEA Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship**,” published in *Clinical Infectious Diseases* (January 2007), are the most definitive guidelines to date. Many **follow-up articles** have been written evaluating the use and successful application of these guidelines.
- The **special topic issue on antimicrobial stewardship** published by *Infection Control and Hospital Epidemiology* (April 2012) included **policy statements**, reviews of “**state of the science**” and of **best practices**, **cost analyses**, **evaluations of methods**, etc.
- **CDC resources** from “Get Smart for Healthcare”:
  - “**Implementing and Improving Stewardship Efforts**”: getting started, tools, **success stories** from individual hospitals
  - **“Resources”**:
    - From the Hospital Corporation of America: **technical advice** for stewardship program implementers (“Physician Champion”), **case-by-case guidance** for clinicians (“Clinician Guide”), stewardship program **gap analysis checklist**
From hospitals nationwide that have experience implementing stewardship programs: very technical advice such as program management guidelines, microbiology specimen collection guidelines, etc. (e.g. Johns Hopkins Hospital)

- Successful statewide implementation programs:
  - California: in 2010, developed the only statewide ASP program that requires general acute care hospitals to monitor/evaluate antibiotic use and set up a quality improvement committee to oversee judicious use
  - Oregon: established a HAi reporting program in 2007, have seen decreased incidence of all HAi tracked since 2009 (CLABSIs and various types of surgical-site infections). Most HAi tracked also exhibited significantly lower incidence than the national average.

- APUA Clinical Newsletters of interest:
  - Enhancing Infection Control with Antibiotic Stewardship (Vol.29 No.3)
  - Antibiotic Stewardship Gaining Traction: Recommended Models and Resources (Vol.29 No.1)
  - Antibiotic Stewardship Programs: Proven Strategies to Preserve Medicine’s “Magic Bullets” (Vol.24 No.1)
  - More under For Practitioners: Treatment Guidelines and Stewardship

- The best set of guidelines are established by a broad-based healthcare team that includes patients, are based on evidence (both literature and specific patient data), and where the institution and not the treating physician is held liable when guidelines are followed but outcomes are poor. It might be helpful if patients/families signed “informed consents” after having the reasons for following the guidelines explained.

Do you envision ESBLs being a significant threat outside of the healthcare setting (i.e., in the community) in the next 5 years? 10 years?

- Most APUA experts expect ESBLs in the community to get worse within the next 5 years.
- ESBLs are already beginning to be a problem among patients cared for at home and in extended-care facilities. CRE is just starting. These care institutions really do not have resources and expertise. However, there are increasing collaborations between acute care and long-term care, as the mutual advantage of working together on this is appreciated.

What do you see as the future role of biomarkers (i.e., CRP, procalcitonin, others) in guiding patient management and therapeutic decisions in the future?

- The ones mentioned need to be incorporated into guidelines, but more rapid culture results (possibly based on microbial DNA identification) have more potential. Techniques already exist that can separate soluble, non-host DNA present in host blood at concentrations of only 0.2% of soluble host DNA. These techniques will make it possible to identify viral or bacterial DNA/RNA in the blood of patients in real time at reasonable costs. We are using such techniques to identify organ donor DNA in the blood of human transplant recipients. It will not take long for this to be applied to infectious diseases once such tests are reimbursed for. Similar techniques for identifying very small quantities of infectious agent proteins in host blood are also already possible. Only by going away from outdated, too-slow, but reimbursable microbiology testing and paying for such [rapid culture] tests will they become cheap enough to use routinely. When
clinicians know what the infecting organism is, in real time, they will feel comfortable not using "shotgun" inappropriate or unnecessary therapies: especially if they are not afraid of a malpractice suit if there is a bad outcome.

- Limited to critical care and ultimately a minority of patients.

Is a simple, point-of-care “viral vs. bacterial” diagnostic test the Holy Grail? If not, what is the Holy Grail to encourage prudent use of antibiotics and improve outcomes?

- Viral vs. bacterial decider at point-of-care may not quite be Holy Grail, but would be enormously helpful.
- Not at all. The inappropriate use of antibiotics in hospitals is rarely due to misdiagnosis of viral infections as bacterial, but more commonly due to interpretation of non-infectious causes of fever and/or leukocytosis as bacterial, misinterpretation of colonization as infection, use of overly broad-spectrum regimens where narrower ones would do, and failure to de-escalate broad-spectrum regimens when culture results are available.
- It could be a "Holy Grail" but only if it actually identified the infectious agent with great specificity and sensitivity, and if it could identify both agent and sensitivities. I suspect that removing the risks of malpractice claims by providing a patient compensation system (similar to that used to develop immunizations), if combined with appropriate education and reimbursement, would be as effective and take less time to implement.
- We have so far to go just getting everyone on board with the basics. Non-culture diagnostic methods are going to complicate things, because there will be fewer isolates to test for antibiotic susceptibility and a loss of phenotypic identification of resistance. Using molecular methods for antibiotic susceptibility testing only works to the extent that you identify genetic mechanisms.