



# **Antimicrobial Stewardship:**

## **Arizona Partnerships Working to Improve the Use of Antimicrobials in the Hospital and Community**

### **Part 4**

**“Antibacterials – indeed, anti-infectives as a whole – are unique in that misuse of these agents can have a negative effect on society at large. Misuse of antibacterials has led to the development of bacterial resistance, whereas misuse of a cardiovascular drug harms only the one patient, not causing a societal consequence.”**

**- Glenn Tillotson; Clin Infect Dis. 2010;51:752**

**“...we hold closely the principles that antibiotics are a gift to us from prior generations and that we have a moral obligation to ensure that this global treasure is available for our children and future generations.”**

**- David Gilbert, et al (and the Infectious Diseases Society of America). Clin Infect Dis. 2010;51:754-5**

# A Note To Our Readers and Slide Presenters

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The objectives of the Subcommittee on Antimicrobial Stewardship Programs are directed at education, presentation, and identification of resources for clinicians to create toolkits of strategies that will assist clinicians with understanding, implementing, measuring, and maintaining antimicrobial stewardship programs.

The slide compendium was developed by the Subcommittee on Antimicrobial Stewardship Programs (ASP) of the Arizona Healthcare-Associated Infection (HAI) Advisory Committee in 2012-2013.

ASP is a multidisciplinary committee representing various healthcare disciplines working to define and provide guidance for establishing and maintaining an antimicrobial stewardship programs within acute care and long-term care institutions and in the community.

Their work was guided by the best available evidence at the time although the subject matter encompassed thousands of references. Accordingly, the Subcommittee selectively used examples from the published literature to provide guidance and evidenced-based criteria regarding antimicrobial stewardship. The slide compendium reflects consensus on criteria which the HAI Advisory Committee deems to represent prudent practice.

# Disclaimers

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All scientific and technical material included in the slide compendium applied rigorous scientific standards and peer review by the Subcommittee on Antimicrobial Stewardship Programs to ensure the accuracy and reliability of the data. The Subcommittee reviewed hundreds of published studies for the purposes of defining antimicrobial stewardship for Arizonan clinicians. The Arizona Department of Health Services (ADHS) and members of its subcommittees assume no responsibility for the opinions and interpretations of the data from published studies selected for inclusion in the slide compendium.

ADHS routinely seeks the input of highly qualified peer reviewers on the propriety, accuracy, completeness, and quality (including objectivity, utility, and integrity) of its materials. Although the specific application of peer review throughout the scientific process may vary, the overall goal is to obtain an objective evaluation of scientific information from its fellow scientists, consultants, and Committees.

Please credit ADHS for development of its slides and other tools. Please provide a link to the ADHS website when these material are used.

# Introduction to Slide Section

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Reasons to Optimize Antibiotic Use

Pathways to a Successful ASP

Antimicrobial Stewardship: Making the Case

ASPs: Nuts & Bolts

Antimicrobial Stewardship: Measuring Antibiotic Utilization

Antimicrobial Stewardship: Daily Activities

Antimicrobial Stewardship: Computerized & Clinical Decision Support Services

Microbiology: Cumulative Antibigram & Rapid Diagnostics

Antimicrobial Stewardship Projects: Initiation & Advanced

Antimicrobial Stewardship Barriers & Challenges: Structural & Functional

Antibiotic Use in the Community

Opportunities to Justify Continuing the ASP

Antimicrobial Stewardship: Perspectives to Consider

Summary

- **Preface:**

By now all clinicians should understand why antimicrobial stewardship should be part of the mindset of prescribers. Unfortunately, the “Nuts and Bolts” are frequently unclear or not even discussed in the stewardship literature leaving programs to adopt examples from published studies. These slides may help direct young ASPs to get off the ground.

- **Content:**

20 slides; 1 back-up slide. Because these slides constitute the crux of an ASP and are technical in nature, one hour should be allotted for presentation.

- **Suggestions for Presentation:**

This section naturally follows “Pathways to a Successful Program”. But once your “case has been adopted” the real nuts and bolts need to be discussed with your stakeholders and ASP participants.

- **Comments:**

The repetition between some slides have been included depending upon audience or presentation style. However, the basic messages of sequential phases and steps of the ASP are most important to review. Documentation is emphasized as the means to collect data on interventions and outcomes. The mandate of stewardship in California, as well as potential federal mandates for ASPs, are discussed.

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# **ANTIMICROBIAL STEWARDSHIP PROGRAMS: THE NUTS AND BOLTS**

# Perspective #1:

## Four Phases ... in Sequence

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### Philosophy of ABX Stewardship



### Acceptance by Hospital System



### Implementation



### Sustain Stewardship Program; Continuous Education, Feedback & Quality Improvement

- Goals and objectives of ASP
  - Business model (written & slides); cost of resistance
  - Staff models for internal discussion; “how to do this?”
  - List of challenges with associated solutions
- 
- Identify champions
  - Job responsibilities, functions, anticipated outcomes
  - General and daily activities – a framework to discuss
  - Identify and meet with all stakeholders; specific agendas
- 
- Measure antibiotic use and resistance
  - List of projects, by year; divided into levels of difficulty
  - Roll out to Pharmacy Department staff
  - Specific interventions within classes (low-hanging fruit)
  - Documentation requirements
  - Education of staff (Pharmacy, IPAC, Micro, CMO/Med Staff)
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- Attention to antibiogram and trends
  - List of high (higher) hanging fruit; projects; feedback
  - Continuous documentation of benefits; assign value to improvement of care
  - Strengthen ASP functions in the business model
  - Report on progress to departments; feedback

# An Alternative Perspective:

## Twelve Steps to Implementing an ASP

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|          |                                                                                                                             |           |                                                                                                                            |
|----------|-----------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | Assess motivations for an ASP                                                                                               | <b>7</b>  | Define how progress is to be measured; what constitutes success?                                                           |
| <b>2</b> | Identify physician champion; form core group (physician-pharmacy)                                                           | <b>8</b>  | Establish an implementation plan; identify phases                                                                          |
| <b>3</b> | Gain administration support (includes P&T, Med Exec, Departments); business model and physician compensation plan developed | <b>9</b>  | Identify resources (education of pharmacists, tools, training, medical meetings, networking, society membership, software) |
| <b>4</b> | Identify which of the defined problems/issues will be addressed by the ASP                                                  | <b>10</b> | Establish frequency of monitoring and documentation; daily activities and hierarchy of notifications                       |
| <b>5</b> | Assess barriers to success (level of education, work flow)                                                                  | <b>11</b> | Establish mechanism and schedule for reporting of results (to whom?; with what?)                                           |
| <b>6</b> | Identify Team members, roles, responsibilities, and accountabilities; meeting frequency                                     | <b>12</b> | Market the program (internal and external; insurers/contract groups)                                                       |

# Baseline Data Collection

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- Antimicrobial Consumption – multiple methods
  - Hospital purchase costs
  - Antibiotic costs per patient day
  - Daily defined doses (DDD)/1000 pt days
  - Days of therapy (DOT)
  - Length of therapy (LOT)
  - Days of IV and Oral therapy
- Antibiotic prescribing issues
  - Ask around; focus groups
- Antimicrobial Susceptibility Report (antibiogram)
- Length of stay – total and ICU LOS
- Healthcare-associated infections
- Physician survey
- Performance measures – areas for improvement?
- % Patients on > 3 days targeted antibiotics
- % Patients on  $\geq 3$  antimicrobial agents

**Baseline data collection relies on ASP goals and objectives**

# Sequence of ASP Projects: First Steps, First Year

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## First steps

- Get all Team members together
- Introduce program to all stakeholders
- Meet with ID and pharmacy staffs
- Know strengths of information systems

## Develop First-Year Plans

- Identify “low-hanging fruit” for first-year plans
- Duplication of therapy
- Unnecessary combination therapy
- Vancomycin use system-wide
- Choose one broad-spectrum agent or class to study use
- IV-to-PO sequential therapy
- Disease-specific performances: CAP in the ED and HAP in the ICU
- Lectures and Grand Rounds with ID physician

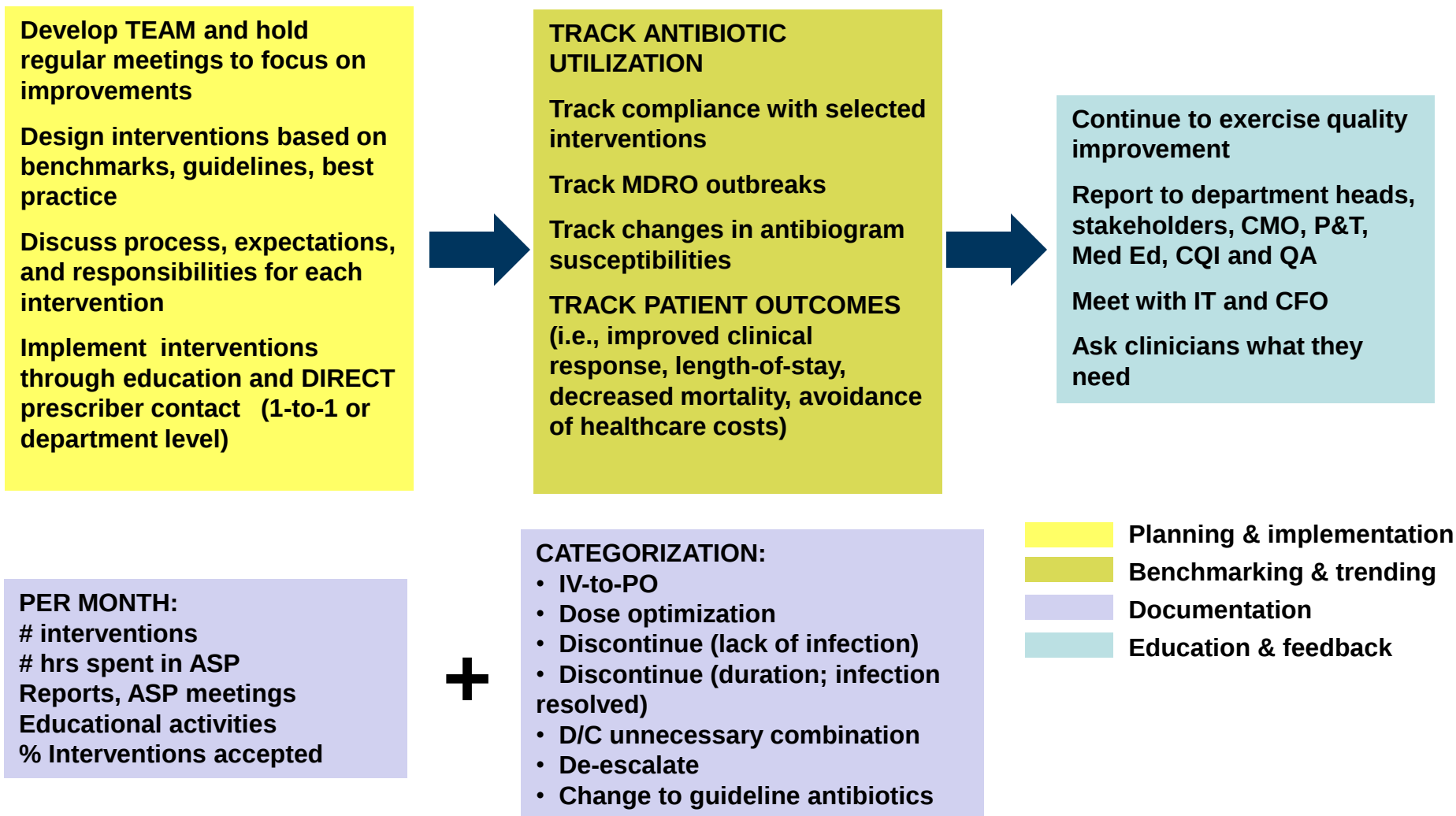
# Sequence of ASP Projects: Second Year

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## Second Year Plans

- System-wide education of clinicians
- Duration of therapy
- Vaccination rates
- Guideline development
- Clinician feedback (“report cards”)
- Drug information questions and monographs
- Bacterial resistance demographics – beyond the antibiogram; redesign antibiogram
- Resistance trending
- Information technology – CPOE
- Automatic stop orders
- Audit appropriateness of dose reduction based on renal function
- Nosocomial multidrug-resistant organism infection investigations (with infection prevention and control)

# Process Measures for Evaluating ASP Success: Progress Should Reflect Goals and Program Intensity



# Measure Something

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- What to measure depends on objectives of the program, data available, and the audience
- Demonstrate effectiveness of the antibiotic stewardship program
  - Improved patient outcomes
  - Improved patient safety
  - Decreased antimicrobial use
- Study your institution's antibiogram – assess the need for a “deeper dive” into patient demographics (refer to Antibiogram Toolkit)
- Internal benchmarking and trending
- External benchmarking
  - Multi-hospital systems
  - Quality improvement measures

**Everything measured has the potential of becoming a report with actionable items**

# Valuable Metrics for the ASP

| Purpose              | Metric                                                              | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Workload statistics  | Daily activities                                                    | <ul style="list-style-type: none"><li>• Hours on patient care rounds</li><li>• Prescriber education</li><li>• Projects, such as antibiogram development</li><li>• Antibiotic utilization review (AUR) committee, nursing, infection prevention, department meetings</li><li>• Pharmacy residents and fellows; mentoring</li><li>• Number and type of interventions</li><li>• Formulary reviews; P&amp;T Committee</li><li>• Meetings with sales representatives, etc</li></ul> |
| Antibiotic use       | Monthly or quarterly                                                | <ul style="list-style-type: none"><li>• Normalize antibiotic use data (e.g., per 1,000 patient bed days)</li><li>• DDD, DOT, LOT</li><li>• Costs</li></ul>                                                                                                                                                                                                                                                                                                                     |
| Specific initiatives | Improve clinical outcomes; prevent resistance; performance measures | <ul style="list-style-type: none"><li>• Surgical antibiotic prophylaxis (% improvement)</li><li>• Avoiding treatment of asymptomatic bacteriuria (pre/post intervention)</li><li>• Other audits</li></ul>                                                                                                                                                                                                                                                                      |

# Documentation is Mandatory to Justify Continued Approval for ASP Operations – Monthly or Quarterly

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- **Basic activities:**

- Hours spent performing ASP functions
- Review of ASP activities
- Educational activities

- **Categorization of interventions:**

- IV-to-PO
- Dose optimization
- Discontinuation (all antibiotics)
- D/C unnecessary combination
- De-escalate antibiotic
- Change to guideline antibiotic(s)
- Cancel laboratories (e.g., therapeutic drug monitoring)

- **Significant achievements, milestones, or communications**

- Reflect on ASP goals and objectives
- Ongoing projects – list them

- **Number of interventions**

- Submitted to clinician
- Acceptance rate (%) of interventions
- Trending specific classes of interventions

- **Antibiotic utilization**

- **Specific activities**

- ASP meeting time
- Antibiogram development
- Development of resources
- Tracking outcomes
- Chart review
- Patient rounds
- P&T committee, Pharmacy department

- **Direct education**

- Department meetings, presentations
- 1-to-1 meetings with prescribers
- Develop tools to facilitate “message”
- Other educational opportunities

# Documenting Outcomes is Where the Value's ("Money's") At! Emerge From the Silos

## ACTIVITIES

- Intervene on allergies
- Dose-adjustment
- Disease-state measurement
- Infection prevention
- Optimize therapy
- Decrease broad-spectrum
- Optimal dose & combinations
- Optimize therapy
- Decrease duration of therapy
- Evaluate discharge ABXs



## OUTCOMES

- Safety
- Toxicity
- Compliance core measures
- Care bundles
- LOS (total, ICU)
- Superinfections
- Cure "resistant" infections
- Infection-related mortality
- HAI incidence (eg, CDI, SSTIs)
- Prevent 30-day readmissions

**Activities translate into clinical outcomes – document both!**

# Track Functionality and Measure Outcomes: Examples of Metrics

- Examine potential links between ASP activities and changes on bacterial susceptibilities, hospital-acquired infection rates (especially *C. difficile* infection), and other infection-related quality indicators
- Institutional data on antibiotic use and infection rates can be compared with benchmark data from local hospitals, CDC, and published literature
- Prescriber surveys may establish baseline “perceptions”, suggest educational activities for development, and can assess impact of ASP using post-education surveys <sup>1</sup>
- Improvements in antibiotic prescribing, such as decreasing use of fluoroquinolones and selected cephalosporins <sup>2</sup>
- Appropriate dosing of certain antibiotics with high potential for toxicity, such as aminoglycosides, voriconazole, polymyxins, and vancomycin
- Interventions regarding antibiotic allergies, such as improving access to appropriate beta-lactams via penicillin skin testing <sup>3</sup>
- Decreasing redundancy of anaerobic antibiotic coverage <sup>4</sup>

**Document ASP activities which demonstrate a favorable impact on clinical outcomes, antimicrobial resistance, and health care costs**

1 Srinivasan A et al. Arch Int Med. 2004;164:1451-6.

2 Ashiru-Oredope D et al. J Antimicrob Chemother. 2012;67 (suppl 1):i51-i63.

3 Unger N et al. Pharmacotherapy. 2013;33(8):856-67.

4 Huttner B et al. J Antimicrob Chemother. 2012;67:1537-9.

# California Legislative Mandates Regarding Antimicrobial Stewardship Programs

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- Acute care hospitals in California are encouraged to implement ASPs
- The emphasis on the judicious use of antimicrobials within California hospitals was established by California Health and Safety Code 1288.8<sup>1</sup>, which states the following:
  - “(a) By January 1, 2008, the department shall take all of the following actions to protect against HAI in general acute care hospitals statewide:
    - (3) Require that general acute care hospitals develop a process for evaluating the judicious use of antibiotics, the results of which shall be monitored jointly by appropriate representatives and committees involved in quality improvement activities.”
- In order to provide acute care hospitals (ACHs) with further guidance, the California Healthcare Associated Infections Advisory Committee proposed a 3-tier definition for what constitutes an ASP
- The purpose of the 3-tier definition is to provide ACHs with an understanding of what is considered a basic program while encouraging implementation of additional strategies to achieve and intermediate or advanced status

# California Legislative Mandates Regarding ASPs:

## Three-Tiered Definition for ASPs and Expectations

### Basic tier hospital:

- ☐ Hospital antimicrobial stewardship policy/procedure
- ☐ Physician-supervised multidisciplinary antimicrobial stewardship committee, subcommittee, or workgroup
- ☐ Program support from a physician or pharmacist who has attended specific training on antimicrobial stewardship (e.g., CE training program offered by the CDC and SHEA or other recognized professional organization, or post-graduate training with concentration in antimicrobial stewardship)
- ☐ Reporting of ASP activities to hospital committees involved in quality improvement activities

### Intermediate tier hospital:

- ☐ Annual antibiogram developed using CLSI guidelines with distribution to/education of the medical staff
- ☐ Institutional guidelines for the management of common infection syndromes (e.g., order sets, clinical pathways, empiric antimicrobial therapy guide, etc.)
- ☐ Monitoring of usage patterns of antibiotics determined to be of importance to the resistance ecology of the facility, using defined daily dosing (DDD) or days of therapy (DOT)
- ☐ Regular education of hospital staff/committees about antimicrobial stewardship

### Advanced tier hospital:

- ☐ Antimicrobial formulary that is reviewed annually with changes made based on local antibiogram
- ☐ Prospective audit with intervention/feedback
- ☐ Formulary restriction with preauthorization

# CMS Surveyor Worksheet: Preparation for Metrics

- 3 new CMS Surveyor worksheets
- Adopted Oct 2011
- No penalties assessed
- Section 1.C. Systems to prevent transmission of MDROs and promote antibiotic stewardship, Surveillance
- Subsection 1.C.2. Can the primary interview participants provide evidence that the hospital has developed and implemented policies and procedures aimed at preventing the development of, and preventing transmission of, MDROs?
  - 1. C.2.a Facility has a multidisciplinary process in place to review antimicrobial utilization, local susceptibility patterns, and antimicrobial agents in the formulary and there is evidence that the process is followed.
  - 1. C.2.b Systems are in place to prompt clinicians to use appropriate antimicrobial agents (e.g., computerized physician order entry, comments in microbiology susceptibility reports, notifications from clinical pharmacist, formulary restrictions, evidenced based guidelines and recommendations).
  - 1. C.2.c Antibiotic orders include an indication for use.
  - 1. C.2.d There is a mechanism in place to prompt clinicians to review antibiotic courses of therapy after 72 hours of treatment.
  - 1. C.2.e The facility has a system in place to identify patients currently receiving intravenous antibiotics who might be eligible to receive oral antibiotic treatment.

DEPARTMENT OF HEALTH & HUMAN SERVICES  
Centers for Medicare & Medicaid Services  
7500 Security Boulevard, Mail Stop C2-21-16  
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Office of Clinical Standards & Quality/Survey & Certification Group

REF: S&C: 12-01-Hospital

DATE: October 14, 2011

TO: State Survey Agency Directors

FROM: Director  
Survey & Certification Group

SUBJECT: Survey & Certification Focus on Patient Safety and Quality - Draft Surveyor Worksheets

# Development of National Quality Measures for Antibiotic Use in the USA

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- Process
  - CDC solicited input on potential measures from a variety of key stakeholders
  - CDC developed a few candidate measures
  - These measures are currently being piloted as part of a new Center for Medicare and Medicaid Services inpatient infection control worksheet
- Issues
  - How will the measures be assessed? Chart review? Are reviewers able to assess complex ID cases?
  - The Joint Commission (TJC) uses the Tracer Method, but would this work for antibiotic stewardship metrics?
  - What would be an acceptable level of compliance with the measures?
  - How do these measures apply to patients in pediatric hospitals and adults in long-term acute care hospitals and skilled nursing facilities?

# Monitoring Your Antibiotic Stewardship Program: Five Basic Rules

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- Do not panic – it will take time to see results, but know how you plan to justify your program ahead of time
- Communicate your program – take advantage of department meetings with nurses and physicians; develop a business card to provide clinicians
- Choose metrics to report – there are many
  - Antibiotics by cost, utilization (DDD, DOT), or indication; trend over time
  - Antibiotics by duration or culture and sensitivity results (prospective review)
  - Program objectives and initiatives
  - Patient demographics, such as hospital unit or admitting service
  - CMS performance measures; IDSA guidelines
  - Adverse drug events
- Track interventions and activities, including acceptance of ASP recommendations
- Be creative
  - Are you already doing things that could count as stewardship?
  - Learn about data streams within your institution
  - Find your champions – talk to everyone who will listen
  - Celebrate and advertise your successes
  - Be flexible – not everything will work and things will change, but that is job security

# Take Home Message

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- Start small and look for the “low-hanging fruit” <sup>1</sup>
  - IV-to-PO conversions, batching intravenous antimicrobials, therapeutic substitutions, and formulary restriction (with prior authorization based on criteria and education with feedback) or other prospective audit review and interventions
- Goals must be measurable and achievable
- Develop protocols, policies, and other services, but be sure they can be approved and implemented
- Educate face-to-face as preferred method; enhance clinical interfaces
- Develop an intervention program based on a model of actionable feedback<sup>2</sup>
  - Real-time feedback with easily accessible and concise reports or well-attended group presentations
  - Individualized or focus group feedback; concept of shared responsibility amongst prescribers
  - Create a nonpunitive atmosphere in which prescribing practices would not be used to assess job performance, or at least maintain confidentiality
  - Customize feedback based on differences in antibiotic decision-making patterns and limited clinical data; formulate more solid treatment pathways using interdisciplinary committee review
- Document ASPs interventions to prove its success
- Expand program whenever possible

1 Goff D et al. Clin Infect Dis. 2012;55(4):587-92.

2 Patel S et al. Interdisc Perspect Infect Dis. Volume 2012, Article ID 150367, 6 pages

# Tips Review

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- Recruit an ID physician, or physician with interest and passion for antimicrobial stewardship (if no ID physician available)
- Get buy-in from providers before starting the program
- Start small
  - Concentrate on use of 1 drug/drug class or syndrome instead of comprehensive antimicrobial stewardship; start targeted rather than broad-based
  - Don't start with your workhorse antibiotic
- Develop tools for daily ASP activities
  - Guidelines, therapeutic recommendations, and clinical pathways
  - Standard order forms
  - Some activities may need P&T approval, e.g., IV-to-PO automatic switch
- Develop communication tools to communicate messages to prescribers
- Consider antimicrobial stewardship training/certification for clinical pharmacists (many ID certification programs available, e.g., MAD-ID and SIDP)
- Use available free online resources on stewardship but study primary literature
- Partner with IT for clinical decision support tools in order sets
  - Dosing calculators
  - Pop-up screens/ drop-down menus

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**ADDITIONAL SLIDES**

# It Has to be a Well-Orchestrated Effort

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- Ask yourself: “why do I want to develop, improve, and/or participate in antibiotic stewardship?”
- Develop your goals and objectives for the ASP based on institution-specific area for improvement; function as a quality assurance and patient safety initiative; identify expected outcomes of the ASP
- Support and collaboration of hospital administration, medical staff leadership, and local providers; get your “buy-in”
- Recruit physician leader, usually infectious disease
- Develop a business model based on institution-specific data, but this may require prior audits and interviews
- Determine appropriate initial stewardship strategies for the institution
- Collaborate and obtain adequate authority to perform activities
- Coordinate activities between key stakeholders (e.g. Infectious Diseases, Pharmacy, Infection Control and Microbiology)
- Recruit more leaders and find your champions
- Begin collecting antimicrobial consumption and antibiogram data
- Develop and execute a daily plan