Adventures in Antimicrobial and Patient Protection

(Stewardship)

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Disclosures

• I have no financial relationships with commercial interests to disclose

• This presentation does not include discussions of off-label usage of medications or Investigational therapies
Objectives

• Antimicrobial stewardship: definition, aims

• Opportunities to optimize antimicrobial use

• Diagnostic strategies to decrease testing and improve prescribing (Diagnostic Stewardship)

• Decreasing variation in prescribing

• Care integration with a handshake
Aims of Antimicrobial Stewardship

• Optimize the **Drug**
  – Broad spectrum agents used for susceptible organisms or community-acquired diseases

• Optimize the **Dose** (and route)
  – Doses not adjusted for renal dysfunction, IV used when PO alternative, organisms with higher MICs underdosed, site of infection not considered

• Optimize the **Duration**
  – Durations are arbitrary

• **De-escalate/Discontinue**
  
  Minimize adverse events
  (C. difficile, MDROs, ADEs, gut dysbiosis)

  Improve patient outcomes

A Coherent Set of Actions Which Promote Using Antimicrobials Responsibly

*Fig. 2. Examples of actors and actions within antimicrobial stewardship. AMS, Antimicrobial stewardship.*

Opportunities To Optimize Antibiotic Use Are Everywhere

- Settings and populations have different needs
- NO “One-size-fits-all” approach. Get creative!
# Opportunities and Integration

## Using Reduction in Variation of Care to Impact Mortality

**October 25, 2019 • Baton Rouge Marriott • Baton Rouge, LA**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM</td>
<td>Breakfast/Registration</td>
<td></td>
</tr>
<tr>
<td>8:00 AM</td>
<td>RAMI Driver Diagram and High-Level View of Variation Reduction</td>
<td>Richard Guthrie, MD, Christopher White, MD</td>
</tr>
<tr>
<td>8:45 AM</td>
<td>Structure, Tools and Support Needed for Execution</td>
<td>Richard Guthrie, MD</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>Sepsis</td>
<td>Sandra Kemmerly, MD</td>
</tr>
<tr>
<td>9:50 AM</td>
<td>Antibiotic Stewardship</td>
<td>Jonathan Hand, MD</td>
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<tr>
<td>10:00 AM</td>
<td>Break</td>
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<tr>
<td>10:30 AM</td>
<td>Resuscitation</td>
<td>Mike Truxillo, MD</td>
</tr>
<tr>
<td>11:15 AM</td>
<td>Transferring Patients to a Higher Level of Care</td>
<td>Jeffrey Kuo, MD</td>
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<tr>
<td>12:00 PM</td>
<td>Lunch/Networking</td>
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<tr>
<td>1:00 PM</td>
<td>Evidenced Based Treatment including Appropriate Use Criteria</td>
<td>Christopher White, MD</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>Palliative Care</td>
<td>Susan Nelson, MD</td>
</tr>
<tr>
<td>2:15 PM</td>
<td>Artificial Intelligence</td>
<td>Richard Milani, MD</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>BREAK</td>
<td></td>
</tr>
<tr>
<td>3:30 PM</td>
<td>Cardiac Positron Emission Tomography</td>
<td>Robert Bobo, MD</td>
</tr>
<tr>
<td>4:15 PM</td>
<td>Standardization of Patient Care in the Post-Acute Setting</td>
<td>Ari Cohen, MD</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>ADJOURN</td>
<td></td>
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- $400 Non-Ochsner Physicians
- $250 Ochsner network learners
- 20% Discount for four or more attendees—Please email Mimi Carruth for more information

For more information visit [www.ochsner.org/cme](http://www.ochsner.org/cme) or email Mimi Carruth at mimi.carruth@ochsner.org

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**Designation** The Ochsner Clinic Foundation designates this live activity for a maximum of 7 ACP Category 1 Credits. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
Regulatory Requirements

TJC: 2017 acute care, critical access hospitals and NH's

CMS: Rule first proposed in 2016

Joint Commission unveils antibiotic stewardship programs for outpatient settings

June 20, 2019 05:01 PM

MARIA CASTELLUCCI
The Stewardship Team

- Tell them what you are doing
- Look for project partners
- Ask for resources

P&T, IPAC, Quality Council

Pharmacists
- ID
- Ward or Service Based

Physicians
- ID
- Generalists or other subspecialty

Leadership
Microbiology
Infection Prevention
EMR Informatics
Data Analyst
Nursing
Surgical Providers
Special Populations
Predicted effectiveness based on staffing levels
What if I am understaffed?

• Limited infectious diseases expertise
  – Pharmacist-led study over 5 years demonstrated an 18.1% (p<0.001) reduction in overall antibiotic consumption integrating non-specialized pharmacists into ASP\(^1\)
  – Pharmacy generalists trained in AS care bundle had higher bundle compliance compared to controls (68.5% vs 45.7%, p < 0.001).\(^2\)
  – Focus on basic interventions

• Rural settings\(^3\)
  – Access to a remotely located ASP using telemedicine
  – Successful interventions leveraged across multiple facilities

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Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America


Clinical Infectious Diseases

CLINICAL PRACTICE: Ellie J. C. Goldstein, Section Editor

Eight Habits of Highly Effective Antimicrobial Stewardship Programs to Meet the Joint Commission Standards for Hospitals

Debra A. Goff,1 Ravina Kullar,2 Karri A. Bauer,2 and Thomas M. File Jr3

1The Ohio State University Wexner Medical Center, The Ohio State University College of Pharmacy, Columbus, Ohio. 2VR/IL, Merck & Co., Inc., Kenilworth, New Jersey; and 3Division of Infectious Diseases, Northeast Ohio Medical University, and Summa Health, Akron, Ohio

Diagnostic Stewardship: Changing the Culture of Culturing

- Modify:
  - Ordering
  - Performing
  - Reporting

Optimize Patient Outcomes?
- Adverse drug effect
- Length of stay
- CAUTI, CDIff, HABSI/CLABSI, VAP

Integrating Diagnostic + Antimicrobial Stewardship

Diagnostic Stewardship—Leveraging the Laboratory to Improve Antimicrobial Use

**Preanalytic**
- Test Selection
- Test Ordering

**Preanalytic**
- Specimen collection + transportation

**Analytic**
- Specimen processing

**Postanalytic**
- Reporting
- Evaluate use

Test related decision making:
- “lower urinary tract symptoms?”
- “diarrhea?”

Stool collected 72 hours into admission though POA?
Cultures pre-antibiotics “lost”

Lab protocols
- Discard formed stool
- Reflex algorithms (no pyuria, no Ucx)

Antimicrobial susceptibility reporting
- Sputum culture with “No S. aureus or PsA”

Adapted from Morgan, D et al. *JAMA* 2017 Aug 15;318(7):607-608
Changing Urine Culture Orderable in Order Sets Can Decrease Urine Cultures

UA and Urine Culture Panel

Urinalysis, Reflex to Urine Culture (UAR): This Urinalysis test will reflex to a Urine Culture only when the results of the Urine WBC is > 10. If the Urine WBC is < 10 then the Urine Culture will not be ordered. The goal is to decrease the over diagnosis and overtreatment of bacteriuria. The highest probability of a clinically significant infection occurs with a urinary WBC > 10.

A Urinalysis, Reflex to Urine Culture order should NOT be ordered in conjunction with a Urinalysis order or a Urine Culture order.

Urinalysis should NOT be ordered for the following:
- Do not order based on urine characteristics such as smell, color, sediment
- Do not order routinely in the absence of an appropriate indication
- Do not repeat to document clearance
- Do not order for specific groups of patients in the absence of symptoms such as those with chronic Foley’s or Chronic Intermittent Catheterization

Urinalysis (Urinalysis, Reflex to Urine Culture order) should only be ordered in the following patients:
- Patients with signs/symptoms of a urinary tract infection such as dysuria (Recent Foley’s may cause dysuria without infection), suprapubic pain, costovertebral angle pain
- Part of an evaluation of fever or sepsis without another clear source
- Work up of patients with altered mental status only if no other source identified on history, exam, or other lab testing
- For bacteriuria screening in asymptomatic patients with the following conditions (order Urine High Risk Culture for these patients):
  1) Children <25 months of age
  2) Prior to urologic procedures
  3) Pregnant women
  4) Neutropenic patients
  5) Kidney transplant < 2 months

- Urinalysis, Reflex to Urine Culture (if criteria met)
- Urinalysis
- Urine Culture High Risk
- Urinalysis and Urine Culture High Risk

No Orders
Changing Orderables: Urine Cultures

- 50% reduction in catheter-associated urinary tract infections (CAUTI)
- 33% reduction in ED
- 14% system

50% reduction in catheter-associated urinary tract infections (CAUTI)
Clostridium (Clostridioides) difficile

- Antibiotic optimization and infection control practices are key strategies to combat C. difficile

- HOWEVER, literature suggests we are:
  - **over-testing** (low pre-test probability, laxative use)
  - therefore **over-diagnosing** (high sensitivity of 2-step and PCR testing)
  - leading to **over-treatment** (metronidazole/PO vanco/fidaxomicin are not benign)
  - and **unnecessary contact isolation** (associated with worse outcomes)

Laboratory Diagnosis of *Clostridium difficile* Infections: There Is Light at the End of the Colon

Stephen M. Brecher,1,2 Susan M. Novak-Weekley,3 and Elisabeth Nagy4

1Pathology and Laboratory Medicine, VA Boston Healthcare System, West Roxbury, and Department of Pathology, Boston University School of Medicine, Massachusetts; 2Southern California Permanente Medical Group, Kaiser Permanente, North Hollywood, and 3Institute of Clinical Microbiology, University of Szeged, Hungary

Lab must be/feel supported to discard specimens

≥3 watery stools in 24 hours
NO testing if laxative in prior 48 hours

Table 2. The Brecher Guidelines

<table>
<thead>
<tr>
<th>Observation</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look at the stool specimen</td>
<td>If it ain’t loose, it’s of no use</td>
</tr>
<tr>
<td>Put a thin lab grade stick in the specimen</td>
<td>If the stick stands, the test is banned</td>
</tr>
<tr>
<td>If the stick falls, test them all3</td>
<td></td>
</tr>
</tbody>
</table>

Minimal (no) increase in diagnostic yield if repeated within 7 days

> 50% of patients will remain asymptomatically colonized

Work with institution to create policy/letter for care facilities

Leveraging the EMR to Reduce HO-CDI

Order Validation

You cannot sign these orders because information is missing or requires your attention:

The following duplicate tests have been collected within the last 7 days. If you are placing other orders, go back and remove these in order to continue. If you still wish to order these tests, call Lab Client Services at 504-842-4823 to obtain today's code. If not needed, click cancel below and remove this order.

CLOSTRIDIUM DIFFICILE - Resulted at 4:02 AM on 10/26/2017
Component Value Reference Range
C. diff Antigen Positive (A) Negative
C. difficile Toxins A+B, EIA Positive (A) Negative

Current C. difficile testing algorithm is highly sensitive. Repeat testing is unnecessary and may lead to erroneous clinical interpretation. Test of cure is not recommended and should not be performed.

Patient Received Laxative in Last 48 Hours

A laxative has been administered to this patient within the last 48 hours. This may cause diarrhea in a hospitalized patient. Would you still like to continue your order for Clostridium difficile?

Laxative Administered (last 48 hours)

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Action</th>
<th>Medication</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/26/17 1200</td>
<td>Given</td>
<td>senna tablet</td>
<td>8.6 mg</td>
</tr>
</tbody>
</table>

Remove the following orders?

Remove Keep C Diff Toxin by PCR Once First occurrence Today at 1445

Accept Dismiss
Diagnostic Stewardship: C. difficile Testing

- C. difficile testing prevented through lab optimization and decision support

2,090 tests prevented
Implementation of testing initiatives
Ochsner Health System Outpatient Intervention

- Goal: Reduce inappropriate antibiotic prescriptions for upper respiratory infections

1. Provider education
2. Patient education *(expectation)*
3. Normative comparison
   - *unblinded* provider reports through email
Appropriate Antibiotic Use for Acute Respiratory Tract Infection in Adults: Advice for High-Value Care From the American College of Physicians and the Centers for Disease Control and Prevention

Aaron M. Harris, MD, MPH; Lauri A. Hicks, DO; and Amir Gaseem, MD, PhD, MHA, for the High Value Care Task Force of the American College of Physicians and for the Centers for Disease Control and Prevention*

Background: Acute respiratory tract infection (ARTI) is the most common reason for antibiotic prescription in adults. Antibiotics are often inappropriately prescribed for patients with ARTI. This article presents best practices for antibiotic use in healthy adults (those without chronic lung disease or immunocompromising conditions) presenting with ARTI.

Methods: A narrative literature review of evidence about appropriate antibiotic use for ARTI in adults was conducted. The most recent clinical guidelines from professional societies were complemented by meta-analyses, systematic reviews, and randomized clinical trials. To identify evidence-based articles, the Cochrane Library, PubMed, MEDLINE, and EMBASE were searched through September 2015 using the following Medical Subject Headings terms: “acute bronchitis,” “respiratory tract infection,” “pharyngitis,” “rhinosinusitis,” and “the common cold.”

High-Value Care Advice 1: Clinicians should not perform testing or initiate antibiotic therapy in patients with bronchitis unless pneumonia is suspected.

High-Value Care Advice 2: Clinicians should test patients with symptoms suggestive of group A streptococcal pharyngitis (for example, persistent fever, anterior cervical adenitis, and tonsillopharyngeal exudates or other appropriate combination of symptoms) by rapid antigen detection test and/or culture for group A Streptococcus. Clinicians should treat patients with antibiotics only if they have confirmed streptococcal pharyngitis.

High-Value Care Advice 3: Clinicians should reserve antibiotic treatment for acute rhinosinusitis for patients with persistent symptoms for more than 10 days, onset of severe symptoms or signs of high fever (>39 °C) and purulent nasal discharge or facial pain lasting for at least 3 consecutive days, or onset of worsening symptoms following a typical viral illness that lasted 5 days that was initially improving (double sickness).

High-Value Care Advice 4: Clinicians should not prescribe antibiotics for patients with the common cold.

For author affiliations, see end of text.
This article was published at www.annals.org on 19 January 2016.

Pocket guide

Antibiotic Stewardship Program

CDC video

“5 communication strategies”
Patient Education/Expectation

Poster

Viruses or Bacteria
What's got you sick?

Antibiotics only treat bacterial infections. Viral illnesses cannot be treated with antibiotics. When an antibiotic is not prescribed, ask your healthcare professional for tips on how to relieve symptoms and feel better.

<table>
<thead>
<tr>
<th>Illness</th>
<th>Usual Cause</th>
<th>Viruses</th>
<th>Bacteria</th>
<th>Antibiotic Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold/Rhiny Nose</td>
<td>Yes</td>
<td>✔️</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Bronchitis/Chest Cold</td>
<td>Yes</td>
<td>✔️</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Wheezing/Cough</td>
<td>Yes</td>
<td>✔️</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Flu</td>
<td>Yes</td>
<td>✔️</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Sore Throat</td>
<td>Yes</td>
<td>✔️</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Sinus Infection</td>
<td>Yes</td>
<td>✔️</td>
<td>NO</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Antibiotics Aren’t Always the Answer

www.cdc.gov/getsmart

Rx Pad

Brochure

Antibiotics Aren’t Always the Answer

www.cdc.gov/getsmart
Normative Comparison

- Published percentile ranking of each physician in local practice
- Emailed to each physician every 2 weeks
- Email contains all physicians data unblinded for full transparency and comparison

*URI diagnosis code (ICD10) + antibiotic = inappropriate
  - Both pulled from EPIC, automatic email generated
Rate of Inappropriate Antibiotic Prescribing: Baseline vs 1-year Follow Up

Baseline inappropriate rate

Intervention: Patient education, provider education, unblinded provider reports

A. Antibiotics for URI

B. Antibiotic rate per visit (all conditions)

C. % visits with URI diagnosis

D. % visits URI 1st diagnosis
Clinical and Financial Impact

- In the second year of the intervention, across all primary care practices, we avoided prescribing an estimated $16,589$ unnecessary antibiotics.

- The estimated savings include approximately $751,664$ in antibiotic costs (average wholesale price)

- Avoided estimated $3,318$ ADE costing $5,447,796$
Remember: Culture Trumps Strategy

The Differences in Antibiotic Decision-making Between Acute Surgical and Acute Medical Teams: An Ethnographic Study of Culture and Team Dynamics

E. Charani,^1^ R. Ahmad,^1^ T. M. Rawson,^1^ E. Castro-Sánchez,^1^ C. Tarrant,^2^ and A. H. Holmes^1^

Qualitative research on prescribing is limited and more needed to understand cultures, psychology, behaviors related to antibiotic use

Figure Adapted from Fishman, N "Antimicrobial Stewardship" Am J Inf Control. 2006 34(5)S1: S55-63, courtesy Julie Szymczak
Using Behavioral Economics to Design Physician Incentives That Deliver High-Value Care

**Table: Principles and Examples**

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
<th>Examples in Health and Health Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limitations of information provision</td>
<td>Providing information is necessary and reflects social norms, but is rarely sufficient alone to induce behavior change.</td>
<td>Smoking: Smokers know that smoking causes cancer, but many, despite that information, continue to smoke. Menu labeling: In New York City, there was no significant change in mean number of calories purchased before and after menu labeling of calories.</td>
</tr>
<tr>
<td>Inertia, or status quo bias</td>
<td>People tend to favor the status quo and current practices rather than initiating change.</td>
<td>Generic prescribing: When generic drugs are the default in computerized physician order entry, prescription of generics increases significantly. Organ donation: When people must actively sign up to donate organs or not, such as in the Netherlands, 27.5% of population agrees to donate. In neighboring countries, where donation is universal, 90% of people agree to donate.</td>
</tr>
</tbody>
</table>

**INNOVATIONS IN HEALTH CARE DELIVERY**

Physician Peer Comparisons as a Nonfinancial Strategy to Improve the Value of Care

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limits of willpower</td>
<td>Willpower is a limited resource. The more people need to exercise willpower in one activity, the less likely they are to have willpower in other activities.</td>
<td>Physician effort: Having to constantly remember to prescribe a generic is less likely to be effective than setting this up as a default within an electronic health record.</td>
</tr>
<tr>
<td>Mental accounting and salience</td>
<td>The incentive is stronger if given distinctly and explicitly rather than folded into regular compensation for an activity, such as a paycheck.</td>
<td>Distributing physician financial bonuses: $1000 in a separate check is more noticeable than $1000 electronically deposited as part of a paycheck.</td>
</tr>
</tbody>
</table>
Stewardship Team?
Start with a Handshake

"Handshake Stewardship”
• Stewards participate in clinical rounds
  – Lack of restriction and pre-authorization
  – Review of ALL prescribed antimicrobials
  – In-person feedback by pharmacist-physician team

• Associated with significant reductions in antimicrobial use and increased ID consults

• Resource intensive

Messacar K Clin Infect Dis 2017 May 15;64(10):1449-1452
Handshake for Stewardship in SOT

Help with:
- social interaction
- understanding culture
- attitudes/perceptions of providers
- Can also:
  - Intervene
  - Educate

Clinical Team Integration

Shared Outcomes
Summary

• Antimicrobial optimization relies on large team with leadership support

• Opportunities vary between patient populations and locations

• Diagnostic stewardship can decrease HAI rates and avoid overuse

• Peer comparison may decrease prescribing variation

• Work to understand culture and clinically integrate with a handshake
Questions?
Jonathan.Hand@ochsner.org
@jonathanhandMD or @OchsnerID