Antimicrobial Stewardship
Washington State Initiative

December 16th, 2014

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Blythe Steele, RPh, PharmD, BCPS, Confluence Health Clinical Coordinator
Objectives:

• Review the “Three Tiers” of a strong ASP program
• Review the data definition and process used to collect data across the state.
• Hear from two organizations: “Clinical Pharmacists in Action in ASP” in their facilities
  • UW/Harborview Medical Center
  • Confluence Health Central Washington Hospital

Presented at the Washington State Hospital Association Statewide ASP Initiative Webcast on December 16, 2014
Statewide Antimicrobial Stewardship (ASP) Initiative – Three Tiers

All Washington hospitals and health systems will have an Antimicrobial Stewardship Program

**Basic (Foundation)**
- ASP Policy and Procedure in place and annual ASP training
- Local antibiogram available for use
- Physician supervised multi-disciplinary committee and dedicated ASP FTE
- Report and improve results on days of therapy of select antibiotics per 1000 patient days
- Real-time antibiotic review and feedback process

**Intermediate (Intervention)**
- Expanded annual education
- Antibiogram generates an action plan to drive results
- Guidelines for managing common infections and syndromes
- Monitor antibiotic usage, resistance and individual prescriber patterns
- Increased frequency of prospective audits and feedback loops

**Advanced (System-Wide)**
- Antimicrobial formulary reviewed annually, with changes based on local antibiogram
- Physicians review antibiotics after 48-72 hours of therapy
- Engage in collaborative projects with Infection Control or other services
- Continued expansion of real-time review and feedback processes
- Share best practices with others
Measure Definition

Data Definition – Antimicrobial Utilization

**Numerator**: Total days of therapy (DOT) of select antibiotics*

A Day of Therapy (DOT) will be defined as at least one dose of a selected antibiotic given on a calendar day to a patient in an inpatient unit (Med/Surg, ICU/Tele, OB). A patient on multiple antibiotics on the selected list would be counted for each separate antibiotic given each calendar day.

**Denominator**: Patient days
Measure Definition

Antibiotic Focuses

- Fluoroquinolones
- Clindamycin
- Penicillins (broad spectrum)
- Cephalosporins (3rd and 4th generation, broad spectrum)
- Carbapenems
Updates to definition:

Penicillins
- Piperacillin/Tazobactam (Zosyn)
- Ticarcillin/Clavulanate (Timentin)
- Ampicillin/Sulbactam (Unasyn)
- Amoxicillin/Clavulanate (Augmentin)

Cephalosporins:
- Ceftriaxone (Rocephin)
- Cefotaxime (Claforan)
- Ceftazidime (Fortaz)
- Cefepime (Maxipime)
- Ceftaroline (Teflaro)

Updated Measure Definition Sheet
http://www.wsha.org/0712.cfm
Data Submission

- Input data into the WSHA Quality Benchmarking System (QBS) at the following link or NHSN.
- Current users may log in with their QBS credentials.
- If you need access to QBS, contact Decision Support at decisionsupport@wsha.org

Goal: Identify areas of opportunity to optimize antimicrobial utilization and decrease antimicrobial resistance patterns, development of secondary infections and adverse medication effects.
The Pharmacist’s Role in an Antimicrobial Stewardship Program
Rupali Jain, PharmD, BCPS
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Rupali Jain, PharmD, BCPS is the Antimicrobial Stewardship Clinical Pharmacist for the UWMC.

She has extensive clinical experience with Infectious Diseases since completion of her Infectious Diseases fellowship in 2004. In her current role, she is responsible for the daily activities with the antimicrobial stewardship program, including tracking resistance, patient management, and clinical guideline development.
Outline

1. Review the role and activities of an Antimicrobial Stewardship Program (ASP) pharmacist, in general

2. Discuss the role of the clinical pharmacist in the ASP at University of Washington Medical Center
ASP needs you!

- “Core members of a multidisciplinary antimicrobial stewardship team include an infectious diseases physician and a clinical pharmacist with infectious diseases training (A-II) who should be compensated for their time (A-III)...”

Clin Infect Dis 2007:44
Strategies for ASP

- All strategies require pharmacy input!
- Don’t FRET! Every medical center will have different strategies based on their size, patient population, resources, staff, etc

Clin Infect Dis 2007:44

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How the prescription flows...

Patient Evaluation ➔ Choice of antimicrobial ➔ Prescription Ordering ➔ Dispensing Antimicrobial

Guidelines / Education

Restriction / Pre-authorization

Computer-Assisted Strategies

Review and Feedback

Adapted from Clin Micro Rev. 2005;18(4) 638.
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How do we apply these strategies to our setting?
University of Washington Medical Center

- Academic medical center in Seattle serving Washington, Wyoming, Alaska, Montana and Idaho
- Part of the UW Medicine Health System
- Beds: 410
  - Critical care beds: 50
- Admissions: 19,260 (2010)
- ED visits: 25,602 (2010)
- Solid Organ Transplants: 310 (2009)
- Bone Marrow Transplants: > 500 (2011)
Our team

Director: Paul Pottinger, MD
Clinical Pharmacist: Rupali Jain, PharmD

Stakeholders:
• Decentralized clinical pharmacists
• Microbiologist
• Infection Control
• Infectious Disease Consult Team (3 teams)

Committees:
• Infectious Diseases P&T
• Infection Control

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Vital Stats

- Over 3500 prescriptions filled per day in our inpatient pharmacy
- 12,000 blood cultures sent each year
- 26 Decentralized Clinical pharmacists
- Three Infectious Diseases consult service
Components of our ASP:

1. Education
   - Dosing cards
2. Guideline development
   - CPOE
   - VAP, sepsis protocol
3. Prospective feedback
   - Carbapenems
   - Linezolid/ Daptomycin
4. Review antimicrobials for formulary consideration
5. Innovative practices

Antibiotics are NOT restricted!!!
Use Theradoc® to identify High Cost/Toxicity/Broad Spectrum drugs

ASP Pharmacist reviews microbiology, clinical status, etc

Contact Clinical Pharmacist/ Infectious Diseases

RECOMENDATIONS

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Triggers for Prospective Feedback

- Daptomycin, Linezolid, Amikacin, Colistin, HIV medications, Non-formulary antimicrobials, Combination antifungals

- Carbapenems prescribed with a positive blood culture

- Vancomycin used for MSSA infection

- Multi-drug resistant bacteria

- Adverse events
Supplemental strategy: Microbiology rounds

- Monday, Wednesday, Fridays

- Review **all positive blood cultures** and some cultures from other sterile sites (CSF, pleural fluid, etc)

- ID teams and ASP are present
  - Responsibility of the medical teams: Present the clinical history
  - Stewardship discusses de-escalation and optimization strategies

- ASP Goal: Ensure appropriate therapy, testing and appropriate consultation of Infectious Disease Service.
Selected Innovative Practices
Prolonged Pip-tazo

• Automatic switch to prolonged piperacillin-tazobactam.

• Prolonged infusion of piperacillin-tazobactam has been associated with improved clinical outcomes compared to intermittent infusion.

• Increased resistance at UW Medicine and nationwide --- we are losing the battle!

• Financial benefits because less drug is used.

• Harborview: Costs reduced by 43% and number of doses decreased by 16%

• UWMC: Costs reduced by 35% and number of doses decreased by 48%

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IV to PO program

- P&T approved list of “IV to PO” drugs
- Switch can occur without MD order
- Clinical Pharmacists actively engage providers to switch
- Impact unclear

- Ciprofloxacin
- Digoxin
- Fluconazole
- Levofloxacin
- Linezolid
- Metronidazole
- Moxifloxacin
- Pantoprazole
- Ranitidine
- Rifampin
- Voriconazole
10% of our patients have a documented penicillin allergy
- As we know, this is over reported!
- True incidence of penicillin allergy is probably around 1%

Patients with penicillin allergies are more likely to:
- have longer hospitalizations
- receive fluoroquinolones, clindamycin or vancomycin during their hospitalizations
- have more cases of *C. difficile*, more MRSA and VRE infections

Contreras J Allergy Clin Immunol Mar 2014
Solution

✓ Allergists are automatically notified (via Theradoc) of any prescription for aztreonam

✓ They do a bedside assessment of the penicillin allergy

✓ Recommend alternative antibiotic

✓ Remove penicillin allergy from chart

✓ Hoping to expand to additional antimicrobials
C. difficile initiative

✓ Multi-disciplinary committee to reduce the hospital-acquired (HAI) C. difficile
  ✓ Infection control, environmental services, nursing, stewardship and medical director

✓ Monthly Quality Improvement meeting to discuss HAI Cdiff cases
  ✓ ASP reviews the antibiotic therapy preceding the development of HAI Cdifficile
  ✓ Follow-up with providers when inappropriate antibiotic therapy contributes to Cdifficile

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Others initiatives

1. Multidrug resistant infection pathway

2. CPOE alerts

3. Allergy assessment pre-op
### University Hospital Consortium antibiotic use data (2011)

Administrative claim data reported to UHC from 115 academic medical center hospitals and 250 affiliated hospitals

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Challenges

✓ Cost savings substantial with ASP, but consumption still higher than optimal
  ✓ Overuse of carbapenems for empiric therapy in oncology patients
  ✓ Increased expenditures for inhaled ribavirin
  ✓ Increased expenditures for antifungal therapy

✓ Working together with providers to consider stewardship when developing guidelines
Summary of program

• Academic medical center program with highly immunocompromised patients with many care providers

• Focus on education, clinical pathways, innovative programs and formulary review
Thanks!

You are the next class of drug-resistant bacteria. As humans continue to abuse and overuse antibiotics, your ranks will swell. So, go out there and mutate! And remember: that which does not kill us makes us stronger!
The Anatomy of Confluence Health’s Antimicrobial Stewardship Program

Blythe Steele, RPh, PharmD, BCPS
Blythe Steele, RPh, PharmD, BCPS

- BS Pharm, University of Cincinnati 1996
- PharmD, University of Cincinnati 2007
- BCPS Certified in 2010
- SIDP Certification earned in 2012
- Corporate Clinical Manager and Residency Program Director for Confluence Health since November 2012.
- Prior to 2012, worked for TriHealth in Cincinnati, Ohio as Clinical Coordinator.
- Adjunct/field faculty, various universities.

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Objectives

1. Discuss limitations of data collection for Confluence health pharmacists-driven recommendation acceptance rates.
2. Provide examples of metrics to determine the success of an antimicrobial stewardship program.
3. Explain how order sets can be helpful in an antimicrobial stewardship program.
ASP Models....... from Standard to Practical

• Prospective vs. retrospective

• Dedicated multidisciplinary rounding team vs. decentralized pharmacist review

• Metrics
  – Decrease in complications
  – *C. difficile* infection rates
  – Antibiotic expenditures
  – Decrease in days of therapy
Confluence Health ASP Structure

- Works with:
  - Infection Control
  - Microbiology
  - Pharmacists
  - Providers
  - Administration
  - P&T Committee

Antimicrobial Stewardship Committee

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The structure/function of the committee

Members include:
• ID Physician
• SIDP Certified PharmD
• Infection Preventionist
• Microbiologist

Reports to:
• Quality via Infection Control Committee

Main function:
• Gives direction to the Antimicrobial Stewardship Program
Team Pharmacists as Frontline Agents

• Examples of education provided to team pharmacists
  – Asymptomatic bacteriuria
  – Duration of therapy for infectious processes
  – Urosepsis/pyelonephritis
  – Pharmacokinetic dosing

Recommendations regarding antimicrobial therapy are made during interdisciplinary rounds

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Recommendations From Pharmacists

HOW TO DOCUMENT RECOMMENDATIONS??

• Cerner
  • Ad hoc
    – No way to obtain data from this intervention reporting mechanism

• Manual collection? At this time, YES.

• Future – may include CORES M Page documentation?
Pharmacist’s Recommendation Form

Antimicrobial Recommendation to Provider – all elements required

Pharmacist: ___________________________ Date: ___________________________
Patient name: ___________________________ FIN: ___________________________
Provider: ___________________________
Antimicrobial therapy/day of therapy: ___________________________
NOTES: ___________________________

Recommendations:
☐ Discontinue Vancomycin after 72 hours of empiric treatment.
  ☐ No positive MRSA cultures for pneumonia, no positive MRSA surveillance cultures.
  ☐ Culture results covered by another antimicrobial
☐ Discontinue antibiotic used to treat UTI
  ☐ Patient is asymptomatic at onset of treatment
  ☐ Negative urine culture
☐ De-escalation of excessively broad antibiotic therapy to treat cellulitis
  ☐ Negative MRSA surveillance cultures
  ☐ Patient is not diabetic
☐ De-escalation of excessively broad antibiotic therapy for infections other than cellulitis. (If de-escalating pneumonia empiric treatment other than vancomycin, use this line).
☐ Change from IV to PO antimicrobial
  ☐ Clinical condition has improved
  ☐ Taking other oral medications/renal diet
  ☐ PO approximates IV dose availability
☐ Change to antimicrobial that is more effective
  ☐ Drug/dose mismatch
  ☐ Drug/host mismatch
☐ Stop data for antimicrobial recommended.

Outcome:
☐ Recommendation accepted
☐ Recommendation not accepted
Limitations of using recommendation forms for data collection

If it’s not documented, It didn’t happen.

OR

Only the accepted recommendations are documented
Are recommendations making a difference?

• How to measure??

• Antibiotic expenditures? Not at this time
  – Many corporate changes – difficult to compare expenditures
    – GPO
    – 340-B

• DOT/1000 patient days
  – To compare month to month
Antibiotic Use Over Time
DOT/1000 patient days

Presented at the Washington State Hospital Association Statewide ASP Initiative Webcast on December 16, 2014
Carbapenem use over time

Carbapenems

Presented at the Washington State Hospital Association Statewide ASP Initiative Webcast on December 16, 2014
Cephalosporin use over time

Cephalosporins

Presented at the Washington State Hospital Association Statewide ASP Initiative Webcast on December 16, 2014
Extended spectrum penicillin use over time

Penicillins

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Fluoroquinolone use over time

Fluoroquinolones

- Fluoroquinolone
- Linear (Fluoroquinolone)

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Confluence Health ASP Structure

- Increased awareness
- Open to recommendations
- ASP a part of daily rounds
- Dialog has been initiated with outpatient providers

Pharmacists

- Appropriateness of antimicrobial
- Stop dates
- De-escalation
- IV to PO
- Dose optimization

Providers

- Works with:
  - Infection Control
  - Microbiology
  - Pharmacists
  - Providers
  - Administration
  - P&T Committee

Antimicrobial Stewardship Committee

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In addition to daily rounds discussion

• Order set utilization rate – data collection
  Order sets for infectious processes are utilized 29% of the time, not 100% as previously assumed.

• Order set review
  • Antibiotic duration
    – 72 hours for Vancomycin if not proven MRSA
    – Levofloxacin 750mg for pneumonia
  • Antibiotic content of order sets
    – Is something driving duplication of therapy?

• Discussion with providers – inpatient and outpatient

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Interventions to include

• Updating order sets to reflect standards of practice and instituting stop dates
  • Providers to champion order sets

• Shopping order sets to providers

• Antimicrobial Stewardship as part of annual mandatory education
Confluence Health ASP Wish List includes:

• Community education

• Continuing education for providers, pharmacists, nursing

• Faster identification of culture-proven infection resulting in rapid de-escalation of antimicrobial therapy

**ULTIMATELY**

• No C. difficile infections, EVER
• No multi-drug resistant organisms, EVER
• No harm to patients from antimicrobials, EVER
Sustainability of success is dependent on having the Antimicrobial Stewardship conversation OVER AND OVER.
Objectives

1. Discuss limitations of data collection for Confluence health pharmacist-driven recommendation acceptance rates.
   - If it’s not documented, it didn’t happen
   - Only the “wins” are documented

2. Provide examples of metrics to determine the success of an antimicrobial stewardship program.
   - Decrease in C. difficile rates
   - Days of therapy/1000 patient days

3. Explain how order sets can be helpful in an antimicrobial stewardship program.
   - Standards of care for infectious process
   - Stop dates can be automatically instituted
Next Steps

Future Statewide WebEx Meetings
• January 21\textsuperscript{st}: 10:00 – 11:00 a.m.
  • Focus on data collection; hear from organizations
• February 18\textsuperscript{th}: 10:00 – 11:00 a.m.
  • Focus on provider engagement; hear from organizations

In-Person Safe Table – Antimicrobial Stewardship
• March 10\textsuperscript{th}, 2015: 9:30 a.m. to 2:30 p.m.
• Location DoubleTree (SeaTac)
• Focus on data collection
• National expert and local presenter

Questions? Contact Meg Kilcup at megk@wsha.org or Amber Theel at ambert@wsha.org