Antimicrobial Stewardship

Dimitri Drekonja, MD, MS
Staff Physician, Infectious Diseases Section, Minneapolis VA Health Care System
Associate Professor of Medicine, University of Minnesota
Disclosures

• Grant funding from VA Merit Review and VA Cooperative Studies Program
• Work with Minneapolis VA Evidence Synthesis Program
Evidence-based Synthesis Program

About the ESP Program

The VA Evidence-based Synthesis Program (ESP) was established to provide timely and accurate syntheses of targeted healthcare topics of particular importance to clinicians, managers and policymakers, as they work to improve the health and healthcare of Veterans. HSR&D provides funding for four ESP Centers and each Center has an active University affiliation. The Centers include: Durham, Minneapolis, Portland, and West Los Angeles Veterans Affairs Medical Centers. The Center directors are national and international leaders in the field of evidence synthesis with close links to the AHRQ Evidence-based Practice Centers.

The ESP Centers generate evidence syntheses on important clinical practice topics, and these reports help:

- Develop clinical policies informed by evidence,
- The implementation of effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures, and
- Set the direction for future research to address gaps in clinical knowledge.
Outline

• Scope of antimicrobial use
• Inappropriate use
• Key differences between inpatient/outpatient
• Stewardship strategies for both settings
• Low-hanging fruit
• Personal advice
• Conclusions
• Questions
Scope of antimicrobial use

• In a word, lots

• Broad breakdown: Human use ~ 7 million pounds annually (US)

• Animal use: ~25-30 million pounds (topic for another talk...)

• Both numbers can fluctuate based on:
  – Including soaps, lotions, etc in human totals
  – Including drugs not used in humans in animal totals

http://www.fda.gov/Drugs/DrugSafety/InformationbyDrugClass/ucm261160.htm
Regardless of where used; same effect

- Antimicrobial-susceptible bacteria
- Antimicrobial-resistant bacteria
Overview of antimicrobial resistance

- Antimicrobial age began in 1930’s, with sulfonamides, penicillin, and streptomycin
- Resistance emerged soon after
  “The microbes are educated to resist penicillin and a host of penicillin-fast organisms is bred out....In such cases the thoughtless person playing with penicillin is morally responsible for the death of the man who finally succumbs to infection with the penicillin-resistant organism”
  - Alexander Fleming, NY Times, June 26 1945
Scope of inappropriate use

• In hospital: 30-50% of antimicrobial use unnecessary/inappropriate

• Outpatient: same or higher
  – Rhinosinusitis: 80%
  – Pharyngitis: 60%
  – Bronchitis: 70%
  – UTI: 30%
Community Antibiotic Prescribing Rates by State (2013/2014)*

50% of all antibiotics prescribed in U.S. health provider offices are either unnecessary or inappropriate

*Antibiotic prescriptions per 1000 persons
Prescribing data from 2014; population data from 2013
Source: IMS Health
Why higher among outpatients?

• No good data, but hypotheses are:
  – Single opportunity/time to intervene
  – Expectation of pt seeking care (vs. provider rounding on/coming to the pt)
  – Impression of helpfulness/safety
  – Limited other therapies (I would argue reassurance, discussion, and observation is therapy)
Key differences between inpatient/outpatient

• Inpatient
  – Higher acuity
  – Opportunity to revisit/reexamine
  – More diagnostic options
  – Multiple providers
  – Higher “valued” abx

• Outpatient
  – Generally stable
  – Single encounter (follow-up may inc. out-of-pocket costs)
  – Fewer diagnostic options
  – Sole provider
  – Less “valued” abx
Stewardship in the inpatient setting

- Many models, but Joint Commission issued a “Standard” that accredited hospitals are held to (https://www.jointcommission.org/topics/hai_antimicrobial_stewardship.aspx)

- Sorry to invoke the joint commission...
My regulatory slide

• Hard to summarize, but 8 points are:
  – Organizational priority (budget, plans, etc)
  – Staff education (at hire, and periodically)
  – Patient education (displaying CDC materials)
  – Multidisciplinary team (ID MD, IP, PharmD)
  – MD and Pharmacy champion; tracking, reporting
  – Policies/procedures (formularies, pathways, etc)
  – Data collection and analysis (prescribing patterns)
  – Action taken on issues found
OK, what does that mean?

- Most hospitals: ID doc + ID trained pharmacist + IT support + Microbiology input
- Visible portion: calls/notes from stewardship team (prospective audit and feedback)
- In the background:
  - Analyzing antimicrobial use and resistance trends, outliers, underlying drivers of use, meeting with involved parties
  - Examples: sepsis order sets, building stop orders into post-op orders, eliminating pre-op UCs, changing formulary, managing outbreaks
Do these things work?

• Question asked of VA ESP in ‘14, reviewed 37 studies:
  – Prescribing improved
  – Microbial outcomes improved
  – Most underpowered to detect mortality, LOS, etc
  – No harms detected
Stewardship in the outpatient setting

- Evidence base less robust (but actually more studies)
- Audit and feedback (cornerstone of inpatient stewardship) usually not feasible
- Instead:
  - Provider and or patient education
    - Guideline dissemination/discussion
    - Feedback of prescribing patterns
    - Communication skills training
    - Guidance on utilizing CRP testing
  - Restriction policies
  - Computer decision support systems
  - Financial incentives
  - Rapid diagnostics
So, does it work? Depends on what you’re trying to do:

<table>
<thead>
<tr>
<th>Outcome category</th>
<th>Specific outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribing</td>
<td>Rate, selection, duration</td>
</tr>
<tr>
<td>Patient-specific</td>
<td>Return visit, hospitalization, AE’s, late prescribing, satisfaction</td>
</tr>
<tr>
<td>Bacterial resistance</td>
<td>None</td>
</tr>
</tbody>
</table>
Overall theme:

- More data on prescribing: can decrease prescribing rates, effect selection
- Less on patient outcomes
- Little to nothing on safety (in inpatient setting, have signal that no inc. LOS, mortality, ICU transfers)
  - Harder to detect rare outcomes, so lacking in outpatient setting
Low-hanging fruit

• Diseases not warranting abx that can be identified by diagnoses
  – Pharyngitis
  – Bronchitis
  – Early sinusitis

• Amenable to electronic order sets, flags, reminders, etc

• Easy to audit
Slightly higher-hanging...

• Pneumonia, UTI
  – Obviously, if valid diagnoses, need treatment
  – BUT: often not valid diagnoses (30-60% for UTI; 30-40% for pneumonia)
  – Need to try educate, audit and feedback, decision support, rapid diagnostics (PCT testing), other
Personal advice

- Try assess where have problems/resources, tailor approach
  - Lots of broad-spectrum use? → guideline based
  - Good IT support? → CDSS
  - On-site lab? → rapid diagnostic test support
  - Local pneumonia expert? → provider education/“academic detailing”
Personal advice

• Know what is being sought
  – Reduction of antimicrobial use?
  – Decrease of certain drugs?
  – Decreased rates of CDI?
  – Fewer return visits?
  – Document outcome rates; both to justify, and to disseminate
Personal advice

• Know your assets
  – Adopt an approach that has local support (personnel, effort, and funding)
  – Engage stewardship team to address problems you see that need a solution
Conclusions

• Antimicrobial stewardship reduces prescribing; signal of benefit, none of harms
• Multiple approaches tried
  – Most effect prescribing
  – Harder to show effect on patient outcomes
• Inpatient stewardship now a requirement, with suggested core elements
• Outpatient stewardship: not a requirement (yet); no one approach that has strong evidence over others
• Build programs to address local needs and resources
• Collect data, and share what you learn
Questions?

drek0002@umn.edu
@ddrekonja

Suggested references:

