Reducing Antibiotic Use in the Management of Upper Respiratory Infections in the Urgent Care Setting

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Setting
Problem Statement

The lack of treatment guidelines at Carroll Hospital Center My Care Now urgent care centers has resulted in the inconsistent use of antibiotics among providers in the management of upper respiratory infections (URIs).
“In everyone’s lifetime, they will experience symptoms or be diagnosed with an upper respiratory infection”
Melissa J. Holley

- URIs = 25 million outpatient visits/year
- 60% of URIs are treated with antibiotics despite etiology
- Most URIs are caused by viruses
- National guidelines are widely published and available by leaders in disease control and prevention
- National strategy for combating antibiotic resistant bacteria
- Global antibiotic resistance is on the rise

2. Infectious Disease Society of America, 2013
3. CDC, 2014
5. World Health Organization, 2014
Background & Significance

Local Data

- 47% of cases are due to Influenza (1091 cases)
- 14% are due to Acute URI (2009 cases)
- 13% are due to Otitis Media (1400 cases)
- 8% are due to Bronchitis (2050 cases)
- 8% are due to Sinusitis (3281 cases)
- 8% are due to Pharyngitis (3887 cases)
- 6% are due to All others (10,296 cases)

Practice Velocity PVM, 2013
**Search of the Evidence**

**Search terms:** URIs, antibiotics, urgent care, compliance

**Limits:** 2003-2013, English, Humans

**Inclusion Criteria:** RCT, NRCT, SRs, interventions targeting compliance with URI guideline compliance

**Exclusion Criteria:** Study protocols, articles dealing with trainees, isolated to ethnic groups, inpatient settings, comorbid conditions, diagnostics, disease prevention

- **Cochrane Library, Joanna Briggs & PubMed 4221**
- **Titles & Abstracts Screened**
  - 522
- **Full Text Review**
  - 55
- **Keepers**
  - 20
Summary of the Evidence

Frequency of Intervention Type by Level

- Provider Education
- Prescribing Audit and Feedback
- Algorithms
- Patient Education
- Provider/Clinic Champions
- Peer Review Groups
- Financial Incentives
- Collective Protocol Development
- Patient Satisfaction Survey
- Staff Survey (Excluding Physicians)
- Focus Group Interviews

Level I
Level II
Level III
**Synthesis & Recommendations**

- **Level IA**
  - Provider education, Prescription feedback & audit, Decision algorithms, Physician champions ↓ antibiotic use for URI’s. (2,3,5)
  - Individual interventions were ineffective (6)

- **Level II A/B**
  - Provider education + Prescription feedback & audit
  - ↓ use of antibiotics for bronchitis (8) and sinusitis (9)
  - ↓ use of broad spectrum antibiotics for sinusitis (9,12)
  - Algorithms + other interventions:
    - ↓ broad spectrum antibiotic use in children (12, 14) & sinusitis (12)
    - Improved clinical guideline adherence for otitis media and pharyngitis in children (15)

- **Level III B**
  - Multi-faceted interventions improved URI treatment guideline adherence (17,20), & reduced overall antibiotic prescribing for URIs (17,20)
  - Effective leadership is essential to intervention success (18)

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Grading of the evidence done using the Johns Hopkins Evidence Based Practice tools for appraisal strength and quality
Knowledge to Action Framework
Application & Evaluation

Adaptation of Knowledge to Providers

Dissemination of results

Evaluation of Outcomes using chi square analysis

Monitor use through prescriber feedback & audit and meetings

Barriers assessed during consensus meetings

Clinical guidelines reviewed and adapted, marketing of patient materials

Literature Search
To integrate evidence based interventions into the management of URIs in the urgent care setting to improve patient outcomes and reduce the overuse of antibiotics.
AIMS

1. Decrease use of antibiotics in the management of URIs by 10%
2. Attain an 80% utilization rate of developed clinical pathways for URIs

www.cdc.gov/getsma
Implementation/Execution

October 1, 2014 – February 1, 2015

Baseline Data Collection (after IRB approval)

Provider Consensus Meetings (Monthly 1-hour meetings)

Clinical Guideline Review for Sinusitis, URI-NOS, & Bronchitis

*Key component of KTA cycle

Clinical Pathway Development

*used to translate guidelines locally

Confidential Provider Feedback and Audit

Patient Education/Marketing
Clinical Pathway for the Management of Acute Bacterial Rhinosinusitis in Adults and Children

**Signs & Symptoms either:**
- Persistent & not improving (>10 days)
- Severe (≥3-4 days), or
- Worsening or "double-sickening" (≥3-4 days)

**Risk for Resistance?**
- No
- Yes

**Symptomatic Management**
- Initiate first line antimicrobial therapy (amoxicillin or doxycycline)

**Improvement after 3-5 days**
- Complete 5-7 days of antimicrobial therapy

**Worsening or no improvement after 3-5 days**
- Broaden coverage or switch to different antimicrobial class

**Improvement**
- Complete 5-7 days of antimicrobial therapy

**Risk for antibiotic resistance**
- Age <2 or ≥65, daycare
- Prior antibiotics within the past month
- Prior hospitalization past 5 days
- Comorbidities
- Immunocompromised
- Travel

**Initiate second-line antimicrobial therapy (Augmentin or Levaquin)**

**Improvement after 3-5 days**
- Complete 7-10 days of antimicrobial therapy

**Worsening or no improvement after 3-5 days**
- Refer to specialist

Adapted from the IDSA and the Centers for Disease Control and Prevention Guidelines for Acute Bacterial Sinusitis
Marketing

Interviews
Articles
Brochures
Posters
Exit care instructions
Script Pads
Video casts
Social Media Posts
Because your family’s well-being is just as important to us!

ZipPASS™
Get in line, online!

FORMS
Save time by completing our Registration Form and Established Patient Registration Form prior to your visit.

- Registration Form
- Established Patient Registration Form
Innovation

Implementation of evidence based interventions in urgent care setting

Adapted clinical guidelines to meet patient and provider needs
Measurement & Evaluation

Compare rate of abx prescribing for URIs between periods
• N pts with URIs given abx rx
  N of patients with URI dx during baseline/intervention period

Proportion visits with guideline adherence
• N pts with URIs txd w/guidelines
  N of pts with URI diagnoses during intervention

Prescriber Feedback and Audit
• # uri abx cases by provider
  all uri cases
The sample size calculation was based on a 12% reduction in antibiotic prescriptions for URIs in a study conducted by Harris et al. (2003) & Jenkins et al. (2013).
Data Collection

Obtain baseline data from Practice Velocity PVM System (Practice Management Software)

Report 17 from PVM for patients with the following ICD9 codes from 10/1/2012-2/1/2013 & 10/1/2014-2/1/2015

- 461.9 Acute Sinusitis
- 466.0 Acute Bronchitis
- 465.9 URI NOS
- 460 Acute Nasopharyngitis

Systematic randomization of the sample (every 3rd chart)

Chart Review Audit Tool used to obtain demographic & clinical data:

- De-identified data
- encounter number
- month and year of visit
- gender
- smoking status
- primary, secondary and tertiary diagnosis codes (ICD9 codes)
- provider type

SPSS 22 used to enter, code and analyze data

* This project was deemed Non-Human Subject Research by the Johns Hopkins Medicine Institutional Review Board
### Table 1. Demographic and Clinical Characteristics of Urgent Care URI Patient Encounters During Project Periods

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Baseline, n=273</th>
<th>Intervention, n=273</th>
<th>p value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Age, years (range)</strong></td>
<td>34 (0-85)</td>
<td>36 (0-87)</td>
<td>0.940</td>
</tr>
<tr>
<td><strong>Gender, No. (%)</strong></td>
<td></td>
<td></td>
<td>0.929</td>
</tr>
<tr>
<td>Female</td>
<td>178 (65%)</td>
<td>176 (65%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>95 (35%)</td>
<td>97 (36%)</td>
<td></td>
</tr>
<tr>
<td><strong>Clinical Data</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diagnosis, No. of cases. (%)</strong></td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>82 (30%)</td>
<td>4 (2%)</td>
<td></td>
</tr>
<tr>
<td>Nasopharyngitis</td>
<td>22 (8%)</td>
<td>4 (2%)</td>
<td></td>
</tr>
<tr>
<td>Sinusitis</td>
<td>96 (35%)</td>
<td>158 (58%)</td>
<td></td>
</tr>
<tr>
<td>URI</td>
<td>107 (39%)</td>
<td>112 (41%)</td>
<td></td>
</tr>
<tr>
<td><strong>Provider Type, No. (%)</strong></td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Physician</td>
<td>138 (50%)</td>
<td>145 (53%)</td>
<td></td>
</tr>
<tr>
<td>Nurse Practitioner</td>
<td>108 (40%)</td>
<td>61 (22%)</td>
<td></td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>27 (10%)</td>
<td>67 (25%)</td>
<td></td>
</tr>
<tr>
<td><strong>Smoking Status, No. (%)</strong></td>
<td></td>
<td></td>
<td>0.024</td>
</tr>
<tr>
<td>Non smoker</td>
<td>237 (87%)</td>
<td>253 (93%)</td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>36 (13%)</td>
<td>20 (7%)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>t-test (age), χ² (categorical variables)
Using $x^2$, we appreciated a statistically significant change ($p<0.05$) in the proportion of patients prescribed an antibiotic for URIs as a result of the intervention (155/273 or 56.8%) in comparison to the baseline period (203/273 or 74.4%).

Graph 1. Bar chart demonstrating rates of antibiotic prescribing for URI between periods.

Rate of Antibiotic Prescribing for URIs for Baseline and Intervention Periods

- **Baseline N=273**: 74%
- **Intervention N=273**: 57%

* $p<0.05$
Graph 2. Pie chart demonstrating rates of guideline adherence to URI guidelines during the intervention.
We appreciated a modest, statistically significant (24%) decrease in the rate of antibiotic prescribing among the urgent care providers with our intervention.

Buy in from the providers was evidenced through the attainment of an 87% rate of adherence to treatment guidelines.

Logistic regression confirmed there was a reduction in the rate of antibiotic prescribing as a result of the intervention after controlling for diagnosis type, provider type and smoking status.
Limitations

- Changes in providers between periods
- Hawthorne effect
- Unable to determine effects of individual components of intervention
- Delays in IRB approval delayed data collection until December 2014.
Replication in other urgent care and outpatient settings

Interventions can be tried for other diagnosis

Promote judicious antibiotic use world-wide

Implications for Practice
All providers should promote the judicious use of antibiotics

Sustainability of results

Disseminate findings
THANK YOU!


References
