Supplementary Online Content


eAppendix. Content Summaries of Clinician Education for Sinusitis, Pharyngitis, and Pneumonia

eFigure 1. Example Clinician Feedback Report

eFigure 2. Study Timeline

eTable 1. *ICD*-9 Codes and Laboratory Test Results Used for ARTI Case Definitions

eTable 2. *ICD*-9 Codes Used for Defining Non-ARTI Diagnoses Excluded From Analyses

eTable 3. Antibiotic Prescribing by Condition With Supplementary (Post Hoc) Pre-Post Analyses Confirming the Results of the Primary Analyses

This supplementary material has been provided by the authors to give readers additional information about their work.
eAppendix. Content Summaries of Clinician Education for Sinusitis, Pharyngitis, and Pneumonia

Antimicrobial Treatment of PHARYNGITIS in Children
*Updated: 5/3/2010*

- Most cases of pharyngitis are viral in origin.
- Antimicrobial therapy should NOT be given to a child with pharyngitis in the absence of positive rapid test or positive culture for Group A Streptococcus (GAS).
- For the treatment of the non-allergic patient with documented GAS pharyngitis:
  
  **Penicillin (PO or IM) is recommended**
  
  **Amoxicillin** is an acceptable alternative

- A clinical isolate of GAS resistant to penicillin has NEVER been documented.
- **Azithromycin and cephalosporins** (e.g. cephalexin/keflex®, cefdinir/omnicef®), though active against GAS, are not recommended for routine treatment of GAS pharyngitis because:
  
  - These drugs have NOT been shown to be superior for the treatment of GAS pharyngitis, or for the prevention of suppurative or non-suppurative sequelae (e.g. acute rheumatic fever) of GAS pharyngitis.
  
  - Data does not support increased patient compliance of these oral medications over oral penicillin or amoxicillin.
  
  - Exposure to such broad-spectrum agents promotes resistance to these and other antibiotics.

Sources:


(continued)
Antimicrobial Treatment of PNEUMONIA in Children
*Updated: 5/3/2010*

- After respiratory viruses, *Streptococcus pneumoniae* remains the predominant organism causing uncomplicated, community-acquired pneumonia in children, particularly in those between ages 3 months and 6 years of age.

- Initial antimicrobial treatment of uncomplicated, community-acquired pneumonia in children should be with a narrow-spectrum agent with good activity against *Streptococcus pneumoniae*.

- Because of its effectiveness, safety, tolerability, low cost, and narrow spectrum:

  - **amoxicillin (80-90 mg/kg/day) is recommended**

- azithromycin (zithromax®), cefdinir (omnicef®), and cefixime (suprax®) have inferior activity, relative to amoxicillin, against *Streptococcus pneumoniae*.

- The addition of clavulanate to amoxicillin (amoxicillin-clavulanate/augmentin®) does NOT enhance its activity against *Streptococcus pneumoniae*.

Sources:

Antimicrobial Treatment of SINUSITIS in Children
*Updated: 5/3/2010*

- Based on the available data, initial antimicrobial treatment of acute, uncomplicated sinusitis should be with a narrow-spectrum agent targeting *Streptococcus pneumoniae*.

- Because of its effectiveness, safety, tolerability, low cost, and narrow spectrum:

  - **amoxicillin (80-90 mg/kg/day) is recommended**

- azithromycin (zithromax®) and cefdinir (omnicef®) have inferior activity, relative to amoxicillin, against *Streptococcus pneumoniae*.

- The addition of clavulanate to amoxicillin (amoxicillin-clavulanate/augmentin®) does NOT enhance its activity against *Streptococcus pneumoniae*.

Sources:

**eFigure 1.** Example Clinician Feedback Report

Abbreviations: Rx, Prescription; Q, Quarter.
eFigure 2. Study Timeline

Feedback reports occurred at 4-month intervals.
### Table 1. ICD-9 Codes and Laboratory Test Results Used for ARTI Case Definitions

<table>
<thead>
<tr>
<th>Viral ARTIs</th>
<th>ICD-9 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute nasopharyngitis</td>
<td>460</td>
</tr>
<tr>
<td>URI</td>
<td>465.9 or 465.8 or 487.1</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>466.0 or 490</td>
</tr>
<tr>
<td>Acute tonsillitis</td>
<td>463</td>
</tr>
<tr>
<td>Acute pharyngitis</td>
<td>462</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bacterial ARTIs</th>
<th>ICD-9 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinusitis</td>
<td>461.8, 461.9, 473.9, 473.2, 473.1, 473.0, 487.1</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>481, 482.9, 486, 485, 483.8, 519.8</td>
</tr>
<tr>
<td>Streptococcal pharyngitis</td>
<td>(034.0 or 462 or 463) AND (rapid strep or culture positive)</td>
</tr>
</tbody>
</table>

Abbreviations: ICD-9, International Classification of Disease, 9th edition; ARTI, Acute Respiratory Tract Infections; URI, Upper Respiratory Tract Infection
**eTable 2. ICD-9 Codes Used for Defining Non-ARTI Diagnoses Excluded From Analyses**

<table>
<thead>
<tr>
<th>Non-ARTIs</th>
<th>ICD-9 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otitis externa</td>
<td>380.10, 380.11, 380.12, 380.13, 380.14, 380.15, 380.16</td>
</tr>
<tr>
<td>Skin/soft tissue infection</td>
<td>680.00, 680.10, 680.20, 680.30, 680.40, 680.50, 680.60, 680.70, 680.80, 680.90, 681.00, 681.10, 681.20, 681.30, 681.40, 681.50, 681.60, 681.70, 681.80, 681.90, 682.00, 682.10, 682.20, 682.30, 682.40, 682.50, 682.60, 682.70, 682.80, 682.90</td>
</tr>
<tr>
<td>Lyme disease</td>
<td>088.81, 919.40, 711.80</td>
</tr>
<tr>
<td>Acne</td>
<td>706.1</td>
</tr>
<tr>
<td>Chronic sinusitis</td>
<td>473.9</td>
</tr>
<tr>
<td>Mycoplasma infection</td>
<td>041.81, 483.0, 711.90</td>
</tr>
<tr>
<td>Staphylococcal infection</td>
<td>041.10, 041.11, 041.12, 041.19</td>
</tr>
<tr>
<td>Bite wound</td>
<td>879.80, 879.90, 959.90, E906.50, E906.00, E906.30, 891.00, 890.00, 884.00, 883.00, 882.00, 881.00</td>
</tr>
<tr>
<td>Oropharyngeal infection (not Streptococcal)</td>
<td>522.5, 522.4, 528.3, 475, 478.24</td>
</tr>
<tr>
<td>Streptococcal infection (without pharyngitis)</td>
<td>034.1, 041, 041.00, 041.01, 041.10, 041.90, 390, 040.82, 566, 580.00, 686.90, 711.40</td>
</tr>
<tr>
<td>Pertussis</td>
<td>033.0, 033.9</td>
</tr>
<tr>
<td>Sexually transmitted infection</td>
<td>079.90, 079.88, 079.98, 614.90, 616.10, 616.10</td>
</tr>
<tr>
<td>Bone/joint infection</td>
<td>730.20, 730.21, 730.22, 730.23, 730.24, 730.25, 730.26, 730.27, 730.28, 730.29, 711.06, 711.05, 711.03, 711.00</td>
</tr>
<tr>
<td>Bacterial gastroenteritis</td>
<td>008.50, 008.43, 008.00, 004.90, 004.30, 003.90, 003.10, 003.00</td>
</tr>
</tbody>
</table>

Abbreviations: ICD-9, International Classification of Disease, 9th edition; ARTI, Acute Respiratory Tract Infections
**Table 3.** Antibiotic Prescribing by Condition With Supplementary (Post Hoc) Pre-Post Analyses Confirming the Results of the Primary Analyses

<table>
<thead>
<tr>
<th>Tx Group</th>
<th>Total Counts In period</th>
<th>Rate (%): Month -20 to -1</th>
<th>Total Counts In period</th>
<th>Rate%: month 0 to +12</th>
<th>Difference Post – Pre % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ABX/sick visit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>44,263/246,338</td>
<td>17.8</td>
<td>25,772/150,093</td>
<td>17.0</td>
<td>-0.8 (-1.1, -0.5)</td>
</tr>
<tr>
<td>CONT</td>
<td>42,349/231,674</td>
<td>18.5</td>
<td>24,387/143,227</td>
<td>17.2</td>
<td>-1.3 (-1.8, -0.7)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5 (-0.1, 1.1); p=0.13</td>
</tr>
<tr>
<td><strong>Strep/sick visit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>6,245/246,338</td>
<td>2.5</td>
<td>4,625/150,093</td>
<td>3.0</td>
<td>0.5 (0.3, 0.8)</td>
</tr>
<tr>
<td>CONT</td>
<td>5,281/231,674</td>
<td>2.3</td>
<td>3,765/143,227</td>
<td>2.7</td>
<td>0.3 (0.0, 0.7)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2 (-0.2, 0.6); p=0.42</td>
</tr>
<tr>
<td><strong>PNA/sick visit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>2,116/246,338</td>
<td>0.9</td>
<td>807/150,093</td>
<td>0.5</td>
<td>-0.3 (-0.5, -0.2)</td>
</tr>
<tr>
<td>CONT</td>
<td>1,883/231,674</td>
<td>0.8</td>
<td>850/143,227</td>
<td>0.6</td>
<td>-0.2 (-0.3, -0.1)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.1 (-0.3, 0.1); p=0.25</td>
</tr>
<tr>
<td><strong>Sinu/sick visit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>7,022/246,338</td>
<td>2.8</td>
<td>3,877/150,093</td>
<td>2.5</td>
<td>-0.2 (-0.6, 0.1)</td>
</tr>
<tr>
<td>CONT</td>
<td>7,665/231,674</td>
<td>3.4</td>
<td>4,110/143,227</td>
<td>2.9</td>
<td>-0.4 (-0.6, -0.3)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2 (-0.2, 0.6); p=0.52</td>
</tr>
<tr>
<td><strong>Broad/All ABX</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>13,453/44,263</td>
<td>29.9</td>
<td>4,864/25,772</td>
<td>18.7</td>
<td>-11.3 (-14.9, -7.6)</td>
</tr>
<tr>
<td>CONT</td>
<td>12,375/42,349</td>
<td>29.6</td>
<td>6,160/24,387</td>
<td>25.7</td>
<td>-4.0 (-6.8, -1.2)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-7.3 (-11.9, -2.7); p&lt;0.001</td>
</tr>
<tr>
<td><strong>Broad/Strep</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>359/6,245</td>
<td>5.6</td>
<td>166/4,625</td>
<td>3.6</td>
<td>-2.1 (-4.0, -0.1)</td>
</tr>
<tr>
<td>CONT</td>
<td>381/5,281</td>
<td>7.3</td>
<td>161/3,765</td>
<td>4.4</td>
<td>-2.9 (-5.4, 0.5)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.8 (-2.3, 4.0); p=0.82</td>
</tr>
<tr>
<td><strong>Broad/PNA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>367/2,116</td>
<td>17.0</td>
<td>67/807</td>
<td>8.1</td>
<td>-8.8 (-14.9, -2.8)</td>
</tr>
<tr>
<td>CONT</td>
<td>395/1,883</td>
<td>21.4</td>
<td>130/850</td>
<td>15.8</td>
<td>-5.6 (-10.3, -1.0)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-3.2 (-10.8, 4.4); p=0.05</td>
</tr>
<tr>
<td><strong>Broad/SINU</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>3,211/7,022</td>
<td>45.0</td>
<td>964/3,877</td>
<td>24.5</td>
<td>-20.5 (-29.9, -11.0)</td>
</tr>
<tr>
<td>CONT</td>
<td>3,106/7,665</td>
<td>41.1</td>
<td>1,479/4,110</td>
<td>36.5</td>
<td>-4.5 (-8.4, -0.7)</td>
</tr>
<tr>
<td>Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-15.9 (-26.1, -5.8); p=0.002</td>
</tr>
</tbody>
</table>

Tx: treatment (I=intervention; C=control; Diff = difference between treatment and control groups)

All rates are standardized estimates (see text and references for details on standardization) based on a logistic regression model with main effects for period (pre vs. post), a main effect for intervention, and the interaction. Covariates used for standardization are the same as those listed in the text. P-values are based on the Wald test for the interaction term. P-values and confidence intervals allow for the cluster-randomized design. P-values can differ from the primary models (displayed in the figures and reported in the text), which account for the trajectories of prescribing prior to the intervention and then compare these trajectories to those after the intervention.

Counts represent the number of prescriptions/number of visits during the entire period, pre-intervention or intervention.