TARGET

presents

THE IMPORTANCE OF APPROPRIATE ANTIBIOTIC USE

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University of Southampton
SUMMARY

- The Resistance Crisis
- Why does GP prescribing matter?
- Why prescribe for respiratory infections?
- A focus on alternatives in acute sore throat
- Action summary
ANTIBIOTIC RESISTANCE CRISIS
Antibiotics have transformed human health and saved millions of lives. Now, as a result of overuse, they are no longer working. The golden age of medicine has come to an end.

How long until your antibiotics stop working? More infections are becoming resistant to drugs at a frightening speed.
High proportions of resistance were reported in all regions to common treatments in both healthcare settings and in the community.

Risk of death doubled with resistant bugs.
Estimated by 2050, deaths due to resistance will exceed those due to cancer.

Current estimates 700,000
By 2050 estimate 10 million
O’Neill 2014
WHY DOES GP PRESCRIBING MATTER?
GPRD data 568 practices

Median prescribing rates
- 48% for ‘cough and bronchitis’
- 60% for ‘sore throat’
- 60% for ‘otitis-media’

Median for RTI 54%
(39-69%) lowest/highest

http://bmjopen.bmj.com/content/4/10/e006245.full
Trimethoprim resistance in GP urines by age group (Welsh data)
Longer duration and multiple courses were associated with higher resistance rates.

Costelloe BMJ 2010  [http://www.bmj.com/content/340/bmj.c2096.full](http://www.bmj.com/content/340/bmj.c2096.full)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Antibiotic &lt;2 m</th>
<th>Antibiotic &lt;12 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTI</td>
<td>2.5</td>
<td>1.33</td>
</tr>
<tr>
<td>(5 studies, 14,348)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTI</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>(7 studies, 2,605)</td>
<td></td>
<td></td>
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</tbody>
</table>
PRESCRIBING AND CONSULTATION RATE
IS THERE A LINK?

- GPRD data 108 practices 1995-2000
- 10 fold variation in consultation rate for RTI125/1000 to 1110/1000
- Antibiotic prescription 45-98% of RTI consults
- Standardised consultation rates were related to prescribing
- Practices who reduced prescribing experienced a reduced consultation rate

ASHWORTH  BJGP 2005 http://bjgp.org/content/55/517/603.short
IN SUMMARY SO FAR

- Antibiotic resistance is important
- GP prescribing is an important component of total antibiotic use
- GPs prescribe antibiotics following the majority of consultations with RTI
- Higher prescribing is linked to resistance and higher consultations in the future
WHY PRESCRIBE FOR RESPIRATORY INFECTIONS?
WHY PRESCRIBE?

- Relief of symptoms
- Worry about complications/more serious illness
- Patient pressure
### EVIDENCE FROM RCTS, SYSTEMATIC REVIEWS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Prior Duration</th>
<th>Duration After Seeing Doctor</th>
<th>Total Duration Untreated</th>
<th>Benefit From Antibiotics</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otitis Media</td>
<td>1-2 days</td>
<td>3-5 days</td>
<td>4 days</td>
<td>8-12 hours</td>
<td>18</td>
</tr>
<tr>
<td>Sore Throat</td>
<td>3 days</td>
<td>5 days</td>
<td>8 days</td>
<td>12-18 hours</td>
<td>10-20</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>5 days</td>
<td>7-10 days</td>
<td>12-15 days</td>
<td>24 hours</td>
<td>13</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>10 days</td>
<td>10-12 days</td>
<td>20-22 days</td>
<td>24 hours</td>
<td>10-20</td>
</tr>
</tbody>
</table>
In routine data comparing high prescribing and low prescribing practices

No association with risk of mastoiditis, empyema, meningitis, and intracranial abscess

Association between prescribing and risk of pneumonia and peritonsillar abscess
In a practice of 7000, a 10% reduction in antibiotic prescribing for RTI might expect:

- 1 additional pneumonia each year
- 1 additional peritonsillar abscess each 10 years

BMJ 2016 Gulliford Moore
http://www.bmj.com/content/354/bmj.i4245
ANTIBIOTICS AND COMPLICATIONS

- Serious complications rare after URTI sore throat and otitis media NNT > 4000
- Pneumonia more common after LRTI
  - Age over 65 years: NNT 39
  - Age under 65 years: NNT > 100

BMJ 2007 Petersen
http://www.bmj.com/content/335/7627/982?variant=full
39% want antibiotics

Patients want
- Relief from symptoms (43%) / pain (24%)
- Diagnosis (49%)
- Reassurance (13%)

ANTIBIOTICS AND SORE THROAT
WHY PRESCRIBE?

- Symptom Benefit?
- Avoid complications?
- Patient Demand?
- Target to those at high risk?
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PRIOR DURATION</th>
<th>DURATION AFTER SEEING DOCTOR</th>
<th>TOTAL DURATION UNTREATED</th>
<th>BENEFIT FROM ANTIBIOTICS</th>
<th>NNT</th>
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<td>12-15 days</td>
<td>24 hours</td>
<td>13</td>
</tr>
<tr>
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<td>10 days</td>
<td>10-12 days</td>
<td>20-22 days</td>
<td>24 hours</td>
<td>10-20</td>
</tr>
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</table>
Duration of sore throat after consultation in 716 community patients over 4 years with sore throat, randomised to one of three treatment groups.

13,738 adults presenting with acute sore throat of 2 weeks duration or less

1.3% (165/12,451) developed complications, 47/12,451 (3 in 1,000) had a recorded quinsy

Only severe tonsillar inflammation and severe ear pain significantly predicted the development of complications (odds ratio 2.36)

Complications following a sore throat are unusual:

- 1 in 10 people re-consult
- 1 in 100 have suppurative complications
- 1 in 1000 have a significant complication

It is not possible to identify those at risk of the serious complications based on their symptoms and examination.
Examined outcome in acute sore throat according to antibiotic strategy (immediate, delayed/back-up, none)

Antibiotics reduced suppurative complications by 1/3

Delayed/back-up prescription similar efficacy and complication rate as immediate

Current NICE guidance for sore throat

When to prescribe antibiotics:

- If 3+ Centor (pus, temp, glands, no cough)
- Otherwise….No antibiotic or delayed/back-up antibiotic prescribing strategy should be negotiated
CURRENT OPTIONS IN SORE THROAT: ANYTHING TO ADD TO NICE?

- Use current clinical score-Centor
- Improved clinical score?
- Rapid Test?
CAN THE CENTOR SCORE BE IMPROVED?

- Developed in emergency department setting
- Predicts presence of Streptococcus A only
- Not that selective
ARE STREPTOCOCCI C+G IMPORTANT?

BEST PREDICTORS OF STREP A/C/G FROM 2 COHORTS?: FeverPAIN

- * Fever last 24h
- Pus on tonsils
- * Attend rapidly (3 or less days)
- * severely Inflamed tonsils
- No cough or coryza (i.e. pharyngeal illness)

* = univariate and multivariate in both cohorts

## CENTOR SCORE
(PUS, NODES, FEVER, NO COUGH)

<table>
<thead>
<tr>
<th>Centor score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number patients with Streptococcus (% PPV)</td>
<td>3 (7%)</td>
<td>10 (11%)</td>
<td>45 (23%)</td>
<td>65 (43%)</td>
<td>55 (57%)</td>
<td>178 (31%)</td>
</tr>
<tr>
<td>Total number patients with each score (% of total)</td>
<td>45 (8%)</td>
<td>88 (15%)</td>
<td>199 (34%)</td>
<td>152(26%)</td>
<td>97(17%)</td>
<td>581(100%)</td>
</tr>
</tbody>
</table>
**FeverPAIN SCORE**
*(FEVER, PUS, ATTEND RAPIDLY, INFLAMED, NO COUGH/CORYZA)*

<table>
<thead>
<tr>
<th>FeverPAIN score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4+</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number patients with Streptococcus (% PPV)</strong></td>
<td>7 (11%)</td>
<td>21 (14%)</td>
<td>45 (30%)</td>
<td>40 (39%)</td>
<td>62 (62%)</td>
<td>175 (31%)</td>
</tr>
<tr>
<td><strong>Total number patients with each score (% of total)</strong></td>
<td>63 (11%)</td>
<td>155 (27%)</td>
<td>149 (26%)</td>
<td>103 (18%)</td>
<td>100 (17%)</td>
<td>570 (100%)</td>
</tr>
</tbody>
</table>

Use of FeverPAIN score in sore throat reduced antibiotic prescribing by nearly one third

Score also resulted in improved symptom control

### RESULTS: DELAYED/BACK-UP vs FeverPAIN vs RADT

<table>
<thead>
<tr>
<th></th>
<th>Delayed/ Back-up (Control)</th>
<th>FeverPAIN</th>
<th>RADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity sore throat/difficulty swallowing (Days 2-4; 0 no, 3 mod bad; ...6 as bad as it could be)</td>
<td>3.11</td>
<td>-0.33* (-0.64 to -0.02)</td>
<td>-0.30 (-0.61 to 0.004)</td>
</tr>
<tr>
<td>Duration of moderately bad or worse Symptoms</td>
<td>Median 5 days</td>
<td>HR 1.30* (1.03 to 1.63)</td>
<td>HR 1.11 (0.88 to 1.40)</td>
</tr>
<tr>
<td>Antibiotic use</td>
<td>75/164 (46%)</td>
<td>RR 0.71* (0.05 to 0.95)</td>
<td>RR 0.73* (0.52 to 0.98)</td>
</tr>
<tr>
<td>Belief that not likely to need to see doctor in future</td>
<td>62/163 (38%)</td>
<td>RR 0.97 (0.71 to 1.27)</td>
<td>RR 1.03 (0.76 to 1.32)</td>
</tr>
</tbody>
</table>

*P<0.05. RADT=rapid antigen detection test for Gp A streptococcus
All models controlled for fever and symptom severity at baseline
No difference in returns within one month or following

**HR** = Hazard Ratio
**RR** = Relative Risk
Targeting antibiotics using a clinical score (FeverPAIN) improves symptoms and reduces antibiotic use for acute sore throat.

RADTs used with a clinical score provide similar benefits, but no clear advantages to a clinical score alone.
Outcomes are similar using immediate vs delayed prescribing

Short term re-consultation is higher with no prescribing

Immediate prescribing encourages belief in antibiotics and future consultation
Complications are rare and hard to predict

Delayed antibiotics are probably as effective as immediate antibiotics to prevent complications

A,C & G Strep all important causes of sore throat

FeverPAIN better predicts A,C & G

FeverPAIN results in better symptom control and lower antibiotic use than delayed prescription
WHAT IS THE OPTIMAL STRATEGY?

- Probably targeted prescribing using a clinical score
- Default position should be: delayed/back-up or no prescribing
- Use the score to identify patients with more severe symptoms, who may need an immediate antibiotic prescription with intermediate symptoms, to use delayed/back-up antibiotic prescription
FeverPAIN?
A PAIN TO REMEMBER

https://ctu1.phc.ox.ac.uk/feverpain/index.php
Think about sore throat prescribing in your practice - do an audit and discuss results

Is the default position a no or delayed prescribing - challenge that using the evidence

Talk about FeverPAIN

Put the link to the score on everyone’s desktop

Repeat the audit next year
Feel good about reduced prescribing (GPs prescribe 70-80% of all antibiotics used in humans in the UK)

Reduced prescribing will reduce workload in the future.

Low prescribing practices have lower consultation rates for RTI
THANK YOU

QUESTIONS PLEASE