Choosing Wisely in Infection

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Antimicrobial Lead, HEYHT
Stewardship & Surveillance Officer, BSAC

@gavin_barlow
Look at what’s happening in Greece...

Carbapenem-resistant Gram-negative infections

Klebsiella spp. bloodstream infections

>7477

Mostly:
- Pneumonia
- Bloodstream
- Urinary

53% resistant to carbapenems

Vulnerable patients

52% ICU

BM transplant>> immunocompetent
Only 12 antibiotics in development have the potential to treat WHO’s critical threat pathogens.
Adverse effects of antibiotics

USA: 14% of drug related visits to ED
145,490 per year due to antibiotics

Hospitalised patients prescribed antibiotics
1 in 5 will develop a clinically important adverse event
**THE HUMAN MICROBIOME**

Bacteria, fungi, and viruses outnumber human cells in the body by a factor of 10 to one. The microbes synthesize key nutrients, fend off pathogens and impact everything from weight gain to perhaps even brain development. The Human Microbiome Project is doing a census of the microbes and sequencing the genomes of many. The total body count is not in but it’s believed over 1,000 different species live in and on the body.

**600+ SPECIES**
- in the mouth, pharynx and respiratory system include:
  - Streptococcus viridans
  - Neisseria sicca
  - Candida albicans
  - Streptococcus salivarius

**25 SPECIES**
- in the stomach include:
  - Helicobacter pylori
  - Streptococcus thermophilus

**500–1,000 SPECIES**
- in the intestines include:
  - Lactobacillus casei
  - Lactobacillus reuteri
  - Lactobacillus gasseri
  - Escherichia coli
  - Bacteroides fragilis
  - Bacteroides thetaiotaomicron
  - Lachnoclostridium ramosus
  - Clostridium difficile

**1,000 SPECIES**
- in the skin include:
  - Fiturosoporum ovale
  - Staphylococcus epidermidis
  - Corynebacterium jeikeium
  - Trichosporon
  - Staphylococcus haemolyticus

**60 SPECIES**
- in the urogenital tract include:
  - Ureaplasma parvum
  - Corynebacterium aurimucosum

Sources: National Institutes of Health, Scientific American Human Microbiome Project

Dean Tweed - Postmedia News / Image: Fotolia
Figure 3.7 Total and broad spectrum antibiotic consumption in NHS acute

ESPAUR report 2018
Choosing Wisely Aims

Promote conversations between doctors and patients by helping patients choose care that is:

- Supported by evidence
- Not duplicative of other tests or procedures
- Free from harm
- Truly necessary
- Consistent with their values
Sharing Expertise

**Clinician**
- Diagnosis
- Disease aetiology
- Prognosis
- Treatment options
- Outcome probabilities

**Patient**
- Experience of illness
- Social circumstance
- Attitude to risk
- Goals, values, preferences
- Support needs
Shared decision making is a process

Clinicians and patients work together based on the clinical evidence and the patient's informed preferences (values, beliefs and goals). Decision support counseling and a system for recording and implementing patients' informed preferences.

Coulter and Collins, 2011
Average life expectancy is continuing to rise in the UK

2016

over half a million people in their 90s
more than 2.5 times the number in 1985

by 2041

estimated 3.2 million people aged 85 years and older

People are living longer in poor health
Choosing Wisely, Stewardship and AMR agendas could synergise

Choosing Wisely UK principles

• What are the benefits?
• What are the risks?
• What are the alternatives?
• What if I do nothing?
The Challenge:
Association Between Antibiotic Prescribing for Respiratory Tract Infections and Patient Satisfaction

JAMA Intern Med. 2018;178(11):1558-1560

Adjusted rates of antibiotic prescribing
19% to 90%

Satisfaction correlated with prescribing rate
500 doctors said...

“82% doctors surveyed reported they had prescribed or carried out treatment which they deemed unnecessary”
FIGURE 3: WERE YOU INVOLVED AS MUCH AS YOU WANTED TO BE IN DECISIONS ABOUT YOUR CARE AND TREATMENT? (INPATIENT SURVEY 2005-2014)

Percentage of respondents (%)

<table>
<thead>
<tr>
<th>Year of survey</th>
<th>Yes, definitely</th>
<th>Yes, to some extent</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>40</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2006</td>
<td>45</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>2007</td>
<td>50</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>2008-2014</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Development of BSAC
Choosing Wisely UK recommendations

- BSAC executive/council (N = 21)
- Potential areas identified/agreed

- BSAC members
  - Survey (N = 37)
  - Data analysis

- 5 recommendations developed

- Patients
  - N = 9 (OPAT patients)

- Revision (wording)
Initial

- Antibiotic use at end-of-life
- Asymptomatic/minimal symptoms bacteriuria
- Simple respiratory infection
- Skin abscess
- Antibiotic use for non-infection reasons
- Intra-abdominal infection
- Limb cellulitis
- Respiratory vaccination

Final

- Simple respiratory infections
- Asymptomatic/minimal symptoms bacteriuria
- Intra-abdominal infection
- Antibiotic use for non-infection reasons
- Antibiotic use at end-of-life
http://www.choosingwisely.co.uk/i-am-a-clinician/recommendations/

Recommendations 2018

- British Society for Antimicrobial Chemotherapy
- Royal College of Emergency Medicine
- Royal College of Obstetricians and Gynaecologists
- Royal College of Ophthalmologists
- Royal College of Pathologists
- Royal College of Physicians
- Royal College of Psychiatrists
- Royal College of Radiologists
- British Society of Rheumatology
- Faculty of Sexual and Reproductive Health

FOUR QUESTIONS TO ASK MY DOCTOR OR NURSE TO MAKE BETTER DECISIONS TOGETHER

1. What are the Benefits?
2. What are the Risks?
3. What are the Alternatives?
4. What if I do Nothing?
Positive messaging

**NOT** Though shall not do... recommendations

- *Not all patients* with simple respiratory tract infections will need antibiotics...
- *Review use of* antibiotics for patients with bacteria in their urine who have no...
- *Consider stopping* antibiotics after 4 days for patients with abdominal infection under control...
- *Discuss the use of* antibiotics with patients who are close to the end of life
- *Review the use of* antibiotics for conditions that are not infections
Choosing Wisely in Infection

International recommendations

- Do not treat asymptomatic bacteriuria with antibiotics
- Do not use antibiotics or order radiological tests for upper RTIs that are likely viral
- Consider de-escalation of IV to oral antibiotics daily

Acknowledgement: Alexander Richards
### SUMMARY OF FINDINGS FOR THE MAIN COMPARISON

**Shared decision making compared to usual care for acute respiratory infections in primary care**

**Patient or population:** antibiotic use in acute respiratory infections  
**Setting:** primary care  
**Intervention:** interventions to facilitate shared decision making  
**Comparison:** usual care

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Anticipated absolute effects* (95% CI)</th>
<th>Relative effect (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics prescribed or dispensed (6 weeks or less) assessed with: risk ratio</td>
<td>Moderate</td>
<td>RR 0.61 (0.55 to 0.68)</td>
</tr>
<tr>
<td></td>
<td>47 per 100 (26 to 32)</td>
<td>10172 (8 RCTs)</td>
</tr>
<tr>
<td>Anticipated absolute effects</td>
<td>Moderate</td>
<td>RR 0.74 (0.49 to 1.11)</td>
</tr>
<tr>
<td>Risk with usual care</td>
<td>RR 0.61 (0.55 to 0.68)</td>
<td></td>
</tr>
<tr>
<td>Risk with Interventions to facilitate shared decision making</td>
<td>RR 0.74 (0.49 to 1.11)</td>
<td></td>
</tr>
<tr>
<td>Antibiotics prescribed or dispensed (12 months or greater) assessed with: risk ratio</td>
<td>Moderate</td>
<td>RR 0.74 (0.49 to 1.11)</td>
</tr>
<tr>
<td></td>
<td>47 per 100 (23 to 52)</td>
<td>481588 (3 RCTs)</td>
</tr>
<tr>
<td>Patient initiated re-consultations for the same illness episode</td>
<td>Moderate</td>
<td>RR 0.87 (0.74 to 1.03)</td>
</tr>
<tr>
<td></td>
<td>40 per 100 (30 to 41)</td>
<td>1881 (4 RCTs)</td>
</tr>
<tr>
<td>Patient satisfaction with the consultation</td>
<td>Moderate</td>
<td>RR 0.86 (0.57 to 1.30)</td>
</tr>
<tr>
<td></td>
<td>71 per 100 (58 to 76)</td>
<td>1052 (2 RCTs)</td>
</tr>
</tbody>
</table>

**Quality of the evidence (GRADE):**
- **Moderate**
- **Low**
What were the interventions?
The intervention had to be aimed at facilitating shared decision making

• All provided education and communication skills training on RTI to GPs

• Other programme components in some studies:
  – consensus procedures
  – simulated patient consultations
  – personal reflection on clinical practice
  – reminders of expected behaviours
  – provision of antibiotic resistance trend data
  – Patient materials, including:
    • education materials in waiting rooms (poster and leaflet)
    • interactive booklet for use within consultation or as a take home
    • decision support tools
**Review:** In primary care, CRP testing, shared decision making, and procalcitonin reduce antibiotic prescribing for ARI

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**Clinical impact rating:*****

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**Question**
In primary care, what is the effect of clinician-targeted interventions on antibiotic prescribing for acute respiratory infections (ARIs)?

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**Commentary**

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**Effects of clinician-targeted interventions vs usual care on antibiotic prescribing for acute respiratory infections in primary care**

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Setting</th>
<th>Number of trials (n)</th>
<th>RR/OR/RD (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRP point-of-care test</td>
<td>GP</td>
<td>6 (3284)</td>
<td>RR 0.78 (0.66 to 0.92)</td>
</tr>
<tr>
<td>Shared decision making</td>
<td>GP</td>
<td>3 (3274)</td>
<td>OR 0.44 (0.26 to 0.75)</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>2 (4623)</td>
<td>RR 0.64 (0.49 to 0.84)</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>4 (481 807)</td>
<td>RD −18.4% (−27.2 to −9.7)</td>
</tr>
<tr>
<td>Procalcitonin-guided management</td>
<td>GP</td>
<td>2 (1008)</td>
<td>aOR 0.10 (0.07 to 0.14)</td>
</tr>
<tr>
<td></td>
<td>ED</td>
<td>7 (2605)</td>
<td>aOR 0.34 (0.28 to 0.43)</td>
</tr>
</tbody>
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For correspondence: Dr. S. Tonkin-Crine, University of Oxford, Oxford, England, UK. E-mail sarah.tonkin-crine@phc.ox.ac.uk.
“Current infection management and antimicrobial prescribing practices in secondary care fail to engage patients with the decision-making process”
Case 1

- 73 year old female
- Initially managed in private sector
- Low back pain 2 years; worse on movement
- Underwent lumbar MRI scans 2 months apart
- Case reviewed @ NHS spinal MDT Dec ‘16: There is definite progression and discitis
- Referred to Dept. of Infection
- Blood cultures negative
CRP 6.4
PV 1.61
Case 1

- Discussed with two different radiologists; neither keen to biopsy; patient not keen either!

- Clear from notes that it was recognised diagnosis of discitis had not been clearly established

- After discussion with patient, decision made to commence OPAT

-Commenced IV Teicoplanin 2g thrice weekly **plus** oral Co-trimoxazole 960mg/12h
Case 1

- **Day 25:** Rash – antibiotics stopped
- **Day 30:** Rash improving
- Teicoplanin monotherapy re-started with plan to add a different 2\textsuperscript{nd} oral agent later
- Rash!
Case 1 – Shared decision making

- What are the benefits?
  - Antibiotics
    - Minimal
  - No antibiotics
    - No adverse effects

- What are the risks?
  - Antibiotics
    - Adverse effects, AMR, microbiome
  - No antibiotics
    - May actually be infection (low risk)

- What are the alternatives?
  - Analgesia, pain team referral, physiotherapy, monitoring, etc.

- What if I do nothing?
  - It may be infection, but even if it is, low risk for harm (can monitor)
AKA pseudo-discitis
Would you choose wisely in this infection?


<table>
<thead>
<tr>
<th>Patient outcome</th>
<th>Antibiotics</th>
<th>No Antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Failure within 1 month</strong></td>
<td>5.6 per 100 patients</td>
<td>9.3 per 100 patients</td>
</tr>
<tr>
<td>(NNT 27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hospitalisation</strong></td>
<td>2.2 per 100 patients</td>
<td>3.9 per 100 patients</td>
</tr>
<tr>
<td>(NNT 59)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>More (minor) surgery &lt;3 months</strong></td>
<td>8.4 per 100 patients</td>
<td>13.6 per 100 patients</td>
</tr>
<tr>
<td>(NNT 19)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Adverse effects**

| Antibiotic X (NNH 48) | 10.6 per 100 patients | 8.5 per 100 patients |
| Antibiotic Y (NNH 10.5)| 18.5 per 100 patients | 9.0 per 100 patients |

<table>
<thead>
<tr>
<th>Sepsis</th>
<th>No difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>No difference</td>
</tr>
</tbody>
</table>
Comments from: Antibiotics after incision and drainage for uncomplicated skin abscesses: a clinical practice guideline

BMJ 2018;360:k243

• “…an expert panel makes a weak recommendation in favour of trimethoprim-sulfamethoxazole (TMP-SMX, co-trimoxazole) or clindamycin in addition to incision and drainage over incision and drainage alone”

• “The panel emphasises shared decision making in the choice of whether to initiate antibiotics and in which antibiotic to use, because the desirable and undesirable consequences are closely balanced”
Comparison 1

No antibiotics
Incision and drainage alone

or

Antibiotics
Incision and drainage plus trimethoprim and sulfamethoxazole or clindamycin

No antibiotics

Applies to All

Strong
Weak

Antibiotics

We suggest TMP-SMX or clindamycin plus incision and drainage rather than incision and drainage alone. Discuss both options with each patient.

Weak
Strong
Case 2

• 19 year-old
• Pott’s puffy tumour (9 months)
• *Streptococcus milleri* and *Streptococcus intermedia* from multiple tissue specimens
• Penicillin allergy (rash); IV ceftriaxone
• Day 7 discharged on oral Linezolid
• Plan was to complete 6 week course
### Case 2

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre-Linezolid</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; review</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; review</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt; review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin (g/L)</td>
<td>141</td>
<td>129</td>
<td>106</td>
<td>91</td>
</tr>
<tr>
<td>[Normal: 135 to 175 g/L]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelet count</td>
<td>490</td>
<td>396</td>
<td>280</td>
<td>156</td>
</tr>
<tr>
<td>[Normal: 150 to 400 x 10&lt;sup&gt;9&lt;/sup&gt;/L]</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

- Nausea despite anti-emetic
- Oral intake less than normal
- Mouth sore, red, dry; angular stomatitis
- Feels miserable
Case 2 – Shared decision making

• What are the benefits?
  Antibiotics
    – Might avoid recrudescence
  No antibiotics
    – No adverse effects

• What are the risks?
  Antibiotics
    – Adverse effects, AMR, microbiome
  No antibiotics
    – Recrudescence (probably low risk)

• What are the alternatives?
  Reassurance and monitoring

• What if I do nothing?
  Likely to be fine, but some uncertainty
Should we use more non-antibiotic therapy in uncomplicated UTI in females?

<table>
<thead>
<tr>
<th>Trial</th>
<th>Symptom resolution (d7)</th>
<th>Antibiotic use (&lt;30d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSAID</td>
<td>Antibiotic</td>
</tr>
<tr>
<td>BMJ 2017 (N = 253)</td>
<td>83%</td>
<td>96%</td>
</tr>
<tr>
<td>BMJ 2015 (N = 484)</td>
<td>70%</td>
<td>82%</td>
</tr>
<tr>
<td>BMC 2010 (N = 79)</td>
<td>75%</td>
<td>61%</td>
</tr>
<tr>
<td>Totals (unadjusted)</td>
<td>75%</td>
<td>84%</td>
</tr>
</tbody>
</table>

**Note:** Non-UTI adverse events similar in all studies NSAID versus Antibiotic
<table>
<thead>
<tr>
<th>Disease</th>
<th>Treatment, Days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short</td>
</tr>
<tr>
<td>Community-acquired pneumonia (^1-3)</td>
<td>3-5</td>
</tr>
<tr>
<td>Nosocomial pneumonia (^6,7)</td>
<td>≤8</td>
</tr>
<tr>
<td>Pyelonephritis (^10)</td>
<td>5-7</td>
</tr>
<tr>
<td>Intraabdominal infection (^11)</td>
<td>4</td>
</tr>
<tr>
<td>Acute exacerbation of chronic bronchitis and COPD (^12)</td>
<td>≤5</td>
</tr>
<tr>
<td>Acute bacterial sinusitis (^13)</td>
<td>5</td>
</tr>
<tr>
<td>Cellulitis (^14)</td>
<td>5-6</td>
</tr>
<tr>
<td>Chronic osteomyelitis (^15)</td>
<td>42</td>
</tr>
</tbody>
</table>

Abbreviation: COPD, chronic obstructive pulmonary disease.
Summary

• Over-diagnosis and -therapy are the fundamental problems that have driven AMR

• Many opportunities in infection practice for shared-decision making and to apply Choosing Wisely principles

• Diagnostic and antimicrobial stewardship agendas could benefit from collaboration with global, pan-specialty/generic, patient-focused initiatives (and vice versa)
Final comment

“We all need to do more to promote *Choosing Wisely*, a great idea with little penetration in the UK medical workforce”

BSAC member

Questions?