Deaths Attributable To Antimicrobial Resistance Every Year

Based on scenarios of rising drug resistance unless action taken:

- By 2050; **10 million deaths** (more than that due to cancer) i.e. 1 person every 3 seconds
- Global economic cost = £100 trillion USD

The Challenge: changing prescribing practice for antimicrobials

Reducing the use of antimicrobials where they are not indicated will:

• slow down the emergence of antimicrobial resistance
• ensure that antimicrobials remain an effective treatment for infection
• improve clinical outcomes for the population as a whole
• conserve healthcare resources
National Guidance on Antimicrobial Stewardship

NICE NG15 - Antimicrobial Stewardship: systems and processes for effective antimicrobial medicine use

NICE NG63 – Antimicrobial Stewardship; changing risk-related behaviours in the general population
Antimicrobial Stewardship

Definition:
‘An organisational or healthcare-system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness’

NICE Guidance NG15 (Aug 2015)
Sheffield AMS Group

Remit of the group:

• To optimise antimicrobial prescribing practice in primary and secondary care also including out of hours GPs and dentists

• To support and encourage use of the NICE Antimicrobial Stewardship Quality Standard QS121 (April 2016) Quality Statements

• To consider where new antimicrobial agents may be placed in specific patient pathways to include considerations relating to admission avoidance strategies

• To discuss and find solutions to Infection Prevention & Control (IPC) and microbiology related problems
Sheffield AMS Group

• To Develop, agree and oversee the implementation of action plans (e.g. *C.* difficile to reduce *C.* difficile incidence in community which links to anti-microbial prescribing) and audit programmes (e.g. annual antibiotic audits).

• To provide timely education and feedback on antibiotic stewardship and IPC programmes as set out above and in NICE Guidance (Aug 2015) as well as feedback from audits (antimicrobial, IPC, surviving sepsis etc.)

• To agree what information/messages and updates to be provided to GPs, Practice Nurses and other prescribers in Primary Care
Twelve month rolling percentage of prescribed antibiotic items from cephalosporin, quinolone and co-amoxiclav class
Broad spectrum Antibiotic Prescribing – Total Items

Q3 2012/13 – Q4 2016/17

Items

3rd Quarter 2012/13
4th Quarter 2012/13
1st Quarter 2013/2014
2nd Quarter 2013/2014
3rd Quarter 2013/2014
4th Quarter 2013/2014
1st Quarter 2014/2015
2nd Quarter 2014/2015
3rd Quarter 2014/2015
4th Quarter 2014/2015
1st Quarter 2015/2016
2nd Quarter 2015/2016
3rd Quarter 2015/2016
4th Quarter 2015/2016
1st Quarter 2016/2017
2nd Quarter 2016/2017
3rd Quarter 2016/2017
4th Quarter 2016/2017
Twelve month rolling total number of prescribed antibiotic items per
STAR-PU – NHS Sheffield CCG
Twelve month rolling proportion of trimethoprim class prescribed antibiotic items as a ratio of trimethoprim to nitrofurantoin – NHS Sheffield CCG
The TARGET Antibiotics Toolkit
Guide to Resources for Prescribers and Commissioning Organisations written by Rebecca Owens with Cliodna McNulty, Meredith Hawking and Leah Jones who work in the Primary Care Unit of Public Health England
# PHE – Treating Your Infection

## Treating your infection

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Your doctor or nurse recommends that you self-care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Your infection</strong></td>
<td><strong>Usually lasts</strong></td>
</tr>
<tr>
<td>Middle-ear infection</td>
<td>4 days</td>
</tr>
<tr>
<td>Sore throat</td>
<td>7 days</td>
</tr>
<tr>
<td>Common cold</td>
<td>10 days</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>18 days</td>
</tr>
<tr>
<td>Cough or bronchitis</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Other infection:</td>
<td></td>
</tr>
<tr>
<td>……………………..</td>
<td>………. days</td>
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## Back-up antibiotic prescription to be collected after ___ days only if you are not starting to feel a little better or you feel worse.

Collect from: GP reception  GP or nurse  Pharmacy

- Colds, most coughs, sinusitis, ear infections, sore throats, and other infections often get better without antibiotics, as your body can usually fight these infections on its own.
- If you take antibiotics when you don’t need them, it allows bacteria to build up resistance. This means, they’re less likely to work in the future, when you really might need them.
- Antibiotics can cause side effects such as rashes, thrush, stomach pains, diarrhoea, reactions to sunlight, other symptoms, or being sick if you drink alcohol with metronidazole.
- Find out more about how you can make better use of antibiotics and help keep this vital treatment effective by visiting and pledging at www.antibioticguardian.com

Never share antibiotics and always return any unused antibiotics to a pharmacy for safe disposal.

Leaflet developed in collaboration with these professional societies.
Local Guidelines for Primary Care (1)

- Adapted from PHE Guidance May 2017
- Incorporated within Sheffield Drug Formulary Chapter 5 – Infections (CCG intranet)
- Approved by APG in January 2017
- Interim update approved June 2017
- Produced in consultation with local microbiologists
- Intended to provide a ready reference for appropriate antimicrobial prescribing which takes into account local sensitivities.
Local Guidelines for Primary Care (2)

- New recommendations on the management and treatment of UTI
- Driven by national rise in resistant strains to trimethoprim (Sheffield rate = approx 40%)
- First choice is now nitrofurantoin if eGFR > 45ml/min
- Alternative choices:
  - Trimethoprim; if low risk of resistance
  - Pivmecillinam; useful if eGFR < 45ml/min
  - Amoxicillin; if micro-organism susceptible
Local Guidelines for Primary Care (3)

Treatment Course Costs:
• Nitrofurantoin capsules 50mg = £6.17 per 3 day course (qds)
versus
• Nitrofurantoin MR capsules 100mg = £4.07 per 3 day course (bd)
• BEWARE – Nitrofurantoin oral suspension = £446.95 per 300ml bottle
Further UTI Treatment Options: Fosfomycin sachets

- Option if known/suspected high risk of resistance e.g. care home resident, recurrent UTI, hospitalisation for > 7 days in last 6 months, un-resolving urinary symptoms, previously resistance to first line choice(s)
- If risk of resistance then send urine for C&S and always safety net
- Dose is a single 3g sachet (as Monuril brand) or 2 x 3g doses three days apart for men (unlicensed)
New MSU request on ICE
Rifamixin

• Semi-synthetic derivative of rifamycin
• Reduces intestinal ammonia
• Guidance agreed on use for hepatic encephalopathy not responsive to lactulose alone
• £259/month
• Not for ‘S.I.B.O.’ – small intestinal bacterial overgrowth
Gram negative blood stream infections

- E coli is carried harmlessly in the gut in a lot of people, however if it is able to access other body organs/systems like the urinary tract or blood stream it can cause infection, morbidity and mortality
- ~75% infections start in the community
- CCG charged with a 10% reduction in cases, by identifying trends, planning and taking action
- Process for data collection that minimises impact on practices approved by CCG Information Governance Group
Strategies that avoid systemic antibiotics for common infections
40%
% of people better at 3 days without antibiotics

16 hours
Number of hours of reduced symptoms if all patients with sore throat receive abx.

50%
% people with reduced pain and fever after antibiotics compared to placebo
Predicting who has strep...

- Centor
- FeverPAIN
Management Strategies
Management Strategies

Px taken

46 Standard
37 FeverPAIN
35 FeverPAIN + rapid
Management Strategies

29%

% reduction in antibiotics: delayed prescriptions + score

0

No added reduction with rapid GAS test
The global threat of Antimicrobial Resistance

“Antimicrobial resistance poses a catastrophic threat. If we don’t act now, any one of us could go into hospital in 20 years for minor surgery and die because of an ordinary infection that can’t be treated by antibiotics. And routine operations like hip replacements or organ transplants could be deadly because of the risk of infection.”

Dame Sally Davies, CMO DH 2011
Summary: throats

- Complications from strep are rare
- Antibiotics limit duration of illness if raised scores, BUT
- Even if strep positive antibiotics may not be required and limit immunity
- Delayed prescriptions (48h) reduce abx usage
- Safety netting and complications do occur rarely: Lemierre’s and strep related
Ears: acute otitis media (AOM)

- More difficult to distinguish bacterial causation
- Antibiotic decision based on trials with differing clinical scenarios
Acute otitis media

**Most**
Under dosed with analgesia.

**0**
Difference in symptoms at 24h with Abx

**Who?**
- <2y bilateral AOM
- Higher symptom scores
- More bulging tympanic membrane
Complications of AOM

- 0 increase in mastoiditis
- 0 increase in deafness

Complications do occur: safety netting required
Female UTI

- Mild UTI symptoms (<3 sympt)
- Ibuprofen vs cipro or fosfomycin

- More symptoms
- More pyelonephritis (NS)
- Positive cultures: more benefit with abx (!)
Older patients with UTI

Women

25%
When to test and treat?

- Only empirical antibiotics and send urine if..
- two or more signs of infection, especially dysuria,
- A positive urine culture or dipstick test will not differentiate between UTI or asymptomatic bacteriuria, [SIGN 2006]
When Should I Worry?

• If I were sat with you in the audience then probably about now but as I’m standing up here it was a little over an hour ago.
When Should I Worry?

• If I were sat with you in the audience then probably about now but as I’m standing up here it was a little over an hour ago.
• I am an Antibiotic Guardian, now you should really worry!
This is the real superhero
This is Staph Aureus
This is Staph Aureus
This is Staph Aureus
This is Staph Aureus
Now he likes to be called MR Staph Aureus
BECOME AN ANTIBIOTIC GUARDIAN
CHOOSE YOUR PLEDGE NOW!

I AM A

HEALTHCARE PROFESSIONAL OR LEADER
Select from the list below
- Primary Care Prescribers

MEMBER OF THE PUBLIC
Select from the list below

STUDENT OR EDUCATOR
Select from the list below
SELECT A PLEDGE MESSAGE*

Messages will display below

- When I see a child with a respiratory tract infection I will share the “When should I worry” booklet with parents/carers. Available at http://www.whenshouldiworry.com/

- I will ensure all prescribers in my practice including locums have easy access to the local antibiotic guidance

- I will adopt the use of delayed/backup prescription for self-limiting respiratory tract infections. The next time I intend to prescribe antibiotics for a self-limiting infection to a patient with high expectations of antibiotic treatment, I will use a delayed/backup prescription


- I will review my practice prescribing against that of the CCG and national averages on fingertips.

TITLE / FULL NAME*

Mr  First name  Surname

EMAIL*

SELECT YOUR COUNTRY
Setting the scene

• ~80% of antibiotic prescribing is in primary care setting.
• Up ~50% said to be ‘unnecessary’.
• I don’t like the word ‘unnecessary’ I’d prefer to say ‘potentially avoidable’.
• Give me an instant, simple, acceptable (affordable) test that tells me a patient’s symptoms are viral and antibiotics are not required. Until then.........
Eight pages of really good advice for parents

Children aged 3 months+

Covers common minor illness symptoms,
  – How long they can last
  – What to do
  – When to get worried
  – How to seek help.

Don’t clinicians look younger these days? (or is it just me?)

www.whenshouldidiworry.com
Sore Throat

- A sore throat does not need any treatment to make it go away. It will get better by itself.
- If your child seems very unwell or has a sore throat and temperature, but no cough, for more than 3 days, he or she should see a doctor or nurse.
- You do not need to look in your child’s throat. If you have, and you are worried about large tonsils, this is not, by itself, something to be concerned about. However, if your child is having difficulty breathing, or seems very unwell (see page 7), you should consult your doctor urgently.

How long will it last?
This chart shows you how long sore throats often lasts in children. The faces represent ten children who have seen their GP with a sore throat. Green faces are those who have recovered at each time period.

Do antibiotics help?
After one week, more than three-quarters of those with a sore throat will be better whether they take antibiotics or not. Most (13 out of 14) who take antibiotics will get better just as quickly as if they had not taken them.
When should I seek further help?

No guide can be complete. If you are still worried about your child after reading this leaflet then you should get advice. This could be telephone advice or a consultation with a doctor or nurse at your surgery. Telephone advice is also available from NHS 111 and out-of-hours services (see contact numbers on the back of this leaflet). If you need urgent advice then dial 111 (England), or if you feel that it is an emergency you should dial 999 for an ambulance.

The following are signs of possible serious illness:

- Your child is drowsy or irritable. (Although children with a temperature are often more sleepy, irritable and lacking interest than usual, they usually improve after treatment with paracetamol and / or ibuprofen. If they do not improve, or if they are very drowsy indeed, they should see a doctor urgently).

- Your child has problems breathing - including rapid breathing and being short of breath or 'working hard' to breath. (It sometimes looks as though the tissues between the ribs and below the ribs get sucked in each time they breath). Any child who has a lot of difficulty breathing needs to see a doctor urgently.

- Cold or discoloured hands or feet with a warm body

- Your child has a fit

- Unusual skin colour (pale, blue or dusky around lips)

- A temperature of 39 C or more in a child aged 3-6 months of age (an infant that is less than 3 months of age should be assessed if they have a temperature of 38 C or more).

- An infant who is not feeding or any child that is showing signs of dehydration such as dry mouth, sunken eyes, no tears and looking generally unwell (see page 5).
Here comes the science.....

http://www.bmj.com/content/339/bmj.b2885

**Results** Reconsultation occurred in 12.9% of children in the intervention group and 16.2% in the control group (absolute risk reduction 3.3%, 95% confidence interval −2.7% to 9.3%, \( P=0.29 \)). Using multilevel modelling (at the practice and individual level) to account for clustering, no significant difference in reconsulting was noted (odds ratio 0.75; 0.41 to 1.38). Antibiotics were prescribed at the index consultation to 19.5% of children in the intervention group and 40.8% of children in the control group (absolute risk reduction 21.3%, 95% confidence interval 13.7 to 28.9), \( P<0.001 \). A significant difference was still present after adjusting for clustering (odds ratio 0.29; 0.14 to 0.60). There was also a significant difference in the proportion of parents who said they would consult in the future if their child developed a similar illness (odds ratio 0.34; 0.20 to 0.57). Satisfaction, reassurance, and parental enablement scores were not significantly different between the two groups.
The results are in….

Table 3  Effect of practice prescribing history and study intervention on probability of being prescribed an antibiotic

<table>
<thead>
<tr>
<th>Practice antibiotic prescribing history</th>
<th>Higher (above national average for 2005)</th>
<th>Lower (below national average for 2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>16.3%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Control</td>
<td>64.1%</td>
<td>27.3%</td>
</tr>
</tbody>
</table>

Values show probability of being prescribed an antibiotic, calculated from coefficients derived from multilevel modelling.

Adverse outcomes
- admissions to hospital; control = 3, intervention = 4 (but one excluded as they already had asthma).
- Longest stay 2 nights for febrile convolution, all others just over night.
The options....

1. Free PDF file to download and print during consultation.
2. Glossy version purchased from RCGP.
3. CCG get booklet printed, in Sheffield, and distribute to practices.

Now commissioners let’s decide what to do.
Some commissioning management speak

Is this Q.I.P.P.?
• Quality?
• Innovation?
• Prevention?
• Productivity?
You can help to save our antibiotics
Acknowledgements

• With thanks to Helena Parsons STH Consultant Microbiologist for slides 23-35

• And Ian Hutchison Medicines Management Pharmacist
Primary care pathway – Urinary Tract Infection

Sally Gibbs, Consultant Paediatrician  SCH

Sheffield Children's NHS Foundation Trust
Key learning points

• To raise awareness of the new primary care pathway for UTI management in children

• To clarify outpatient referral pathways for children with proven UTI

• To review urine collection techniques

• Highlight variations from NICE guidance
Background

• Urinary tract infection (UTI) is one of the most common bacterial infections.
• Making the diagnosis is particularly difficult in young children and infants because of non-specific clinical signs and the difficulty of urine collection in the non toilet-trained.
• Although the vast majority of children who have a urine infection recover promptly and do not have any long-term complications, there is a small subgroup at risk of significant morbidity ie renal scarring / adult hypertension / chronic renal failure
New primary care pathway

- New pathway for primary care in Sheffield
- Simple
- Easy to follow
- How to guide not a textbook
- Consistent between ED and primary care

That should be easy – shouldn’t it?
Why do we vary from NICE?

- Urinary tract infection in under 16s: diagnosis and management
  Clinical guideline [CG54] Published date: August 2007

- Following NICE in most areas eg diagnosis, testing, inpatient referral, babies < 6 months, children over 3 years.

- Controversies around imaging / follow up regimes – especially for the 6 months to 3 years group
### Children 6 months – 3 years

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<th>Atypical UTI&lt;sup&gt;a&lt;/sup&gt;</th>
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<td>No</td>
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<td>No</td>
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<td>No</td>
<td>No</td>
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<td>DMSA 4–6 months following the acute infection</td>
<td>No</td>
<td>Yes</td>
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<td>MCUG</td>
<td>No</td>
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** Atypical UTI includes children who are seriously ill / systemically unwell, non E coli organisms, risk factors

(Audit)
Definitions

• Upper vs pyelonephritis vs lower vs simple vs too many definitions

• Why does it matter?

• Upper – unwell, fever, vomiting, abdominal pain
• Lower – well, dysuria, frequency

• UTI – pure growth of organisms > 10x5
Diagnosis

- **Infants:** Infants and children under 3 years – NICE suggests send urine for microscopy and culture, and start antibiotics based on microscopy result.

- In practice – use dipstick or if very suggestive symptoms start antibiotics and wait for culture result.

- (SCH study)

- **Children over 3** - base on dipstick result
Urine collection

• NICE states “clean catch urine is the recommended method for urine collection.”

• If not available then collection pads

• NOT cotton wool balls, bags, gauze etc

• ?Quick wee:
  • Faster clean catch urine collection (Quick-Wee method) from infants: randomised controlled trial
  • BMJ 2017; 357 doi: https://doi.org/10.1136/bmj.j1341 (Published 07 April 2017)
## Urine dipstick

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*LE = Leucocyte Esterase

Please note, dipstick testing may be inaccurate in patients under 2 years of age. Positive bacterial culture is the ‘gold standard’ for diagnosis.
Risk factors

• All children:

• Gather and record the information about risk factors for UTI (NICE)
• E.g. Recurrent infection, antenatal diagnosis renal condition, constipation
Antibiotic treatment

• If well enough to stay at home, treat as per Sheffield formulary. If no improvement in 24-48 hours advise to return for urgent review and review of urine culture result.

• If on prophylactic antibiotics and UTI is likely, give an alternative antibiotic and NOT the therapeutic dose of the prophylactic antibiotic. Stop prophylactic antibiotics for the duration of the treatment course.

• Prophylactic antibiotics are not recommended for routine use after first-time UTI
Acute inpatient referral

Consider acute admission to General Paediatric Inpatient Team at Sheffield Children’s Hospital for the following groups:

- Infants under 3 months with temperature > 38 °C (NICE guidance: Fever in under 5s) or suspected UTI
- Infants 3 - 6 months with temperature > 39 °C
- Unwell child, i.e. vomiting, looks unwell, signs of shock
8. Pathway for outpatient referral for UTI

Positive urine culture

A pure growth of $10^5$ organisms per ml is a proven UTI, or $10^4-10^5$ with a strong clinical picture of UTI

- 0-6 months
  - 7 months-2 years
    - 3 years and over
      - Simple
        - No referral (unless recurrent - see below)
      - *Atypical
        - Refer to General Paediatric Outpatients

*Atypical UTI includes:
- seriously ill, i.e. fever or systemic symptoms
- infection with non-E.coli organisms
- poor urine flow
- abdominal or bladder mass
- raised creatinine
- septicaemia
- failure to respond to treatment with suitable antibiotics within 48 hours
Recurrent UTI

- Recurrent UTI is an indication for referral to General Paediatric Outpatients:
  - two or more episodes of UTI with acute pyelonephritis/upper urinary tract infection, or
  - one episode of UTI with acute pyelonephritis/upper urinary tract infection plus one or more episode of UTI with cystitis/lower urinary tract infection, or
  - three or more episodes of UTI with cystitis/lower urinary tract infection
Prevention of recurrence

If treating a UTI, ensure that parents are given UTI prevention advice, including:

• Ensure they are aware of the possibility of a UTI recurring and understand the need to be vigilant and to seek prompt treatment for any suspected reinfection

• Address constipation

• Encourage children to drink an adequate amount

• Emphasise the importance of not delaying voiding and address any dysfunctional voiding
Summary

- Review of new primary care pathway for UTI management in children
- Clarified outpatient referral pathways for children with proven UTI
- Reviewed urine collection techniques
- Discussed variations from NICE guidance
Questions?
Primer care pathway – Urinary Tract Infection
Sally Gibbs, Consultant Paediatrician SCH
- To raise awareness of the new primary care pathway for UTI management in children
- To clarify outpatient referral pathways for children with proven UTI
- To review urine collection techniques
- Highlight variations from NICE guidance
Urinary tract infection (UTI) is one of the most common bacterial infections. Making the diagnosis is particularly difficult in young children and infants because of non-specific clinical signs and the difficulty of urine collection in the non toilet-trained.

Although the vast majority of children who have a urine infection recover promptly and do not have any long-term complications, there is a small subgroup at risk of significant morbidity ie renal scarring / adult hypertension / chronic renal failure.
- New pathway for primary care in Sheffield
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(Audit)
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- (SCH study)

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0-6 months
- 7 months - 2 years (unless simple UTI, but please note this is unusual in this age group)
- 3 years and over

0-6 months
- Refer to General Paediatric Outpatients

7 months - 2 years
- Simple
- No referral (unless recurrent - see below)

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- Simple
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- Refer to General Paediatric Outpatients

*Atypical UTI includes:
- Seriously ill, i.e. fever or systemic symptoms
- Infection with non-E.coli organisms
- Poor urine flow
- Abdominal or bladder mass
- Raised creatinine
- Septicaemia
- Failure to respond to treatment with suitable antibiotics within 48 hours
Recurrent UTI is an indication for referral to General Paediatric Outpatients:

- two or more episodes of UTI with acute pyelonephritis/upper urinary tract infection, or
- one episode of UTI with acute pyelonephritis/upper urinary tract infection plus one or more episode of UTI with cystitis/lower urinary tract infection, or
- three or more episodes of UTI with cystitis/lower urinary tract infection
If treating a UTI, ensure that parents are given UTI prevention advice, including:

• Ensure they are aware of the possibility of a UTI recurring and understand the need to be vigilant and to seek prompt treatment for any suspected reinfection

• Address constipation

• Encourage children to drink an adequate amount

• Emphasise the importance of not delaying voiding and address any dysfunctional voiding
- Review of new primary care pathway for UTI management in children
- Clarified outpatient referral pathways for children with proven UTI
- Reviewed urine collection techniques
- Discussed variations from NICE guidance
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