



**TARGET**

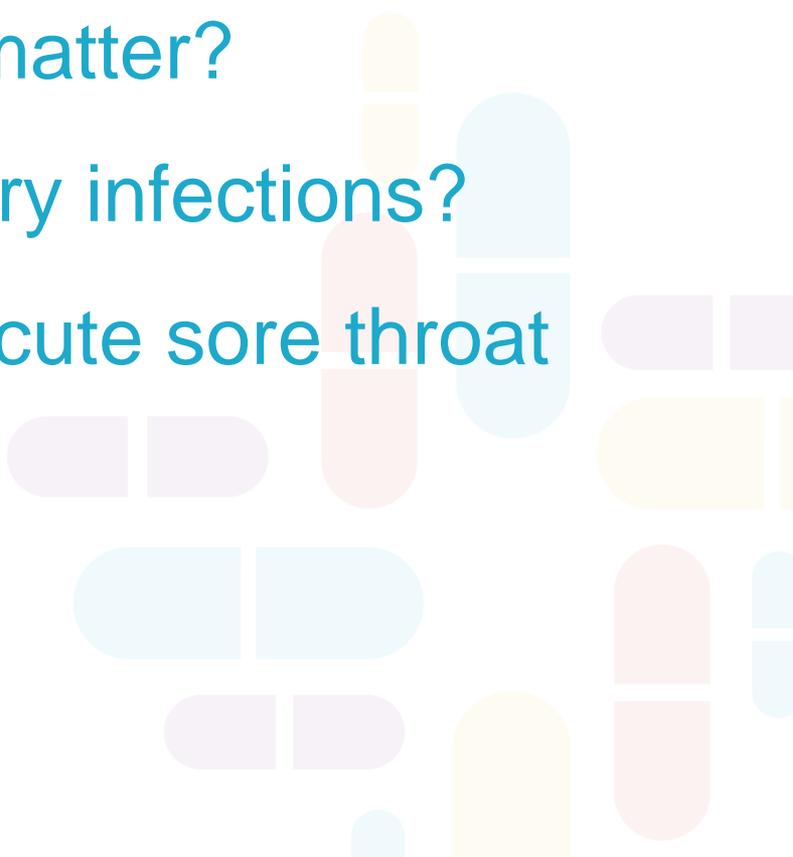
presents



# **THE IMPORTANCE OF APPROPRIATE ANTIBIOTIC USE**

Professor Michael Moore

University of Southampton

- 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

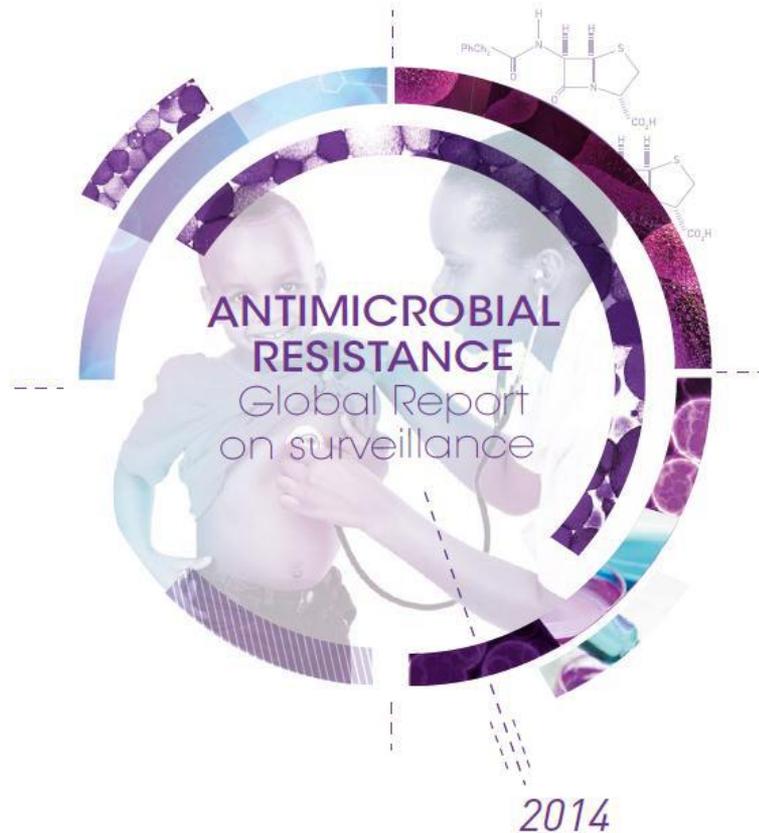


## Telegraph

- ▶ 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.

## Daily Mail

- ▶ How long until your antibiotics stop working? More infections are becoming resistant to drugs at a frightening speed.



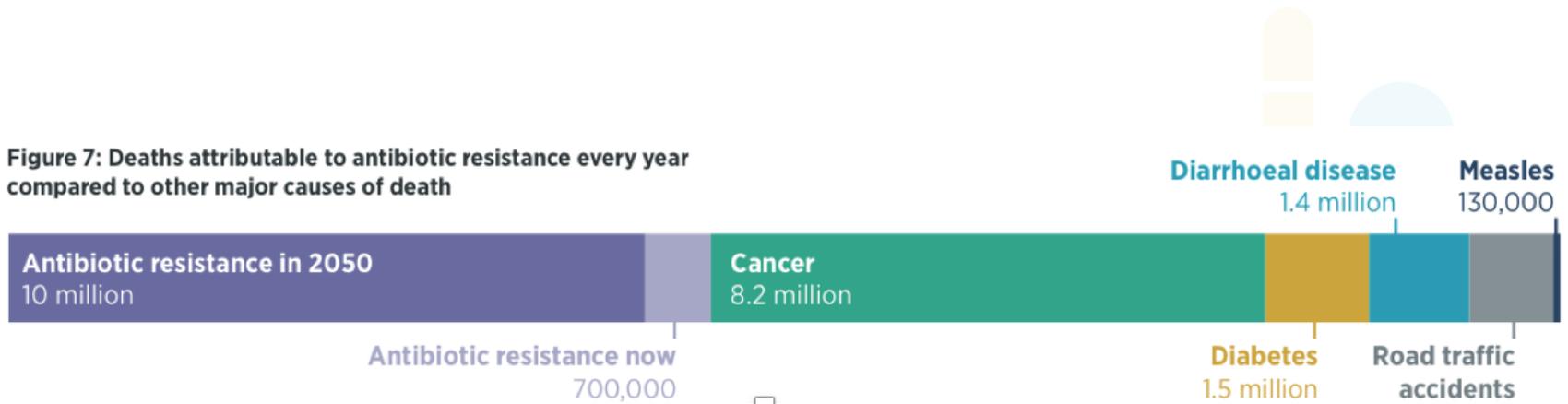
High proportions of resistance were reported in all regions to common treatments in both healthcare settings and in the community

Risk of death doubled with resistant bugs

# DEATHS DUE TO RESISTANCE

Estimated by 2050, deaths due to resistance will exceed those due to cancer

Figure 7: Deaths attributable to antibiotic resistance every year compared to other major causes of death



Current estimates 700 000  
 By 2050 estimate 10 million  
 O'Neill 2014

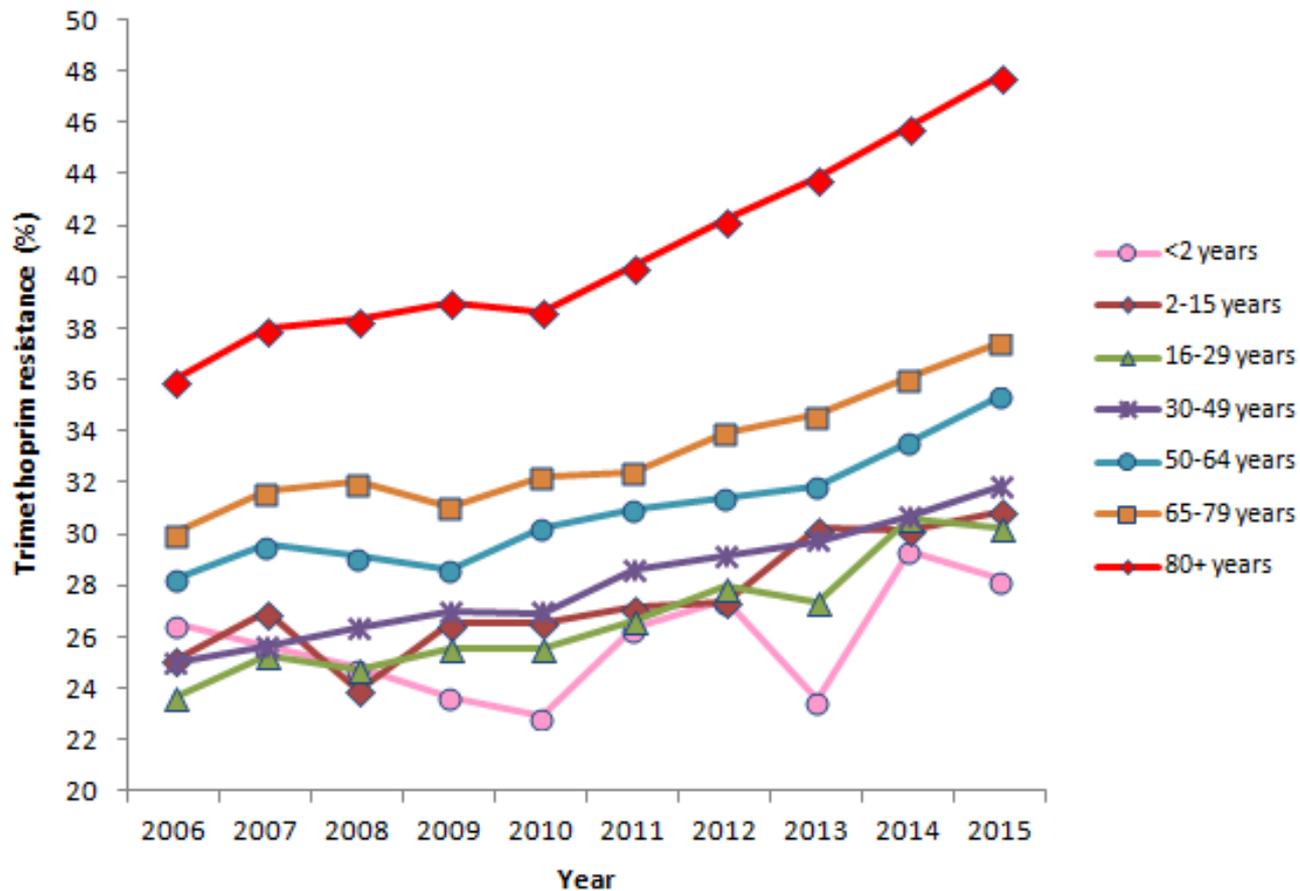
# WHY DOES GP PRESCRIBING MATTER?



# WHAT IS HAPPENING NOW?

- 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

## Trimethoprim resistance in GP urines by age group (Welsh data)



# ANTIBIOTIC PRESCRIBING IN PRIMARY CARE: RESISTANCE - A META-ANALYSIS

	Odds Ratio risk for resistance	
	Antibiotic <2 m	Antibiotic <12 m
<b>UTI</b> <b>(5 studies, 14,348)</b>	<b>2.5</b>	<b>1.33</b>
<b>RTI</b> <b>(7 studies, 2,605)</b>	<b>2.4</b>	<b>2.4</b>

Longer duration and multiple courses were associated with higher resistance rates  
 Costelloe BMJ 2010 <http://www.bmj.com/content/340/bmj.c2096.full>

# 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

## 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



# ANTIBIOTIC AND SYMPTOMS VS NATURAL HISTORY (NICE)

## EVIDENCE FROM RCTS, SYSTEMATIC REVIEWS

	<b>PRIOR DURATION</b>	<b><i>DURATION AFTER SEEING DOCTOR</i></b>	<b>TOTAL DURATION UNTREATED</b>	<b>BENEFIT FROM ANTIBIOTICS</b>	<b>NNT</b>
<b>OTITIS MEDIA</b>	1-2 days	3-5 days	4 days	8-12 hours	18
<b>SORE THROAT</b>	3 days	5 days	8 days	12-18 hours	10-20
<b>SINUSITIS</b>	5 days	7-10 days	12-15 days	24 hours	13
<b>BRONCHITIS</b>	10 days	10-12 days	20-22 days	24 hours	10-20

# ANTIBIOTICS AND COMPLICATIONS

- 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

# HIGH COMPARED TO LOW PRESCRIBING PRACTICES

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

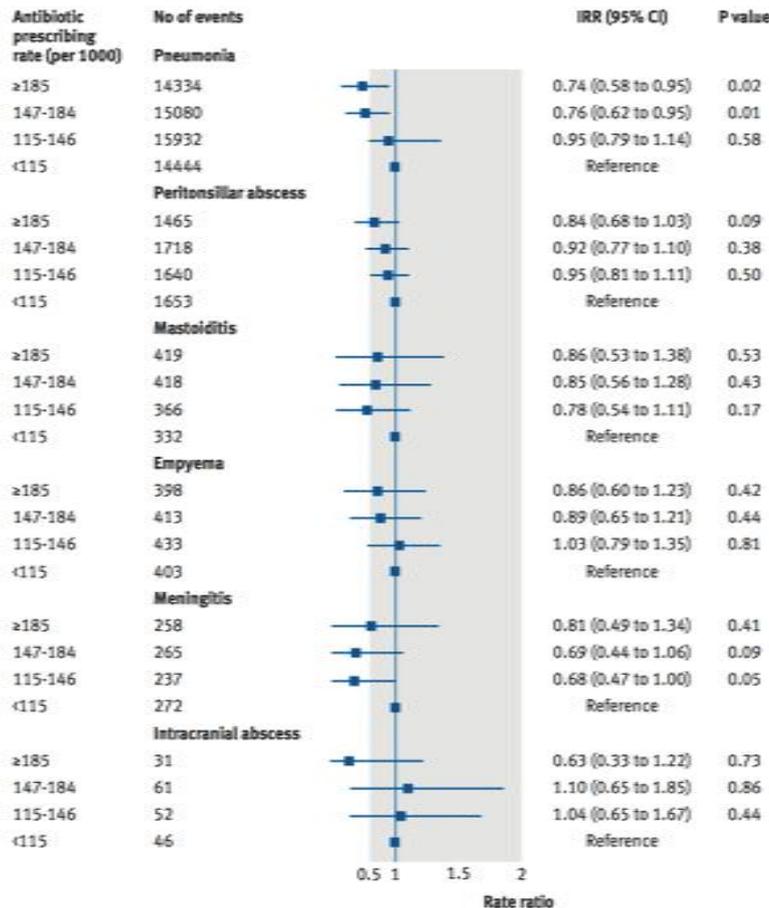


Fig 5 | Association of incidence of infective complications with fourth of antibiotic prescribing rate. Incidence rate ratios (IRRs) were adjusted for consultation rate for respiratory tract infections, sex, age group, region, deprivation fifth, and clustering by general practice

# 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

- 39% want antibiotics
- Patients want
  - Relief from symptoms (43%) /pain (24%)
  - Diagnosis (49%)
  - Reassurance (13%)

Linder 2003 Linder JA, Singer DE. Desire for antibiotics and antibiotic prescribing for adults with upper respiratory tract infections. J Gen Intern Med. 2003;18(10):795-801.

# ANTIBIOTICS AND SORE THROAT

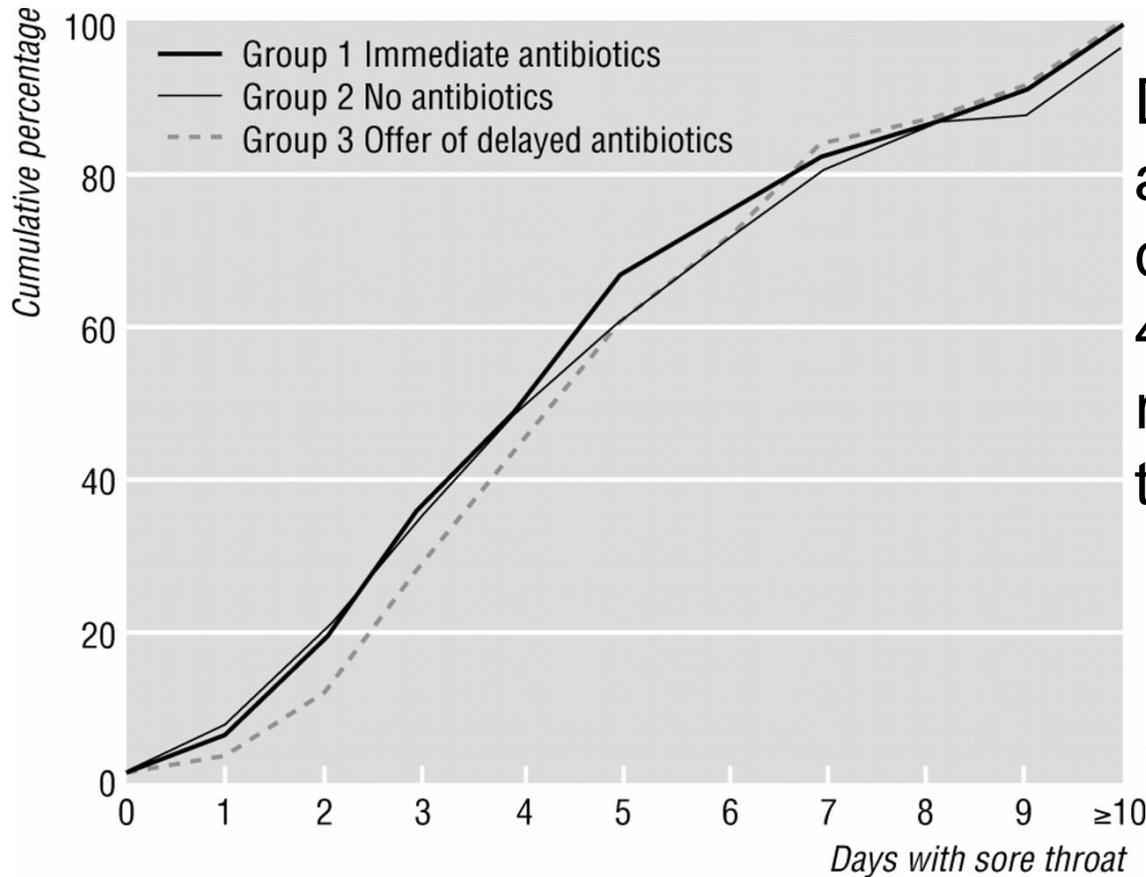


# WHY PRESCRIBE?

- Symptom Benefit?
- Avoid complications?
- Patient Demand?
- Target to those at high risk?



	<b>PRIOR DURATION</b>	<b><i>DURATION AFTER SEEING DOCTOR</i></b>	<b>TOTAL DURATION UNTREATED</b>	<b>BENEFIT FROM ANTIBIOTICS</b>	<b>NNT</b>
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Duration of sore throat after consultation in 716 community patients over 4 years with sore throat, randomised to one of three treatment groups.

Little P, Williamson I et al. Open randomised trial of prescribing strategies in managing sore throat. *British Medical Journal* 1997;314:722-7.

- 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

Little P, Stuart B, Hobbs FD, et al. Antibiotic prescription strategies for acute sore throat: a prospective observational cohort study. *Lancet Infect Dis.* 2014.

## 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?

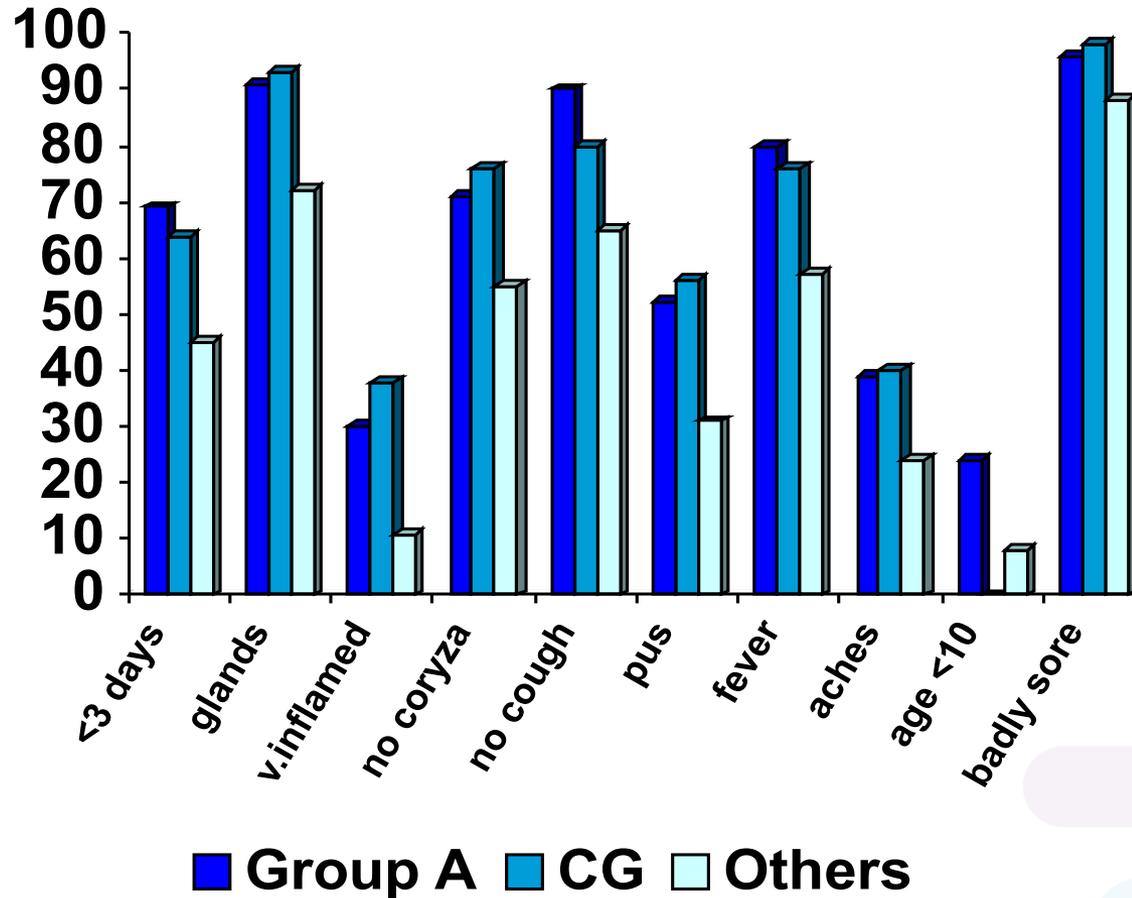


# CAN THE CENTOR SCORE BE IMPROVED?

- Developed in emergency department setting
- Predicts presence of Streptococcus A only
- Not that selective



# ARE STREPTOCOCCI C+G IMPORTANT?



BJGP 2012 Little P. Incidence and clinical variables associated with streptococcal throat infections: a prospective diagnostic cohort study. BrJGenPract. 2012;62(604):787-94.

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

- \* **F**ever last 24h
- **P**us on tonsils
- \* **A**ttend rapidly (3 or less days)
- \* severely **I**nflamed tonsils
- **N**o cough or coryza (i.e. pharyngeal illness)

\* = univariate and multivariate in both cohorts

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

Centor score						
	0	1	2	3	4	Total
<b>Number patients with Streptococcus (% PPV)</b>	3 (7%)	10 (11%)	45 (23%)	65 (43%)	55 (57%)	178 (31%)
<b>Total number patients with each score (% of total)</b>	45 (8%)	88 (15%)	199 (34%)	152(26%)	97(17%)	581(100%

# FeverPAIN SCORE

(FEVER, PUS, ATTEND RAPIDLY, INFLAMED, NO COUGH/CORYZA)

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

# RANDOMISED TRIAL OF FeverPAIN SCORE, DELAYED PRESCRIBING & RADT

thebmj

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## Research

Clinical score and rapid antigen detection test to guide antibiotic use for sore throats: randomised controlled trial of PRISM (primary care streptococcal management)

BMJ 2013 ; 347 doi: <http://dx.doi.org/10.1136/bmj.f5806> (Published 10 October 2013)

Cite this as: *BMJ* 2013;347:f5806

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Peer review

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- ▶ 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

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

\*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.

# SUMMARY: IN SORE THROAT 1

- 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

## SUMMARY: IN SORE THROAT 2

- 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**

