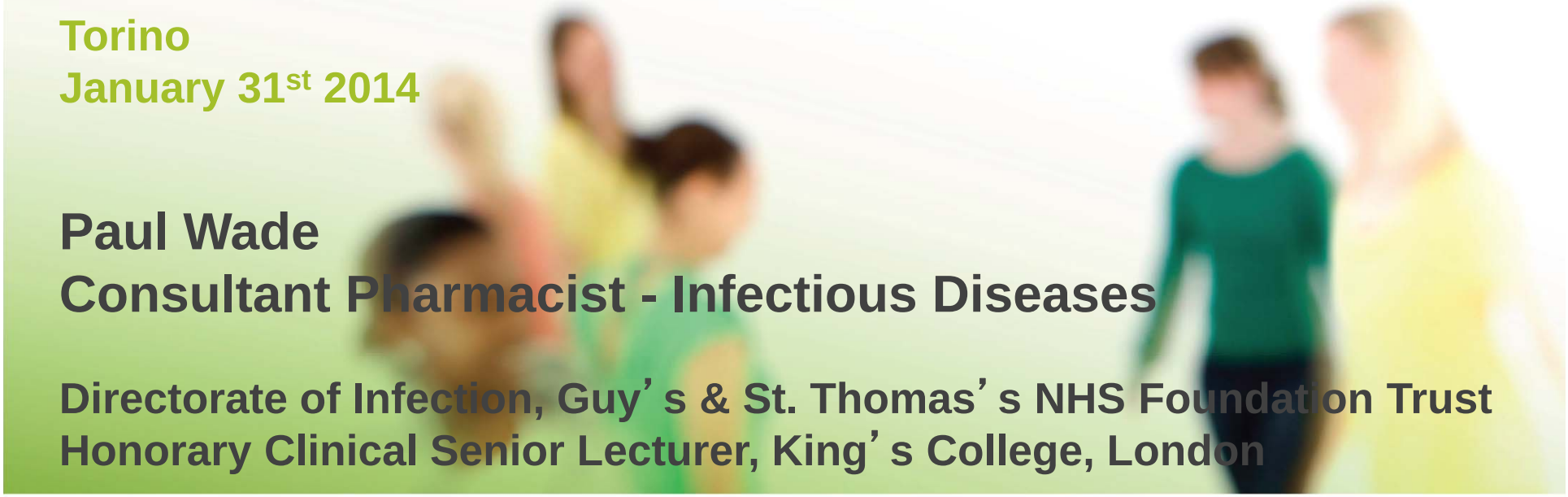
Antimicrobial Stewardship in the UK

Collaborative Working: Antimicrobial Stewardship
SIFO Piemonte-VdA & ANDMO Piemonte-VdA
Torino
January 31st 2014



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Disclosures

Honoraria, consultancy fees & speakers' bureau fees from:

- Astellas
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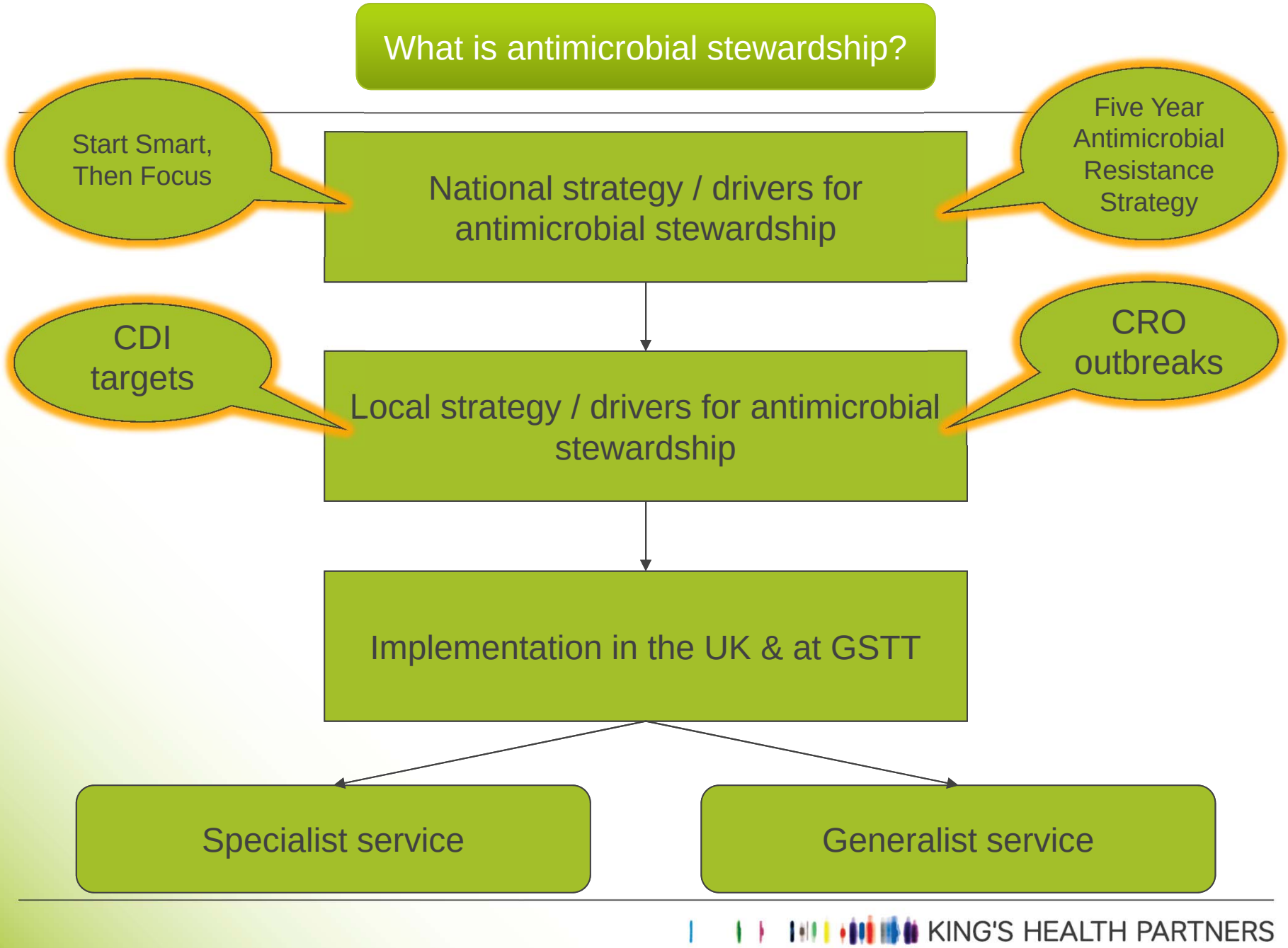

What is antimicrobial stewardship?
Start Smart, Then Focus
National strategy / drivers for antimicrobial stewardship
Five Year Antimicrobial Resistance Strategy
CDI targets
Local strategy / drivers for antimicrobial stewardship
CRO outbreaks
Implementation in the UK & at GSTT
Specialist service
Generalist service

What is Antimicrobial Stewardship (AMS)

Antimicrobial stewardship is a package of measures designed to:

provide effective, safe and economic use of antibiotics while also preventing resistance development

What makes an antimicrobial stewardship program?

Core strategies

- Prospective audit with intervention & feedback
- Formulary restriction & pre-authorisation

Supplemental strategies

- Education
- Guidelines/pathways
- Order forms
- De-escalation
- Dose optimisation
- IV-oral conversion

Who is involved in an AMS Programme?

Antimicrobial Stewardship Team - multidisciplinary

- **ID physician/clinical microbiologist**
- **ID pharmacist**
- **IT support**
- **IC/epidemiology support**

Antimicrobial Stewardship Committee

- **Members of the AMS team**
- **Director for Infection Prevention & Control for organisation**
- **Other clinical members**
  - Intensivists, physicians, surgeons, paediatricians

What is the national & international context?

Antimicrobial resistance is increasing

Healthcare advances are leading to increasing antimicrobial use in secondary care settings

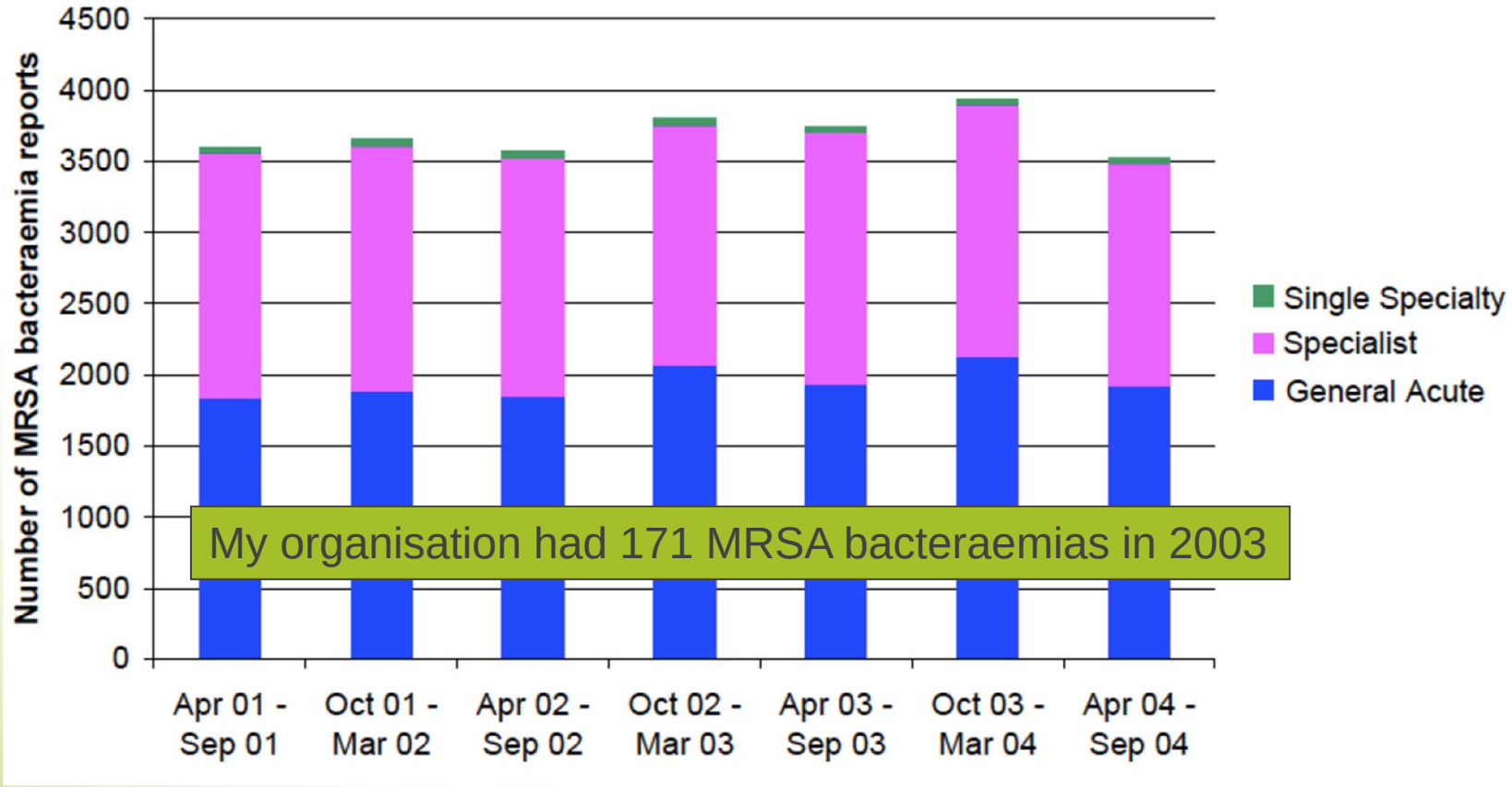
Limited return on investment has led to disengagement in new drug development from Pharma

Lack of information on efficacy of strategies to control antimicrobial usage, resistance development & HCAIs

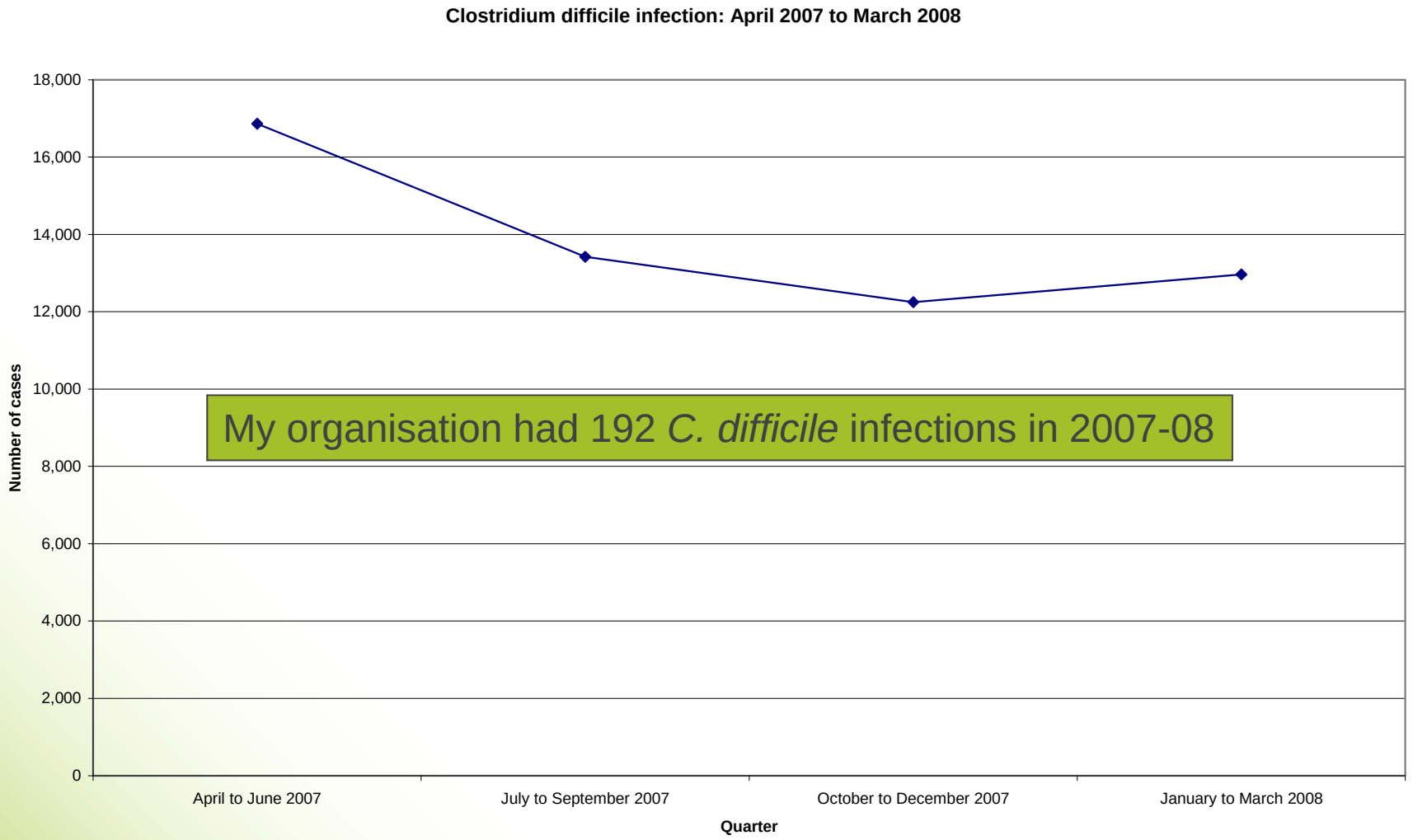
Drivers for Antimicrobial Stewardship
National & Local

Historical MRSA data

Figure 2: Number of MRSA bacteraemia reports in England from April 2001 to September 2004



Historical *Clostridium difficile* infection data



A major driver was also the media pressure…

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Health minister: My father's death after contracting MRSA

A Government health minister has revealed that his father died after contracting the superbug MRSA while in hospital.

Phil Hope MP undertaking a ultrasound scan on his finger Photo: Department of Health

By Laura Donnelly, Health Correspondent
9:01PM GMT 24 Jan 2009

Comment

Phil Hope's father Alfred died in June after becoming infected with the bug during a hip operation. Four months later, Mr Hope was appointed to the Department of Health.

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In Health News

Extent of antimicrobial usage & associated risks

- **Past UK data suggests up to 50% are used inappropriately**
- **30% (400) of in-patients are on antimicrobials**
- **200 patients per day who may require intervention**
- **15 patients per day added to referral & watch list**
  - 600 patients requiring review in last 2 months
- **Robust data is time-consuming to generate & hard to maintain**
  - IT support is lacking

Table 2. Causal associations between antimicrobial use and the emergence of antimicrobial resistance.

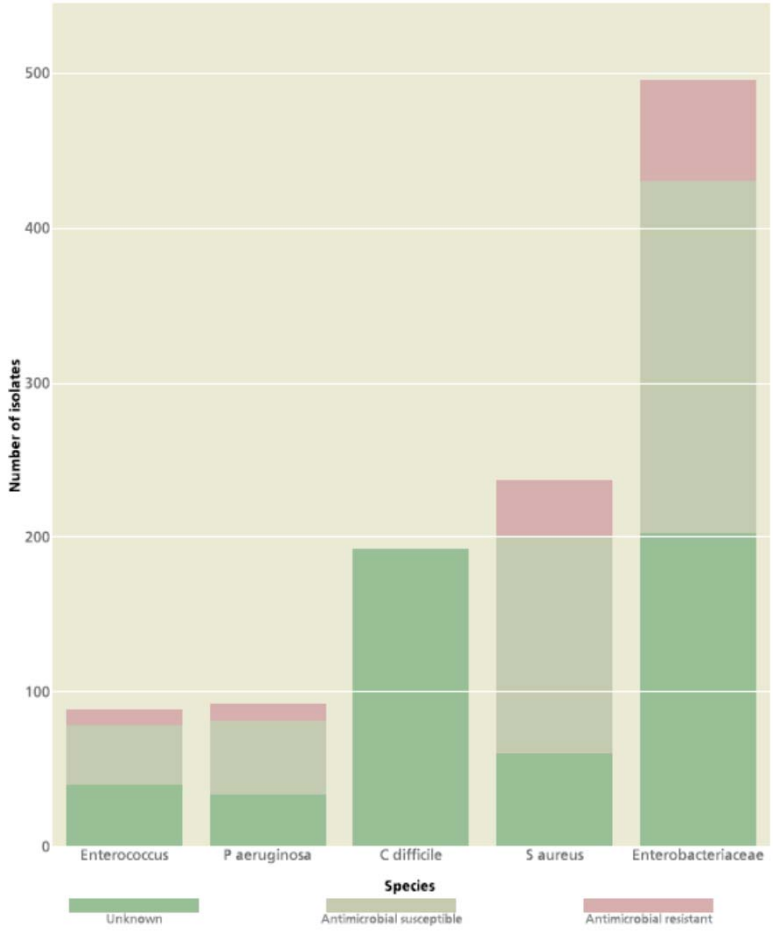
Changes in antimicrobial use are paralleled by changes in the prevalence of resistance.
Antimicrobial resistance is more prevalent in health care–associated bacterial infections, compared with those from community-acquired infections.
Patients with health care–associated infections caused by resistant strains are more likely than control patients to have received prior antimicrobials.
Areas within hospitals that have the highest rates of antimicrobial resistance also have the highest rates of antimicrobial use.
Increasing duration of patient exposure to antimicrobials increases the likelihood of colonization with resistant organisms.

NOTE. A causal association between antimicrobial use and the emergence of antimicrobial resistance has been reviewed elsewhere [9, 19–22] and is strongly suggested on the basis of several lines of evidence that are derived from patient and population levels of analysis, colonization and infection data, and retrospective and prospective studies [23–31]. Adapted from [10].

Clinical Infectious Diseases 2007; 44:159–77

Other resistance problems on the increase

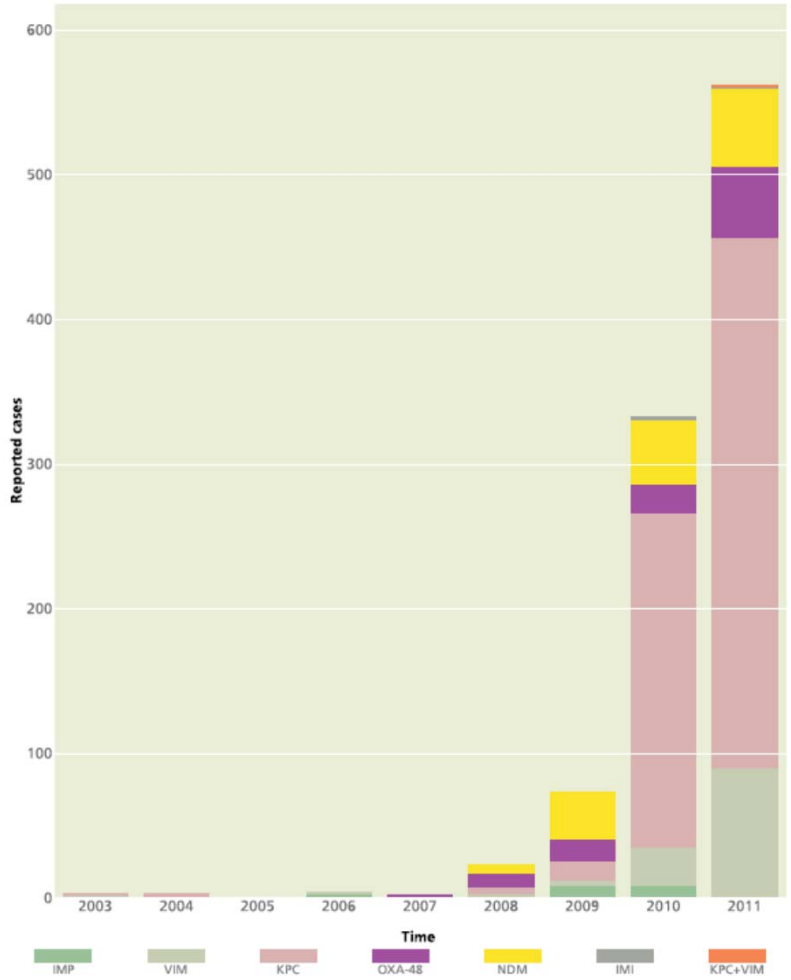
Figure 4.1: Leading pathogens in hospital patients by antimicrobial resistance, England, 2011



Source: English National Point Prevalence Survey on Healthcare Associated Infections and Antimicrobial Use, 2011: Health Protection Agency, England; 2012. (Dr Susan Hopkins, personal communication)

Depicted are the five leading pathogen categories identified among the 52,443 patients surveyed in 2011. Of the 1,526 pathogens identified, these five groups accounted for 1,104 (72%). In total 52,443 patients were surveyed of which 3,509 (6.7%) were diagnosed with HCAI. In the case of S. aureus, resistant refers to MRSA; for Enterobacteriaceae (mostly Escherichia coli) resistant refers to those encoding extended spectrum β-lactamases. Susceptibility testing is not undertaken for C. difficile as a routine.

Figure 5.2: Trend in carbapenemase-producing Enterobacteriaceae cases referred to HPA (Colindale), United Kingdom, 2003 to 2011



Source: HPA. English National Point Prevalence Survey on Healthcare Associated Infections and Antimicrobial Use, 2011: Health Protection Agency, England; 2012. (Dr Susan Hopkins & Dr Alan Johnson, personal communication)

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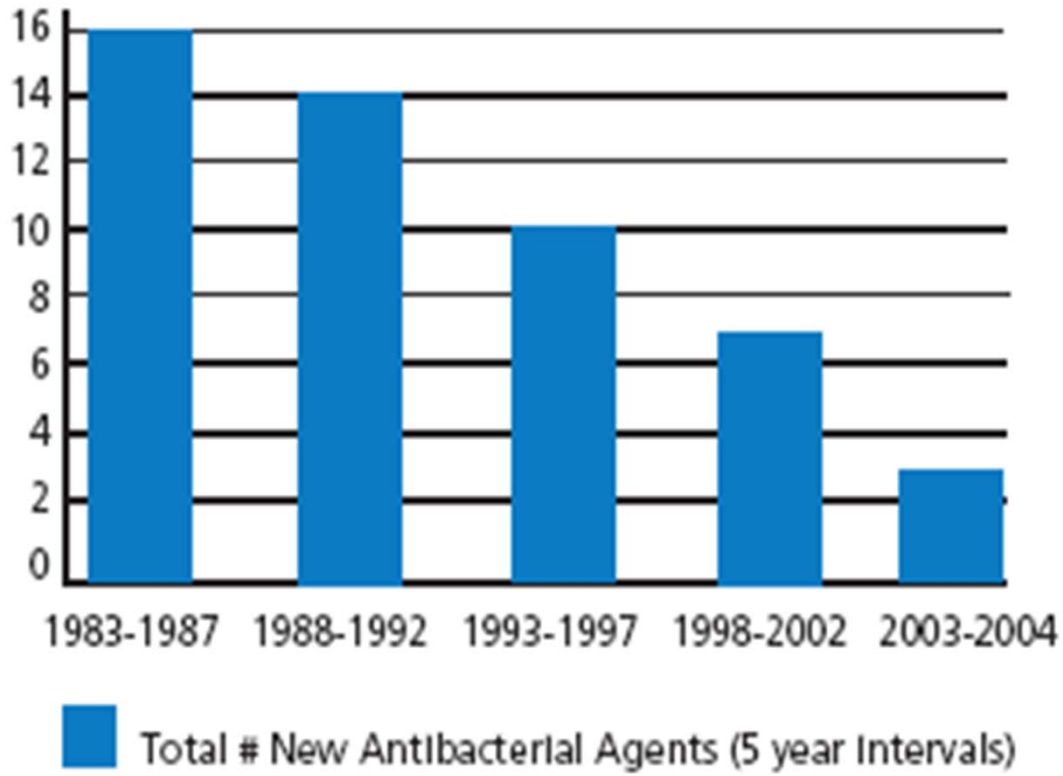
Antimicrobial pipeline is almost dry



Source: Spellberg et al., *Clinical Infectious Diseases*, May 1, 2004 (modified)

2005-2011

Ertapenem

Doripenem

Tigecycline

Daptomycin

Linezolid

2012

Fidaxomicin

2013

Ceftaroline fosamil

National Guidance

Government directives, guidelines, reports since 1998 – slide 1

Table 1. Official texts and guidance from the Department of Health and national bodies to improve antibiotic prescribing and stewardship

Year	Author	Publication title	Focus	Type
1998	Standing Medical Advisory Committee (SMAC) Sub-Group on Antimicrobial Resistance	The Path of Least Resistance	Report on antimicrobial resistance National strategy for minimizing the development of antimicrobial resistance	Report/recommendations
1999	Department of Health	Resistance to antibiotics and other antimicrobial agents: action for the NHS following the government's response to the House of Lords Science and Technology Select Committee report "Resistance to antibiotics and other antimicrobial agents"	Set out an action plan for the NHS, aimed at reducing the emergence and spread of antimicrobial resistance and its impact on the treatment of infection. Includes strategies to monitor and optimize antimicrobial prescribing by implementing antibiotic guidelines, supporting professional development on appropriate prescribing, reducing inappropriate prescribing and using clinical governance arrangements to support improved prescribing	Health Service Circular
2000	Department of Health	UK Antimicrobial Resistance Strategy and Action Plan	UK action plan to reduced resistance	Guidance

Government directives, guidelines, reports since 1998 – slide 2

Table 1. Official texts and guidance from the Department of Health and national bodies to improve antibiotic prescribing and stewardship

Year	Author	Publication title	Focus	Type
2003	Department of Health	Winning ways: Working together to reduce Healthcare Associated Infection in England	Set out for the first time a clear direction for the local NHS to reduced HCAIs. Includes seven action areas including prudent use of antibiotics	Guidance
2003	Department of Health	Hospital Pharmacy Initiative for Promoting Prudent Use of Antibiotics in Hospitals.	Letter highlighting new funding for promoting prudent antibiotic prescribing through enhanced clinical pharmacy activity.	Chief Medical Officer Professional Letter
2006	Department of Health	The Health Act 2006	Code of Practice for Prevention and Control of Healthcare Associated Infections. Requires all NHS trusts to have antimicrobial prescribing policies	Code of practice
2007	Department of Health	Saving Lives: reducing infection, delivering clean and safe care	Provides the tools and resources for Trusts to achieve the legal requirement to meet Implementation of Code of Practice for Prevention and Control of Healthcare Associated Infections (Health Act 2006)	Guidance/Toolkit

Government directives, guidelines, reports since 1998 – slide 3

Table 1. Official texts and guidance from the Department of Health and national bodies to improve antibiotic prescribing and stewardship

Year	Author	Publication title	Focus	Type
2007	Specialist Advisory Committee on Antimicrobial Resistance (SACAR)	Antimicrobial framework	A framework to support the safe and appropriate use of antimicrobials	Best practice, care guideline; journal article
2008	Department of Health	Health and Social Care Act 2008	The Health and Social Care Act sets out what registered providers of health and social care services should do to ensure compliance with the Care Quality Commission (CQC) registration requirement for cleanliness and infection control (CQC Guidance about compliance, Outcome 8). It also sets out the 10 criteria against which a registered provider will be judged on how it complies with this registration requirement. Includes antimicrobial prescribing and stewardship as guidance for compliance with criterion 9	Code of Practice for health and adult social care on the prevention and control of infections and related guidance

Government directives, guidelines, reports since 1998 – slide 4

Table 1. Official texts and guidance from the Department of Health and national bodies to improve antibiotic prescribing and stewardship

Year	Author	Publication title	Focus	Type
2009	Department of Health and HPA	*Clostridium difficile* infection: how to deal with the problem	10 key recommendations including antimicrobial stewardship for healthcare providers and commissioners highlighted as having the greatest impact in helping management address the problem of *Clostridium difficile* infection	Guidance
2009	National Pharmacy Reference Group	Antimicrobial stewardship: an evidence-based, antimicrobial self-assessment toolkit (ASAT) for acute hospitals	A web-enabled, version-controlled instrument for the assessment of antimicrobial stewardship in acute hospitals	Self assessment toolkit; journal article
2010	HPA	HPA Antibiotic Guidance for Primary Care	The updated antibiotic guidance for primary care clinicians. The guidance, is modifiable locally by PCTs and are distributed to practices.	

Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship

Timothy H. Dellit,[1] Robert C. Owens,[2] John E. McGowan, Jr.,[3] Dale N. Gerding,[4] Robert A. Weinstein,[5] John P. Burke,[6] W. Charles Huskins,[7] David L. Paterson,[8] Neil O. Fishman,[9] Christopher F. Carpenter,[10] P. J. Brennan,[9] Marianne Billeter,[11] and Thomas M. Hooton[12]

Clinical Infectious Diseases 2007;44:159–77

Saving Lives: reducing infection, delivering clean and safe care

Antimicrobial prescribing

A summary of best practice

The Health and Social Care Act 2008

Code of Practice for the NHS on the prevention and control of healthcare associated infections and related guidance

Clostridium difficile infection:

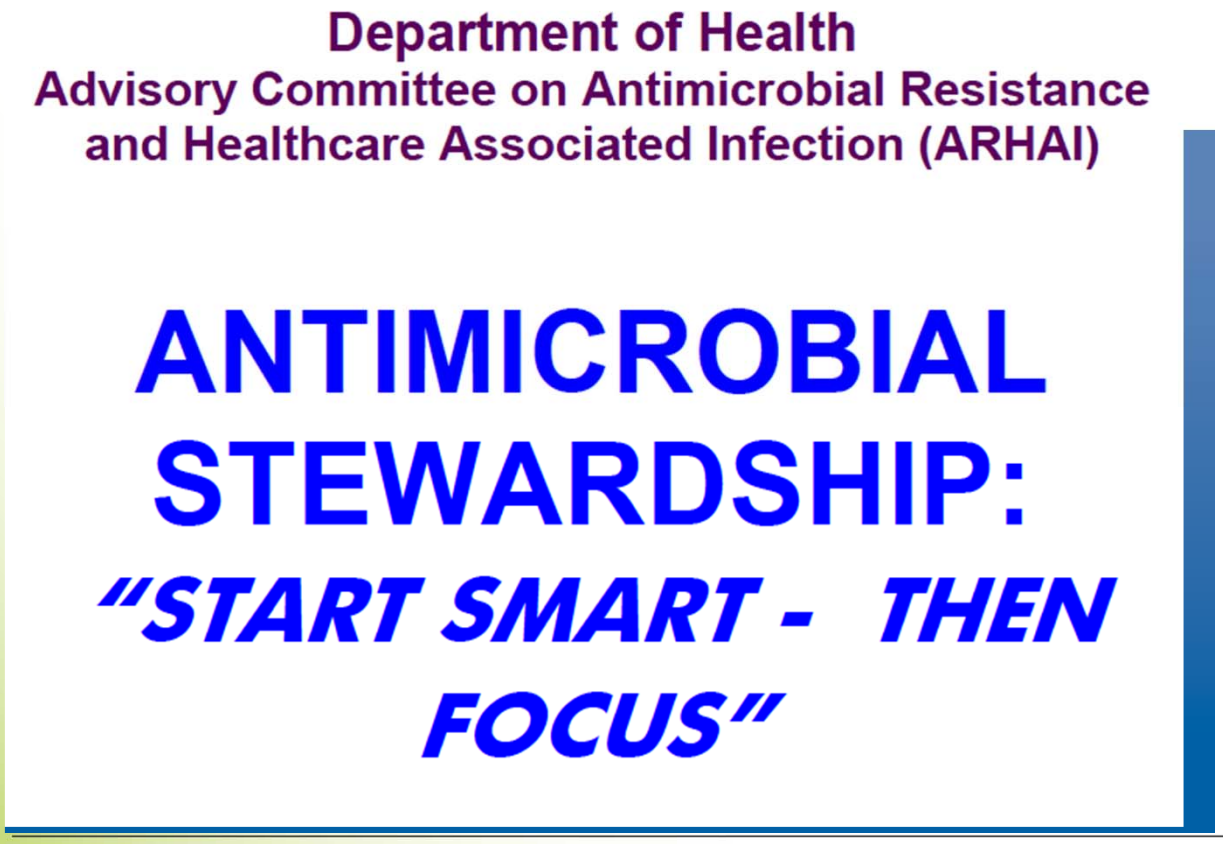
How to deal with the problem

Available at: http://www.researchdirectorate.org.uk/uhsm/asat/rac/rac-request.asp?racdid=AT315701

Antimicrobial (AM) management within the Trust – structures and lines of responsibility and accountability		Enter Your Score Here
Does the Trust have a written strategy for assuring the quality of antimicrobial use?	1 for Y	
Is antimicrobial stewardship addressed within the Trust Infection Control Strategy?	1 for Y	
Does the DIPC have antimicrobial stewardship included within their job description?	1 for Y	
Does the Trust have an antimicrobial committee or equivalent accountable to the IC/DT Committee?*	1 for Y	
How often does it meet?	2 for more frequently than 3 monthly, 1 for quarterly 0 for less	
Does it have minutes or an action list?	1 for Y	
Where do the minutes/actions go?	1 for CG/IC/DT or higher level	
Does the Trust board including non-Exec directors receive an annual report pertaining to AM stewardship?	1 for Y	
	Total	0
Operational delivery of antimicrobial strategy		Enter Your Score Here
Is there an AM policy (overall principles for use) or section in another Trust policy?	1 for Y	
Is there an AM Formulary/section within Trust formulary?	1 for Y	
Is there a system for control of entry for new AMs?	1 for Y	
Is there a system for restricted access to certain Formulary antimicrobials within the trust?	1 for Y	
Is there a system for reporting unauthorised prescribing?	1 for Y	
Are peer-reviewed, evidence-based, guidelines available for treatment of common infections?**	3 for Y	
Are peer-reviewed, evidence-based, surgical prophylaxis guidelines available for the common procedures?	2 for Y	
How frequently are 2.1, 2.2, 2.6 and 2.7 reviewed?	2 for yearly, 1 for every 2 years	
Is there document/version control for all policies/guidelines?	1 for Y	
Are full electronic versions available in all appropriate networked computers?	2 for Y	
Is an easily accessible printed summary available to all wards and prescribers (eg pocket guide)?	3 for Y	
Is selection for the guidelines informed by local microbiological sensitivity patterns?	1 for Y	
Does the Microbiology Laboratory use selective reporting of results in line with formulary choices?	2 for Y	
Does the AM policy stipulate that indication should be recorded before AMs are prescribed?	2 for prescription, 1 for notes, 3 for both	
Does the AM Policy stipulate that course length or review date is recorded on the prescription chart at time of prescribing?	2 for prescription, 1 for notes, 3 for both	
Does the AM policy stipulate that prescriptions for AMs be reviewed in line with "Saving Lives"?	3 for daily, 1 for every 48 hours	
Does the AM Policy stipulate that appropriate de-escalation of therapy takes place?	1 for Y	
Are there IV to Oral switch guidelines?	1 for Y	
Do AM guidelines provide guidance on typical duration of treatment for each indication?	1 for Y	
Do AM guidelines provide guidance on choice, dose, route, IV switch for each indication as appropriate?	1 for each point (4 max)	
Are there antimicrobial ward rounds?	1 for weekly, 2 for twice weekly, 3 for more often	
Is advice from a medical microbiologist/ID physician available by telephone?	1 for working hours, 2 for 24 hours	
	Total	0
NOTE: 2.1 to 2.7 may be contained in a single document, if so score 1 for each		
Risk assessment for antimicrobial chemotherapy		Enter Your Score Here
Does the trust have guidelines that include advice for managing patients with AM allergies?	1 for Y	
Is there guidance on administration of IV AMs?	1 for Y	
Is there guidance on dosing optimisation for AMs with a narrow therapeutic index?	1 for Y	

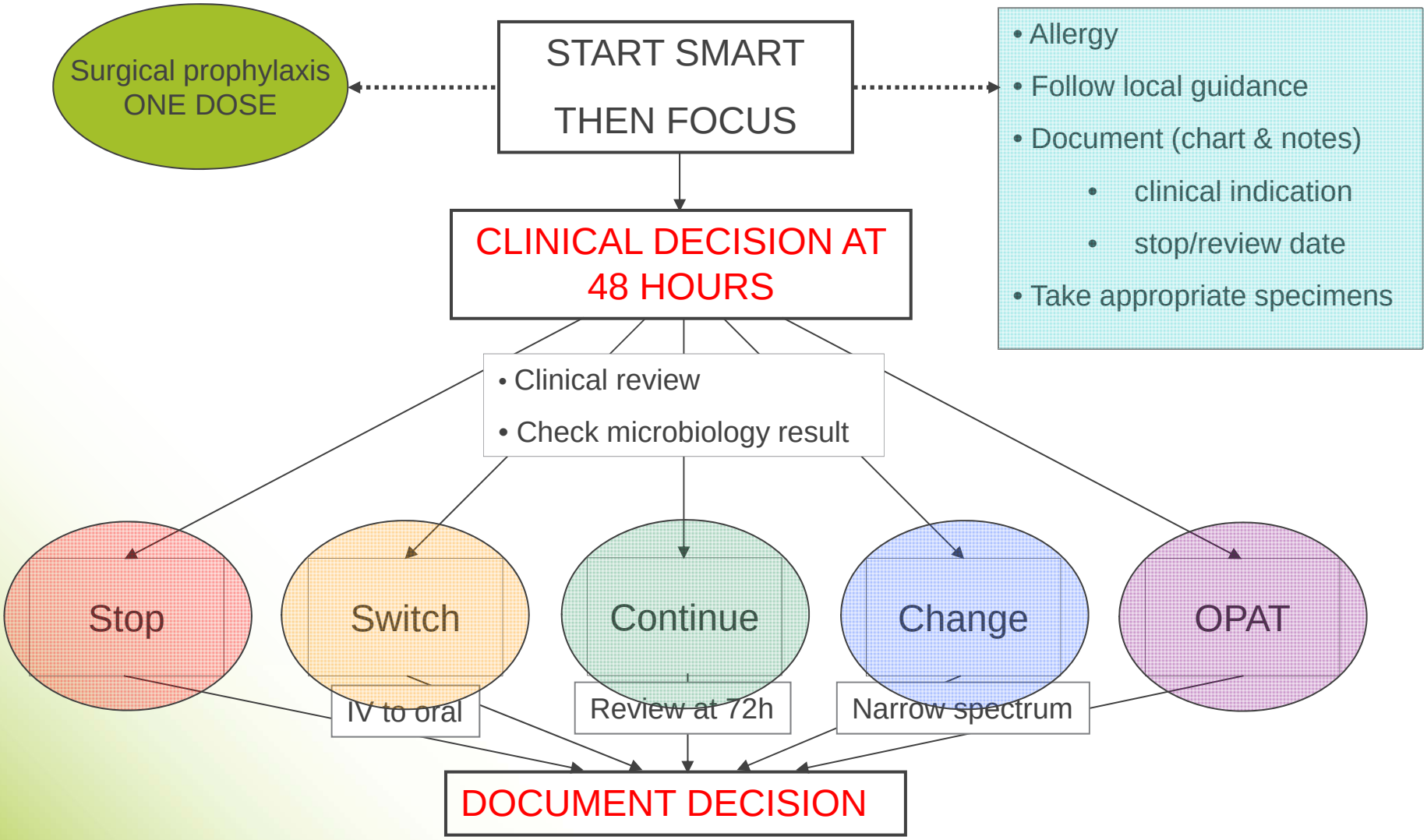
Most recent relevant Government directives, guidelines, reports

- **Start Smart, Then Focus**
  - Published 2011



Right Drug, Right Time, Right Dose, Right Duration…..

….. Every time



Adapted from ARHAI Antimicrobial Stewardship Guidance
November 2011

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UK Five Year Antimicrobial Resistance Strategy

i. **improve the knowledge and understanding of AMR** through better information, intelligence, supporting data and developing more effective early warning systems to improve health security,

ii. **conserve and steward the effectiveness of existing treatments** through improving infection prevention and control and development of resources to facilitate optimal use of antibiotics in both humans and animals,

iii. **stimulate the development of new antibiotics, diagnostics and novel therapies** by promoting innovation and investment in the development of new drugs and ensuring that new therapeutics reach the market quickly.

Actions:

1 **improving infection prevention and control practices** in human and animal health, both through enhanced dissemination and implementation of best practice and better use of data and diagnostics (supports strategic aims i and ii),

2 **optimising prescribing practice** through implementation of antimicrobial stewardship programmes that promote rational prescribing and better use of existing and new rapid diagnostics (supports strategic aims i and ii),

3 **improving professional education, training and public engagement** to improve clinical practice and promote wider understanding of the need for more sustainable use of antibiotics (supports strategic aims i and ii),

4 **developing new drugs, treatments and diagnostics** through better collaboration between research councils, academia, industry and others; and by encouraging greater public-private investment in the discovery and development of a sustainable supply of effective new antimicrobials, rapid diagnostics, and complementary tools for use in health, social care, and veterinary systems (supports strategic aims ii and iii),

5 **better access to and use of surveillance data** in human and animal sectors through new arrangements that facilitate greater consistency and standardisation of the data collected across the system and encourage improved data linkage (supports strategic aims i and ii),

6 **better identification and prioritisation of AMR research needs** to focus activity and inform our understanding of AMR. This may identify alternative treatments to new drugs as well as new or improved rapid or point-of-care diagnostic tests for humans and animals (supports strategic aims i, ii and iii),

7 **strengthened international collaboration** working with and through a wide range of governmental and non-governmental organisations, international regulatory bodies and others to influence opinion, galvanise support, and mobilise action to deliver the scale of change needed globally (supports strategic aims i, ii and iii).

National Implementation & Outcomes

Table 5.1 Implementation of antimicrobial stewardship strategies in UK hospitals – progress over two decades

Year	1994	2006	2012 (ongoing)
Source	BSAC[19]	Wickens & Jacklin[20]	ESGAP & ISC* (unpublished)
Sample	n=427 UK hospitals	n=125 English hospitals	n=126 UK hospitals
Guidelines for antibiotic therapy	62%	90%	100%
Guidelines for surgical prophylaxis	51%	87%	99%
Antibiotic formulary	79%	89%	99%
Restricted list	61%	69%	93%
Educational campaigns	52%	73%	100%
Automatic stop policy	26%	–	61% (stop/review)
Antibiotic committee	17%	56%	85%
Antibiotic audit	11%	78%	98%
IV-to-oral switch guidance	–	69%	92%
Microbiology ward rounds	64%	–	96%
Stewardship ward rounds	–	35%	86%
Antimicrobial consumption surveillance (WHO defined daily doses)	–	46%	69%
Dedicated antimicrobial prescription chart	1.5%	<1%	40%
Inflammatory marker testing (e.g. procalcitonin)	–	–	11%

*Acknowledgement: Provided by Professor Dilip Nathwani and Philip Howard

J Antimicrob Chemother 2011; **66**: 2168–2174
doi:10.1093/jac/dkr253 Advance Access publication 14 June 2011

Journal of Antimicrobial Chemotherapy

Impact of guidelines and enhanced antibiotic stewardship on reducing broad-spectrum antibiotic usage and its effect on incidence of *Clostridium difficile* infection

Moïra Joëlle Talpaert[1]*, Guduru Gopal Rao[2], Ben Symons Cooper[3,4] and Paul Wade[5]

[1]Pharmacy Department, King's College Hospital, London, UK; [2]Department of Microbiology, Northwick Park Hospital, London, UK; [3]Mahidol-Oxford Tropical Medicine Research Unit, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand; [4]Nuffield Department of Clinical Medicine, Centre for Tropical Medicine, University of Oxford, Churchill Hospital, Oxford, UK; [5]Pharmacy Department, Guy's and St Thomas' NHS Foundation Trust, London, UK

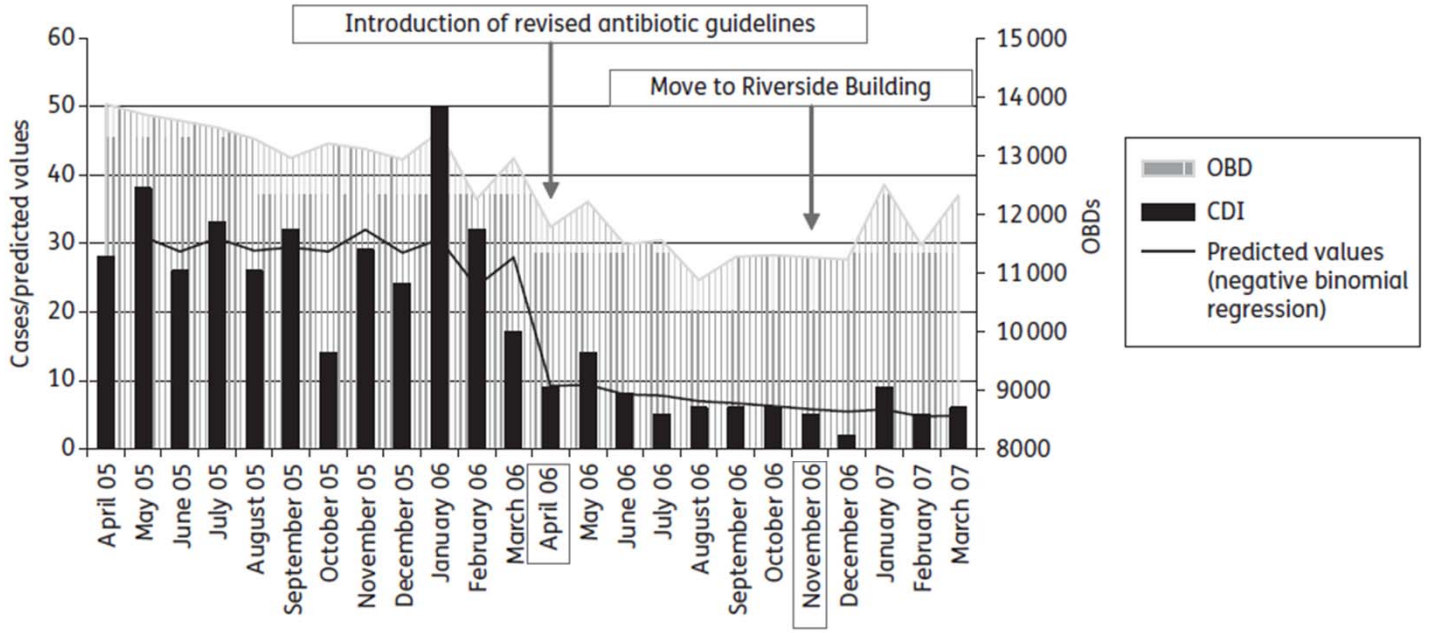


Figure 2. Monthly count data for new cases of CDI and the number of OBDs before and after the introduction of revised antibiotic guidelines.

J Antimicrob Chemother 2011; **66**: 1916–1920
doi:10.1093/jac/dkr207 Advance Access publication 4 June 2011

Journal of Antimicrobial Chemotherapy

A quality improvement programme to increase compliance with an anti-infective prescribing policy

Kandarp Thakkar[1]*, Mark Gilchrist[1], Edward Dickinson[2,3], Jonathan Benn[3], Bryony Dean Franklin[1,4,5] and Ann Jacklin[1,4,5] on behalf of the Anti-infective Policy Implementation Group†

[1]Pharmacy Department, Imperial College Healthcare NHS Trust, London W12 0HS, UK; [2]Department of Elderly Medicine, Imperial College Healthcare NHS Trust, London, UK; [3]Centre for Patient Safety and Service Quality, Imperial College, London, UK; [4]Centre for Medication Safety and Service Quality, Imperial College Healthcare NHS Trust, London, UK; [5]Department of Practice and Policy, The School of Pharmacy, University of London, London, UK

Table 1. Results by phase

	No. of patients on antibiotics		No. of patients compliant with policy		Mean compliance during the phase (CXH and HH)
	CXH	HH	CXH	HH	
Baseline	43	54	16 (37.2%)	13 (24.1%)	30.7%
Phase 1 (policy awareness)	395	273	177 (44.8%)	136 (49.8%)	47.3%
Phase 2 (policy education)	174	151	85 (48.9%)	89 (58.9%)	53.9%
Phase 3 (feedback)	220	168	149 (67.7%)	125 (74.4%)	71.1%

CXH, Charing Cross Hospital; HH, Hammersmith Hospital.

National antimicrobial consumption data

Figure 5.3: Trend in antibiotic use and resistance in E. coli, England, Wales and Northern Ireland, 1999 to 2011

Figure 5.4: Trend in broad-spectrum antibiotic use in English hospitals (n=175), England, 2005 to 2009

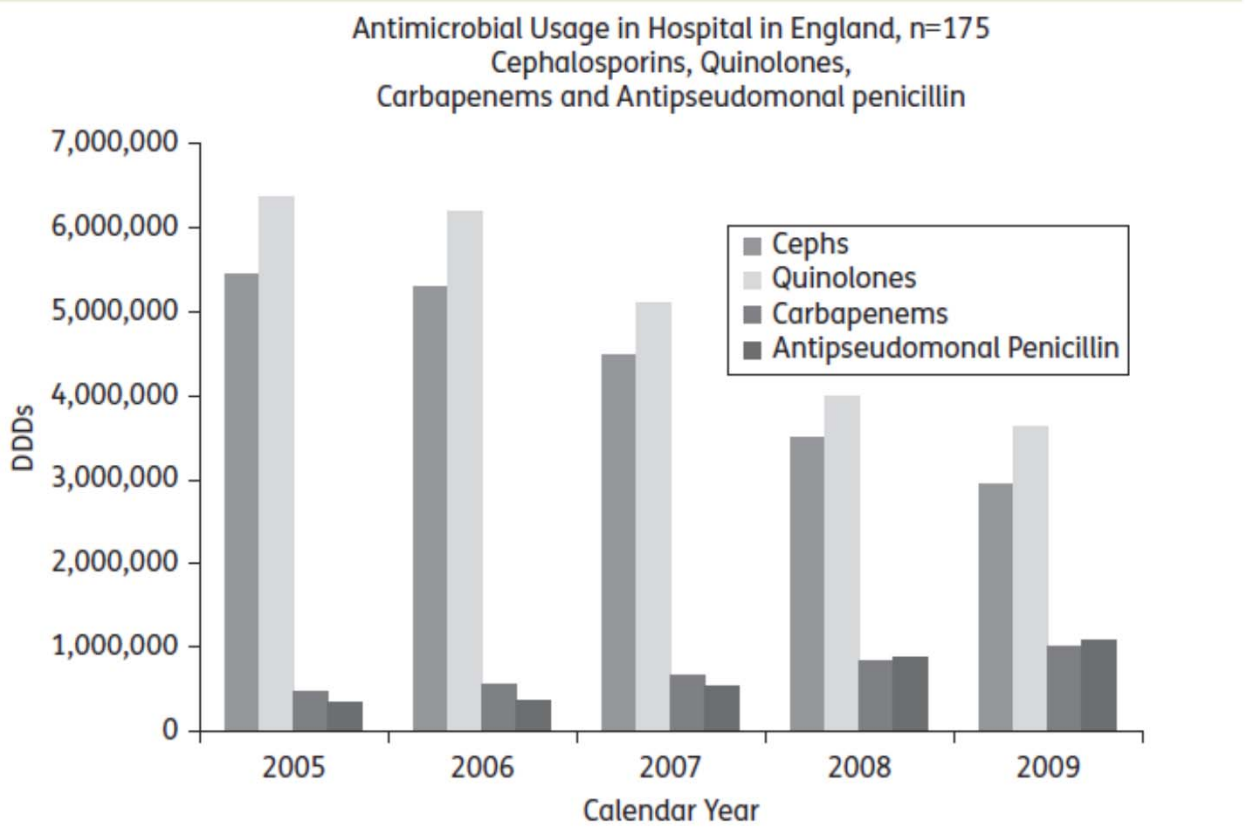


Figure 8. Total fluoroquinolone, cephalosporin, carbapenem and antipseudomonal penicillin usage in English hospitals (Courtesy of IMS).

J Antimicrob Chemother 2012; **67** Suppl 1: i51–i63 *r 175 English hospitals courtesy of Professor Jonathan Cooke, Imperial College London, David Lloyd, NHS Information Centre and Peter Stephens, IMS Health. NB. The greater relative use of meropenem vs. piperacillin-tazobactam than apparent in Figure 4.4 of this report reflects the different denominators, common use of 3g meropenem per day, vs. 2g as the DDD, and, possibly, longer treatment durations.*

Can Pharmacy contribute to stewardship?

The role of microbiology and pharmacy departments in the stewardship of antibiotic prescribing in European hospitals

Journal of Hospital Infection (2007) **65**(S2) 73-81

Fiona M. MacKenzie[a,*], Ian M. Gould[a], Julie Bruce[b], Jill Mollison[b], Dominique L. Monnet[c], Vladimir Krcmery[d], Barry Cookson[e], Jos W.M. van der Meer[f]

Table 5
Total antibiotic use in 2001 by reported key pharmacy practice variables (n = 124)

		Median antibiotic use (IQR) DDD/100 BD	p value*
Prescribing advice available from pharmacist during normal working hours	Yes n = 103	26.6 (16.3, 36.8)	
	No n = 19	46.5 (38.1, 60.9)	0.04
	Missing n = 2		
Prescribing advice available outside of working hours, including weekends	Yes n = 55	61.6 (40.4, 78.5)	
	No n = 64	51.2 (39.2, 67.9)	0.07
	Missing n = 5		
Daily ward visits by pharmacist to advise on therapy	Yes n = 22	66.8 (34.9, 96.9)	
	No n = 100	54.2 (40.5, 69.5)	0.08
	Missing n = 2		
Antibiotics dispensed directly from pharmacy per patient	Yes n = 48	61.6 (42.2, 79.5)	
	No n = 73	49.6 (39.7, 66.6)	0.05
	Missing n = 3		
Wards held stocks of antibiotics	Yes n = 91	55.9 (42.5, 71.8)	
	No n = 28	55.1 (33.8, 75.2)	0.48
	Missing n = 5		

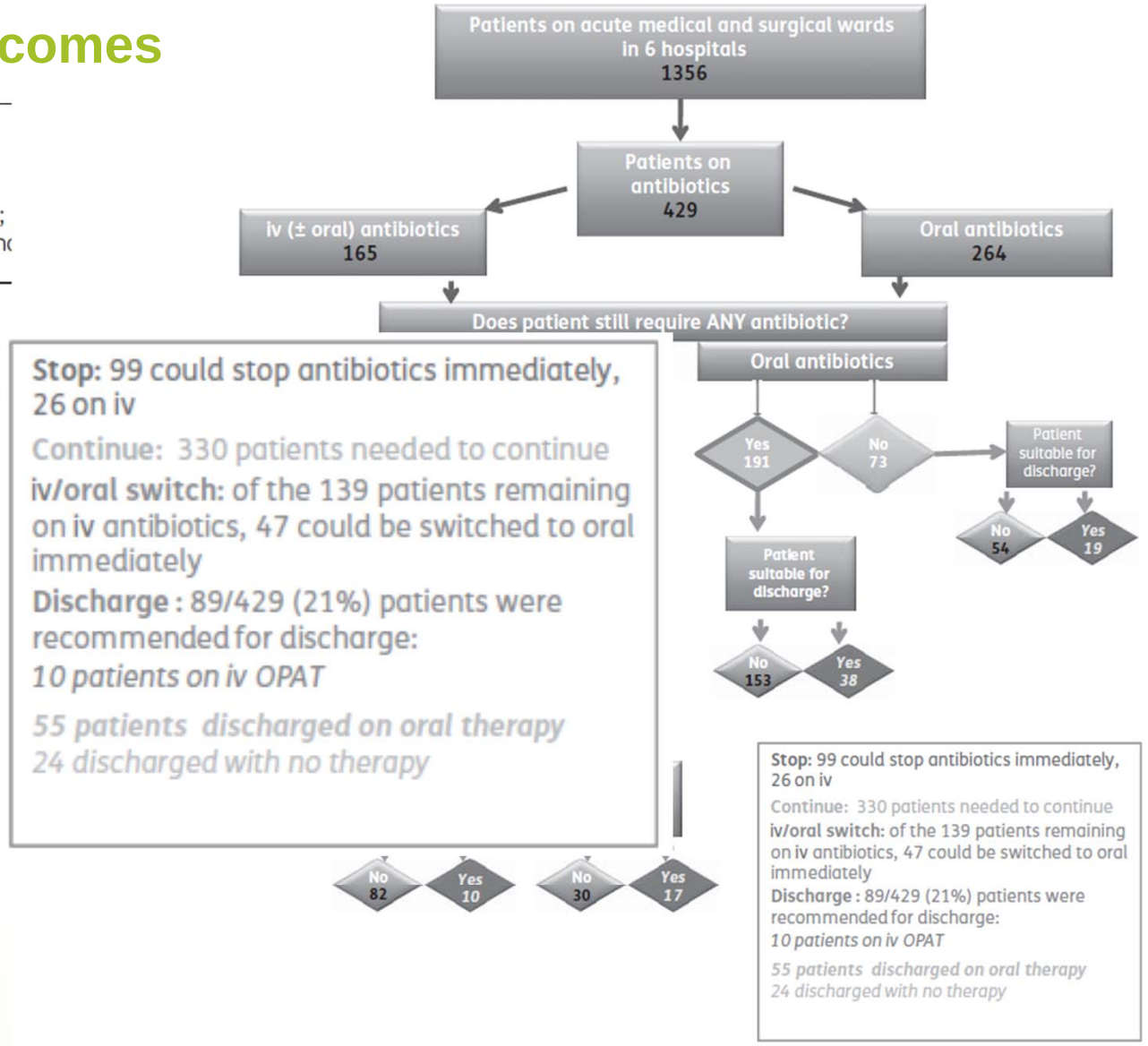
*Mann–Whitney U test.

Other positive outcomes

J Antimicrob Chemother 2012;
doi:10.1093/jac/dks193 Advanc

Antibiotic stewar
structui

M. Dryden[1]*, K. Saeed[1],



Stop: 99 could stop antibiotics immediately, 26 on iv
Continue: 330 patients needed to continue
iv/oral switch: of the 139 patients remaining on iv antibiotics, 47 could be switched to oral immediately
Discharge : 89/429 (21%) patients were recommended for discharge:
10 patients on iv OPAT
55 patients discharged on oral therapy
24 discharged with no therapy

Figure 2. Summary of early discharge and antibiotic management data.

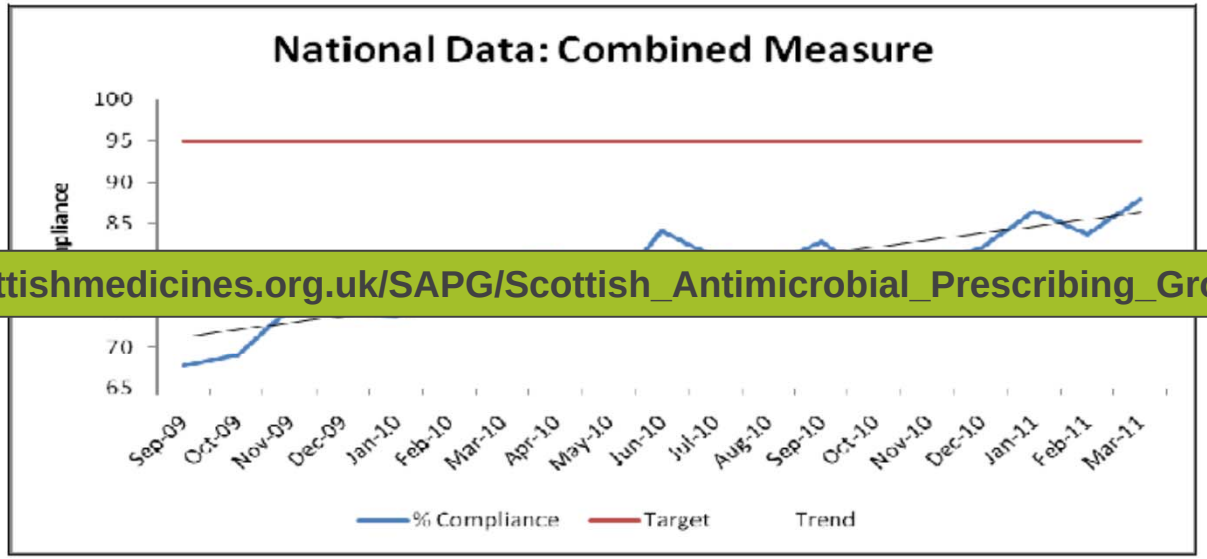
Exemplar approach across an area: Scotland

Scottish Medicines Consortium

Scottish Antimicrobial Prescribing Group

NHS SCOTLAND

Combined measure: policy compliant and indication documented



http://www.scottishmedicines.org.uk/SAPG/Scottish_Antimicrobial_Prescribing_Group__SAPG_

Median: 80% **Target:** ≥95%

Change in Median from February 2011 report: +1%

Outcomes for HCAI

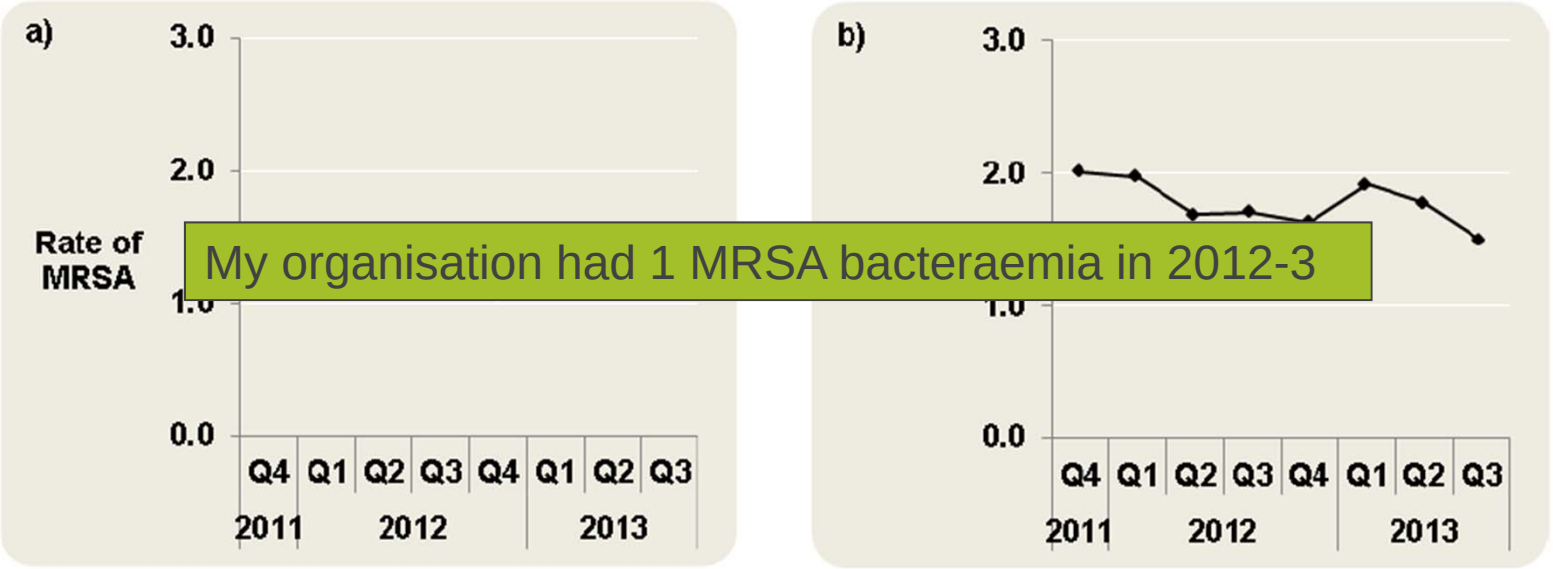
Public Health England

Quarterly Epidemiological Commentary: Mandatory MRSA, MSSA and *E. coli* bacteraemia, and *C. difficile* infection data (up to July–September 2013)

More recent MRSA bacteraemia data

Figure 1: Quarterly rates of MRSA bacteraemia, October 2011- September 2013

a) Trust apportioned rate (per 100,000 bed-days) b) All reports (per 100,000 population)



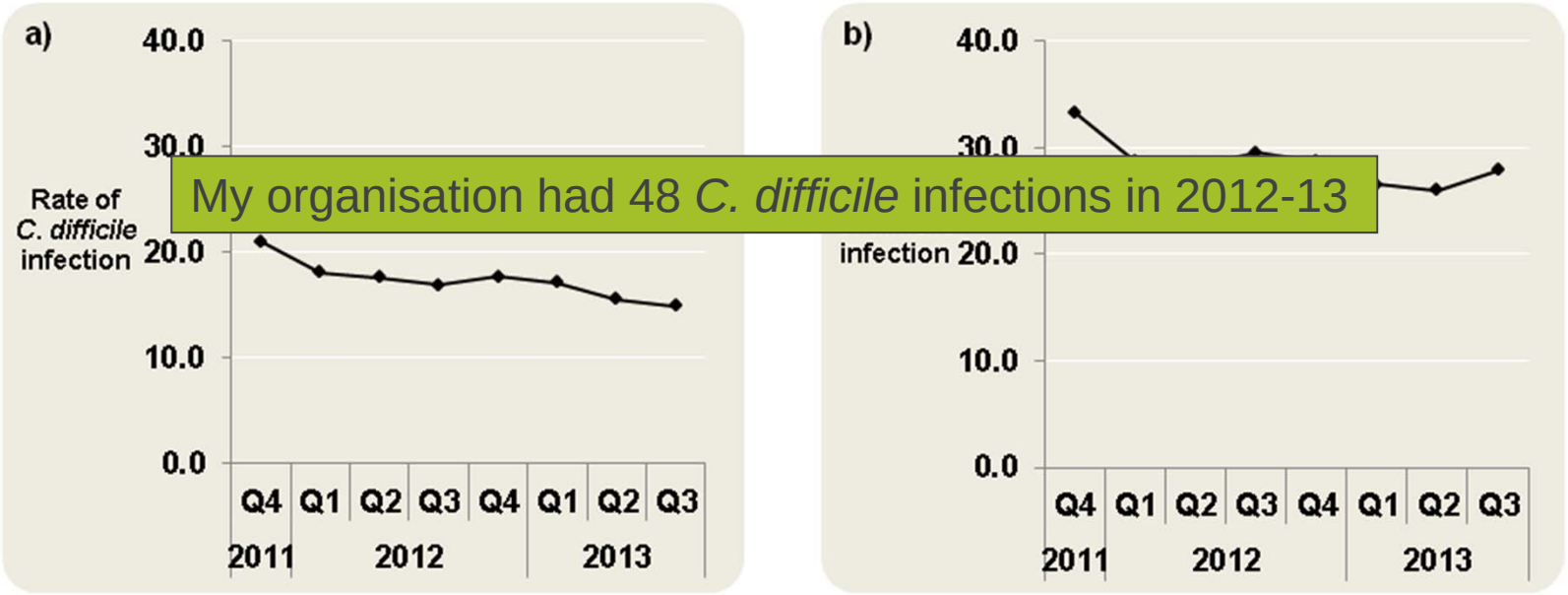
My organisation had 1 MRSA bacteraemia in 2012-3

Note: *The Trust apportioned rates for Q2 and Q3 2013 are missing because since Q2 2013 MRSA cases have been reported by assignment rather than apportionment, please refer to Table 1b for trust assigned reported cases and rates.*

More recent *Clostridium difficile* infection data

Figure 4: Quarterly rates of *C. difficile* infection in patients aged 2 years and over, October 2011- September 2013

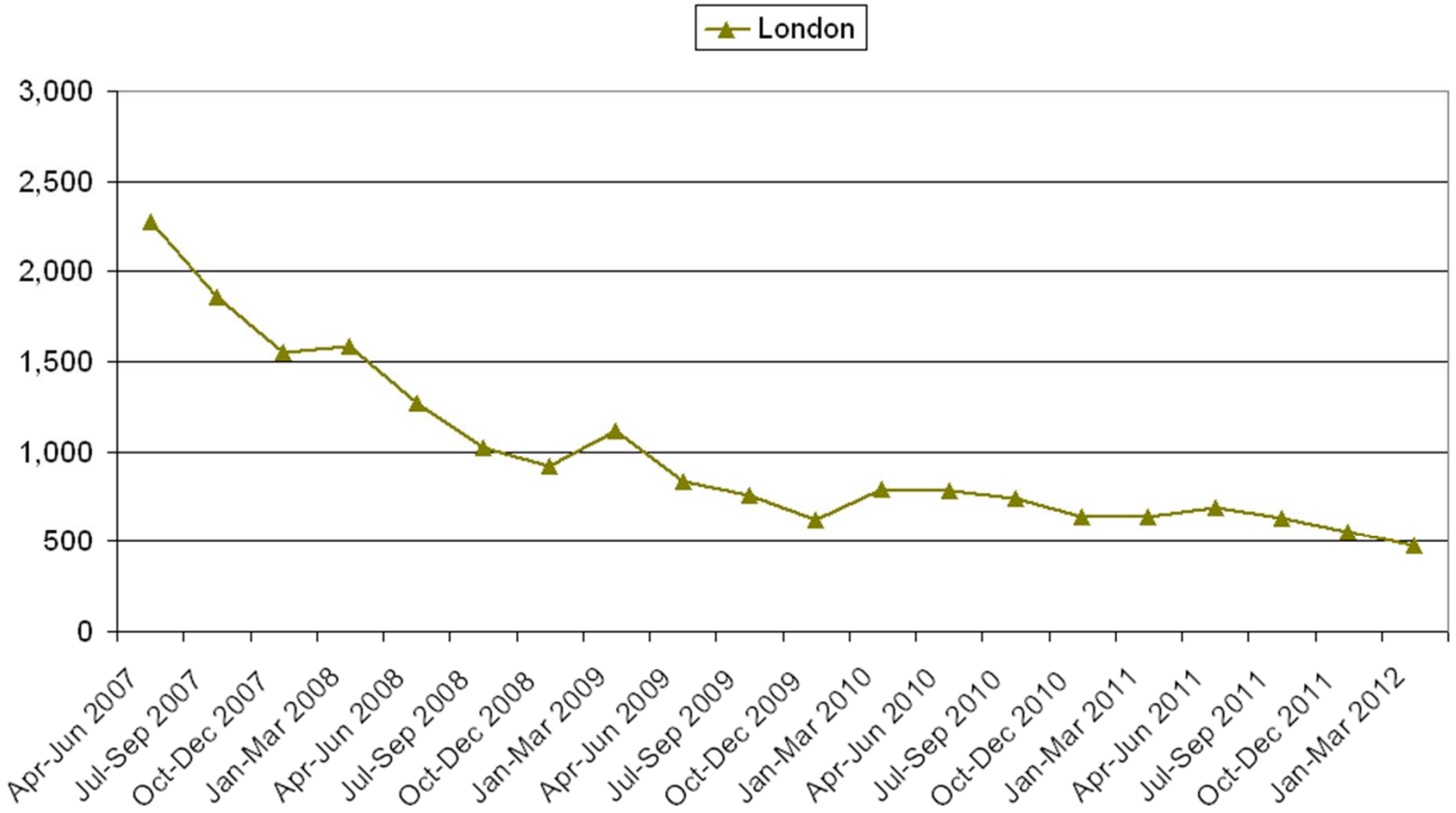
a) Trust apportioned reports (per 100,000 bed-days) b) All reports (per 100,000 population)



My organisation had 48 *C. difficile* infections in 2012-13

Quarterly cases over 2y – 2007 to 2012 - HPA

National Progress with CDI



Local Implementation & Outcomes

GSTT strategy & implementation

Provision of guidance & education

Control measures to limit broad-spectrum agent use

Encouraging routine best practice to improve overall prescribing patterns

Individual patient review to optimise care

Pharmacy role in AMS

Specialist input

- **Education of all levels & specialities of staff**
- **Development of Trust-wide guidance**
- **Monitoring & surveillance of antimicrobial usage**
- **Specialist consult & patient review**
- **Manage introduction of new agents**

Generalist input

- **Routine patient review & antimicrobial management**
- **Collection of audit data & significant contribution to performance**
- **Help to control antimicrobial use**
  - Daily follow-up & referral

Increased resource made available since August

Guidelines

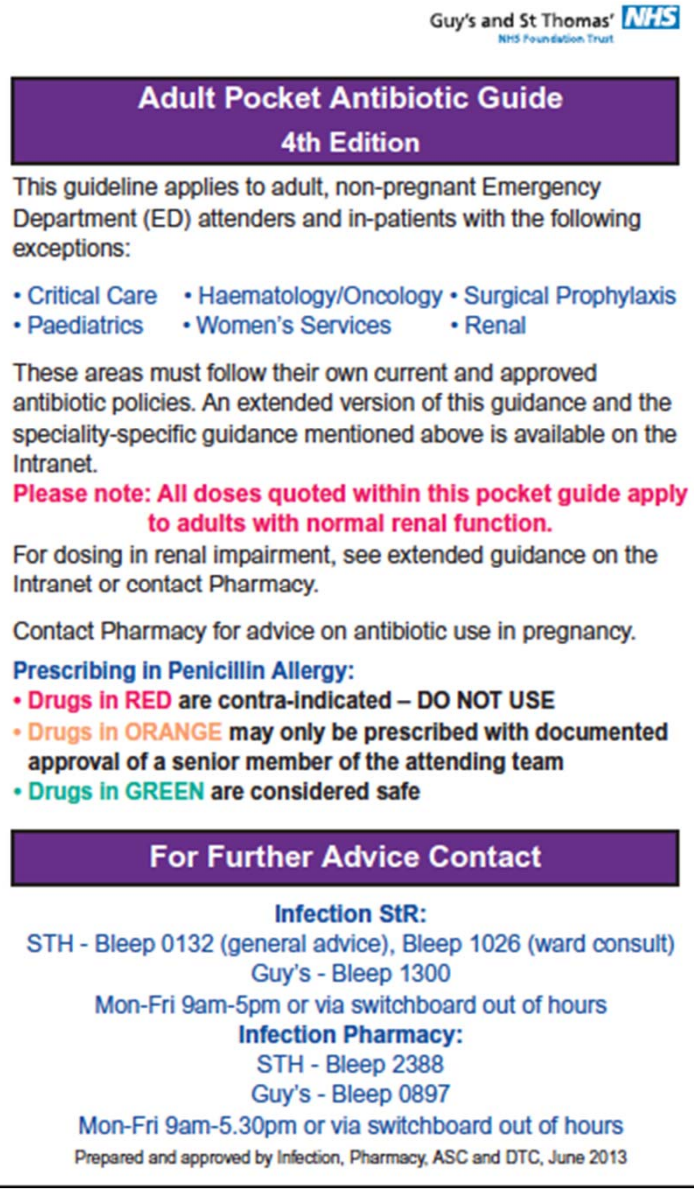
Consistently most used guidance within Trust

Regularly reviewed & updated

Multidisciplinary involvement

Specific guidance available for clinical areas, e.g. ICU, Cancer, Renal, etc.

Smartphone app will be available next month



Guy's and St Thomas' NHS
NHS Foundation Trust

Adult Pocket Antibiotic Guide
4th Edition

This guideline applies to adult, non-pregnant Emergency Department (ED) attenders and in-patients with the following exceptions:

- Critical Care
- Haematology/Oncology
- Surgical Prophylaxis
- Paediatrics
- Women's Services
- Renal

These areas must follow their own current and approved antibiotic policies. An extended version of this guidance and the speciality-specific guidance mentioned above is available on the Intranet.

Please note: All doses quoted within this pocket guide apply to adults with normal renal function.

For dosing in renal impairment, see extended guidance on the Intranet or contact Pharmacy.

Contact Pharmacy for advice on antibiotic use in pregnancy.

Prescribing in Penicillin Allergy:

- **Drugs in RED are contra-indicated – DO NOT USE**
- **Drugs in ORANGE may only be prescribed with documented approval of a senior member of the attending team**
- **Drugs in GREEN are considered safe**

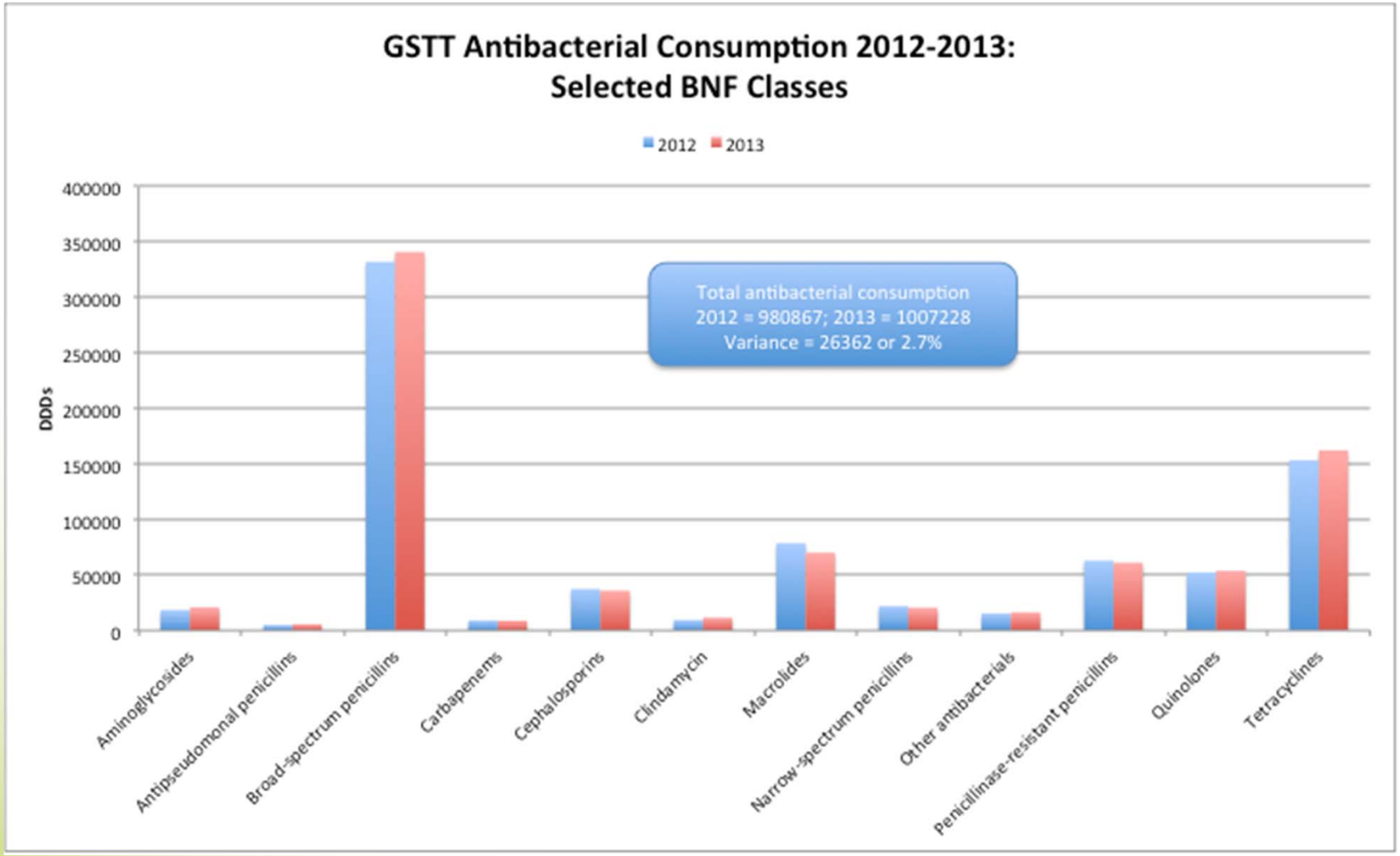
For Further Advice Contact

Infection StR:
STH - Bleep 0132 (general advice), Bleep 1026 (ward consult)
Guy's - Bleep 1300
Mon-Fri 9am-5pm or via switchboard out of hours

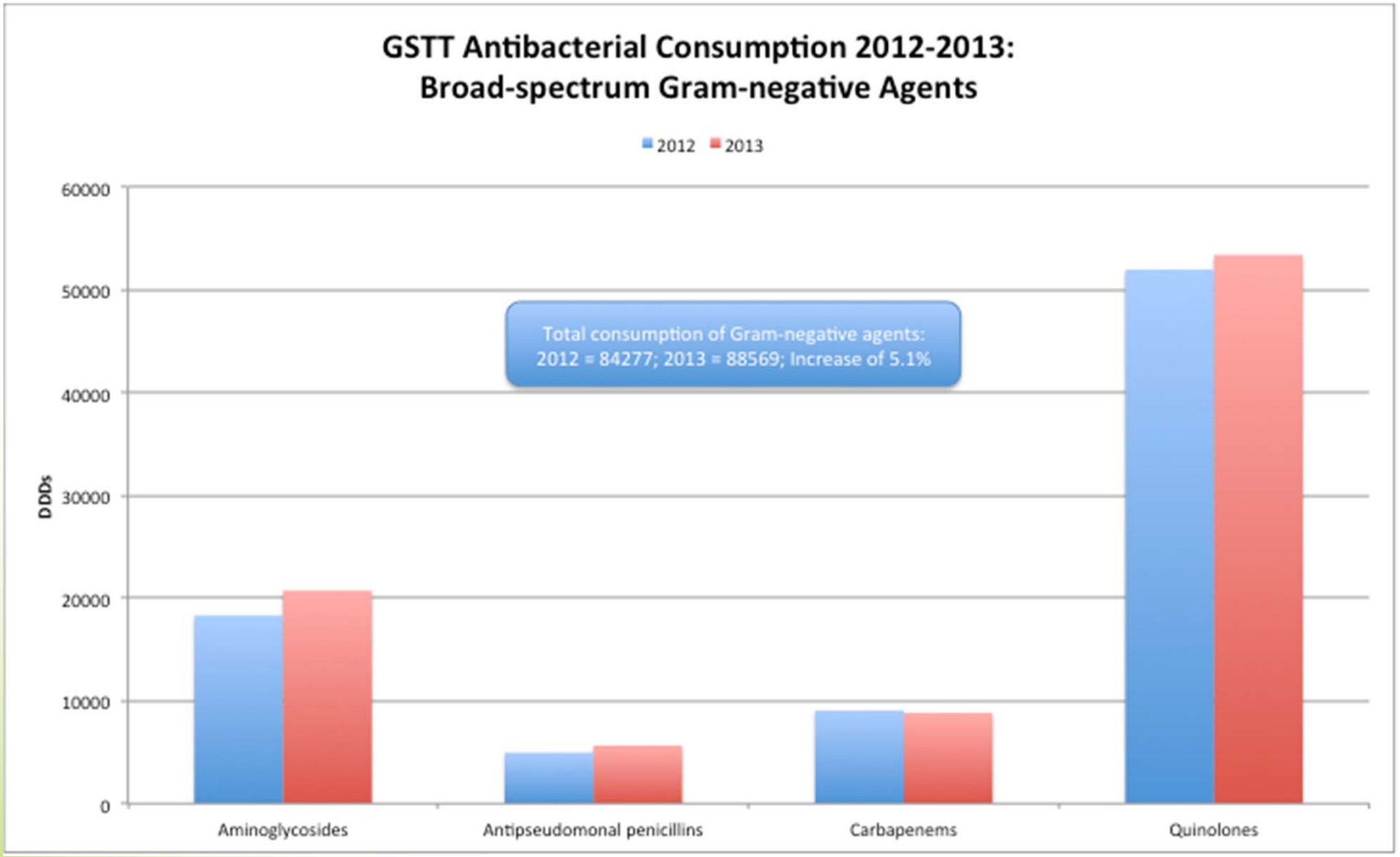
Infection Pharmacy:
STH - Bleep 2388
Guy's - Bleep 0897
Mon-Fri 9am-5.30pm or via switchboard out of hours

Prepared and approved by Infection, Pharmacy, ASC and DTC, June 2013

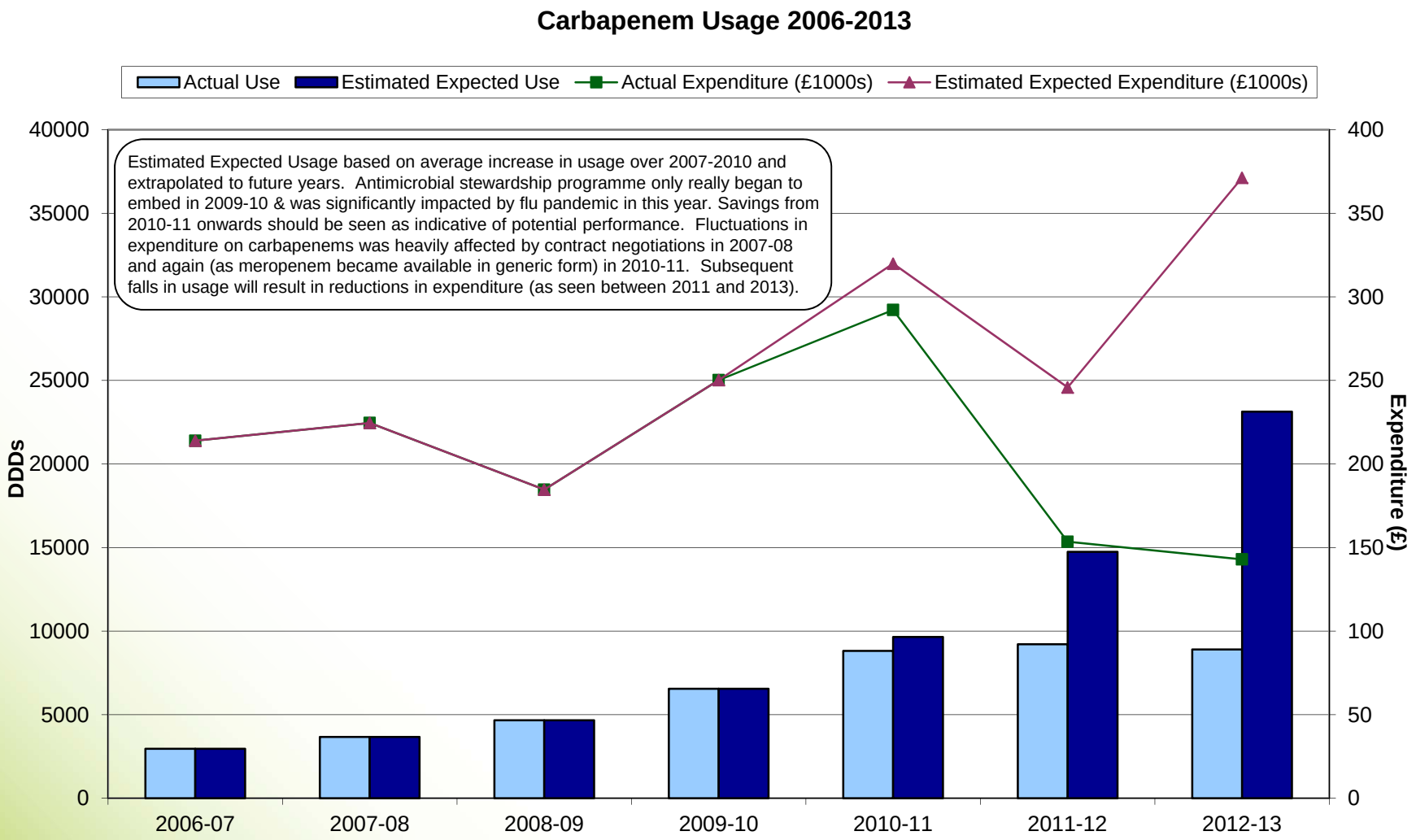
Our own local antibiotic consumption data



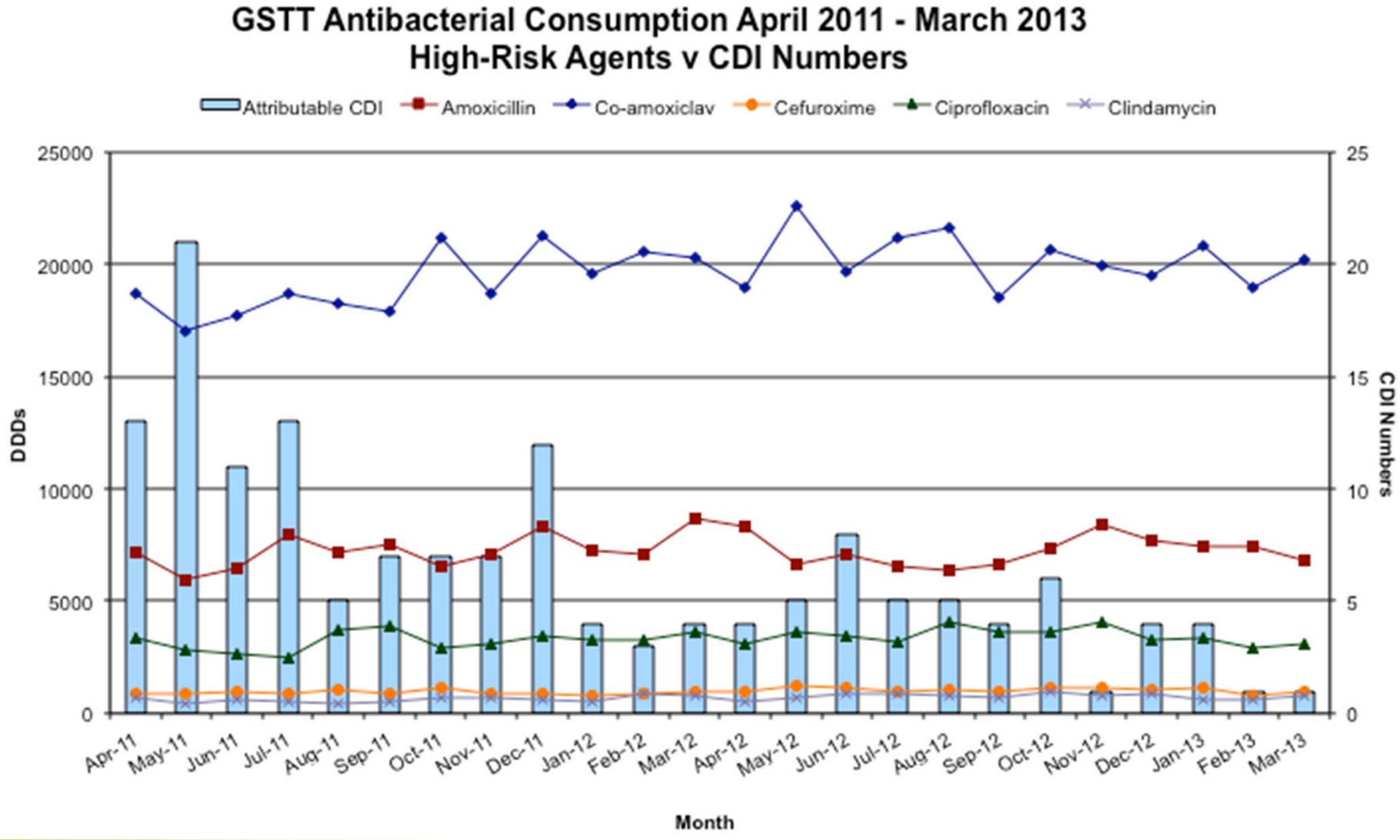
In more detail



Outcomes


Carbapenem Usage 2006-2013
Actual Use
Estimated Expected Use
Actual Expenditure (£1000s)
Estimated Expected Expenditure (£1000s)
Estimated Expected Usage based on average increase in usage over 2007-2010 and extrapolated to future years. Antimicrobial stewardship programme only really began to embed in 2009-10 & was significantly impacted by flu pandemic in this year. Savings from 2010-11 onwards should be seen as indicative of potential performance. Fluctuations in expenditure on carbapenems was heavily affected by contract negotiations in 2007-08 and again (as meropenem became available in generic form) in 2010-11. Subsequent falls in usage will result in reductions in expenditure (as seen between 2011 and 2013).
DDDs
Expenditure (£)
40000
35000
30000
25000
20000
15000
10000
5000
0
400
350
300
250
200
150
100
50
0
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13

High-risk agents & CDI



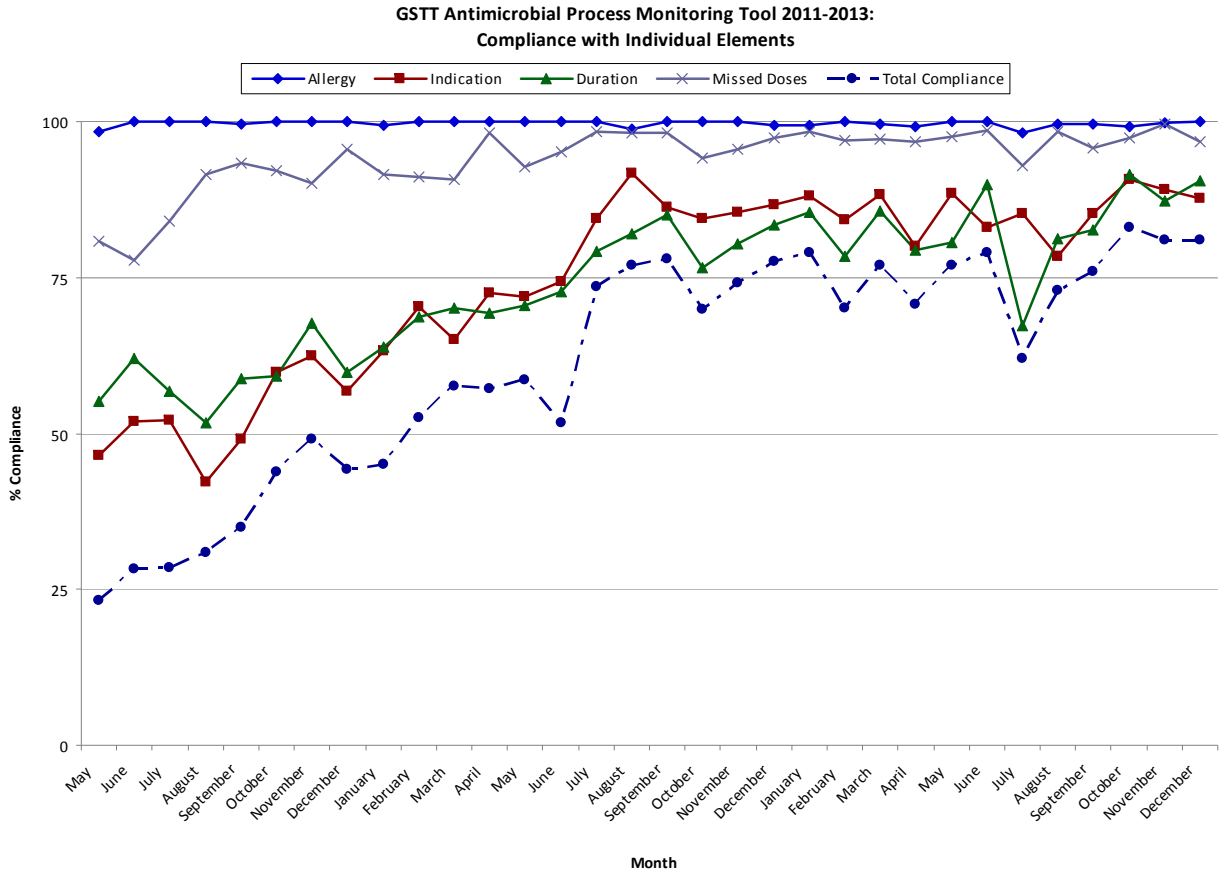
Prescribing Process

Using a "Care Bundle"-type approach

Measuring 4 elements of an ideal prescription

- **Allergy documentation**
- **Indication**
- **Duration/review date**
- **Missed doses**

Results improving

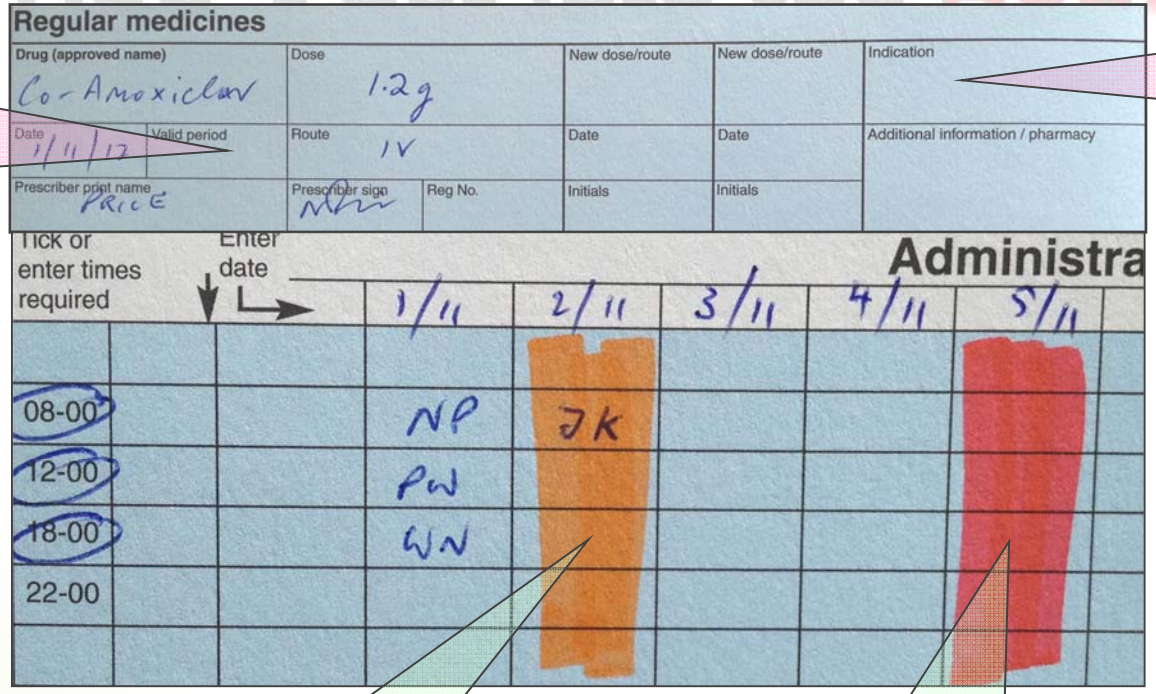


Improving Antimicrobial Stewardship
23rd November 2012

Don't get into the Red!

Always document a duration or review date

If there's no duration or review date, then a Red Highlight will be added to the chart along Day 5. The prescription must be rewritten if it is still required.



Always document an indication

Any prescriptions without a duration which have not been rewritten by Day 5 should be queried with the prescribing team, and any that remain active on Day 7 should be escalated for Infection review

Review at Day 2

Decide by Day 5

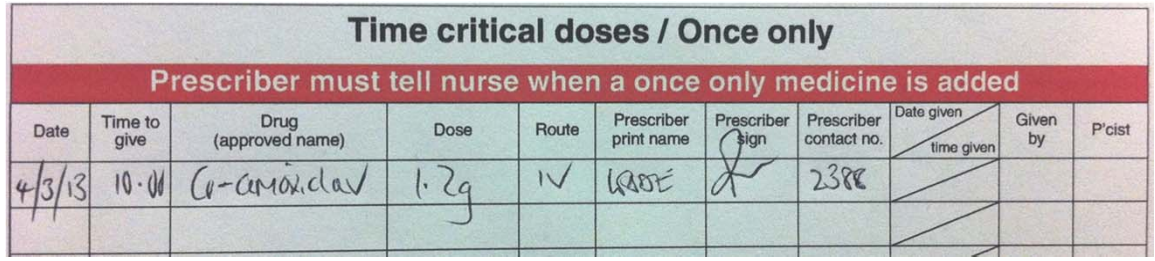
Antibacterial prescriptions will have an Orange Highlight added along Day 2 to prompt review

If the duration is known, then the prescription should be cancelled from the final due day

Antimicrobial Stewardship

Optimising Quality, Improving Safety

FIRST DOSE ONLY prescribed in Emergency Department on front of prescription chart



Time critical doses / Once only

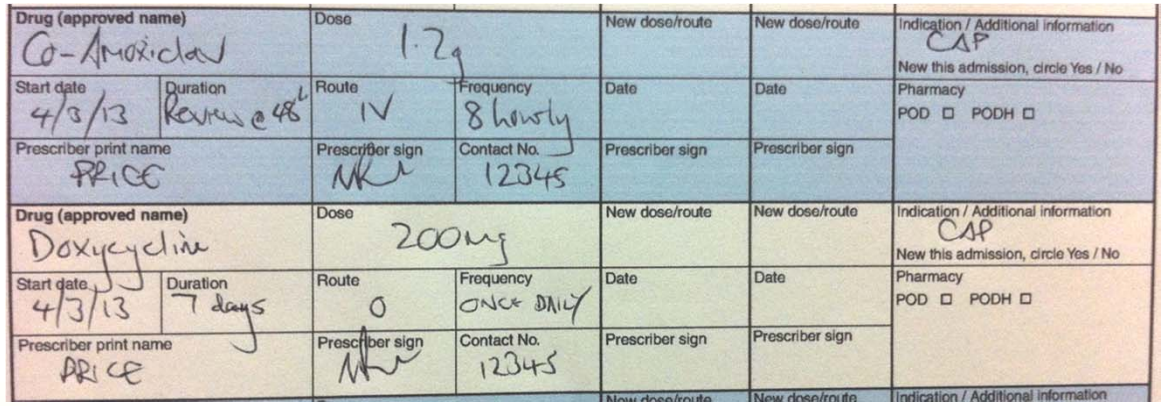
Prescriber must tell nurse when a once only medicine is added

Date	Time to give	Drug (approved name)	Dose	Route	Prescriber print name	Prescriber sign	Prescriber contact no.	Date given / time given	Given by	P'cist
4/3/13	10.00	Co-Amoxiclav	1.2g	IV	PRICE		2388			

FURTHER DOSES prescribed by admitting team, if necessary, inside of prescription chart

For continuing prescriptions:

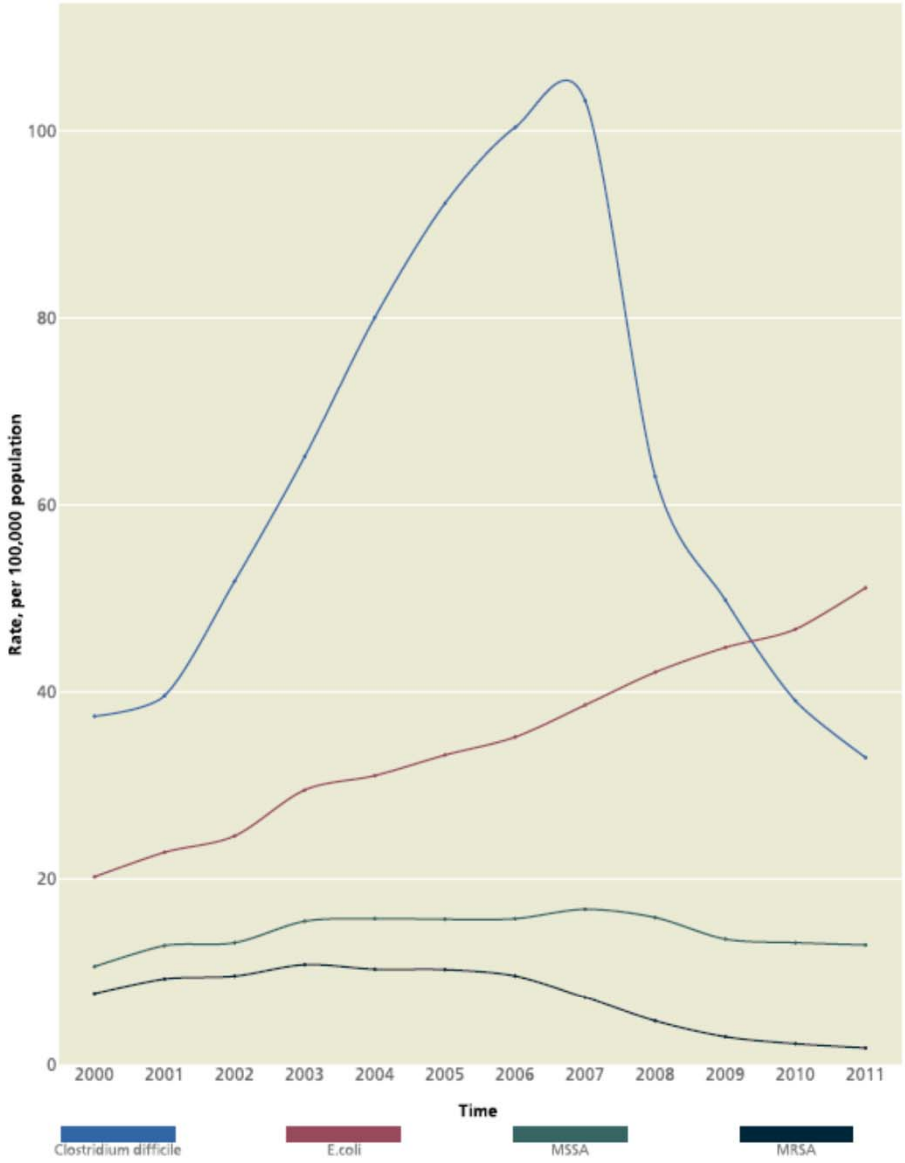
DOCUMENT indication & duration/review date



Drug (approved name)	Dose		New dose/route	New dose/route	Indication / Additional information
Co-Amoxiclav	1.2g				CAP
Start date / Duration	Route	Frequency	Date	Date	New this admission, circle Yes / No
4/3/13 / Review @ 48h	IV	8 hourly			Pharmacy
Prescriber print name	Prescriber sign	Contact No.	Prescriber sign	Prescriber sign	POD ☐ PODH ☐
PRICE		12345			
Drug (approved name)	**Dose**		**New dose/route**	**New dose/route**	**Indication / Additional information**
Doxycycline	200mg				CAP
Start date / Duration	Route	Frequency	Date	Date	New this admission, circle Yes / No
4/3/13 / 7 days	O	ONCE DAILY			Pharmacy
Prescriber print name	Prescriber sign	Contact No.	Prescriber sign	Prescriber sign	POD ☐ PODH ☐
PRICE		12345			

On the horizon

Figure 2.17: Trend in C. difficile infection, Meticillin-resistant and sensitive Staphylococcus aureus (MRSA and MSSA) and E. coli bacteraemias, England 2000 to 2010



Source: Healthcare Associated Infections (HCAI) Data Capture System and LabBase2, HPA. 2000 to 2010 population estimates, ONS. (Analysis by HPA)

Is this all a hospital issue? No…

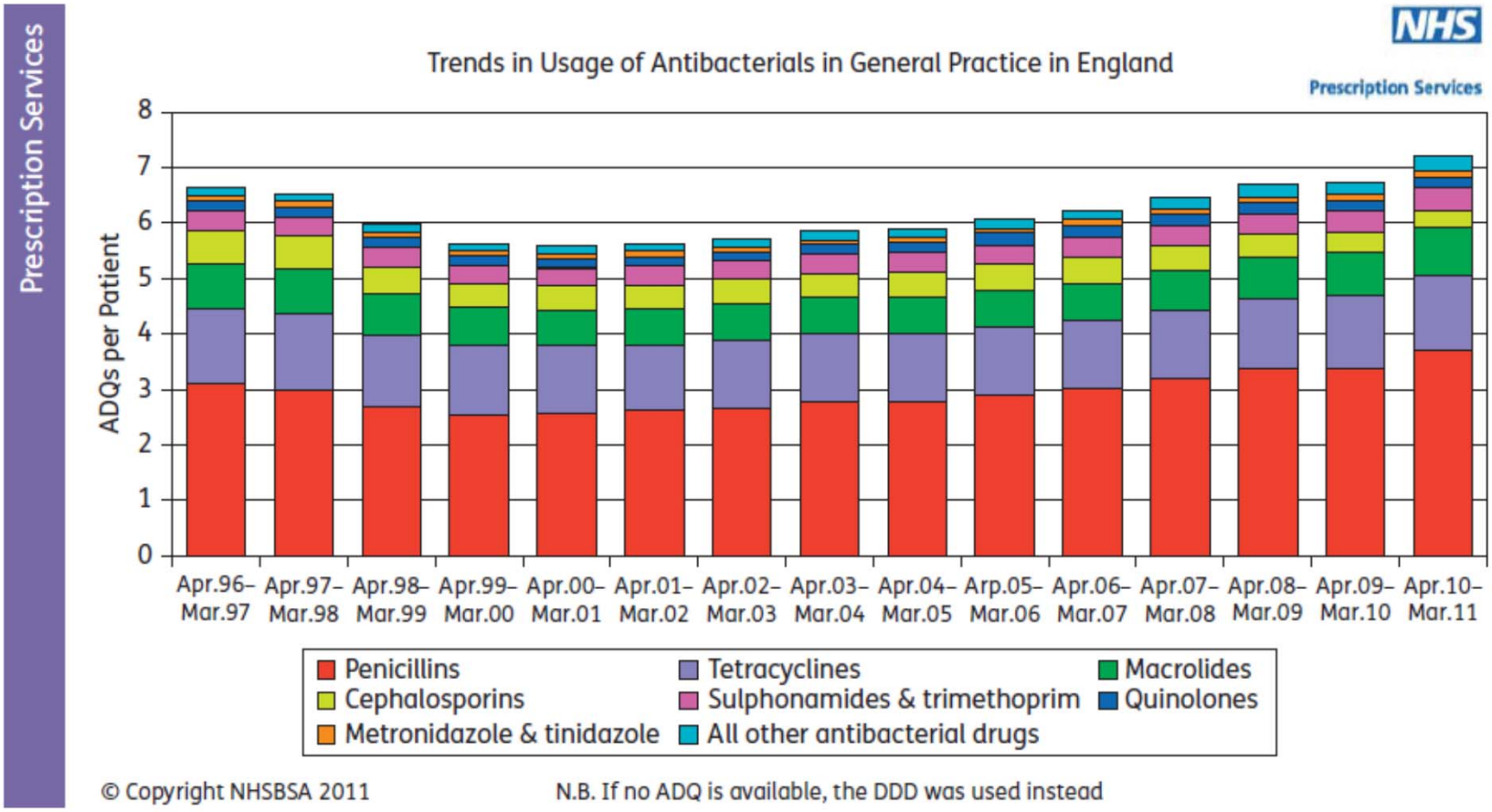


Figure 4. Trends in usage of antimicrobials in general practice in England (Courtesy NHSBSA).[11]

J Antimicrob Chemother 2012; **67** Suppl 1: i51–i63

Some progress has been made…

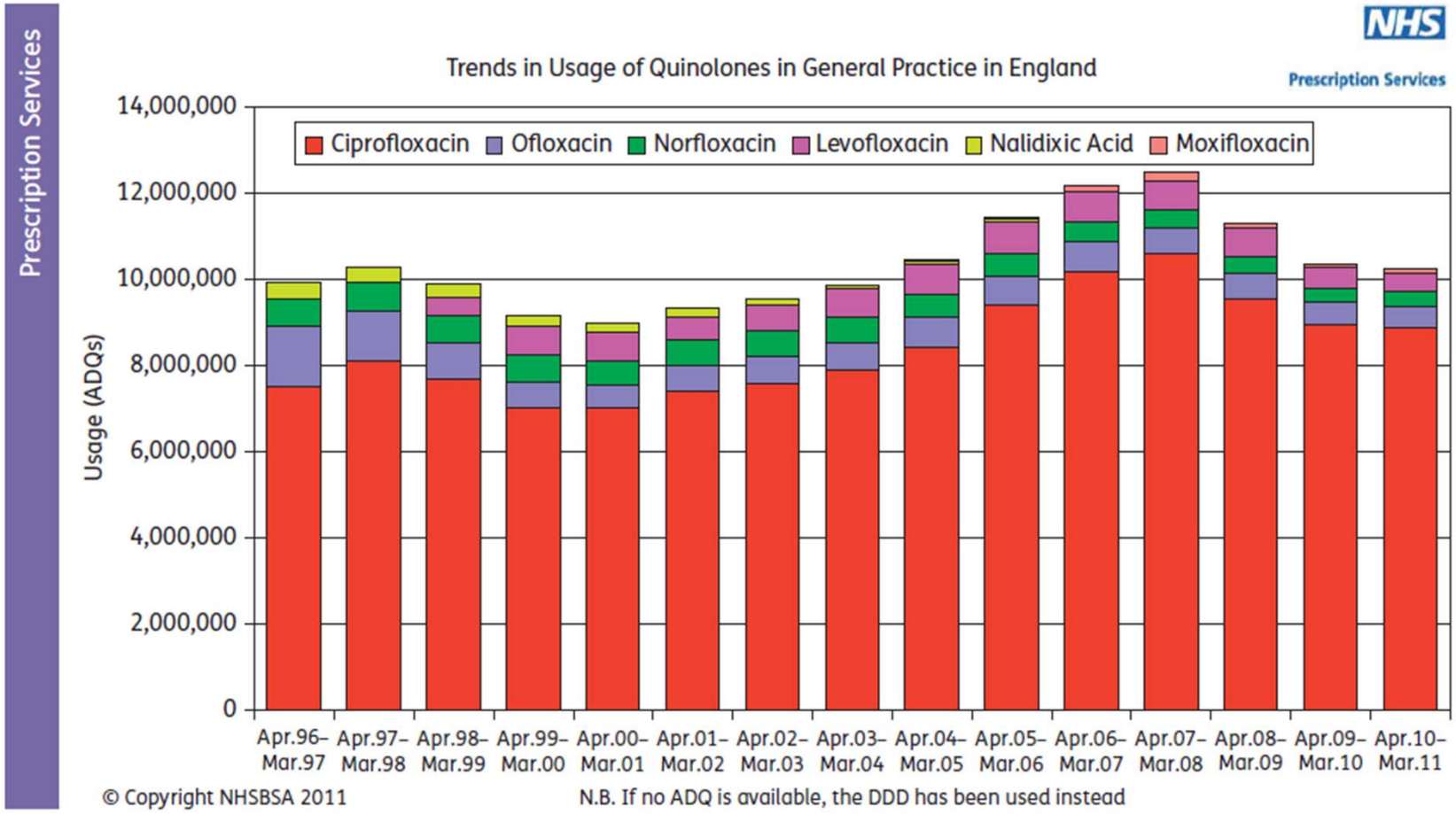


Figure 6. Trends in usage of fluoroquinolones in general practice in England (Courtesy NHSBSA).[11]

J Antimicrob Chemother 2012; **67** Suppl 1: i51–i63

What more needs to be done?

Improve compliance to guidelines

Improve control of duration of therapy

- Appropriate (early) IV to oral switch
- Appropriate de-escalation of therapy
- Narrow spectrum or stop

Ensure prescribing process is consistently appropriate

Improve referral process

Help with improving time to first dose – sepsis or otherwise

Need to strengthen liaison with primary care

Need more routine input

Need more information on eligible patients

Need clinicians to buy-in wholeheartedly

Need improved IT / surveillance information

Need more agile control systems

Primary care colleagues need to see importance of resistance

Future developments – next 2-5 years

Electronic prescribing

Automated audit, surveillance & feedback of antimicrobial usage patterns & associated resistance & outcomes

Faster, near-patient diagnostics

Real-time PCR / genomics directly from clinical samples

Conclusions

Antimicrobial stewardship is a multifactorial & multidisciplinary process

- Clearly linked to patient safety & has clinical, quality and financial implications

Introduction of stewardship has shown significant positive outcomes

- Markedly decreased *C. difficile* infection rates
- Alterations in antimicrobial consumption
- Local linkages between changes in practice & positive outcomes

Substantial risks exist, performance is not optimal, full engagement is slow

- Extensive action list - will not come without cost
- Next steps are out in the community…

Acknowledgements

GSTT colleagues:

Raj Thangarajah, Nick Price, Bill Newsholme,

Carolyn Hemsley & the AMS team

Colleagues throughout UK, in no particular order:

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Laura Whitney, Lilian Li, Phil Howard,

Kelly Alexander, Wendy Lawson, Conor Jamieson,

Tim Hills, Jacqui Sneddon & Jonathan Cooke

Members, past & present of:

United Kingdom Clinical Pharmacy Association

Infection Management Group


St Thomas' Hospital

Any questions?

Email: paul.wade@gstt.nhs.uk

Current *C. difficile* picture in London