




EAHP 2017 | Cannes, France  
Wednesday 22<sup>nd</sup> March 2017  
16:15–17:45  
Salle Estérel

## Effective antimicrobial stewardship programmes – what is my role?



Pfizer  Anti-Infectives

Pharmaceutical Society of Great Britain, February 2017  
West London Conference, 1 Riverside, Strand, London WC2R 2AZ  
© Pfizer Limited 2017. All rights reserved.



EAHP 2017 | Cannes, France  
Wednesday 22<sup>nd</sup> March 2017  
16:15–17:45  
Salle Estérel

## Welcome and introduction

Chair: Mark Gilchrist (UK)



Pfizer  Anti-Infectives

Pharmaceutical Society of Great Britain, February 2017  
West London Conference, 1 Riverside, Strand, London WC2R 2AZ  
© Pfizer Limited 2017. All rights reserved.



# Symposium objectives

- Highlight the situation with regard to the spread of antimicrobial resistance in Europe today
- Provide an overview of current perspectives on, and experiences with, antimicrobial stewardship
- Highlight areas where stewardship initiatives could be implemented or improved to ensure antimicrobial therapies are used appropriately
- Discuss the implications of responsible antimicrobial use in terms of cost-effectiveness and preservation of existing antimicrobial therapies



# Agenda

16:15–16:35	<b>The role of the pharmacist in antimicrobial stewardship programmes: UK point of view</b> <i>Mark Gilchrist (UK)</i>
16:35–16:55	<b>The pharmacist's role in antimicrobial stewardship in France</b> <i>Florence Lieutier-Colas (France)</i>
16:55–17:15	<b>The infectious disease specialist and the pharmacist: working together to tackle resistance</b> <i>Celine Pulcini (France)</i>
17:15–17:45	<b>How to establish and maintain an effective antimicrobial stewardship programme – panel discussion with Q&amp;A</b> <i>All</i>
17:45	Close





## Using your keypad



- Keypads will be used throughout the meeting
- The answers are displayed in multiple-choice format
- Read the question at the top of the slide
- To vote, press the number on the keypad that corresponds with your choice
- A timer on screen displays the time remaining to register your vote



## Questions

- Questions will be taken during the Q&A session after the final presentation
- Please use a question card (located in the back of your programme booklet) or raise your hand for a microphone





# Housekeeping


Please ensure all mobile phones are switched off or turned to silent



Pfizer  Anti-Infectives

Pfizer Exhibitor - Day of Infection - February 2017  
 Pfizer Healthcare Ireland, 1 Riverside, Phoenix Park,  
 15 Spear Business Centre, Dublin 15

Imperial College  
London

Imperial College Healthcare   
NHS Trust

## The role of the pharmacist in (hospital) antimicrobial stewardship programmes – UK point of view

**Mark Gilchrist**

Consultant Pharmacist Infectious Diseases

Imperial College Healthcare NHS Trust

[mark.gilchrist@imperial.nhs.uk](mailto:mark.gilchrist@imperial.nhs.uk) @MGilchrist123

PP-GEF-EUR-0041 Date of preparation: March 2017



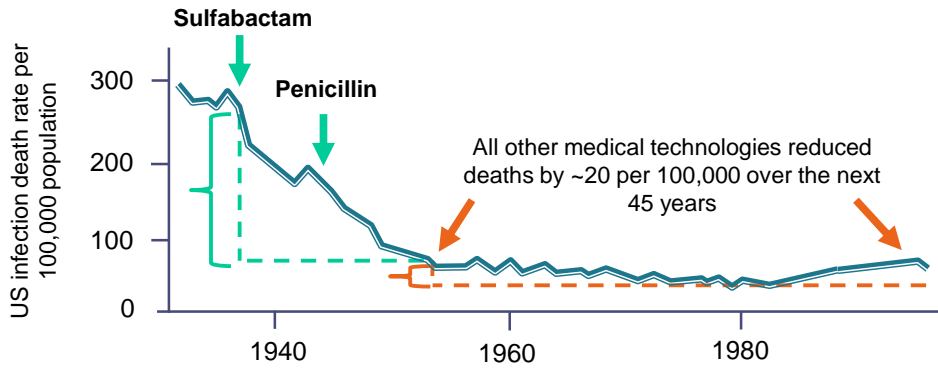
## Disclosures

- ▶ Participated in commercial advisory boards for:
  - MSD
  - Astellas Pharma
  - Pfizer
  
- ▶ Non-commercial positions:
  - Royal Pharmaceutical Society – Spokesperson on antimicrobials
  - BSAC Council
  - Co-Chair BSAC OPAT Initiative
  - UKCPA – Pharmacy Infection Network Committee
  - Editorial Board *Pharmacotherapy/Journal Antimicrobial Stewardship*

## Outline

- ▶ The current situation with regard to antimicrobial resistance in Europe today, in particular, the UK
  
- ▶ Aims and importance of antimicrobial stewardship
  
- ▶ The role of the pharmacist in antimicrobial stewardship programmes

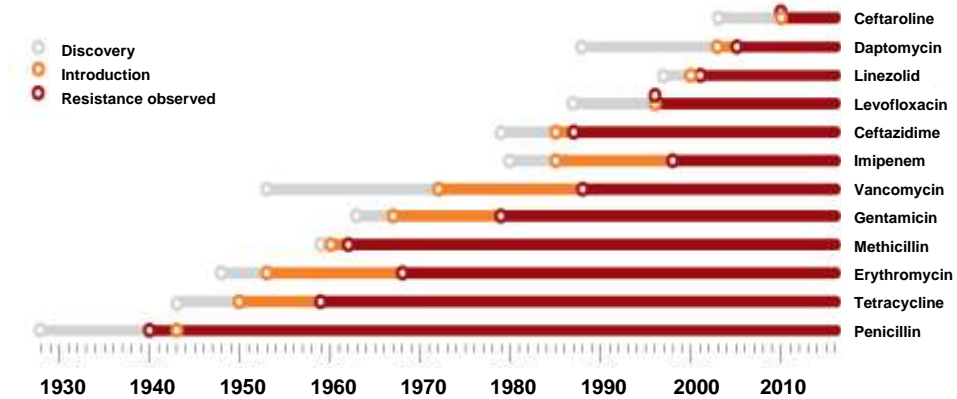
Antibiotics caused US deaths to decline  
by ~220 per 100,000 in 15 years



PP-GEF-EUR-0041 Date of preparation: March 2017

Adapted from: Armstrong GL, et al. *JAMA* 1999;281:61-66; Spellberg B. IDSA Capitol Hill, May 2010. Available at: [www.idsociety.org/Content.aspx?id=4810](http://www.idsociety.org/Content.aspx?id=4810). Accessed March 2017.

## Timeline of antibiotic deployment and the evolution of antibiotic resistance



PP-GEF-EUR-0041 Date of preparation: March 2017

Kupferschmidt K. *Science*;352(6287):758-761. Available at: <http://science.sciencemag.org/>. Accessed March 2017.

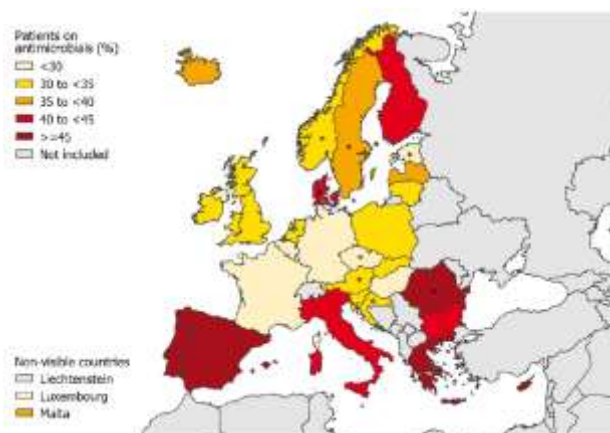
In 2011/12, what was the approximate percentage of inpatients on antibiotics in European hospitals?

1. <10 %
2. 10–20%
3. 20–30%
4. 30–40%
5. Not sure

PP-GEP-EUR-0041 Date of preparation: March 2017

ECDC. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals 2011–2012. Available at: <http://ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-antimicrobial-use-PPS.pdf>. Accessed March 2017.

Prevalence of antimicrobial use (percentage of patients receiving antimicrobials) in acute care hospitals, 2011–2012



PP-GEP-EUR-0041 Date of preparation: March 2017

ECDC. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals 2011–2012. Available at: <http://ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-antimicrobial-use-PPS.pdf>. Accessed March 2017.



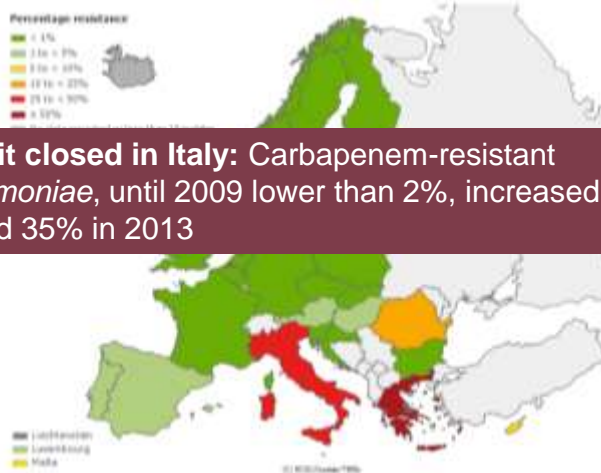
## Proportion of carbapenem-resistant *Klebsiella pneumoniae* in participating countries, 2009



PP-GEP-EUR-0041 Date of preparation: March 2017

ECDC. Surveillance Atlas of Infectious Diseases. Available at: <http://ecdc.europa.eu/en/data-tools/atlas/Pages/atlas.aspx>. Accessed March 2017.

## Proportion of carbapenem-resistant *Klebsiella pneumoniae* in participating countries, 2013



**BMT unit closed in Italy:** Carbapenem-resistant *K. pneumoniae*, until 2009 lower than 2%, increased to 15% in 2010 and 35% in 2013

PP-GEP-EUR-0041 Date of preparation: March 2017

BMT, bone marrow transplant.  
ECDC. Surveillance Atlas of Infectious Diseases. Available at: <http://ecdc.europa.eu/en/data-tools/atlas/Pages/atlas.aspx>. Accessed March 2017.



## WHO: Global antimicrobial resistance in 2014

- ▶ Resistance is growing and spreading according to WHO figures
  - ALL SIX regions have >50% resistance in *K. pneumoniae* to third generation cephalosporins and 2/6 show AMR to carbapenems
- ▶ In time, resistance will emerge against all antibiotics
- ▶ Antimicrobial resistance is generally irreversible
- ▶ Antimicrobial resistance is directly linked to use at national level
- ▶ The antibiotic pipeline is “dripping” at best
  - Few companies researching for little profit
  - New models of research funding and payment being explored

PP-GEP-EUR-0041 Date of preparation: March 2017

AMR, antimicrobial resistance; WHO, World Health Organization.  
 WHO. Antimicrobial resistance. Global report on surveillance, 2014. Available at: [http://apps.who.int/iris/bitstream/10665/112642/1/9789241564748\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/112642/1/9789241564748_eng.pdf). Accessed March 2017;  
 Gilchrist M, personal opinion.

## AMR is one of the biggest threats to humanity

- ▶ **21<sup>st</sup> Sept 2016**
- ▶ 193 countries in the United Nations agreed a landmark declaration to rid the world of drug-resistant infections or “superbugs”!
- ▶ Report back within 2 years



PP-GEP-EUR-0041 Date of preparation: March 2017

AMR, antimicrobial resistance.  
 Gov.uk. UK secures historic UN Declaration on antimicrobial resistance. Available at: <https://www.gov.uk/government/news/uk-secures-historic-un-declaration-on-antimicrobial-resistance>. Accessed March 2017; CDDEP. Antimicrobial resistance infographic. Available at: <https://twitter.com/CDDEP/status/695285451926564865>. Accessed March 2017.



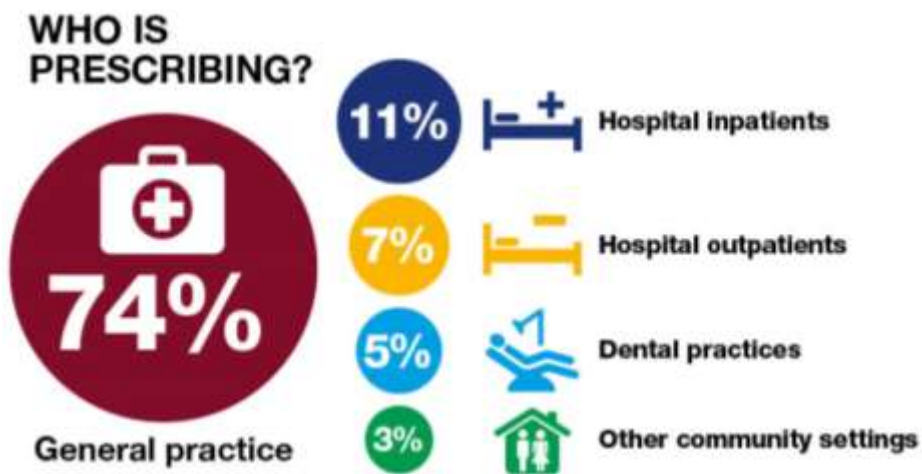
Public Health  
England



PP-GEP-EUR-0041 Date of preparation: March 2017

Public Health England. Health matters: antimicrobial resistance. Available at: <https://www.gov.uk/government/publications/health-matters-antimicrobial-resistance/health-matters-antimicrobial-resistance>. Accessed March 2017.

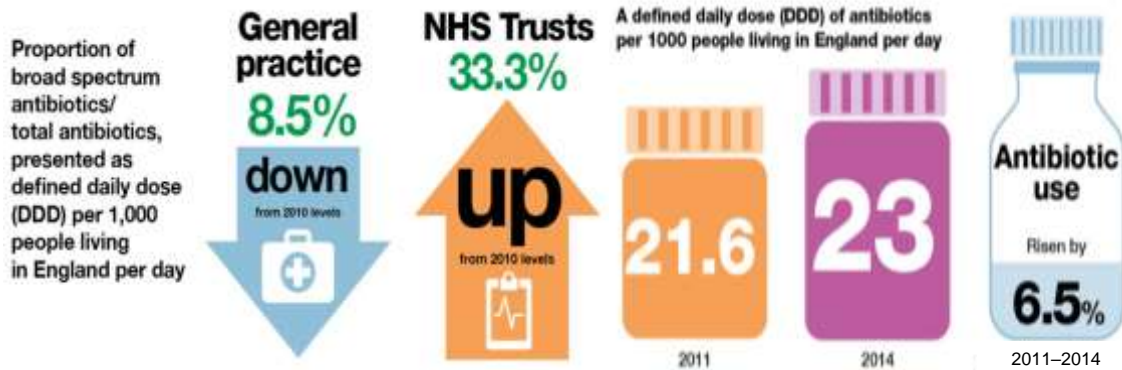
## Antibiotic consumption in England in recent years (2011–4)



PP-GEP-EUR-0041 Date of preparation: March 2017

Public Health England. Health matters: antimicrobial resistance. Available at: <https://www.gov.uk/government/publications/health-matters-antimicrobial-resistance/health-matters-antimicrobial-resistance>. Accessed March 2017.

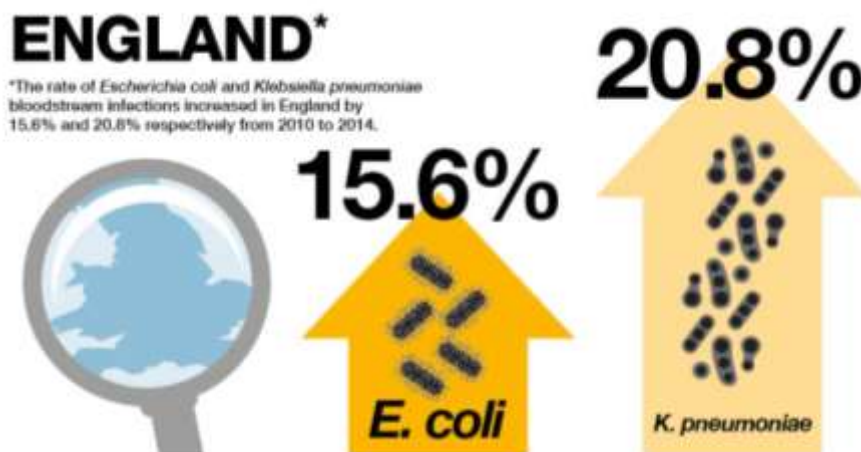
## Antibiotic consumption in England in recent years (2011–4)



PP-GEF-EUR-0041 Date of preparation: March 2017

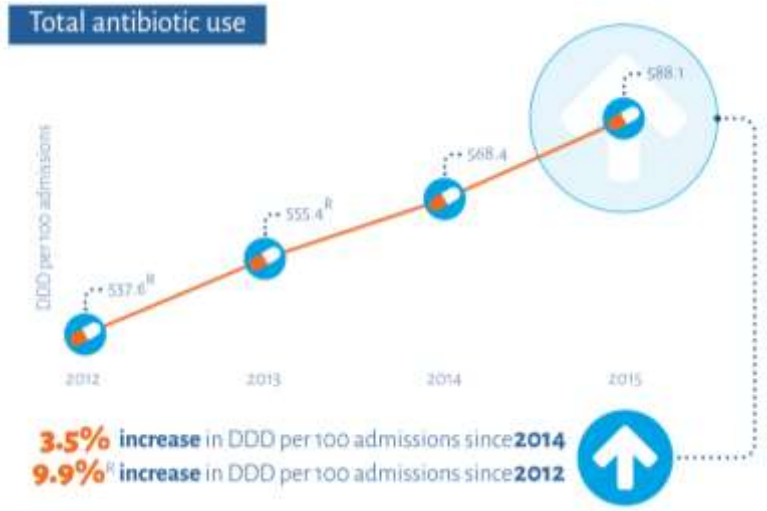
Public Health England. Health matters: antimicrobial resistance. Available at: <https://www.gov.uk/government/publications/health-matters-antimicrobial-resistance/health-matters-antimicrobial-resistance>. Accessed March 2017.

## Antimicrobial resistance among *E. coli* & *K. pneumoniae*



Public Health England. Health matters: antimicrobial resistance. Available at: <https://www.gov.uk/government/publications/health-matters-antimicrobial-resistance/health-matters-antimicrobial-resistance>. Accessed March 2017.

## Antibiotics in Scotland (2012–2015)



DDD, daily defined doses.  
 Health Protection Scotland. Scottish antimicrobial use and resistance in humans in 2015. Available at: <http://www.isdscotland.org/Health-Topics/Prescribing-and-Medicines/Publications/2016-08-30/2016-08-30-SAPG-2015-Report.pdf>. Accessed March 2017.

PP-GEP-EUR-0041 Date of preparation: March 2017

### Superbug Resistant to All Drugs Causes Death, Highlighting Need for Antibiotic Innovation

Targeted efforts by multiple stakeholders required to tackle the global threat of antibiotic resistance

February 02, 2017 | Antibiotic Resistance Project |



The Pew Charitable Trusts. Deadly Superbug Resistant to All Antibiotics in U.S. Highlights Need for Innovation. Available at: <http://www.pewtrusts.org/en/research-and-analysis/analysis/2017/02/02/superbug-resistant-to-all-drugs-causes-death-highlighting-need-for-antibiotic-innovation>. Accessed March 2017; Image courtesy of Gilchrist M, 2017.

PP-GEP-EUR-0041 Date of preparation: March 2017

## Outline

- ▶ The current situation with regard to antimicrobial resistance in Europe today, in particular, the UK
- ▶ Aims and importance of antimicrobial stewardship
- ▶ The role of the pharmacist in antimicrobial stewardship programmes

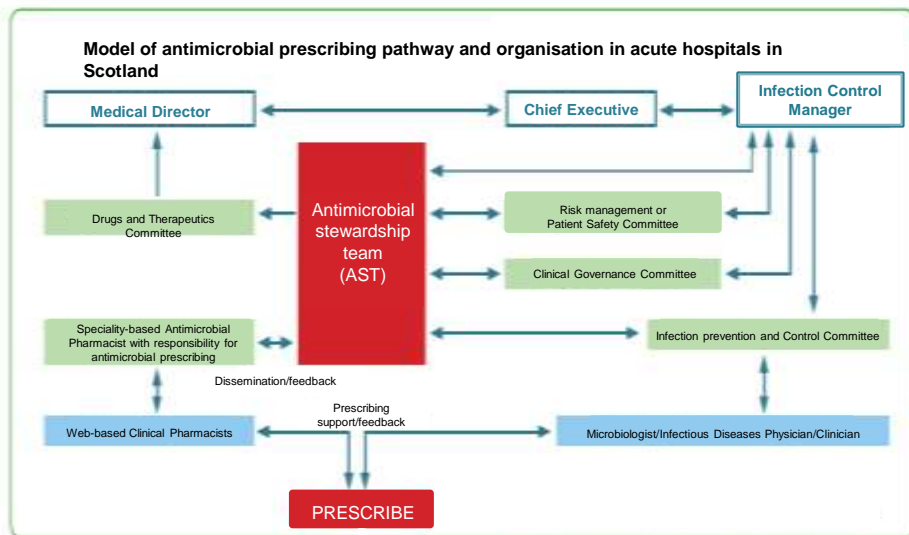
## Antimicrobial stewardship

- ▶ Coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration
- ▶ Antimicrobial stewards seek to achieve optimal clinical outcomes related to antimicrobial use, minimise toxicity and other adverse events, reduce the costs of healthcare for infections, and limit selection for antimicrobial resistant strains

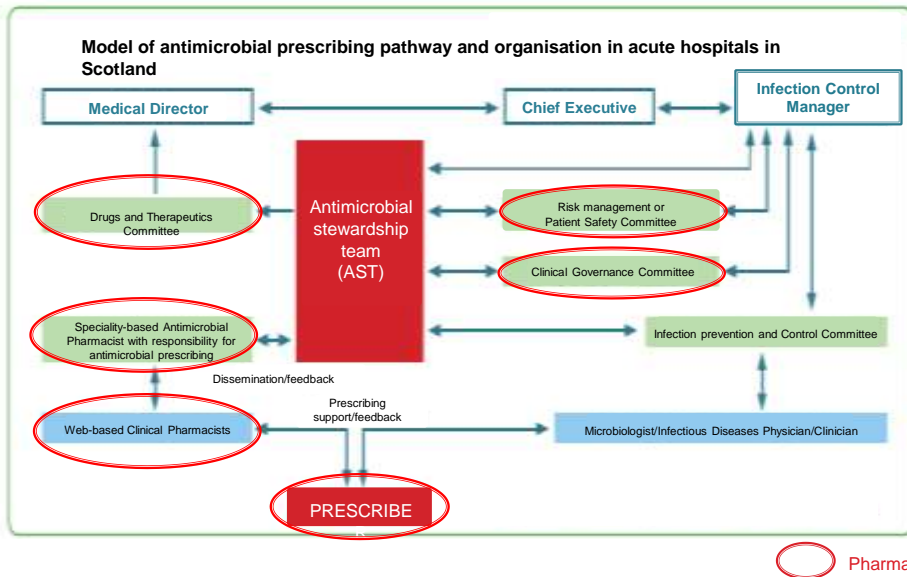
Do you have an antimicrobial stewardship programme in your hospital?

1. Yes
2. No
3. Not sure

PP-GEP-EUR-0041 Date of preparation: March 2017



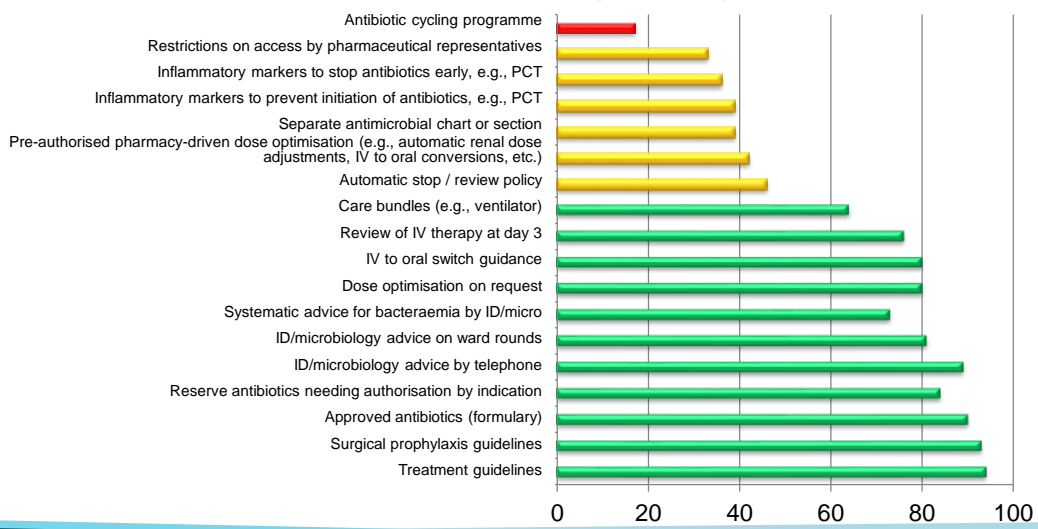
PP-GEP-EUR-0041 Date of preparation: March 2017



PP-GEP-EUR-0041 Date of preparation: March 2017

AST, antimicrobial stewardship team.  
Adapted from: Nathwani D, et al. *J Antimicrob Chemother* 2006;57:1189-1196

## AMS strategies (%) by hospital (n=422)



PP-GEP-EUR-0041 Date of preparation: March 2017

AMS, antimicrobial stewardship; ID, infectious disease; IV, intravenous; PCT, procalcitonin.  
Howard P, et al. *J Antimicrob Chemother* 2015;70:1245-1255.



PP-GEP-EUR-0041 Date of preparation: March 2017

Schuts EC, et al. *Lancet Infect Dis* 2016;16:847–856; BSAC. Practical guide to antimicrobial stewardship in hospitals. Available at: <http://bsac.org.uk/wp-content/uploads/2013/07/Stewardship-Booklet-Practical-Guide-to-Antimicrobial-Stewardship-in-Hospitals.pdf>. Accessed March 2017; Australian Commission on Safety and Quality in Health Care. Antimicrobial Stewardship in Australian Hospitals 2011. Available at: <http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/book/>. Accessed March 2017.

## Outline

- ▶ The current situation with regard to antimicrobial resistance in Europe today, in particular, the UK
- ▶ Aims and importance of antimicrobial stewardship
- ▶ The role of the pharmacist in antimicrobial stewardship programmes

PP-GEP-EUR-0041 Date of preparation: March 2017



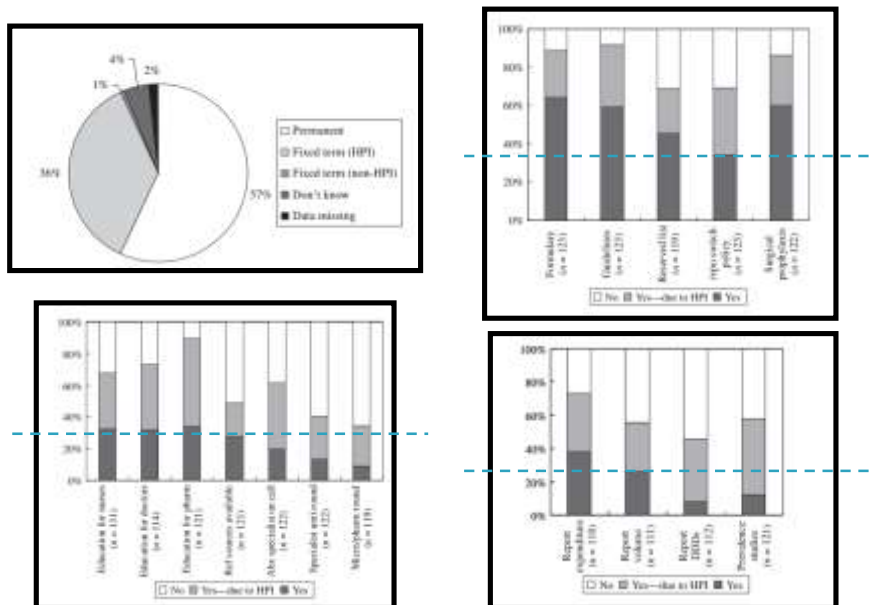
# Rise of antimicrobial pharmacists

## 2003

- ▶ Department of Health Hospital Pharmacy Initiative £12 million for 3 years
- ▶ Improving the monitoring and control of anti-infectives
- ▶ Help tackle growing HAIs (*C. difficile*/MRSA bacteraemia)
  
- ▶ Widespread update and revision of local guidelines
- ▶ Increased interaction between ID/microbiology/pharmacy
  - Leading to development of, or more frequent, JOINT rounds
- ▶ Dramatic increase in provision of education around prudent use of antimicrobial use

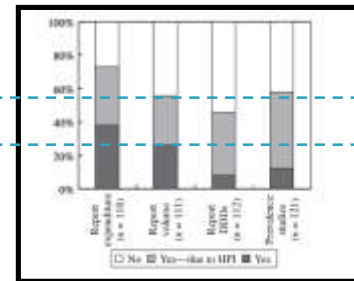
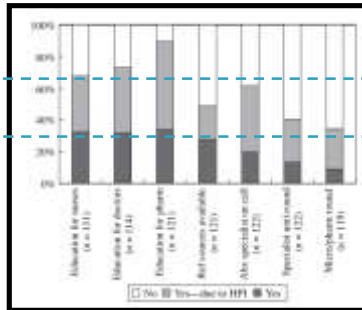
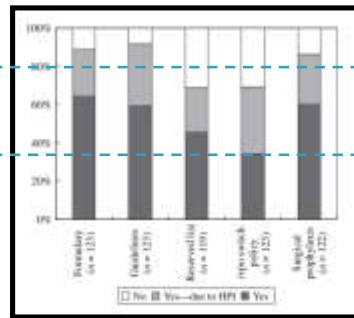
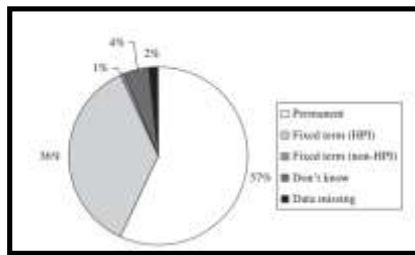
PP-GEF-EUR-0041 Date of preparation: March 2017

HAI, healthcare-associated infections; ID, infectious disease; MRSA, methicillin-resistant *Staphylococcus aureus*  
 Wickens H, Jacklin A. *J Antimicrob Chemother* 2006;58:1230–1237.



Wickens H, Jacklin A. *J Antimicrob Chemother* 2006;58:1230–1237.

PP-GEF-EUR-0041 Date of preparation: March 2017



Wickens H, Jacklin A. *J Antimicrob Chemother* 2006;58:1230-1237.

PP-GEF-EUR-0041 Date of preparation: March 2017

## Demographics and pharmacist-reported antimicrobial stewardship activities: comparison of results from 2011 and 2005 studies

	2011	2005
Number of trusts contacted	153	183
Number of completed questionnaires and return rate	120 (78%)	125 (68%)
Antimicrobial staff designations		
pharmacist	90%	89%
technician	7%	10%
other	3%	4%
Qualifications of antimicrobial pharmacy staff		
BPharm/MPharm/MSc Pharmacy <sup>a</sup>	90%	89%
MSc	16%	10%
PhD	7%	6%
Antimicrobial stewardship activities		
policies and guidance		
empirical usage guidance	99%	92%
antimicrobial formulary	96%	89%
surgical prophylaxis	100%	86%
reserved antimicrobial list	91%	69%
intravenous-oral switch policy	87%	69%
automatic stop policy	36%	not asked
separate antimicrobial drug chart or section to the drug chart	32%	not asked
antibiotic usage (reports provided at least yearly)		
expenditure reports	74%	73%
reports of usage in CDDs	66%	46%
antimicrobial point prevalence survey (PPS) reports	82%	58%

Wickens H, Farrell S, et al. *J Antimicrob Chemother* 2013;68:2675-2681.

PP-GEF-EUR-0041 Date of preparation: March 2017

## UK 5-year AMR Strategy 2013–2018

### CMO Annual Report 2011\*



### 'One Health'



### Strategic aims

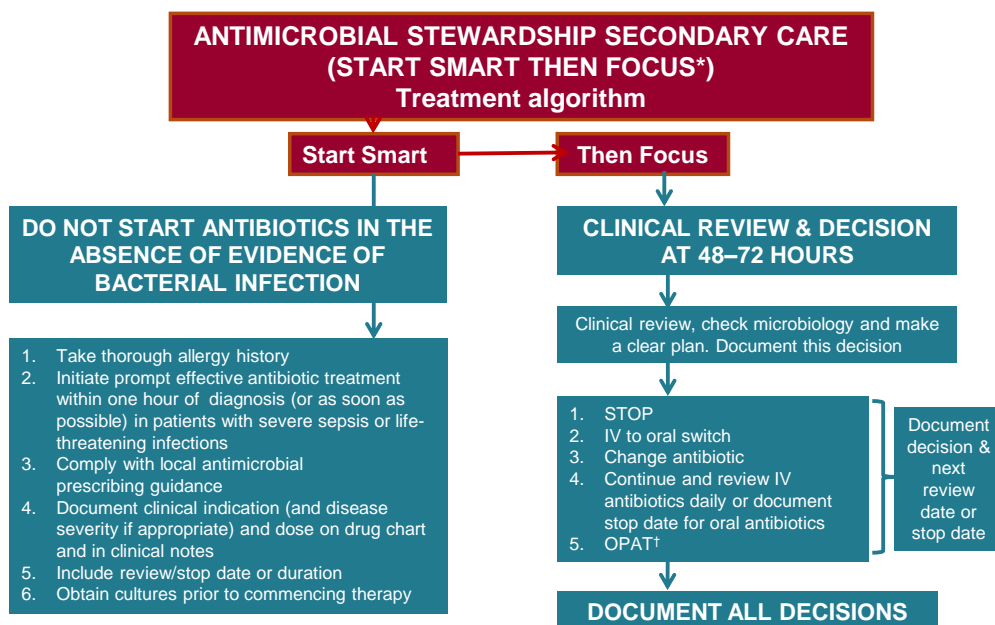
- ▶ Improve the knowledge and understanding of AMR
- ▶ Conserve and steward the effectiveness of existing treatments
- ▶ Stimulate the development of new antibiotics, diagnostics and novel therapies

PP-GEF-EUR-0041 Date of preparation: March 2017

\*Published March 2013

AMR, antimicrobial resistance; CMO, Chief Medical Officer

Gov.uk. Annual report of the Chief Medical officer 2011. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/138331/CMO\\_Annual\\_Report\\_Volume\\_2\\_2011.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/138331/CMO_Annual_Report_Volume_2_2011.pdf). Accessed March 2017; Gov.uk. UK five year antimicrobial resistance strategy 2013 to 2018. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/244058/20130902\\_UK\\_5\\_year\\_AMR\\_strategy.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244058/20130902_UK_5_year_AMR_strategy.pdf). Accessed March 2017.



PP-GEF-EUR-0041 Date of preparation: March 2017

\*Updated 2015. †Outpatient parenteral antibiotic therapy.

Public Health England. Start Smart - Then Focus, Antimicrobial stewardship toolkit for English hospitals. Available at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/417032/Start\\_Smart\\_Then\\_Focus\\_FINAL.PDF](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/417032/Start_Smart_Then_Focus_FINAL.PDF). Accessed March 2017.

**Public Health England** **NHS**

**Stage Two: Resources**  
Addressing antimicrobial resistance through implementation of an antimicrobial stewardship programme  
18 August 2015

**Alert reference number:** 16/09/PSA/16/2015/017  
**Alert stage:** Two - Resources

**Antimicrobial resistance (AMR) has risen alarmingly over the last 40 years and inappropriate use of antimicrobials is a key driver. From 2010 to 2013, total antibiotic prescribing in England increased by 6%, comprised of a 4% rise in general practice and a 12% increase in hospital inpatient prescribing.**

**The consequences of AMR include increased treatment failure for common infections and decreased treatment options where antibiotics are vital, such as during certain cancer treatments. Antimicrobial stewardship is key to combating AMR and is a important element of the UK Five Year Antimicrobial Resistance Strategy.**

**Antimicrobial stewardship embodies an organisational and system-wide approach to promoting and monitoring the judicious use of antimicrobials by:**

- optimising therapy for individual patients;
- preventing overuse and misuse; and
- encouraging the development of resistance at patient and community levels.

**This alert has been jointly issued by Health Education England, NHS England and Public Health England (PHE) to highlight the challenge of AMR and to support the facilities developed by PHE to support the NHS in improving antimicrobial stewardship in both primary and secondary care.**

**Primary care resources (including out-of-hours, urgent care centres and walk-in centres)**

- **EMERGE:** (See Antibiotic Responsibility, Guidance, Education, Tools & Resources) [www.nps.org.uk/antibiotic-responsible-antibiotic-rocket-land/](http://www.nps.org.uk/antibiotic-responsible-antibiotic-rocket-land/) designed to be used by the whole primary care team within the GP practice or out-of-hours setting, as well as being relevant to mental health care settings.

**Actions**

**Who:** All organisations providing NHS-funded care where antibiotics are prescribed, dispensed or administered

**When:** To commence immediately and be completed by 31 March 2016

**Bring this alert to the attention of those holding orders for antimicrobial stewardship your organisation (e.g. GP or infection prevention in and ambulance trusts, the Medicines Organisation in mental health trusts, local trust antimicrobial stewardship)**

**Public Health England** **NHS**

**Stage Two: Resources**  
Resources to support the prompt recognition of sepsis and the rapid initiation of treatment  
2 September 2014

**Alert reference number:** 16/GPS&R/2014/015  
**Alert stage:** Two - Resources

**This patient safety alert applies to all patient age groups**

**Sepsis is a time-critical medical emergency, which can occur at any point of the body's response to infection. The resulting inflammatory response adversely affects tissues and organs. Unless treated quickly, sepsis can progress to severe sepsis, multi-organ failure, septic shock and ultimately death. Sepsis shock has a 50% mortality rate<sup>(1)</sup>.**

**Sepsis is almost unique among acute conditions in that it affects all age groups and can present in any clinical area and health sector. Over 70% of cases arise in the community<sup>(2)</sup>. However, sepsis can be easily treated through timely intervention and basic, cost-effective therapies. Recent epidemiological studies<sup>(3,4)</sup> and data from the Intensive Care National Audit and Research Centre (ICNARC)<sup>(5)</sup> estimate that 25,000 people die from sepsis in England each year. We are seeking in recent data, especially in the UK but the mortality rate for sepsis in children is estimated to be 10 – 15%. Key to reducing these figures are:**

- Timely recognition and diagnosis of sepsis
- Fast administration of relevant antibiotics

**Actions**

**Who:** Chief Executives of NHS Trusts, Foundation Trusts, Ambulance Trusts & General Practitioners

**When:** To commence immediately and by no later than 31 October 2014 have a robust action plan developed to achieve compliance

**Ensure staff have access to both adult, paediatric and infant sepsis screening and action tools that can be used for**

Public Health England. Patient safety alert, Addressing antimicrobial resistance through implementation of an antimicrobial stewardship programme. Available at: <https://www.england.nhs.uk/wp-content/uploads/2015/08/psa-amr-stewardship-prog.pdf>. Accessed March 2017; Public Health England. Patient safety alert, Resources to support the prompt recognition of sepsis and the rapid initiation of treatment. Available at: <https://www.england.nhs.uk/wp-content/uploads/2014/09/psa-sepsis.pdf>. Accessed March 2017.

## Commissioning for Quality and Innovation (CQUIN) 2016–17

CQUIN scheme is intended to deliver clinical quality improvements and drive transformational change. Will impact on reducing inequalities in access to services, experiences of using them and outcomes achieved

### Antimicrobial resistance

**Goal:** Reduction in antibiotic consumption and encouraging focus on antimicrobial stewardship and ensuring antibiotic review within 72 hours

**Rationale:** Reducing consumption of antibiotics and optimising prescribing practice by reducing the indiscriminate or inappropriate use of antibiotics which is a key driver in the spread of antibiotic resistance.

### Identification and Early Treatment of Sepsis

**Goal:** Systematic screening for Sepsis of appropriate patients and where sepsis is identified, to provide timely and appropriate treatment and review.

**Rationale:** Sepsis is potentially a life threatening condition and is recognised as a significant cause of mortality and morbidity in the NHS, with around 32,000 deaths in England attributed to Sepsis annually. Of these it is estimated that 11,000 could have been prevented.

NHS England. Commissioning for Quality and Innovation (CQUIN), Guidance for 2016/17. Available at: <https://www.england.nhs.uk/wp-content/uploads/2016/03/cquin-guidance-16-17-v3.pdf>. Accessed March 2017.

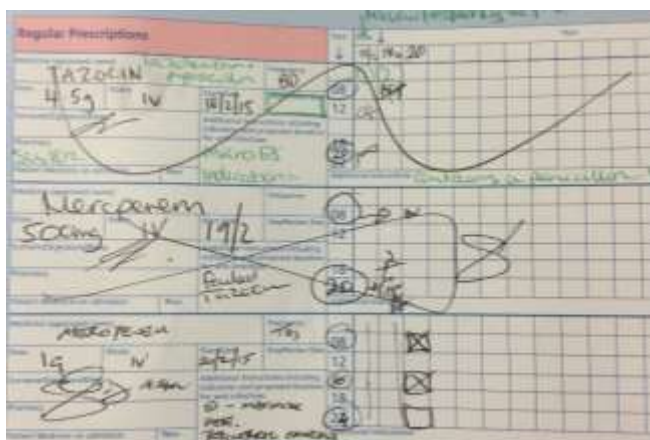
# Clinical

- ▶ Multidisciplinary ward rounds
- ▶ Pharmacist-led ward rounds
- ▶ Antimicrobial stewardship and infection prevention
- ▶ Dose optimisation
  - PK/PD – ADME
  - Formulation choice/mode of delivery
  - Speed of delivery
  - PO vs IV (bolus) vs IV (infusion)
  - IV to PO switching
  - Tissue distribution factors
  - Bone penetration
  - Obesity
  - Surgery (treatment vs prophylaxis)



PP-GEP-EUR-0041 Date of preparation: March 2017

ADME, absorption, distribution, metabolism and excretion; IV, intravenous; PD, pharmacodynamics; PK, pharmacokinetic; PO, oral. Glichrist M, personal opinion.



Once Only Medicines and Surgical Antibiotic Prophylaxis							
Date	Time	Medicine (Approved name)	Dose	Route	Signature/Initials	Time Given	Given by
19/1/15		Amikacin	400mg	IV	[Signature]		[Signature]
20/1/15	1500	Meropenem	2g	IV	[Signature]		

PP-GEP-EUR-0041 Date of preparation: March 2017

Glichrist M, personal data.

## Clinical – Patient safety/governance

- ▶ Indication and licensing
- ▶ Allergy
- ▶ Efficacy vs toxicity
- ▶ Side effects (clinical practice vs text book!)
- ▶ Interactions
- ▶ Pregnancy and breast feeding
- ▶ Reduction of HAI
  - Vascular access removal
  - *C. difficile* agents

PP-GEP-EUR-0041 Date of preparation: March 2017

HAI, healthcare-associated infection.  
Glichrist M, personal opinion.

## Clinical – Patient safety/governance

- ▶ Practicalities of prescribing
  - Electronic systems?
- ▶ Bring to pharmacy's attention – criticality
- ▶ Formulation management
- ▶ Availability of stock
- ▶ Drug shortages
- ▶ New antimicrobial and entry into hospital

PP-GEP-EUR-0041 Date of preparation: March 2017

Glichrist M, personal opinion.

# Clinical – Guideline development

**STEP 3 Prescribe & record administering the ONE-OFF LOADING DOSE in Box 1 below;**

BOX 1   Vancomycin Loading Dose Prescription				Administration Record		
Date to be given	Time to be given	Vancomycin Dose (mg)	Prescriber's signature, PRINTED name and STATUS	Date given	Time given (start/stop)*	Given by

**STEP 4 Prescribe & record administering the INITIAL MAINTENANCE DOSE in Box 2 below;**

BOX 2   Maintenance Dose Prescription				Administration Record		
Drug: VANCOMYCIN				SPECIFY dose time(s) ↓		
Dose (mg)	Dose interval	Route IV Infusion	Start date	Date:	Date:	Date:
				Day 1	Day 2	Day 3
Prescriber's signature, PRINTED NAME & status:				*Infuse at no greater than 500 mg/hr*		
Target vancomycin concentration: 30-20 mg/L (standard) ↓				Date:		
				Day 1	Day 2	Day 3

Gilchrist M, personal data.

PP-GEF-EUR-0041 Date of preparation: March 2017

# Introduction of apps

**Home screen**

**Pregnancy Advice**

**Calculators**

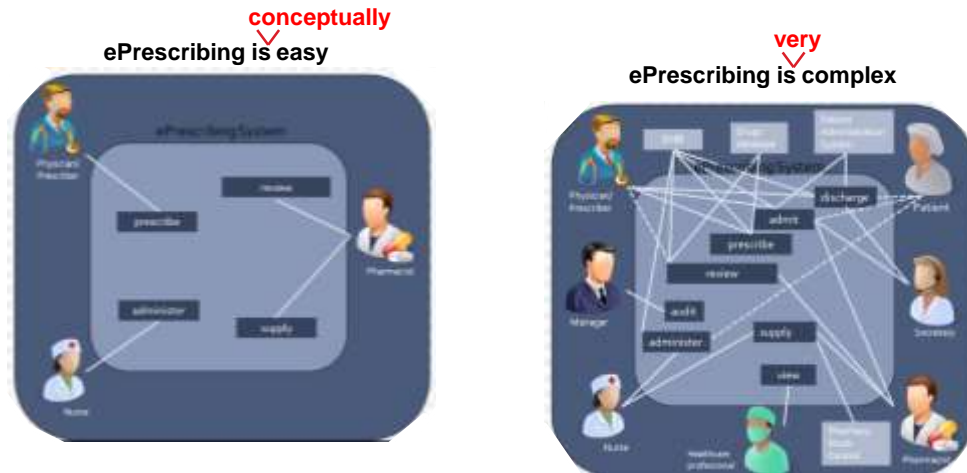
**Prescription Support**

**Antibiotic Protocols**

Gilchrist M, personal data.

PP-GEF-EUR-0041 Date of preparation: March 2017

## Electronic prescribing integration into stewardship programmes



Gilchrist M, personal data.

PP-GEP-EUR-0041 Date of preparation: March 2017

## Surveillance

- ▶ Depends on IT available to you
- ▶ **Surveillance data with outcomes:** difficult without electronic prescribing
- ▶ Measuring the **volume of antimicrobial** usage
  - DDD/1000 OBD or DDD/1000 normalised bed days
  - Linked to infection rates or AMR
  - Local, regional, national or international
  - Control charts to monitor trends
  - Simple feedback to end users 😊 😐 😞
- ▶ Measuring **quality of antimicrobial** usage
  - Point prevalence surveys (national, regional or local)
- ▶ **Process measures** – key performance indicators
- ▶ **Quality outcomes indicators** – ↓ CDI or AMR

AMR, antimicrobial resistance; CDI, *Clostridium difficile* infection; DDD, daily defined doses; OBD, occupied bed days.  
Gilchrist M, personal opinion.

PP-GEP-EUR-0041 Date of preparation: March 2017



## Education and training

- ▶ Policy adherence/promoting best practice/audit/quality improvement
- ▶ Pharmacokinetic/dynamic principles
- ▶ Drug administration
- ▶ Up-skilling medical/pharmacy/nursing staff
- ▶ Leadership around AMR
- ▶ Changing behaviour/understanding how clinical practice works/adapting
- ▶ Role model

PP-GEP-EUR-0041 Date of preparation: March 2017

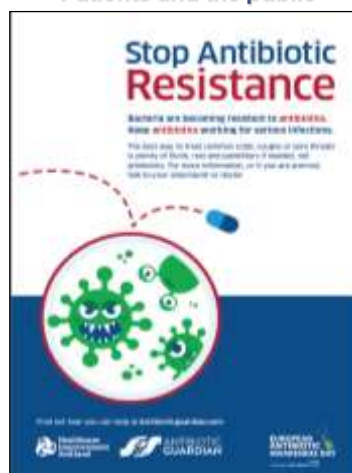
AMR, antimicrobial resistance.  
Glichrist M, personal opinion.

## Education resources

### Healthcare staff



### Patients and the public



PP-GEP-EUR-0041 Date of preparation: March 2017

NHS Scotland, Enhancing the quality of antimicrobial prescribing through education in NHS Scotland. Available at: [http://www.nes.scot.nhs.uk/media/2782990/nesd0290\\_antimicrobial\\_prescribing\\_leaflet\\_final.pdf](http://www.nes.scot.nhs.uk/media/2782990/nesd0290_antimicrobial_prescribing_leaflet_final.pdf), Accessed March 2017, Glichrist M, personal data.

Imperial College Healthcare 

# Antibiotic Awareness Week

## 14 - 18 November

Patients receiving antibiotics should receive the right drug, at the right dose, at the right time and the right duration for the individual.

Each day we will focus on a different aspect of antimicrobial prescribing, and provide you with practical tips.

Everyone in medical, nursing or pharmacy roles has a role to ensure that antibiotics are used responsibly.






PP-GEF-EUR-0041 Date of preparation: March 2017

Gichrist M, personal data.

**Imperial College Healthcare NHS Trust**  
 Published by Fiona Dempsey (1) · November 14, 2016 · 

This week is Antibiotic Awareness Week and Mark Gichrist, consultant pharmacist at Imperial College Healthcare NHS Trust, is leading efforts to educate staff and patients about the safest, most effective ways to use antibiotics, and about antimicrobial resistance. In this week's Trust blog, he explains what we're doing at the Trust and how you can help tackle this challenge. <https://www.imperial.nhs.uk/>...we-all-have-a-role-to-play-in...



**We all have a role to play in fighting antimicrobial resistance**

This week is Antibiotic Awareness Week and Mark Gichrist, consultant phm at our Trust, is leading efforts to educate staff and patients about the safest, [IMPERIAL.NHS.UK](https://www.imperial.nhs.uk/)

**Imperial College Healthcare NHS Trust** added a new photo.  
 Published by Fiona Dempsey (1) · November 16, 2016 · 

**Did you know that no amount of antibiotics can cure your cold?**

Colds, most coughs, sinusitis, ear infections often get better without antibiotics as your body can usually fight these infections on its own.

**KEEP ANTIBIOTICS SAFE FOR THE FUTURE**

**Ask your pharmacist for advice about your symptoms**



PP-GEF-EUR-0041 Date of preparation: March 2017

Gichrist M, personal data.

PP-GEF-EUR-0041 Date of preparation: March 2017

NHS Lanarkshire. Sharing isn't caring when it comes to #norovirus - the winter vomiting bug. Available at: <https://twitter.com/NHSLanarkshire/status/809072628728295424>. Accessed March 2017; NHS Inform. If you catch the winter vomiting bug, you are still contagious 48 hours after your symptoms stop, so stay at home! Available at: <https://twitter.com/nhsinform/status/80172201023258624>. Accessed March 2017; NHS. Get your free NHS flu vaccination at this pharmacy. Available at: <http://psnc.org.uk/wp-content/uploads/2015/07/Flu-vaccination-service-main-poster.pdf>. Accessed March 2017.

PP-GEF-EUR-0041 Date of preparation: March 2017

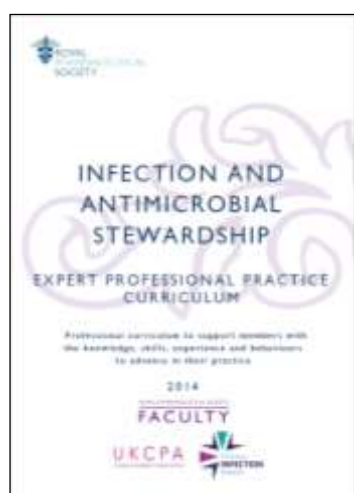
Antibiotic Guardian. Implementing local action plans to tackle antimicrobial resistance. Available at: <http://antibiotiguardian.com/Meetings/antibiotic-guardian-bristol-implementing-local-action-plans-to-tackle-antimicrobial-resistance/>. Accessed March 2017.

## Hospital pharmacists leading national work



PP-GEF-EUR-0041 Date of preparation: March 2017

## UKCPA PIN key achievements



PP-GEF-EUR-0041 Date of preparation: March 2017

## Next steps for antimicrobial pharmacists

- ▶ Continue to support government agenda
- ▶ Continue collaboration
  - Local/National/International
- ▶ Antifungal stewardship
- ▶ Outpatient Parenteral Antimicrobial Therapy (OPAT)
- ▶ Point of care testing
- ▶ Diagnostics
- ▶ Sepsis
- ▶ Vaccination promotion



## Acknowledgements

- ▶ ICHNT antimicrobial teams
- ▶ Alison Holmes/Eimear Brannigan
- ▶ Orla Geoghegan/Emma Guthrie
- ▶ Phil Howard
- ▶ Dilip Nathwani
- ▶ Esmita Charani
- ▶ Alison Cockburn
- ▶ Jacqui Sneddon
- ▶ Diane Ashiru-Oredope
- ▶ Tejal Veghela
- ▶ All UK antimicrobial pharmacists



# The pharmacist's role in antimicrobial stewardship in France

*Florence Lieutier-Colas*

*22<sup>nd</sup> Congress of the European Association of Hospital Pharmacists  
22<sup>nd</sup> March 2017, Cannes, France*

PP-GEP-EUR-0042 Date of preparation: March 2017

## Disclosures

- Participated in commercial advisory boards for:
  - Astellas France
  - Gilead
  - MSD
  - Pfizer

PP-GEP-EUR-0042 Date of preparation: March 2017

## Outline

- Antimicrobial resistance in France
- How are pharmacists involved in AMS?
  - Data from the South West of France
- Our multidisciplinary experience in the South East of France
- Conclusion and perspectives

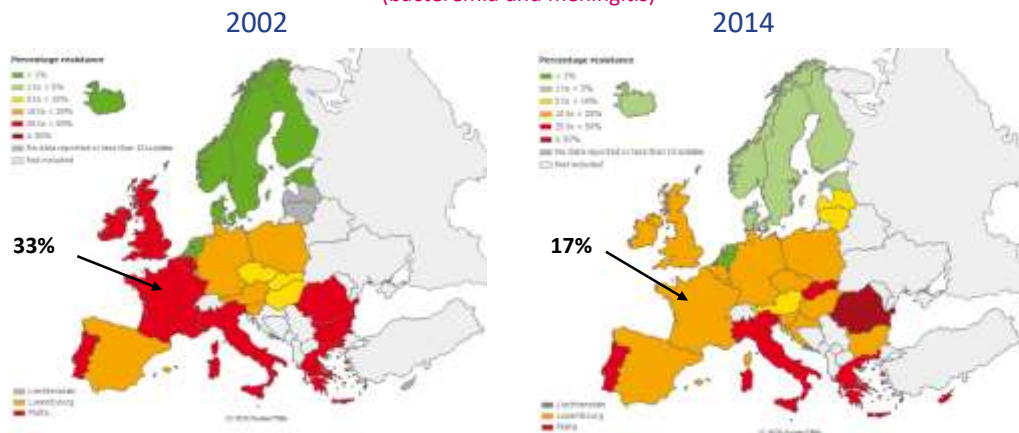
PP-GEP-EUR-0042 Date of preparation: March 2017

AMS, antimicrobial stewardship.



## Antimicrobial resistance in France

Methicillin-resistant *Staphylococcus aureus* (MRSA) isolated from invasive infections (bacteremia and meningitis)



ECDC. Surveillance atlas of infectious diseases. Available at: <http://atlas.ecdc.europa.eu/public/index.aspx>. Accessed March 2017.

PP-GEP-EUR-0042 Date of preparation: March 2017



# Antimicrobial resistance in France today

Evolution of the incidence of MRSA and ESBL Enterobacteriaceae in French hospitals (BMR-Raisin data)



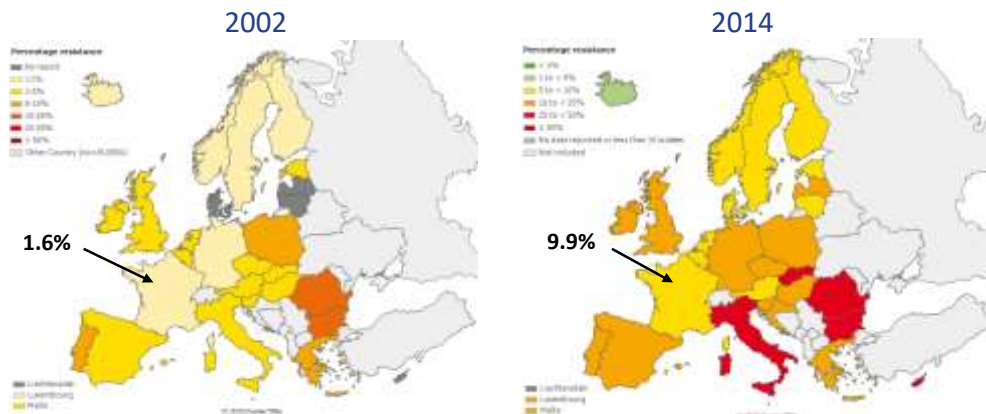
ESBL, extended-spectrum beta-lactamase; MRSA, methicillin-resistant *Staphylococcus aureus*.  
 Rapport BMR-Raisin. Surveillance nationale des bactéries multirésistantes dans les établissements de santé: réseau BMR-Raisin. Available at: <http://inv.santepubliquefrance.fr//bmr-raisin>. Accessed March 2017.

PP-GEP-EUR-0042 Date of preparation: March 2017



# Antimicrobial resistance in France

Resistance of *E. coli* to 3<sup>rd</sup> generation cephalosporins



ECDC. Surveillance atlas of infectious diseases. Available at: <http://atlas.ecdc.europa.eu/public/index.aspx>. Accessed March 2017.

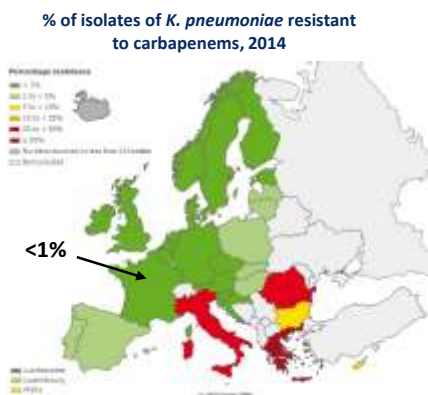
PP-GEP-EUR-0042 Date of preparation: March 2017



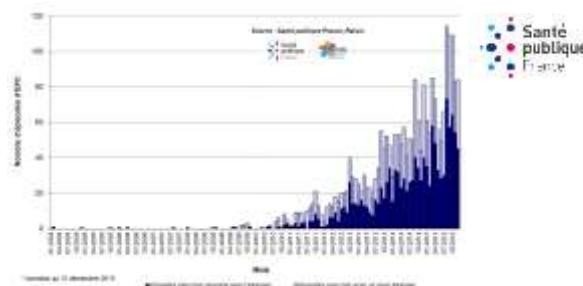


# Antimicrobial resistance in France today

## Carbapenem-resistant Enterobacteriaceae



## Episodes with Carbapenemase-producing Enterobacteriaceae (CPE) in France from 2004 to 2015



- 2385 episodes with CPE from 2004 (report 31.12.2015)
- Strong increase in episodes reported during the summer of 2015

CPE, Carbapenemase-producing Enterobacteriaceae.

ECDC, Surveillance atlas of infectious diseases. Available at: <http://atlas.ecdc.europa.eu/public/index.aspx>. Accessed March 2017; InVS, signalement des infections nosocomiales. Available at: <http://invs.santepubliquefrance.fr/epc>. Accessed March 2017.

## How are pharmacists involved in AMS?

### Responsibilities of pharmacists

- Promoting optimal uses of antimicrobial agents
  - Encouraging multidisciplinary collaboration
  - Working within the pharmacy and therapeutics committee structure
  - Operating a multidisciplinary AMS program
  - Generating and analysing quantitative data on antimicrobial drug use to perform clinical and economic outcome analyses
  - Working with the microbiology laboratory
  - Utilising information technology to enhance AMS through surveillance, utilisation and outcome reporting, and the development of clinical decision-support tools
  - Facilitating safe medication management practices of antimicrobial agents
- Reducing the transmission of infections
- Educational activities

### ASHP Statement on the Pharmacist's Role in Antimicrobial Stewardship and Infection Prevention and Control

Developed through the ASHP Council on Pharmacy Practice and approved by the ASHP Board of Directors on April 17, 2009, and by the ASHP House of Delegates on June 16, 2009.

Am J Health Syst Pharm. 2009;66:757-7.

AMS, antimicrobial stewardship.

ASHP, American Society of Health-system Pharmacists; ASHP Council on Pharmacy Practice. *Am J Health Syst Pharm* 2010;67:575-7.

# How are pharmacists involved in Europe?

## EU guidelines published in February 2017



### Prerequisites and responsibilities of pharmacists:

- Source of advice and information for patients and prescribers
- Gatekeepers to the use of antimicrobials in both community and hospital settings
- Need to be provided with appropriate training
- Only dispense with antibiotic prescription
- Assess the prescription in accordance with local policies
- Provide advice to patients and health professionals with regard to contraindications, drug interactions and food–drug interactions

ECDC. Proposals for EU guidelines on the prudent use of antimicrobials in humans. Available at: <http://ecdc.europa.eu/en/publications/Publications/EU-guidelines-prudent-use-antimicrobials.pdf>. Accessed March 2017.

PP-GEP-EUR-0042 Date of preparation: March 2017

# How are pharmacists involved in AMS?



## Our proposals

*Christelle Elias, World Health Organization, Geneva, Switzerland, Florence Lieutier-Colas, University Hospital Nice, France, Catherine Dumartin, University Hospital Bordeaux, France*

### ECDC DRAFT TECHNICAL REPORT

#### Proposals for draft EU guidelines on the prudent use of antimicrobials in human medicine

### ECDC Public consultation

“Proposals for draft EU guidelines on the prudent use of antimicrobials in human medicine”

Please refer to the [guidelines for submission of comments](#) and the [privacy statement](#).

Deadline for comments: Monday 5 September 2016 sent to [ARHAI@ecdc.europa.eu](mailto:ARHAI@ecdc.europa.eu)

- Assess the prescription after 48–72h according to microbiological and resistance patterns, and alert the ID specialist for targeted antibiotic or if necessary:
- Join the AMS team for the responsible use of antibiotics (audits, monitoring of quality indicators and quantity metrics for antimicrobial use with feedback to prescribers and definition of actions for improvement, updating protocols, prescribers training)
- Update a list on ATB shortages and propose alternatives if necessary
- Promote healthcare workers and participate in patient education programmes on optimal use of ATBs, antimicrobial resistance, vaccination and hygiene

ATB, antibiotic; AMS, antimicrobial stewardship; ID, Infectious Diseases.

ECDC. Proposals for EU guidelines on the prudent use of antimicrobials in humans. Available at: <http://ecdc.europa.eu/en/publications/Publications/EU-guidelines-prudent-use-antimicrobials.pdf>. Accessed March 2017.

PP-GEP-EUR-0042 Date of preparation: March 2017

# How are pharmacists involved in AMS in the South West of France?



POLITIQUE DE BON USAGE,  
CONSOMMATION DES ANTIBIOTIQUES  
ET DES ANTIFONGIQUES,  
RESISTANCE BACTERIENNE – DONNEES 2014

CCIN Sud-Ouest  
Centre de Coopération Interdisciplinaire  
33075 BORDEAUX  
05 56 79 60 08  
05 56 79 60 12  
05 56 79 60 09  
ccin@ccin-sudouest.com  
http://ccin-sudouest.com

## ATB

- Data from annual surveys in the South West of France in around 240 hospitals (voluntary participation) together with a survey on consumption of antibiotics and antifungals (2014 and 2015)
- Items collected according to national requirements with additional details on practical implementation (2014) and according to TATFAR indicators in 2015
  - Antibiotic advisor (mandatory)
  - Antibiotic teams: composition
  - Activities and time spent by pharmacists

AMS, antimicrobial stewardship; TATFAR, Transatlantic Taskforce on Antimicrobial Resistance.  
Special thanks to Catherine Dumartin for this data.

PP-GEP-EUR-0042 Date of preparation: March 2017

# How are pharmacists involved in AMS in the South West of France?



POLITIQUE DE BON USAGE,  
CONSOMMATION DES ANTIBIOTIQUES  
ET DES ANTIFONGIQUES,  
RESISTANCE BACTERIENNE – DONNEES 2014

CCIN Sud-Ouest  
Centre de Coopération Interdisciplinaire  
33075 BORDEAUX  
05 56 79 60 08  
05 56 79 60 12  
05 56 79 60 09  
ccin@ccin-sudouest.com  
http://ccin-sudouest.com

## ATB

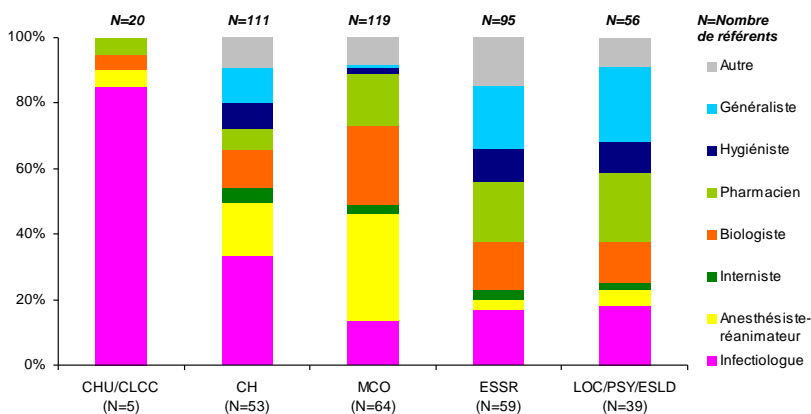
- 92% HCF with a pharmacist in charge of antimicrobial prudent use (2015, indicator TATFAR C5) and 41% with specific training in infectious disease/prudent use of antimicrobials (indicator S7 TATFAR)
- Antibiotic team
  - 2014: 54% of HCF, involving a pharmacist in 92% (median time spent: 1 hour/week)
  - 2015: 50% of HCF, involving a pharmacist in 92% (median time spent: 1 hour/week)

HCF, healthcare facilities; ID, infectious disease; TATFAR, Transatlantic Taskforce on Antimicrobial Resistance.  
Special thanks to Catherine Dumartin for this data.

PP-GEP-EUR-0042 Date of preparation: March 2017

## How are pharmacists involved in AMS in the South West of France?

Specialties of antibiotic advisor according to the type of healthcare facilities



AMS, antimicrobial stewardship.

Special thanks to Catherine Dumartin for this data.

In university hospitals, antibiotic advisors were often an ID specialist

In local HCF, pharmacists were more often antibiotic advisors

PP-GEP-EUR-0042 Date of preparation: March 2017

## How are pharmacists involved in AMS in the South West of France?

Time spent by pharmacists (hours per week per 100 beds) according to HCF types (n=219 HCF)

Type	N	Global no. of beds	Global	Median
CHU	3	2 892	1,73	1,01
CH	49	11 520	2,37	1,99
MCO	63	8 837	2,31	2,31
CLCC	2	269	3,35	3,25
ESSR	59	4 923	2,09	1,94
LOC	24	1 285	3,62	2,89
ESLD	3	170	2,35	3,33
PSY	16	2 847	1,20	0,63
<b>Global</b>	<b>219</b>	<b>32 743</b>	<b>2,25</b>	<b>2,04</b>

The median pharmacist's time for optimising antibiotic use among 219 responders was 2.04 hours per week for 100 beds, corresponding to 1 full-time pharmacist for 2000 beds, with variations according to the type of HCF



POLITIQUE DE BON USAGE,  
CONSUMMATION DES ANTIBIOTIQUES  
ET DES ANTIFONGIQUES,  
RESISTANCE BACTERIENNE – DONNEES 2014

CClin Sud-Ouest  
Cliquez ici pour aller à la page  
d'information sur le site  
Tel : 05 56 79 60 02  
Fax : 05 56 79 60 02  
E-mail : ccclin@chu-bordeaux.fr  
http://www.cclin-sudouest.com

**ATB**

HCF, healthcare facilities.

Special thanks to Catherine Dumartin for this data.

PP-GEP-EUR-0042 Date of preparation: March 2017

# How are pharmacists involved in AMS in the South West of France?



POLITIQUE DE BON USAGE,  
CONSOMMATION DES ANTIBIOTIQUES  
ET DES ANTIFONGIQUES,  
RESISTANCE BACTERIENNE – DONNEES 2014

CCJH Sud-Ouest  
Centre Hospitalier Pellegrin  
33076 BORDEAUX  
Tél : 05 56 79 80 00  
Fax : 05 56 79 80 04  
E-mail : ccjh@chpbordeaux.fr  
http://ccjhsudouest.com

## ATB

HCF, healthcare facilities.

Special thanks to Catherine Dumartin for this data.

## Activities involving pharmacists:

- 2015: 65% HCF with computerised system for antimicrobial prescribing (aid-decision tool) vs 60% in 2014
- Re-assessment after 48–72h (mandatory)
  - Triggered by pharmacy computerised systems in most cases (59.5%, 113 HCF/212)
  - Resulting in actions by pharmacists in 53% towards the prescriber (vs actions by the antibiotic advisor in 32%)

PP-GEP-EUR-0042 Date of preparation: March 2017

# Our multidisciplinary experience in the South East of France: an effective AMS initiative involving pharmacists since 2005



## Role of the pharmacist

- Assessing ATB prescriptions, with regard to microbiological data and eventual organ dysfunction
- Alerting the ID specialist and other team members for targeted ATB and if necessary:
- Specific form filled out by AMT members, visible by all physicians on the patient's electronic medical record
- Participating in the development of electronic prescribing of drugs
- Monitoring ATB consumption regarding the AMR in each unit of the hospital
- Participating in audits and feedback to prescribers, prescribers training, bi-annual journal sent by mail on various topics relating to infectious diseases...

AMR, antimicrobial resistance; AMS, antimicrobial stewardship; AMT, antibiotic management team; ATB, antibiotic; ID, infectious disease. Mondain V, et al. *Med Mal Infect* 2013;43:17–21.

PP-GEP-EUR-0042 Date of preparation: March 2017

## Our antimicrobial stewardship since 2005

### Daily interactions

#### Pharmacist

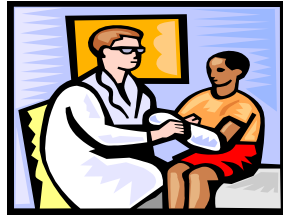
- Assess the prescription according to the indication, microbiological data...
- Alert the Infectious diseases specialist for targeted antibiotics and in other cases if necessary



#### Microbiologist

- Microbiological documentation
- Expert advice

#### Physician / Patient



#### Pharmacologist

- TDM (Therapeutic Drug Monitoring)
- Expert advice



#### Infectious Disease specialist

- Replying to clinicians' requests
- Advice for targeted antibiotics
- Ward rounds



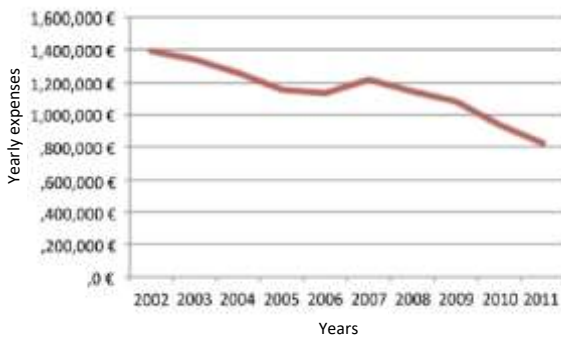
#### Infection preventionist or Hospital epidemiologist

Lieutier-Colas F, personal opinion.

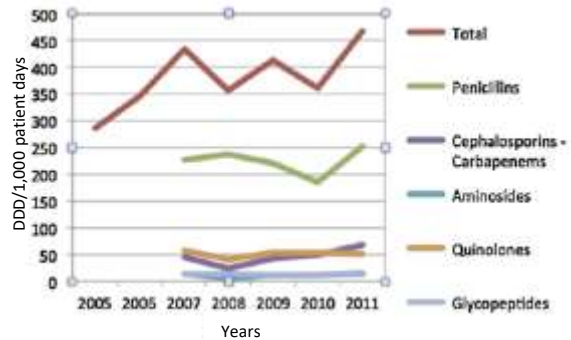
PP-GEP-EUR-0042 Date of preparation: March 2017

## Our multidisciplinary experience in the South East of France: an effective AMS initiative involving pharmacists since 2005

Antibiotic prescription induced cost between 2002 and 2011



Yearly antibiotic use since 2005, in defined daily doses (DDD)/1000 patient-days (PD).



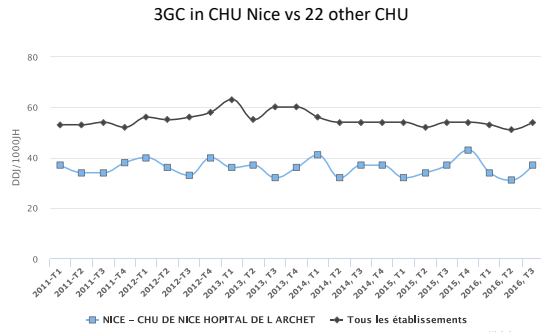
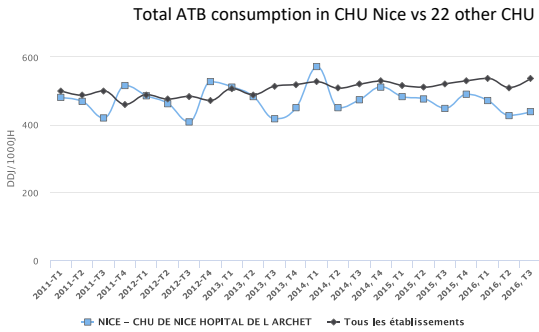
AMS, antimicrobial stewardship; DDD, daily defined dose. Mondain V, et al. *Med Mal Infect* 2013;43:17-21.

PP-GEP-EUR-0042 Date of preparation: March 2017



## AMS initiative in France involving pharmacists: ATB consumption from 2011–2016

PP-GEP-EUR-0042 Date of preparation: March 2017

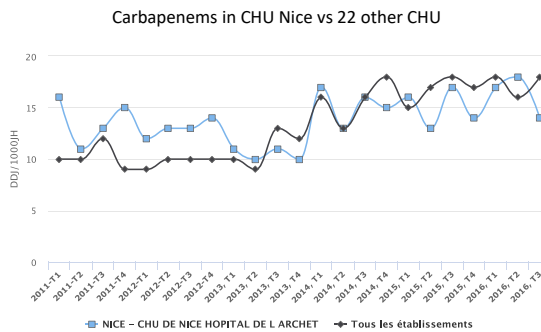
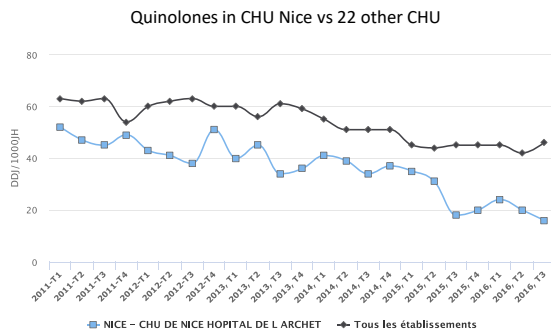


3GC, 3<sup>rd</sup> generation cephalosporins; AMS, antimicrobial stewardship; ATB, antibiotic; CHU, Centre Hospitalier Universitaire.  
Data from the French national website. Available at: [www.consores.net](http://www.consores.net). Accessed March 2017.



## AMS initiative in France involving pharmacists: ATB consumption from 2011–2016

PP-GEP-EUR-0042 Date of preparation: March 2017



AMS, antimicrobial stewardship; ATB, antibiotic; CHU, Centre Hospitalier Universitaire.  
Data from the French national website. Available at: [www.consores.net](http://www.consores.net). Accessed March 2017.

## An effective AMS initiative in France involving pharmacists: where is it today in the South East of France?

2014: Creation of a regional pharmacists' network to promote good use of ATB

- Share tools (aminoside administration protocols, list of targeted ATB...)
- Regional audits on carbapenem use
- Generate and analyse regional quantitative data on antimicrobial drug use
- Coordinate writing of the regional Infectious Disease newspaper

AMS, antimicrobial stewardship; ATB, antibiotics.

Bertrand B et al, poster presentation during the National days on Infectious Diseases, June 2015, Nancy, France.



PP-GEP-EUR-0042 Date of preparation: March 2017



A new software to help optimize regional antimicrobial stewardship policy? Results from a two year-survey of antibiotic consumption and antimicrobial resistance in five hospitals in South-Eastern France

Marion Warembourg<sup>1</sup>, Anne-Charlotte Lombardo<sup>2</sup>, Véronique Blanc<sup>3</sup>, Benjamin Bertrand<sup>4</sup>, Sophie Léotard<sup>5</sup>, Carole Labat<sup>6</sup>, Marine Agullo<sup>7</sup>, Véronique Mondain<sup>8</sup>, Sandrine Boussat<sup>9</sup>, Pierre-Marie Roger<sup>9</sup>, Raymond Ruimy<sup>10</sup>, Florence Lieutier-Colas<sup>1</sup> and the Regional Network Reso-Infectio-PACA-Est.

<sup>1/</sup> Pharmacy, Nice University Hospital, <sup>2/</sup> Pharmacy, Antibes Hospital, <sup>3/</sup> Microbiology, Antibes Hospital, <sup>4/</sup> Pharmacy, Grasse Hospital, <sup>5/</sup> Microbiology, Grasse Hospital, <sup>6/</sup> Pharmacy, Draguignan Hospital, <sup>7/</sup> Pharmacy, Cannes Hospital, <sup>8/</sup> Infectious diseases unit, Nice University Hospital, <sup>9/</sup> Infections Control Committee, Nancy University Hospital, <sup>10/</sup> Microbiology, Nice University Hospital

- New national software to survey antibiotic consumption and AMR in clinical wards since 2013
- Results from a 2-year survey (2013, 2014) in five hospitals
- Focused on two populations of at-risk patients exposed to ATB; in the ICU and in geriatric wards
- ID advice was given upon request and on a weekly basis in the ICU (in UH, GHB and GHD) and in geriatric units (UH and GHA)



AMR, antimicrobial resistance; ATB, antibiotic; DDD, daily defined dose; GHA, General Hospital A; GHB, General Hospital B; GHD, General Hospital D; ICU, intensive care unit; ID, infectious disease; PD, patient days; UH, University Hospital.  
Warembourg M, et al. ECCMID 2016. Poster EV0707.

PP-GEP-EUR-0042 Date of preparation: March 2017



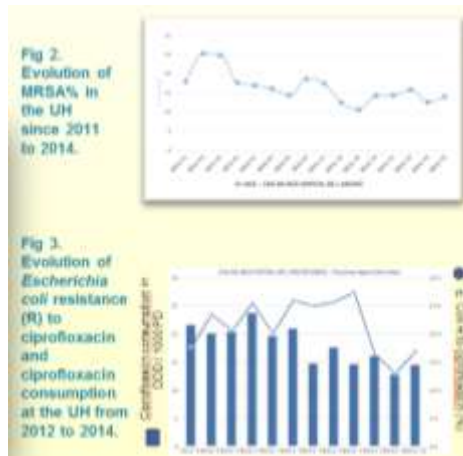


## A new software to help optimize regional antimicrobial stewardship policy? Results from a two year-survey of antibiotic consumption and antimicrobial resistance in five hospitals in South-Eastern France

Marion Warembourg<sup>1</sup>, Anne-Charlotte Lombardo<sup>2</sup>, Véronique Blanc<sup>3</sup>, Benjamin Bertrand<sup>4</sup>, Sophie Léotard<sup>5</sup>, Carole Labat<sup>6</sup>, Marine Agullo<sup>7</sup>, Véronique Mondain<sup>8</sup>, Sandrine Bousset<sup>9</sup>, Pierre-Marie Roger<sup>8</sup>, Raymond Ruimy<sup>10</sup>, Florence Lieutier-Colas<sup>1</sup> and the Regional Network Reso-Infectio-PACA-Est.

<sup>1/</sup> Pharmacy, Nice University Hospital <sup>2/</sup> Pharmacy, Antibes Hospital, <sup>3/</sup> Microbiology, Antibes Hospital <sup>4/</sup> Pharmacy, Grasse Hospital, <sup>5/</sup> Microbiology, Grasse Hospital, <sup>6/</sup> Pharmacy, Draguignan Hospital, <sup>7/</sup> Pharmacy, Cannes Hospital, <sup>8/</sup> Infectious diseases unit, Nice University Hospital <sup>9/</sup> Infections Control Committee, Nancy University Hospital, <sup>10/</sup> Microbiology, Nice University Hospital

- The Reso-Infectio-PACA-Est experience enabled us to quickly survey trends and to compare practices between different units and hospitals
- Prospective monitoring and associated prescriptions quality audit may allow adaption of guidelines to local AMR rates, identifying inappropriate ATB use, targeting improvement interventions, and evaluating the impact of those actions
- These indicators may be useful to assess the impact of this regional multidisciplinary AMS network



AMR, antimicrobial resistance; AMS, antimicrobial stewardship; ATB, antibiotic; DDD, daily defined dose; MRSA, methicillin-resistant *Staphylococcus aureus*; PD, patient days; UH, University Hospital.

Warembourg M, et al. ECCMID 2016. Poster EV0707.



## Appropriate use of carbapenems: a regional audit in 7 hospitals

Delphine Viard<sup>1</sup>, Florence Lieutier-Colas<sup>1</sup>, Benjamin Bertrand<sup>2</sup>, Marine Agullo<sup>3</sup>, Anne-Charlotte Lombardo<sup>4</sup>, Jihen Bousset<sup>5</sup>, Carole Labat<sup>6</sup>, Isabelle Falconi<sup>7</sup>, Karine Rizzo<sup>8</sup>, Pierre-Marie Roger<sup>8</sup>, Raymond Ruimy<sup>9</sup>. **Reso-Infectio-PACA-Est**

Pharmacy department: <sup>1/</sup> Nice University Hospital, <sup>2/</sup> Grasse Hospital, <sup>3/</sup> Cannes Hospital, <sup>4/</sup> Antibes Hospital, <sup>5/</sup> Toulon La Seyne St Mer Hospital, <sup>6/</sup> Draguignan Hospital, <sup>7/</sup> Menton Hospital, <sup>8/</sup> Infectious diseases unit, Nice University Hospital, <sup>9/</sup> Laboratory of microbiology, Nice University Hospital

### Context of the study

- Carbapenem consumption has increased in recent years in Europe and in France (+145% since 2000)
- The frequent use of carbapenems contributes to the increasing emergence of carbapenemase-producing bacteria
- In Europe, the average rate of carbapenem resistance for *Klebsiella pneumoniae* is 8% with a maximum of 59% in Greece
- As a consequence, carbapenems must be used as the last resort antibiotic

**Our aim:** To assess the appropriateness of carbapenem prescriptions in their indication and in the re-evaluation at 48–72 hours or with the bacteriological results

**Method:** Proposed in 2014 by the French Society of Infectious Diseases

### Results:

- 7 health institutions
- **118 carbapenem prescriptions (116 patients):** 87 imipenem, 16 ertapenem, 15 meropenem
- **Appropriate indication: 63.6%**
- **Appropriate re-evaluation: 70.4%**
- **Overall appropriateness: 62.6%**
- The overall appropriateness rate of all the hospital centres (51.7%) vs University Hospital Centre (73.7%),  $p=0.015$

Viard D, et al. ECCMID 2016. Poster P1298.



## Appropriate use of carbapenems: a regional audit in 7 hospitals

Delphine Viard<sup>1</sup>, Florence Lieutier-Colas<sup>1</sup>, Benjamin Bertrand<sup>2</sup>, Marine Agullo<sup>3</sup>, Anne-Charlotte Lombardo<sup>4</sup>, Jihen Bousseta<sup>5</sup>,  
Carole Labat<sup>6</sup>, Isabelle Falconi<sup>7</sup>, Karine Risso<sup>8</sup>, Pierre-Marie Roger<sup>9</sup>, Raymond Rulmy<sup>9</sup>, RésO-InfectiO-PACA-Est

Pharmacy department: 1 Nice University Hospital, 2 Biologie Hospital, 3 Cannes Hospital, 4 Antibes Hospital, 5 Toulon La Seyne St Mer Hospital, 6 Draguignan Hospital, 7 Menton Hospital,  
8 Microbiologie UNIV, Nice University Hospital, 9 Laboratory of microbiology, Nice University Hospital



- More than one third of the carbapenem prescriptions were not appropriate
- The differences observed in the appropriateness rates of each hospital and between all the hospital centres and the University Hospital Centres might be related to various internal organisations and unequal human resources

### Suggestions for improvement:

- To study the organisation of each hospital and their impact on the appropriateness of carbapenem prescriptions
- To work on regional recommendations for the management of carbapenem prescriptions
- To implement targeted actions for each hospital and clinical units according to their respective results

The regional network will allow us to pool our resources and share our ideas, in order to harmonise our clinical practices and organisations

Viard D, et al. ECCMID 2016. Poster P1298.

## An effective AMS initiative in France involving pharmacists: where is it today in the South East of France?

- Systematic clinical pharmacist intervention in the ICU at University Hospital Nice since February 2016
  - 536 interventions from February 2016 to February 2017
  - 165 interventions on antimicrobial prescriptions (confirmity to protocols, drug interactions, parenteral to oral switch, optimisation of the dose or of the administration modalities, need for therapeutic drug monitoring)
  - 95.8% of the pharmacists' interventions were accepted by the prescribers

ATB, antibiotics; ICU, intensive care unit.

Viard D et al, accepted for poster presentation during the next National days on Infectious Diseases, June 2017, Saint Malo, France.

## Next steps for antimicrobial pharmacists

- Continue collaboration (local, regional, national, international)
- Continue antifungal stewardship (since 2005)
- Outpatient Parenteral Antimicrobial Therapy, therapeutic education of the patient
- Vaccination promotion (despite shortages...)



Lieutier-Colas F, personal opinion; Mondain V, et al. *Infection* 2013;41:621–8; Image courtesy of Lieutier-Colas F.

PP-GEP-EUR-0042 Date of preparation: March 2017

## Conclusions and perspective

- Advice to colleagues thinking of initiating such a programme?
  - Multidisciplinary collaboration is essential!
  - Indicator follow-up (antimicrobial consumption, AMR, appropriate use of ATB, IV/PO ratio, acceptance of interventions...)
  - Set goals, essential messages, evaluate the results and provide regular feedback to prescribers
  - Important to trace pharmaceutical interventions to evaluate their clinical and financial impact
  - Utilising information technology to enhance AMS and develop easy-to-use tools (guidelines and newspaper available on the internet, website, poster on how to administer injectable ATB...)
- What lessons can be learned from the French approach to AMS?
  - Multidisciplinary collaboration between pharmacists, ID specialists, microbiologists, hygienists is essential 😊



ATB, antibiotics; AMR, antimicrobial stewardship; AMS, antimicrobial stewardship; IV, intravenous; PO, oral.  
Lieutier-Colas F, personal opinion; Image courtesy of Lieutier-Colas F.

PP-GEP-EUR-0042 Date of preparation: March 2017



# Thank you all

Benjamin Bertrand (CH Grasse), Sandrine Boussat (CH Nancy), Rémy Collomp (CHU Nice), Pierre Dellamonica (CHU Nice), Catherine Dumartin (CHU Bordeaux), Christelle Elias (WHO, Geneva), Didier Guillemot (Institut Pasteur, UVSQ, Paris), Carole Labat (CH Draguignan), Anne-Charlotte Lombardo (IM2S, Monaco), Véronique Mondain (CHU Nice), Aline Mousnier (CHU Nice), Céline Pulcini (CHU Nancy), Pierre-Marie Roger (CHU Nice), Raymond Ruimy (CHU Nice), Delphine Viard (CHU Nice), Marion Warembourg (CH Gap)



PP-GEP-EUR-0042 Date of preparation: March 2017

## THE INFECTIOUS DISEASE SPECIALIST AND THE PHARMACIST: WORKING TOGETHER TO TACKLE RESISTANCE

Professor Céline Pulcini  
Infectious Disease Specialist,  
Centre Hospitalier Universitaire de Nancy, France



PP-GEP-EUR-0043 Date of preparation: March 2017

## Disclosures

- None to declare that are relevant to this topic

GETTING TO KNOW YOU BETTER

## Is there an antimicrobial stewardship team in your hospital?

1. Yes, and I am part of it
2. Yes, but I am not part of it
3. Not yet, but it is planned in the near future
4. No

PP-GEP-EUR-0043 Date of preparation: March 2017

## 2012 ESGAP international survey

- 660 hospitals in 67 countries
- 58% of hospitals had an AMS programme in place
- 22% were planning to implement one

PP-GEP-EUR-0043 Date of preparation: March 2017

For those of you who have an AMS programme in your hospital, which professionals are members of the AMS 'operational' team?

1. Pharmacist
2. Infectious Diseases Specialist
3. Microbiologist
4. Nurse
5. Infection Control Team

PP-GEP-EUR-0043 Date of preparation: March 2017

AMS, antimicrobial stewardship.

## 2012 ESGAP international survey

1. Pharmacist 95%
2. Infectious Diseases Specialist 84%
3. Microbiologist 91%
4. Nurse 59%
5. Infection Control Team 65%

PP-GEP-EUR-0043 Date of preparation: March 2017

ESCMID, European Society of Clinical Microbiology and Infectious Diseases; ESGAP, ESCMID Study Group for Antibiotic Policies.  
Howard P, et al. *J Antimicrob Chemother* 2015;70:1245–55.

Do you have standards regarding the human resources needed for your AMS team in your country ? (e.g. 1 FTE pharmacist / 200 beds)

1. Yes
2. No
3. I don't know

PP-GEP-EUR-0043 Date of preparation: March 2017

AMS, antimicrobial stewardship; FTE, full-time equivalent.

SYNERGY BETWEEN PHARMACISTS AND  
INFECTIOUS DISEASE SPECIALISTS

---

PP-GEP-EUR-0043 Date of preparation: March 2017






Barlam TF, et al. *Clin Infect Dis* 2016;62:e51–77. doi: 10.1093/cid/ciw118; de Wit K et al. *Infection* 2016;44:395–439.

## Other guidelines/guidance

- ECDC proposal/guidance: <http://ecdc.europa.eu/en/publications/Publications/draft-EU-guidelines-prudent-use-antimicrobials-human-medicine.pdf>
- NICE (UK): <https://www.nice.org.uk/guidance/qs121>
- Australia: <http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/>
- Netherlands, Spain...
- Library on the ECDC website: [http://ecdc.europa.eu/en/healthtopics/Healthcare-associated\\_infections/guidance-infection-prevention-control/Pages/guidance-antimicrobial-stewardship.aspx](http://ecdc.europa.eu/en/healthtopics/Healthcare-associated_infections/guidance-infection-prevention-control/Pages/guidance-antimicrobial-stewardship.aspx)

ECDC, European Centres for Disease Prevention and Control; NICE, National Institute for Health and Care Excellence.

## Antimicrobial stewardship guidelines

- All recommend a multidisciplinary team
  - Infectious Disease Specialist
  - Pharmacist
  - Microbiologist
  - Plus others
- 
- CORE TEAM**
- Depending on the context
  - Differences between countries

PP-GEP-EUR-0043 Date of preparation: March 2017

## Clinical impact of Infectious Disease Specialists

- More appropriate antibiotic prescriptions
- Decrease in (unnecessary) antibiotic use
- Better clinical outcomes
- Decrease in AMR in some studies
- The impact is more pronounced if the IDS is helped by a team

PP-GEP-EUR-0043 Date of preparation: March 2017

## Activities of the AMS team and distribution of roles

- Depends on the country
- To be discussed and defined

PP-GEP-EUR-0043 Date of preparation: March 2017

AMS, antimicrobial stewardship.

## Example: France

AMS activity	ID specialist	Pharmacist
Responding to clinicians' requests	Very common	Quite common
Ward rounds	Very common	Quite uncommon
Review of antibiotic prescriptions for specific indications	Very common	Very common
Education of prescribers	Very common	Quite common
Audit and feedback	Very common	Quite common
Guidelines	Very common	Very common
Antibiotic use monitoring, analysis and feedback	Mostly analysis and feedback	Very common
TDM	Quite common	Quite common
Drug interactions, IV-oral switch	Quite common	Very common

■ Very common  
 ■ Quite common  
 ■ Quite uncommon

AMS, antimicrobial stewardship; ID, infectious disease; IV, intravenous; TDM, therapeutic drug monitoring.  
 Le Coz P, et al. *Med Mal Infect* 2016;46:200–6.

PP-GEP-EUR-0043 Date of preparation: March 2017

# POSSIBLE CHALLENGES

PP-GEP-EUR-0043 Date of preparation: March 2017

## Human resources

### German guidelines

- 2 FTE / 1000 beds  
= **minimum** staff resources

### French Task Force

- **Optimal** AMS team resources:
  - 3.6 FTE / 1000 beds ID specialist
  - 2.5 FTE / 1000 beds pharmacist
  - 0.6 FTE / 1000 beds microbiologist
- Total of 6.7 FTE / 1000 beds

PP-GEP-EUR-0043 Date of preparation: March 2017

## Inconsistencies

- Variation in recommendations between AMS team members
- Undermines credibility among prescribers

### Potential solutions:

- Local guidelines
- Avoid multiplicity of advisers for the same patient/ward
- Trace recommendations and check before giving further advice
- Discuss inconsistencies during regular team meetings
- Some situations may lack evidence, or diagnosis is uncertain => explain

AMS, antimicrobial stewardship.  
Pulcini C, et al. *Clin Microbiol Infect* 2014;20:963–72.

## Being a pharmacist is sometimes difficult...

- Qualitative studies in Australia
- Pharmacists' drug expertise sometimes clashes with prescribing decisions made by doctors
  - Two different ways of thinking
- Pharmacists do not prescribe and do not examine patients, they advise
  - Pharmacists' current capacity to influence antibiotic decision-making is limited by the prescribing power of doctors and the perception of antibiotic use as a medical responsibility

Broom A, et al. *BMC Health Services Res* 2016;16:43; Broom A, et al. *BMJ Open* 2015;5:e008326. doi: 10.1136/bmjopen-2015-008326.

## Promote your team!

- Speak in a positive way about your AMS team colleagues to prescribers
- Clinicians are nicer if they know your face

PP-GEP-EUR-0043 Date of preparation: March 2017

AMS, antimicrobial stewardship.

## CONCLUSIONS

---

PP-GEP-EUR-0043 Date of preparation: March 2017

## Work as a team

- There is more than enough work for everyone!
- Multidisciplinary team = a necessity
  
- Don't duplicate actions
- Consistency is essential
  
- Share (IT) tools/information
- Frequent meetings together to have a common culture and share ideas

Pulcini C, personal opinion.

PP-GEP-EUR-0043 Date of preparation: March 2017

## Thanks for your attention!

[celine.pulcini@univ-lorraine.fr](mailto:celine.pulcini@univ-lorraine.fr)



PP-GEP-EUR-0043 Date of preparation: March 2017



EAHP 2017 | Cannes, France  
 Wednesday 22<sup>nd</sup> March 2017  
 16:15–17:45  
 Salle Estérel

# How to establish and maintain an effective antimicrobial stewardship programme

Panel discussion and Q&A



Pfizer  Anti-Infectives

Pharmacovigilance & Safety of Pharmaceuticals, Estérel 2017  
 Pfizer is a registered trademark of the Pfizer Group. © 2017 Pfizer Inc. All rights reserved.

## Antimicrobial stewardship toolkit: Quality of evidence to support interventions




- ▶ **Prospective audit with intervention and feedback (A-I)**
- ▶ **Education (B-II)**
  - Education with an active intervention (A-III)
- ▶ **Formulary restriction and pre-authorisation**
  - Rapid decrease in antibiotic use (A-II); for control of an outbreak (B-II); may lead to unintended increase in resistance to another agent (B-II / B-III)
- ▶ **Guidelines and clinical pathways (A-II)**
  - Guideline implementation can be facilitated by education and feedback on outcomes (A-III)
- ▶ **Antimicrobial cycling (C-II)**
- ▶ **Antimicrobial order forms (B-II)**
- ▶ **Combination therapies (C-II)**
  - In critically ill patients at high risk of MDR pathogens (A-II)
- ▶ **De-escalation review (A-II)**
- ▶ **Dose optimisation (A-II)**
- ▶ **Parenteral to oral conversion (A-I)**
  - Facilitated by the development of clinical criteria and guidelines allowing switching to oral agents (A-III)
- ▶ **Computerised decision support, surveillance (B-II)**
- ▶ **Laboratory surveillance and feedback (A-III)**

PP-GEP-EUR-0080 Date of preparation: March 2017

MDR, multidrug-resistant.  
 Dellit TH, et al. *Clin Infect Dis.* 2007;44:159-177.



## Measuring performance of AMR

- ▶ Depends on IT available to you
- ▶ **Surveillance data with outcomes:** difficult without eRx
- ▶ Measuring the **volume of antimicrobial** usage
  - DDD/1000 OBD or DDD/1000 normalised bed days
  - Linked to infection rates or AMR
  - Local, regional, national or international
  - Control charts to monitor trends
  - Simple feedback to end users   
- ▶ Measuring **quality of antimicrobial** usage
  - Point prevalence surveys (national, regional or local)
- ▶ **Process measures** – key performance indicators
- ▶ **Quality outcomes indicators** – ↓ CDI or AMR

AMR, antimicrobial resistance; CDI, *Clostridium difficile* infection; DDD, defined daily dose  
 Gilchrist M, personal opinion.

PP-GEP-EUR-0080 Date of preparation: March 2017

## How do you restrict antimicrobials?

- ▶ What do you restrict?
- ▶ 1<sup>st</sup> dose or from 2<sup>nd</sup> dose?
- ▶ 24 hours/working hours/week days?
- ▶ Do you use a code? How is it checked?
- ▶ Is restricted antibiotic supply followed up?
- ▶ Do you have an electronic solution?
- ▶ Where are restricted antibiotics supplied from? Pharmacy? Central store? Electronic cabinet?
- ▶ Are there any unintended consequences?  
 e.g., ↑mortality in sepsis. Do you look for them?

PP-GEP-EUR-0080 Date of preparation: March 2017

## How do you educate your staff?

- ▶ Safe and prudent antimicrobial prescribing<sup>1</sup>
  - Prescribing competencies (e.g. UK)
- ▶ All staff: doctors, nurses, pharmacy, other HCPs, undergraduates, PATIENTS<sup>2-4</sup>
  - Nurses: missed doses, prompt samples, challenging prescribing (non-guidelines, IVOS)
  - Pharmacy: local educators, IVOS, de-escalate, etc.
- ▶ Active education: academic detailing, consensus building and workshops better than passive<sup>5</sup>
- ▶ Pharma-led education might adversely affect prescribing behaviour<sup>5</sup>
- ▶ Simple, regular and varied messages<sup>5</sup>

PP-GEP-EUR-0080 Date of preparation: March 2017

HCP, healthcare professionals; IVOS, intravenous to oral switch.

1. Charani E, et al. *Clin Infect Dis* 2011;53:651–62; 2. Cortoos PJ, et al. *J Antimicrob Chemother* 2008;62:189–95; 3. Charani E, et al. *Clin Infect Dis* 2013;57:188–196; 4. Pulcini C, Gyseens IC. *Virulence* 2013;4:192–202; 5. Gilchrist M, personal opinion.

## Best way to communicate? – Global findings

Most common communication method	Africa	Asia	Europe	North America	Oceania	South America
Empiric guidelines	booklet	booklet	intranet	intranet	intranet	staff meetings
Directed guidelines	booklet / intranet	intranet	intranet	intranet	intranet	staff meetings
Surgical prophylaxis guidelines	booklet	intranet	intranet	intranet	intranet	booklet
Antibiograms	staff meetings	intranet	staff meetings	intranet	intranet	staff meetings
Antimicrobial usage	booklet / staff meetings	staff meetings	staff meetings	staff meetings	staff meetings	staff meetings
Learning points from incidents	staff meetings	staff meetings	staff meetings	staff meetings	staff meetings	staff meetings
Formulary	booklet	intranet	intranet	intranet	intranet	booklet / newsletter

PP-GEP-EUR-0080 Date of preparation: March 2017

Howard P, et al. *J Antimicrob Chemother* 2015;70:1245–1255.

## How do you use clinical guidelines?

- ▶ Do you have empiric treatment guidelines?
- ▶ Surgical site infection prophylaxis guidelines?
- ▶ Are they web-based, booklet, poster, etc?
- ▶ Are they followed?
- ▶ Who leads the development of them?
  - Do they get consulted on? How?
  - How often reviewed?
  - Can you monitor hits/use? Feedback available?
- ▶ What do parameters do they contain?
  - Diagnosis, investigations, options in allergy or AMR (MRSA/CRE), dosing in obesity, evidence-based dosing? Natsch et al.
- ▶ Is an audit tool developed to measure compliance?

PP-GEPEUR-0080 Date of preparation: March 2017

AMR, antimicrobial resistance; CRE, carbapenem-resistant Enterobacteriaceae; MRSA, methicillin-resistant *Staphylococcus aureus*.

Adapted from: Dellit TH, et al. *Clin Infect Dis* 2007;44:159–177; Natsch S, et al. *J Hosp Infect* 2003;53:172–176. Carthey J, et al. *BMJ* 2011;343:d5283. Mol P, et al. *J Antimicrob Chemother* 2005;55:550–557. McCahill LE, et al. *Arch Surg* 2007;142:355–361.



EAHP 2017 | Cannes, France

Wednesday 22<sup>nd</sup> March 2017


16:15–17:45

Salle Estérel

## Evaluation

Please use your keypads to answer the following questions



Pfizer  Anti-Infectives

PP-GEPEUR-0080 Date of preparation: February 2017  
 Pfizer Healthcare Ireland, 8 Research Park, Galway, Ireland, EMEA-34



## Question 1

How would you rate this symposium overall?

1

Poor

2

Fair

3

Good

4

Very good

5

Excellent



Pfizer  Anti-Infectives

Pfizer Ltd (UK) - One of Excellence, February 2017  
Pfizer Ltd (UK) - One of Excellence, February 2017  
Pfizer Ltd (UK) - One of Excellence, February 2017



## Question 2

How would you rate the quality of the programme content on improving knowledge in this area?

1

Poor

2

Fair

3

Good

4

Very good

5

Excellent



Pfizer  Anti-Infectives

Pfizer Ltd (UK) - One of Excellence, February 2017  
Pfizer Ltd (UK) - One of Excellence, February 2017  
Pfizer Ltd (UK) - One of Excellence, February 2017



## Question 3

Has this symposium motivated you to change your current antimicrobial stewardship practice?

- 1 Yes, I will change my practice
- 2 Yes, I would like to, however there are challenges
- 3 No, our stewardship programme is running well
- 4 No, for another reason



Pfizer  Anti-Infectives

Pfizer Exhibitor - Day of Proceedings - February 2017  
Pfizer Exhibition Stand - Research - Shared Digital Post  
© Pfizer - All rights reserved. EMEA-16



EAHP 2017 | Cannes, France  
Wednesday 22<sup>nd</sup> March 2017  
16:15–17:45  
Salle Estérel

Thank you  
Please return your keypads



Pfizer  Anti-Infectives

Pfizer Exhibitor - Day of Proceedings - February 2017  
Pfizer Exhibition Stand - Research - Shared Digital Post  
© Pfizer - All rights reserved. EMEA-16