Health Protection Scotland and Antimicrobial Resistance

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Health Protection Scotland

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NHS National Services Scotland

Outline of presentation

- Case to outline the difficulties
- What is HPS and who are its key partners?
- What are the AMR UK requirements?
- What is the Scottish AMR picture?
- Key next steps

Case

Spm: CSU Catheter spec. urin

35. Clinical Details

polly trauma repatriated from india to NHDU.

36. Tests St

VITEK 1 ( ) R

39. Cultures St

1) Klebsiella pneumoniae 10^5 orgs/ml R
Carbapenemase producing Enterobacteriaceae R
ESBL Status Not Determinable R
2) vProvidencia rettgeri 10^5 orgs/ml R

42. Sensitivities

Status	R	R
	1	2
Pivmecillinam	S	R
Amoxicillin	R	R
Trimethoprim	S	R
Nitrofurantoin	R	R
Co-amoxiclav	R	R
Gentamicin	R	R
Temocillin	R	R
Tazocin	R	R
Cefalexin	r	r
Cefuroxime	r	r
Cefoxitin	r	r
Ceftriaxone	r	r
Ceftazidime	r	r

Sensitivities: QUANTITATIVERESULTS Accept PageUp PageLeft PageRight 1/2

42. Sensitivities

Status	R	R
	1	2
Cefepime	r	r
Ertapenem	r	r
Meropenem	i	r
Ciprofloxacin	R	R
Doxycycline	i	r
Fosfomycin	S	R
Colistin	S	R
Tigecycline	S	R

Challenges

- Poor Clinical details
- Pan resistance
- Antiquated IT
- Travel
- Turnaround times
- Lack of PoC testing
- Failure of PH sharing of information

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What is HPS?

About Health Protection Scotland

Health Protection Scotland (HPS) was established by the Scottish Government in 2005 to strengthen and co-ordinate health protection in Scotland.

We plan and deliver effective and specialist national services which co-ordinate, strengthen and support activities aimed at protecting all the people of Scotland from infectious and environmental hazards.

We do this by providing advice, support and information to health professionals, national and local government, the general public and a number of other bodies that play a part in protecting health.

HPS is a division of NHS National Services Scotland which works at the very heart of the health service across Scotland, delivering services critical to frontline patient care and supporting the efficient and effective operation of NHS Scotland.

HPS is organised into three specialist groups with expertise provided by a multi-disciplinary workforce, which includes doctors, nurses, scientists and information staff, all of whom are supported by core business and IM&T teams. The specialist groups are:

- Healthcare Associated Infections & Infection Control
- Blood Borne Viruses, Sexually Transmitted Infections, Immunisation, Respiratory & Vaccine Preventable Disease
- Gastrointestinal and Zoonoses, Travel and Environment and Health

Key Functions of HPS

- Co-ordinating national Health Protection
- Monitoring health hazards for the people of Scotland
- Responding to emergencies
- Raising standards
- Research and development
- Expert advice
- Developing a competent workforce

Key Partner Organisation

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NHS National Services Scotland

ecdc

European Centre for Disease Prevention and Control

Go to Extranet

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Health Topics | Publications | Data & Tools | Activities | About Us | News & Media

You are here: Portal Home > English > About Us > Who we are

- **Who we are**
  - Director of ECDC
  - Senior Management Team
  - Office of the Chief Scientist
  - Surveillance and Response Support
  - Public Health Capacity and Communication
  - Resource Management and Coordination
  - Information and Communication Technologies
  - External experts
- **Governance**
- **Networks**
- **Partnerships**
- **What we do**
- **Job opportunities**
- **Procurement and grants**
- **Access to documents**
- **Contact**

Who we are

The three bodies of the Centre are the Management Board (MB), the Advisory Forum (AF) and the Director and his staff.

The Acting Director of ECDC is Andrea Ammon. In her work she is aided by the Senior Management Team (SMT). The Director's Office carries out the overall coordinating role, and is responsible for external relations and country cooperation.

The organisational structure of ECDC is based on five units:

- Office of the Chief Scientist
- Surveillance and Response Support
- Public Health Capacity and Communication
- Resource Management and Coordination
- Information and Communication Technologies

Disease programmes:

- Antimicrobial Resistance and Healthcare-associated Infections
- Emerging and Vector-borne Diseases
- Food- and Waterborne Diseases and Zoonoses
- STI, including HIV and Blood-borne Viruses
- Influenza
- Tuberculosis
- Vaccine-preventable Diseases

ORGANIGRAMME

ECDC and microbiology

Portal Home > English > Activities > Public health microbiology programme > Microbiology activities

Microbiology activities at ECDC

- Laboratory capabilities
- Molecular typing
- EU integrated surveillance of antimicrobial resistance
- Collaboration with other organisations
- Laboratories networks
- Training in public health microbiology
- External quality assessment
- Advice and technical guidance
- Technology assessment
- Supranational reference services
- Laboratory support for outbreak investigation

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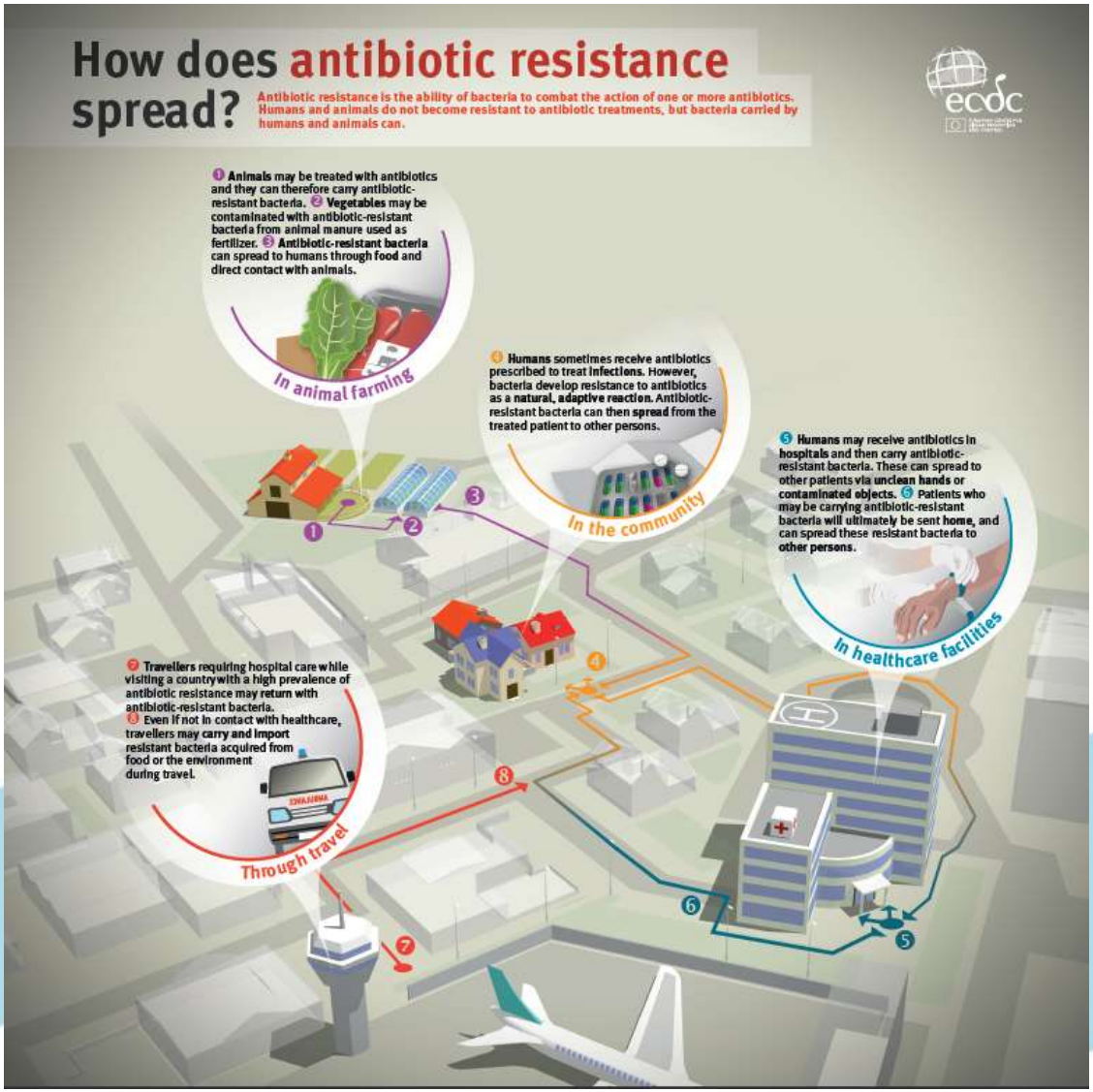

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- Function 1: Reference diagnostics
- Function 2: Reference material resource
- Function 3: Scientific advice
- Function 4: Collaboration and research
- Function 5: Monitoring, alert and response

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and Diagnostic Laboratories!!!

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UK AMR Requirements

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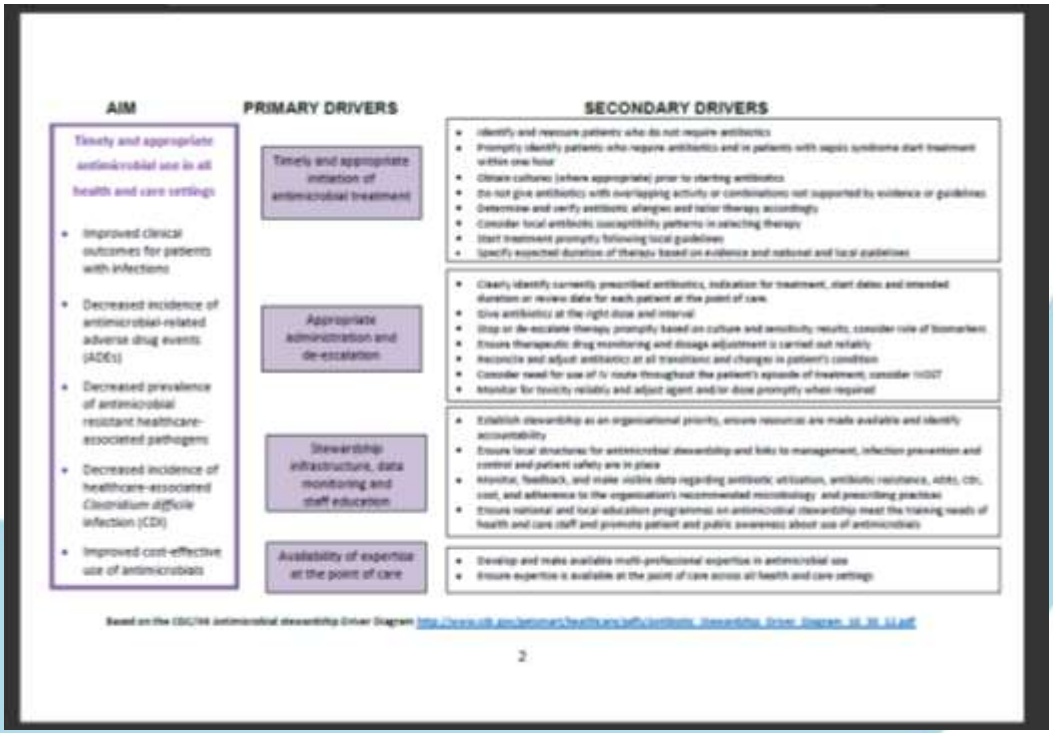
Scottish Management of Antimicrobial resistance Action Plan 2014 – 18 (ScotMARAP 2)

The Scottish Government
Riaghaltas na h-Alba



AIM	PRIMARY DRIVERS	SECONDARY DRIVERS
Timely and appropriate antimicrobial use in all health and care settings • Improved clinical outcomes for patients with infections • Decreased incidence of antimicrobial-related adverse drug events (ADEs) • Decreased prevalence of antimicrobial resistant healthcare-associated pathogens • Decreased incidence of healthcare-associated *Clostridium difficile* infection (CDI) • Improved cost-effective use of antimicrobials	Timely and appropriate initiation of antimicrobial treatment	• identify and reassure patients who do not require antibiotics • Promptly identify patients who require antibiotics and in patients with sepsis syndrome start treatment within one hour • Obtain cultures (where appropriate) prior to starting antibiotics • Do not give antibiotics with overlapping activity or combinations not supported by evidence or guidelines • Determine and verify antibiotic allergies and tailor therapy accordingly • Consider local antibiotic susceptibility patterns in selecting therapy • Start treatment promptly following local guidelines • Specify expected duration of therapy based on evidence and national and local guidelines
	Appropriate administration and de-escalation	• Clearly identify currently prescribed antibiotics, indication for treatment, start dates and intended duration or review date for each patient at the point of care • Give antibiotics at the right dose and interval • Stop or de-escalate therapy promptly based on culture and sensitivity results; consider role of biomarkers • Ensure therapeutic drug monitoring and dosage adjustment is carried out reliably • Reconcile and adjust antibiotics at all transitions and changes in patient's condition • Consider need for use of IV route throughout the patient's episode of treatment; consider OVIVT • Monitor for toxicity reliably and adjust agent and/or dose promptly when required
	Stewardship infrastructure, data monitoring and staff education	• Establish stewardship as an organisational priority, ensure resources are made available and identify accountability • Ensure local structures for antimicrobial stewardship and links to management, infection prevention and control and patient safety are in place • Monitor, feedback, and make visible data regarding antibiotic utilisation, antibiotic resistance, ADRs, CDI, cost, and adherence to the organisation's recommended microbiology and prescribing practices • Ensure national and local education programmes on antimicrobial stewardship meet the training needs of health and care staff and promote patient and public awareness about use of antimicrobials
	Availability of expertise at the point of care	• Develop and make available multi-professional expertise in antimicrobial use • Ensure expertise is available at the point of care across all health and care settings

Based on the CDC/HA Antimicrobial stewardship Driver Diagram http://www.cdc.gov/getsmart/healthcare/pdfs/antibiotic_stewardship_Driver_Diagram_10_30_11.pdf

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UK AMR Requirements

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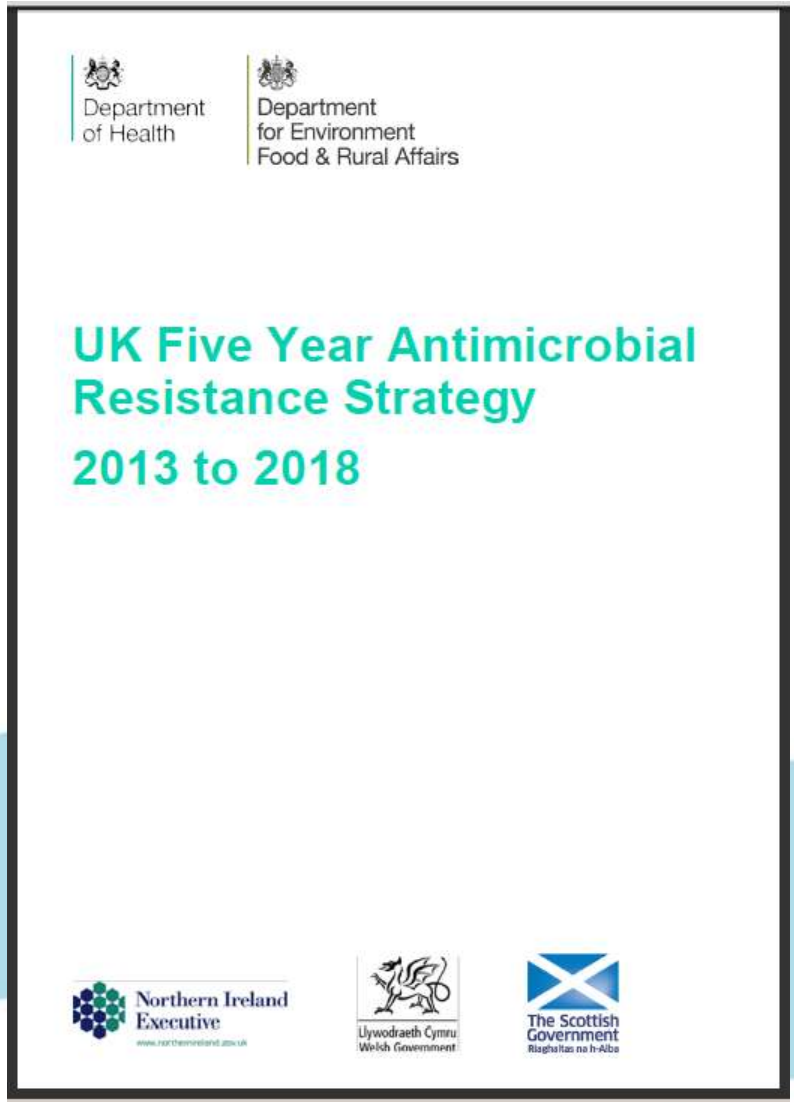

UK AMR Requirements

- Controlling AMR is on the UK Government's long-term risk register, the National Security Risk Assessment, following CMO's (England) annual report 2013

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Control of Antimicrobial Resistance in Scotland (CARS)

- Programme within HPS, tasked with optimising current actions, led by Dr Eleanor Anderson, CPHM
- 7 key action areas following a one health approach, including infection control; optimising prescribing (both human and animal); engagement; support research; optimise surveillance work

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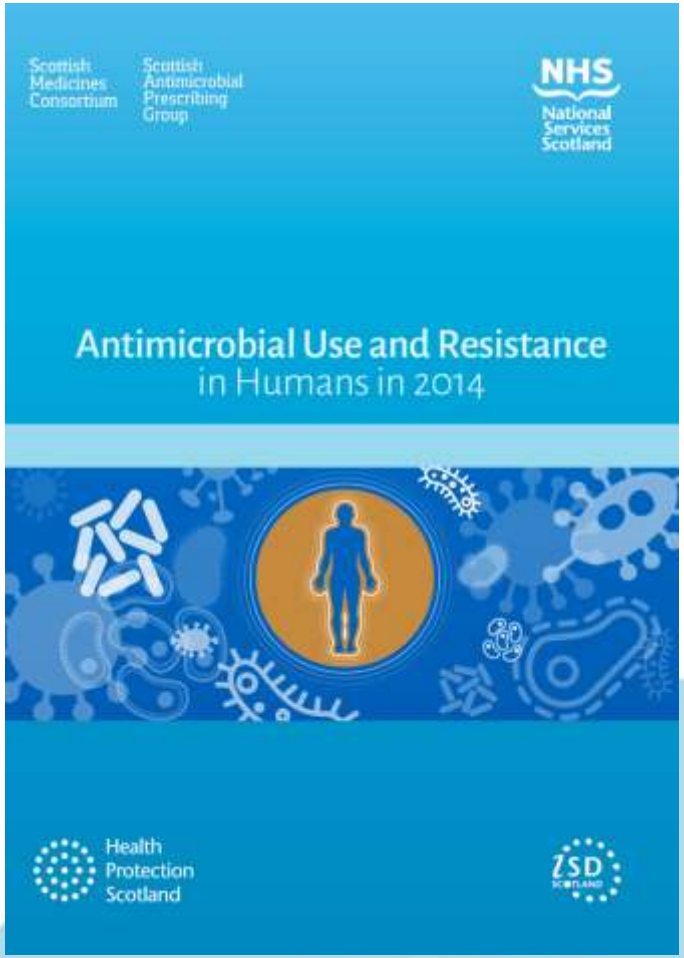

- http://www.isdscotland.org/Health-Topics/Prescribing-and-Medicines/Publications/2015-10-06/2015-10-06-SAPG-2014-Report.pdf

- Published: 6th October 2015

NHS Scotland: Use of antibiotics in primary care items/1000/day 2005-2014

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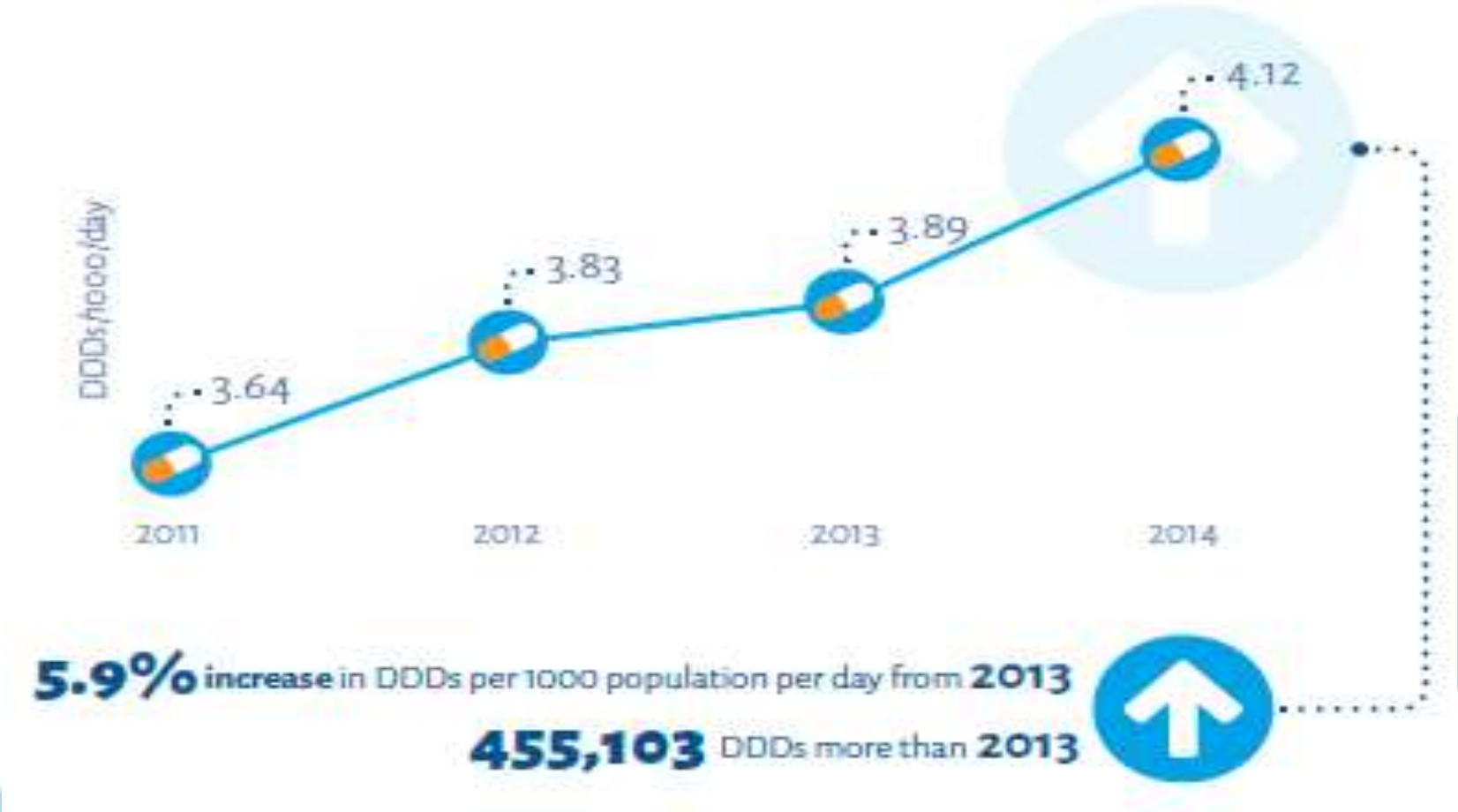
NHS Scotland: Use of antibiotics in secondary care DDD/1000/day 2011-2014



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NHS Scotland: Use of piperacillin/tazobactam and carbapenems in secondary care. DDD/100,000/day 2011-2014

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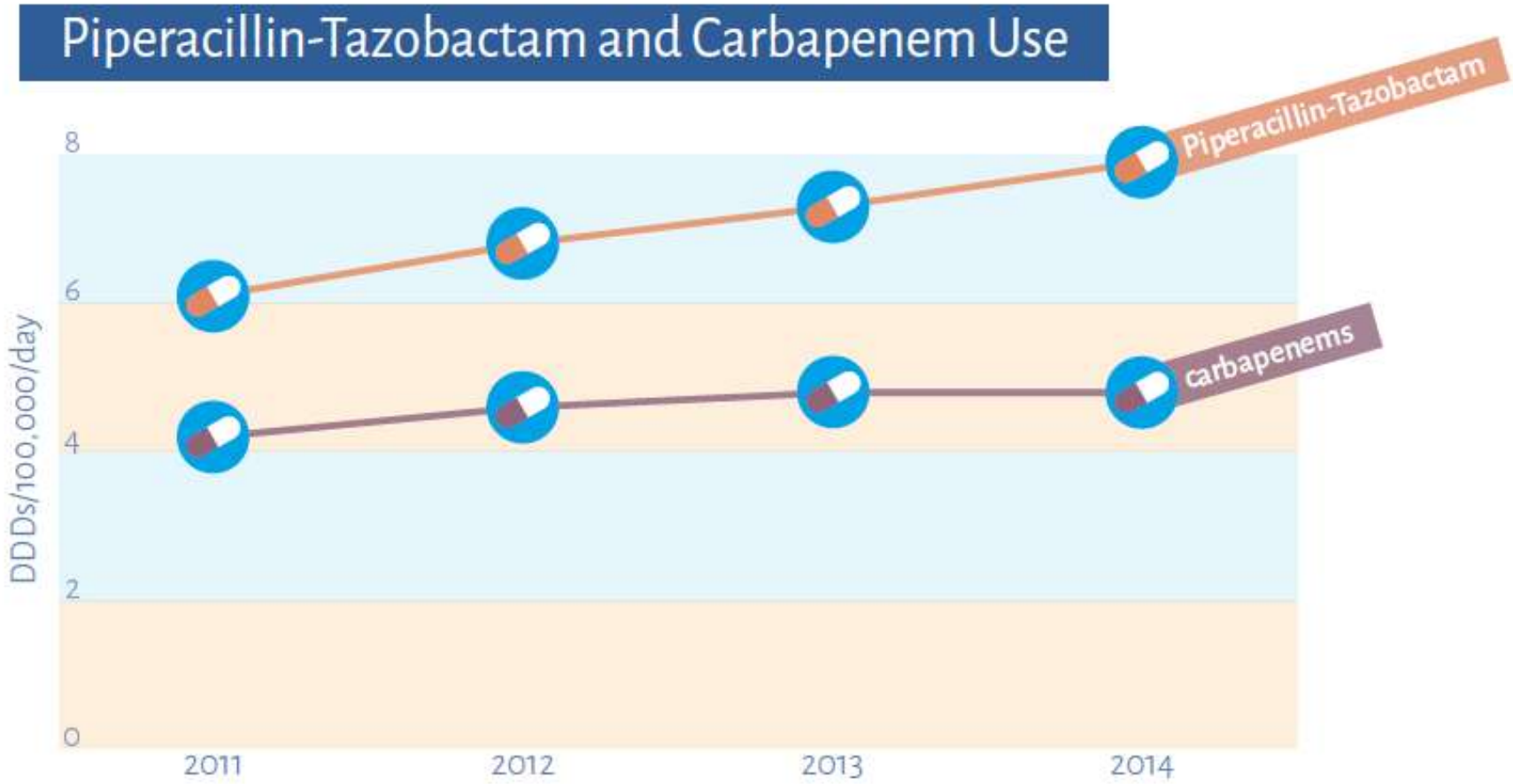

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NHS Scotland: Use of aztreonam, pivmecillinam and temocillin in secondary care. DDD/100,000/day 2011-2014

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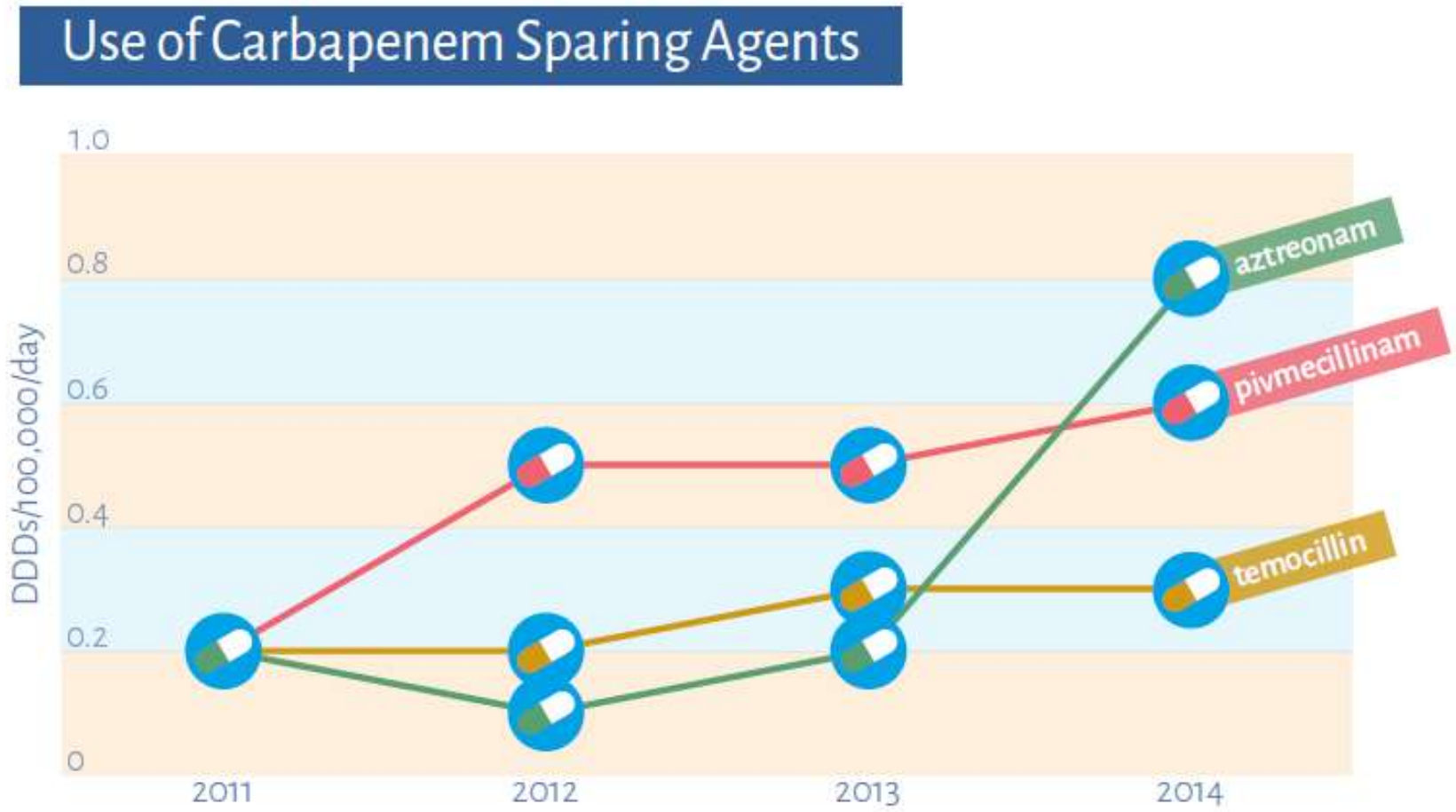

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Antimicrobial susceptibility in Gram-negative bacteria

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NHS Scotland: number of reported cases of bacteraemia 2011-1014

Year	Total	*E. coli* (n)	*K. pneumoniae* (n)	*P. aeruginosa* (n)	*A. baumannii* (n)
2011	4812	3839	697	242	34
2012	4900	3924	718	234	24
2013	5329	4321	688	292	28
2014	5564	4539	753	238	34

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NHS Scotland: ESBL producers among E. coli and K. pneumoniae bacteraemias 2011-1014

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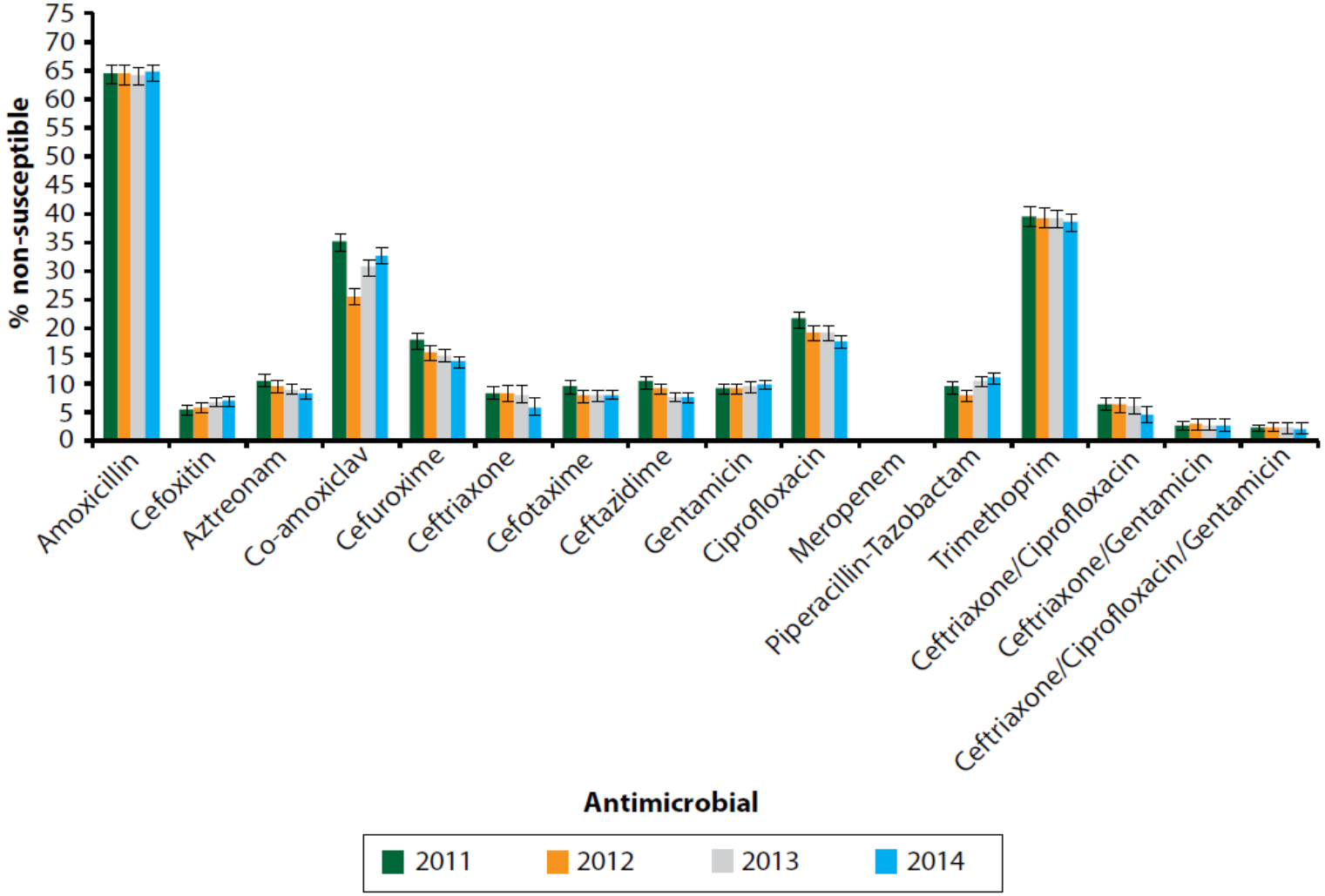
Year	*E. coli* (n)	*E. coli* % ESBL	*K. pneumoniae* (n)	*K. pneumoniae* % ESBL
2011	3839	6.5	697	7.0
2012	3924	6.6	718	6.4
2013	4321	6.7	688	6.0
2014	4539	6.5	753	6.2

NHS Scotland: % non-susceptible E. coli bacteraemias 2011-1014



NHS Scotland: % non-susceptible E. coli urinary isolates 2013-1014

Antimicrobial	% Resistance (number of isolates tested)		
	2013	2014	Statistical significance of % change
ampicillin	54.7 (10858)	54.6 (11625)	↔
cefotaxime	5.6 (11620)	5.1 (11396)	↔
ceftazidime	2.9 (12900)	2.8 (12667)	↔
cefuroxime	11.8 (12891)	11.7 (12665)	↔
cephalexin	7.8 (12876)	7.4 (12652)	↔
ciprofloxacin	12.2 (12900)	12.0 (12666)	↔
ertapenem	0.1 (12889)	0.04 (12666)	↓
gentamicin	5.0 (12900)	5.1(12665)	↔
meropenem	0.02 (12895)	0.01(12663)	↔
nitrofurantoin	3.7 (12880)	3.2 (12658)	↓
tetracycline	29.5 (12878)	29.3 (12658)	↔
trimethoprim	35.5 (12895)	35.0 (12668)	↔
trimethoprim/nitrofurantoin	2.8 (12880)	2.3 (12658)	↓
trimethoprim/nitrofurantoin/ciprofloxacin	1.5 (12880)	1.2 (12657)	↔
trimethoprim/nitrofurantoin/co-amoxiclav	1.5 (12880)	1.4 (12658)	↔
trimethoprim/nitrofurantoin/ciprofloxacin/ co-amoxiclav	1.0 (12880)	0.9 (12657)	↔

* Data for NHS Greater Glasgow and Clyde has been excluded from analysis due to a temporary issue with transfer of data.

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Carbapenemase producers reported in Scotland AMRHI Reference Unit (PHE) 2003-2015

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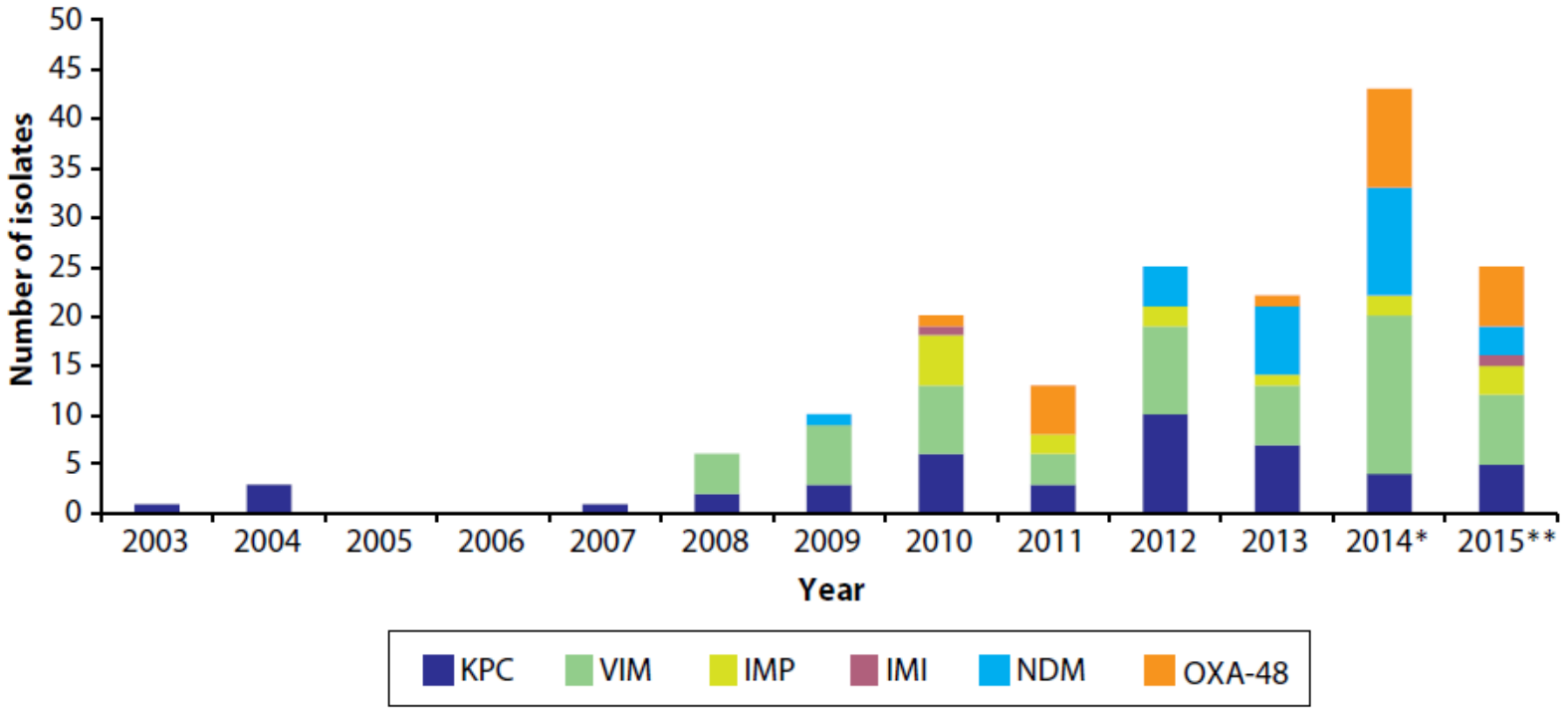

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NHS Scotland: Carbapenemase producing organisms 2013 and 2014

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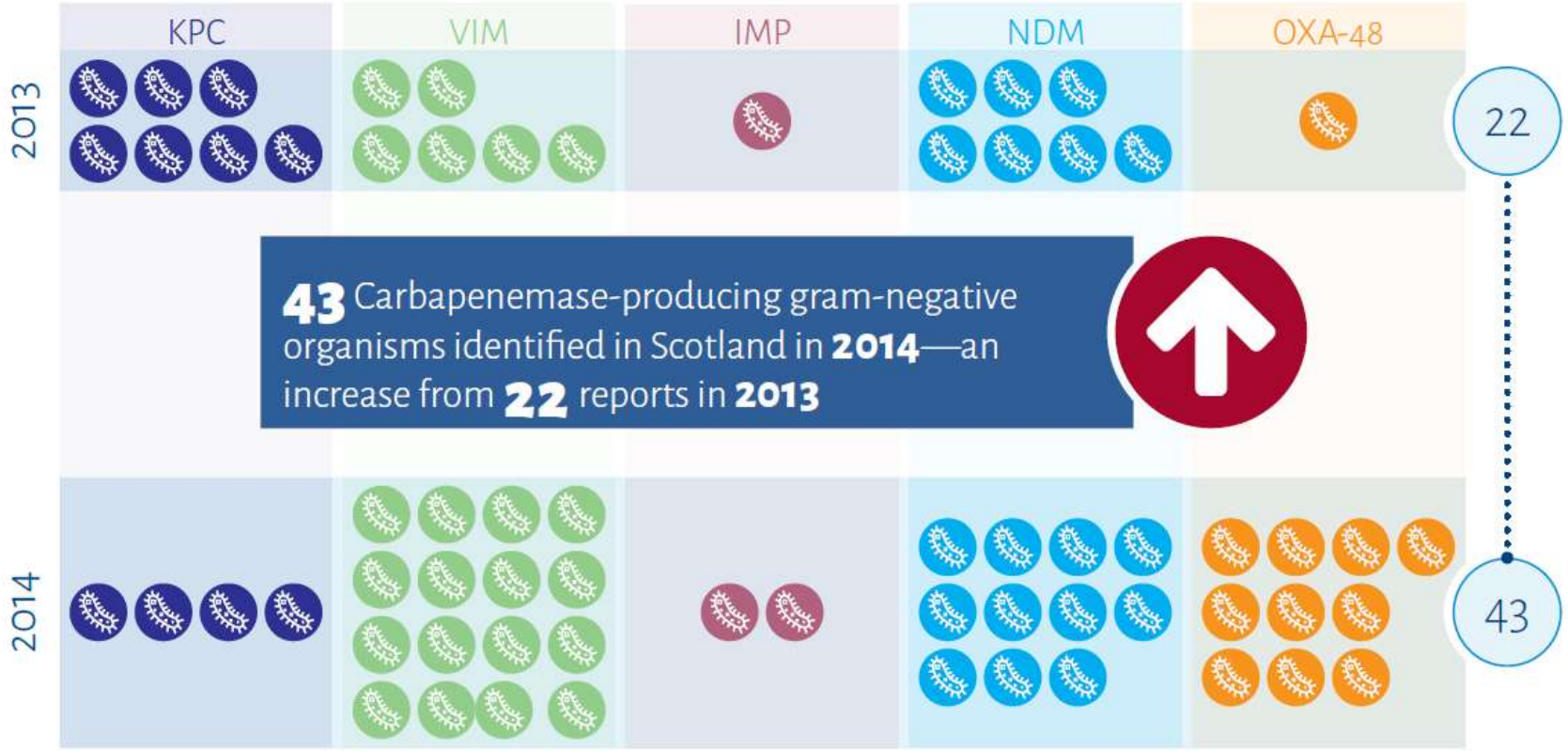

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Antimicrobial susceptibility in Gram-positive bacteria

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NHS Scotland: Number of Gram-positive bacteraemias 2011-2014

Year	MRSA (% of all *S. aureus*)	MSSA	*Streptococcus pneumoniae*	*Enterococcus faecalis*	*Enterococcus faecium*
2011	194 (13.4%)	1258	446	434	236
2012	173 (12.7%)	1187	419	419	250
2013	141 (9.6%)	1327	506	405	261
2014	128 (9.2%)	1269	394	396	320

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NHS Scotland: Vancomycin resistant enterococci 2014

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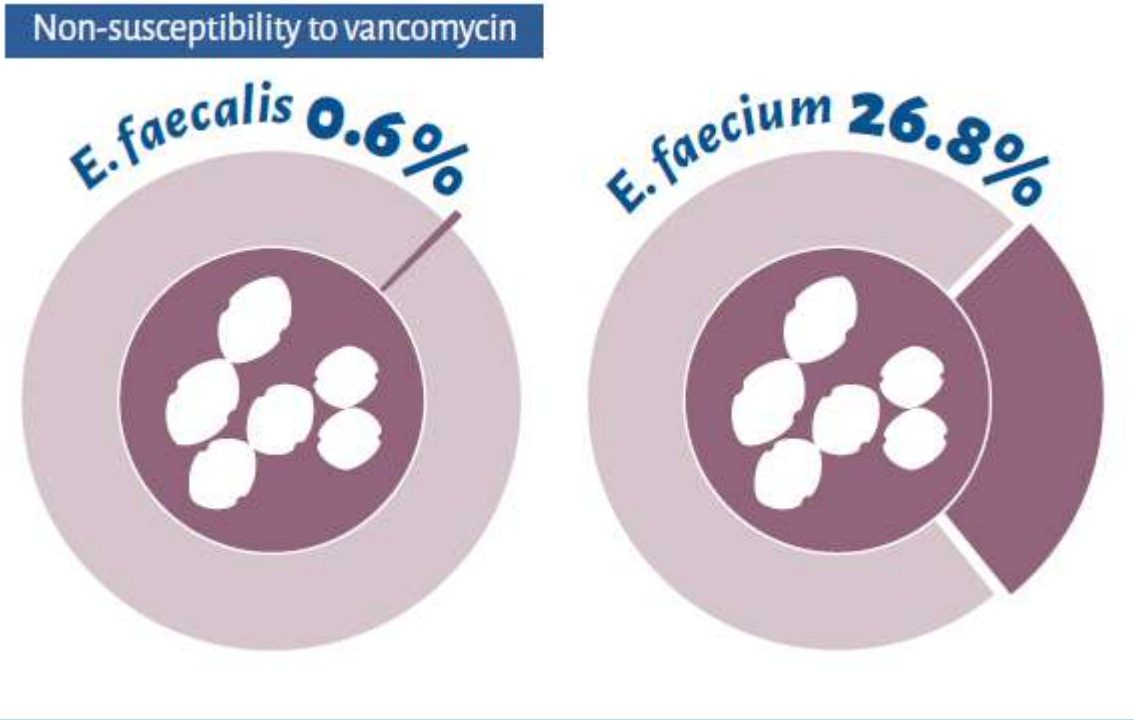

No isolates of ***E. faecium*** reported that were resistant to both **vancomycin** and **linezolid**

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Key Next Steps

- Optimise working with others
- Optimisation of infectious disease surveillance
  - Standardisation of procedures in diagnostic laboratories that work for HPS as well as labs
  - Review HPS commissioning of reference laboratory services
- Harness the potential of new diagnostics
- Improve data capture and IT links

Optimise Working with others

- Scottish Microbiology and Virology Network (SMVN)
- Infectious Disease Physicians
- Scottish Antimicrobial Prescribing Group (SAPG)
- European Centre for Disease Prevention and Control (ECDC)
- Scottish Infection Research Network (SIRN)
- Royal College of Pathologists
- Infection Control Networks
- SNBTS
- Reference laboratories

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OPEN ACCESS Freely available online

PLoS PATHOGENS

Opinion

Routine Use of Microbial Whole Genome Sequencing in Diagnostic and Public Health Microbiology

Claudio U. Köser[1,2*], Matthew J. Ellington[2], Edward J. P. Cartwright[1,2], Stephen H. Gillespie[3], Nicholas M. Brown[2], Mark Farrington[2], Matthew T. G. Holden[4], Gordon Dougan[4], Stephen D. Bentley[4], Julian Parkhill[4], Sharon J. Peacock[1,2,4,5]

[redacted] of Cambridge, Addenbrooke's Hospital, Cambridge, United Kingdom, 2 Clinical Microbiology and Public Health Laboratory, Health

This step change could also represent the most significant advance in diagnostic microbiology and surveillance since the advent of *in vitro* culture.

effective compared to current alternatives. retrospective tool for scientific research initial test (for example, a species-specific

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Peacock and Weinstock *Genome Medicine* 2014, **6**:103
http://genomemedicine.com/content/6/11/103

EDITORIAL

Microbial sequencing to improve individual and population health

Sharon J Peacock[1,2*] and George M Weinstock[3]

[redacted]. In a brave new world where all samples are sequenced as the primary method for pathogen detection, it may prove the case that the majority of samples will be sequence-positive. Re-defining what data can be disregarded and what might represent new and important findings will take at least a generation of microbiologists to resolve.

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Current evolving threats

- CPE's
- Azithromycin resistance in GC
- *mcr-1* gene