



Politique du bon usage des antibiotiques: état des lieux et perspectives en Europe

Dominique L. Monnet, Senior Expert and Head of Disease Programme Antimicrobial resistance and Healthcare-associated infections (ARHAI) European Centre for Disease Prevention and Control

Pornichet, 28 March 2014

What is ECDC and its role?



"An independent agency, named the European Centre for Disease Prevention and Control ..."

... to identify, assess and communicate current and emerging health threats to human health from communicable diseases.

— ECDC Founding Regulation (851/2004), Article 3

EU-level disease surveillance and epidemic intelligence

Scientific opinions and studies

Early Warning System and response

 Technical assistance and training

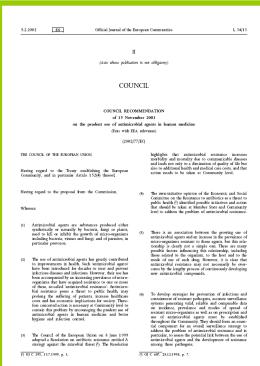
Communication to scientific community and the public

Council Recommendations, 2001 & 2009





Photo: Stuart Chalmers, CC-BY



Council Recommendation of 15 November 2001 on the prudent use of antimicrobial agents in human medicine (2002/77/EC)



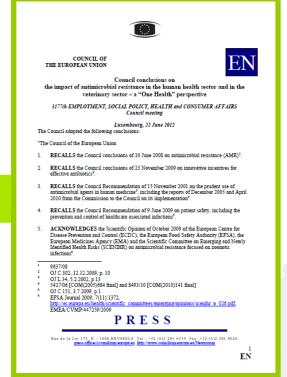
Council Recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare associated infections (2009/C 151/01)

Council Conclusions, 2008, 2009 & 2012









Council Conclusions on Antimicrobial Resistance (AMR) (10 June 2008) Council Conclusions on innovative incentives for effective antibiotics (1 December 2009)

Council Conclusions on the impact of antimicrobial resistance in the human health sector and in the veterinary sector —a "One Health" perspective (22 June 2012)

Reports on implementation of Council Recommendations & Eurobarometer, 2010-2012



SECOND REPORT FROM THE COMMISSION TO THE COUNCIL ON THE BASIS OF MEMBER STATES' REPORTS ON THE IMPLEMENTATION OF THE COUNCIL RECOMMENDATION (2002/77/EC) ON THE PRUDENT USE OF ANTIMICROBIAL AGENTS IN HUMAN MEDICINE (Text with EEA relevance) ΕN EN



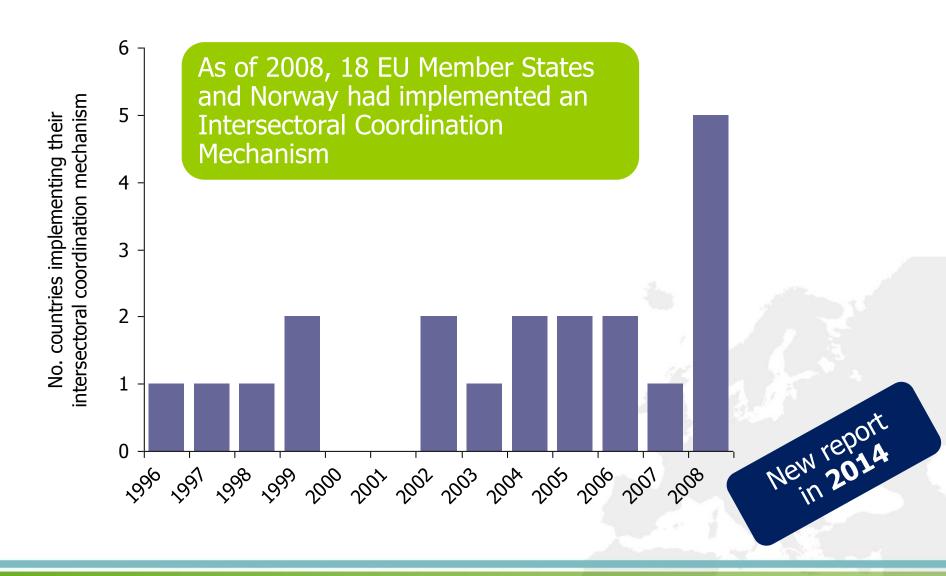


2nd report from the Commission to the Council on the basis of Member States' reports on the implementation of the Council Rec.ommendation 2002/77/EC Special Eurobarometer 338 "Antimicrobial resistance" (9 April 2010)

1st report from the Commission to the Council on the basis of Member States' reports on the implementation of the Council Rec.ommendation 2009/C 151/01

Implementation of National Intectoral Coordination Mechanisms on AMR

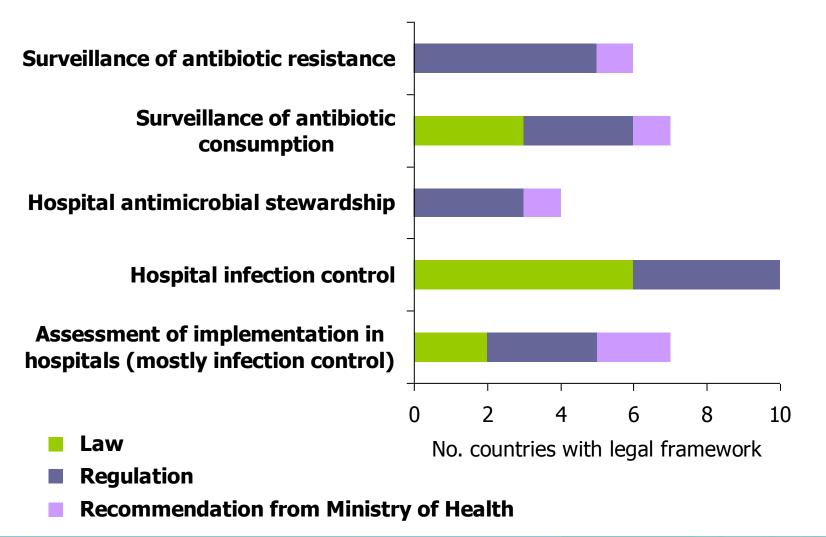




Legal framework on prudent use of antibiotics in 10 EU countries, 2008-2009



(Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, Sweden, UK)



Implementation of measures in Member States and Norway



Surveillance

- All countries but one participate EARSS
- All countries participate in ESAC
- Only 7 countries (and Wales) could link national antibiotic consumption and resistance data
- Links with veterinary surveillance in only 16 countries

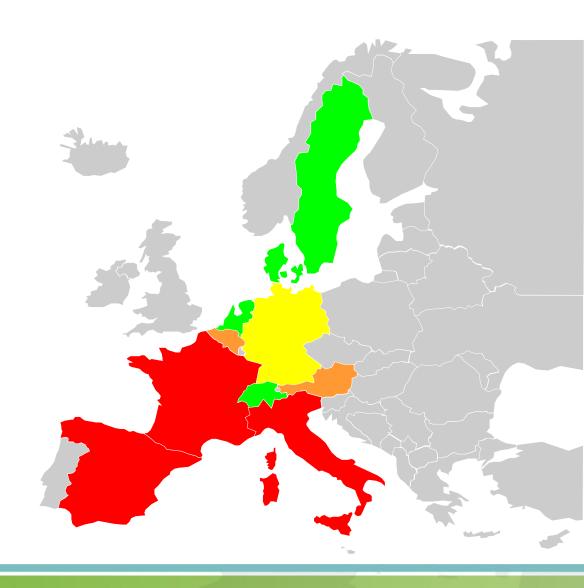
Guidelines

- National guidelines on appropriate use of antimicrobials in all but four countries (and Wales)
- Complicance rarely assessed by the countries
- Guidelines in hospitals only reported by half of countries

Methicillin-resistant *Staphylococcus aureus* (MRSA) in Europe, 1990-1991

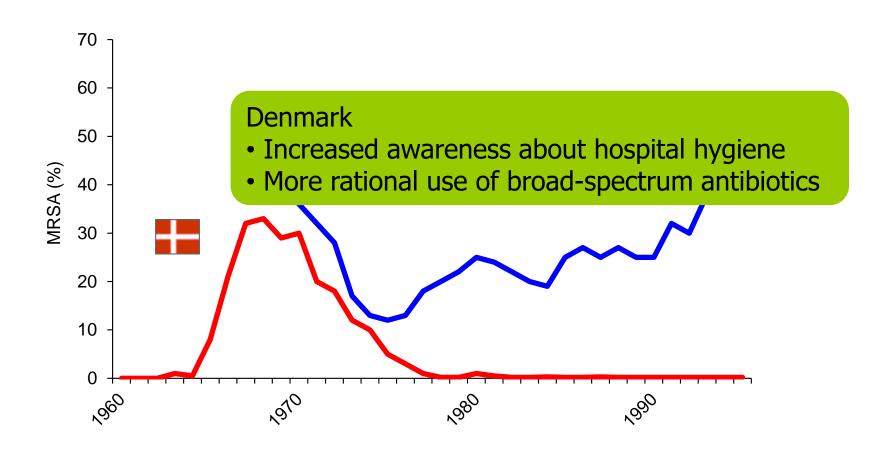


- <3%
- 3 9%
- 10 29%
- >30%
- Did not participate



Meticillin-resistant *Staphylococcus aureus* (MRSA) in one hospital in Paris (all isolates) and in Denmark (blood isolates), **1960-1995**





Surveillance of antimicrobial resistance and antimicrobial consumption in the EU



European Antimicrobial **Resistance Surveillance Network (EARS-Net)**

(formerly EARSS, integrated in January 2010)

European Antimicrobial Consumption Surveillance Network (ESAC-Net)

(formerly ESAC, integrated in July 2011)

ECDC point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care (pilot 2010, all EU MSs in 2011-2012, report 2013)

Source: ECDC, 2014.

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Antimicrobial Resistance and Healthcare-associated Infections Programme

The programme on Antimicrobial Resistance and Healthcare-Associated Infections (ARHAI) covers two major public health issues:



· Healthcare-Associated Infections (HAI), i.e. all infections associated with patient care, in particular hospitals and long-term care facilities.



The ARHAI programme focuses on 4 areas of public health: surveillance, response and scientific advice, training and communication to address the threat of antimicrobial resistance and healthcare-associated infections.

Read more about the programme

:≡ IN FOCUS

Data on antimicrobial consumption from EU/EEA countries now available from the ESAC-Net interactive database



A new interactive database allows the display of selected data on antimicrobial consumption in different formats such as tables, maps and figures. The database includes data on antimicrobial consumption in EU Member States from 1997 to 2010 and ECDC will update it every year.

In addition to the database, ECDC also launches the first ESAC-Net report on antimicrobial consumption surveillance in Europe.

ESAC-Net interactive database ESAC-Net report

INTERACTIVE DATABASES

ESAC-Net interactive database



European reference data on antimicrobial consumption, both in the community and the hospital

EARS-Net interactive database



Data on the occurrence and spread of antimicrobial resistance in the European



Transatlantic Taskforce on Antimicrobial Resistance - TATFAR

ECDC provides the secretariat for the task force and publishes documents relating to the work of the task force on this website.

WARSAW 2011 PRESENTATIONS

The Polish Presidency hosted a Joint Annual Meeting of the Antimicrobial Resistance and Healthcare-associated Infections (ARHAI) Networks, on 23 - 25 November 2011, in Warsaw, Poland, See the conference presentations

http://ecdc.europa.eu/en/activities/diseaseprogrammes/ARHAI/Pages/index.aspx



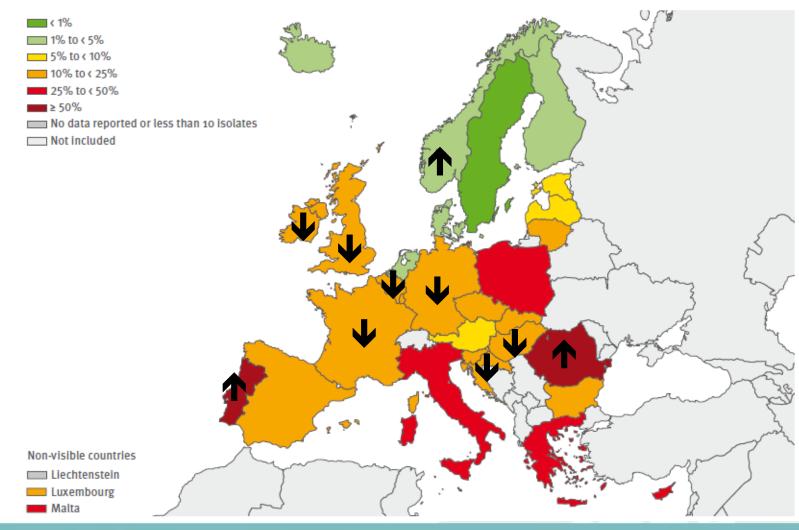






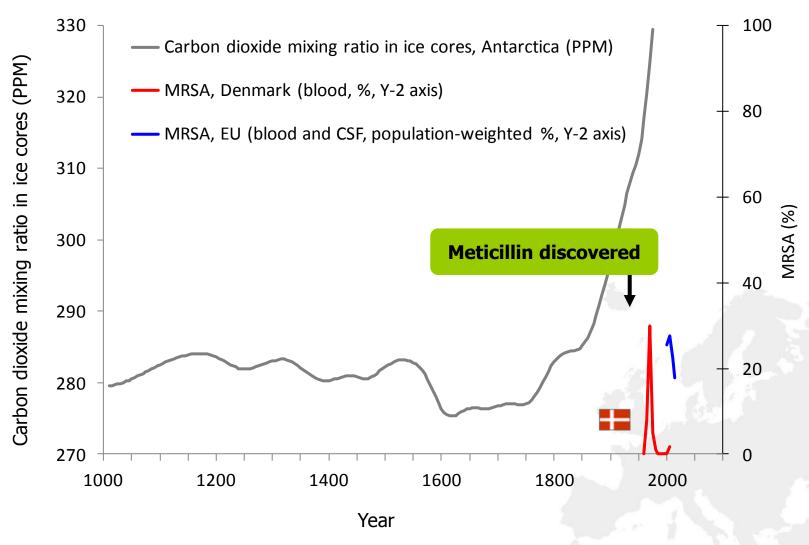
Staphylococcus aureus: percentage of invasive isolates resistant to meticillin (MRSA); EU/EEA, 2012





Methicillin-resistant *Staphylococcus aureus* (MRSA): a rapidly changing phenomenon





Antimicrobial resistance (AMR): what does it really mean?



Several, inter-related compartments of healthcare, (i.e. patients in primary care, hospitals, nursing homes and long-term care facilities), food animals, food, environment

Many types of human infections, i.e. respiratory tract, urinary tract, skin and soft tissue, bloodstream, surgical site, related to medical devices, etc.)

Many bacteria/microorganisms

Many antimicrobials and mechanisms of resistance

Patients with infections due to resistant bacteria!

Antimicrobial resistance A threat to patient safety





Each year, in EU/EAA:

(underestimate: only

5 MDR bacteria and

4 types of infection)

≈2.5 million attributable extra hospital days

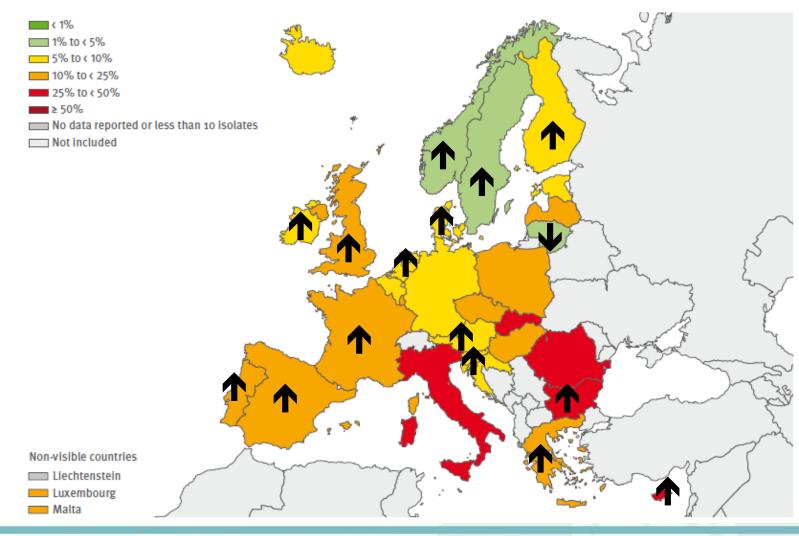
≈25,000 attributable deaths

Source: ECDC, 2009.



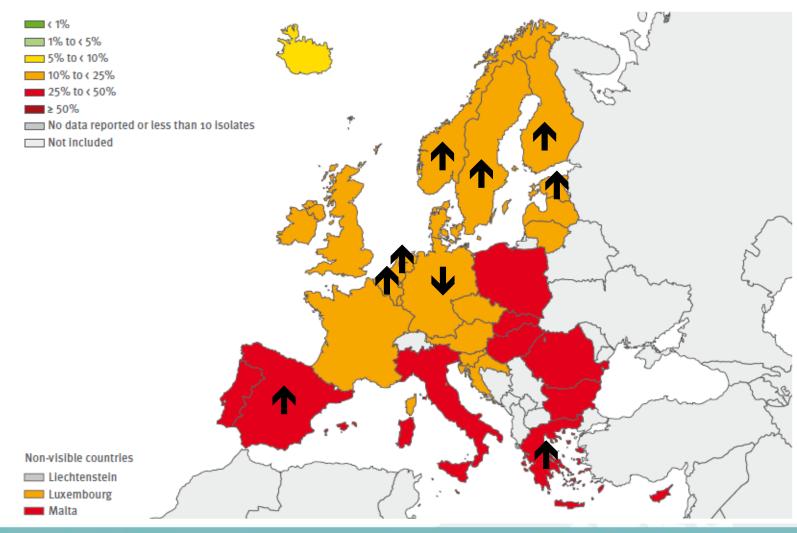
Escherichia coli: percentage of invasive isolates resistant to third-generation cephalosporins; EU/EEA, 2012





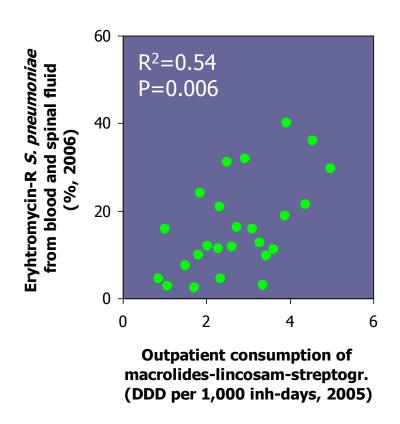
Escherichia coli: percentage of invasive isolates resistant to fluoroquinolones; EU/EEA, 2012

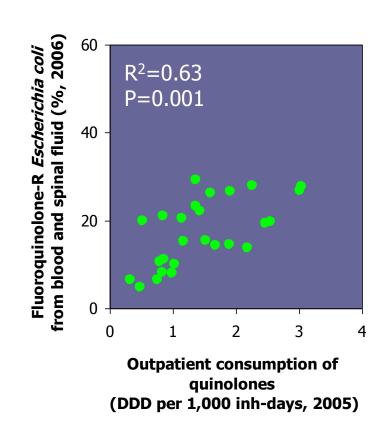




Relationships between antibiotic use and resistance in Europe







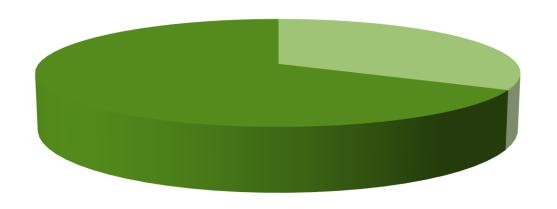
Evidence for a link between AMR in food animals and foods, and in humans



- Extended-spectrum beta-lactamase (ESBL)producing Enterobacteriaceae
- 17 August-30 October, 2009
- Patients in 4 Dutch hospitals (rectal swabs, blood cultures)
- Randomly chosen chicken meat packages from the major chains of grocery stores in the region of the 4 hospitals
- High prevalence (80%) of ESBL was found in chicken meat
- Identical predominant ESBL genes in chicken meat and in rectal swabs. Same genes frequently found in blood cultures.
- High degree of similarity of Escherichia coli strains from meat and from humans.

Comparative sales of antibiotics (in tonnes) for use in human and veterinary medicine, 10 European countries, 2007*

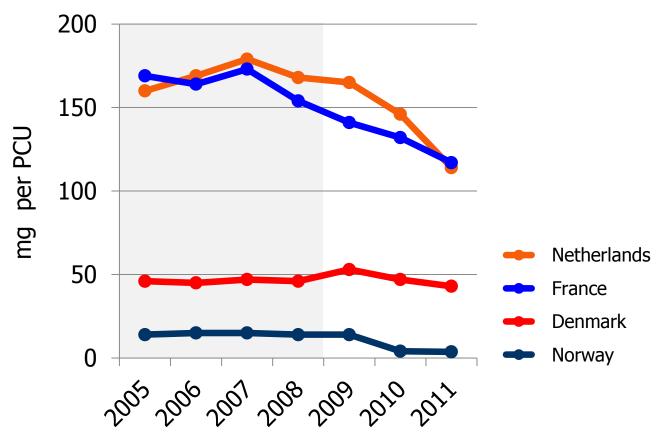




- Human medicine 1600 tonnes
- Veterinary medicine 3300 tonnes

^{*}Czech Republic, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden & United Kingdom; 2007 (or closest available year)

Sales of veterinary antimicrobial agents (mg per population correction unit) in the Netherlands, France, Denmark and Norway, 2005–2011





Collaboration between EU agencies





- Surveillance of AMR and antimicrobial consumption in humans (EARS-Net, ESAC-Net, HAI-Net, FWD-Net)
- Risk assessments and guidance documents



- Surveillance of antimicrobial consumption in animals (ESVAC)
- Opinions (CVMP)
 and reflection papers



- Surveillance of antimicrobial resistance in animals and foods
- Scientific opinions (BIOHAZ)

 Joint Interagency Antimicrobial Consumption and Resistance Analysis report (JIACRA)



Joint scientific opinions

European Commission action plan to combat AMR, 2011





Communication from the Commission to the European Parliament and the Council. Action plan against the rising threats from Antimicrobial Resistance (COM (2011) 748)

Based on preparatory work

- Staff working paper 2009 and public consultation
- Council conclusions on AMR
- EP resolutions on AMR

Holistic approach

- public health
- consumer safety
- food safety

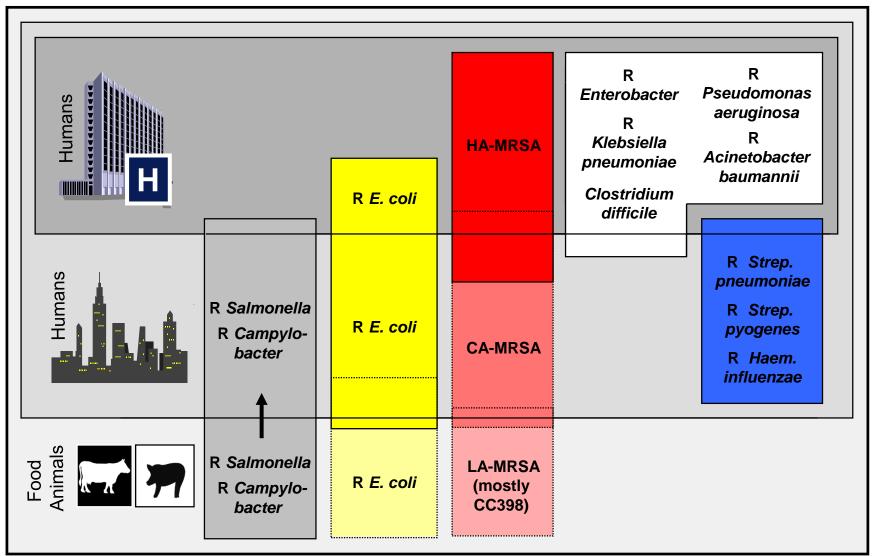
- non therapeutic use
- environment
- animal health & welfare

Objective: combat the rising threat of AMR

- to reduce and prevent the spread of AMR
- to preserve the ability to treat and prevent microbial infections

Compartments of antimicrobial resistance

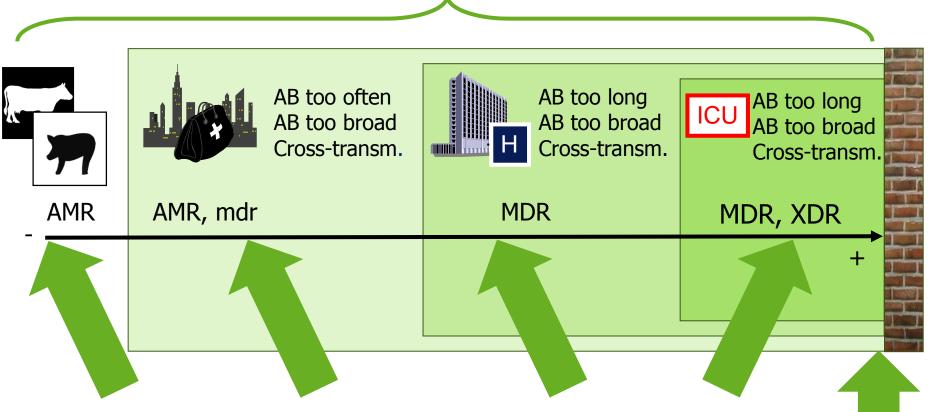




Antimicrobial resistance: a continuum of risks and actions throughout life



Surveillance; Early warning and response

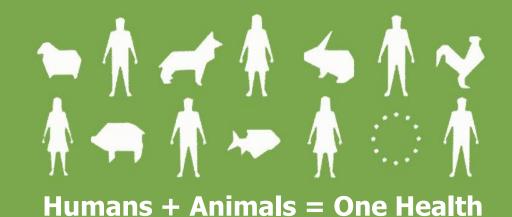


- Food safety
- Environment
- Personal and home hygiene
- Increase public awareness
- Guidance for professionals
- Build capacity
- Promote vaccination
- Promote research

- Guidance for professionals
- Build capacity
- Training
- Increase awareness
- Promote research

New antibiotics

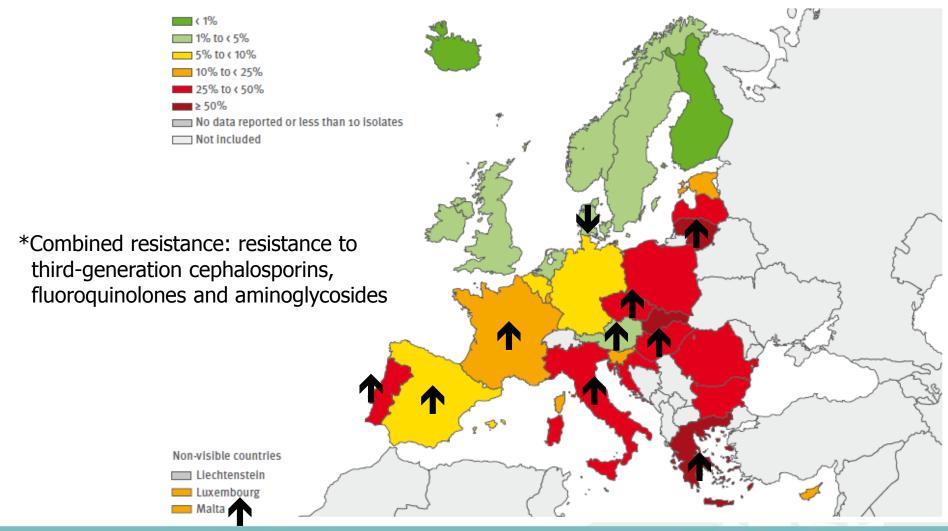




Prudent use of antibiotics. Everyone is responsible!

Klebsiella pneumoniae: percentage of invasive isolates with combined resistance*; EU/EEA, 2012

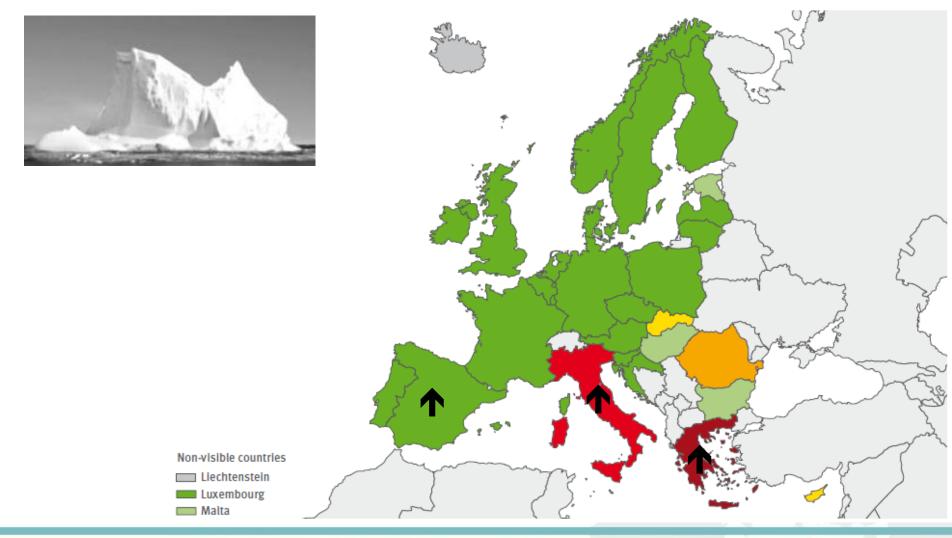




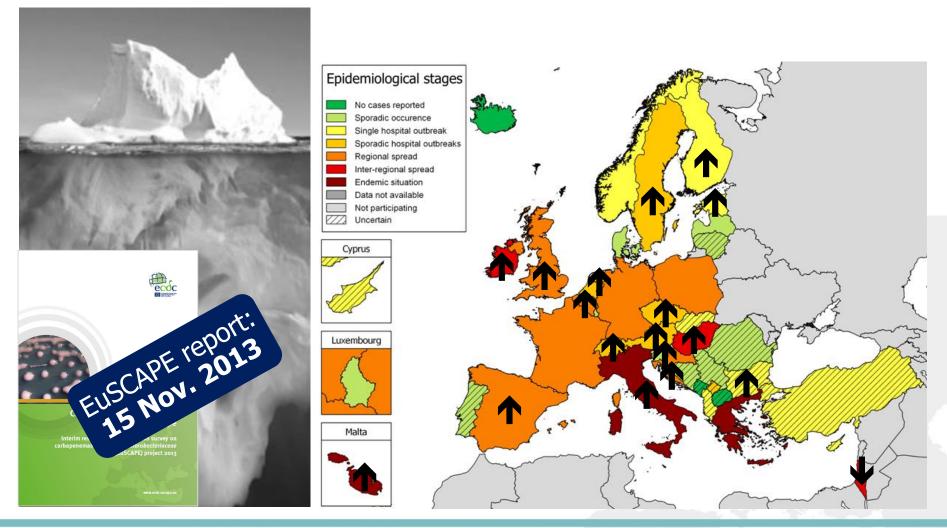


Klebsiella pneumoniae: percentage of invasive isolates resistant to carbapenems; EU/EEA, 2012





Country self-assessment of stages for spread of carbapenemase-producing *Enterobacteriaceae* (all isolates), 2010 and 2013



Modern medicine: not possible without effective antibiotics



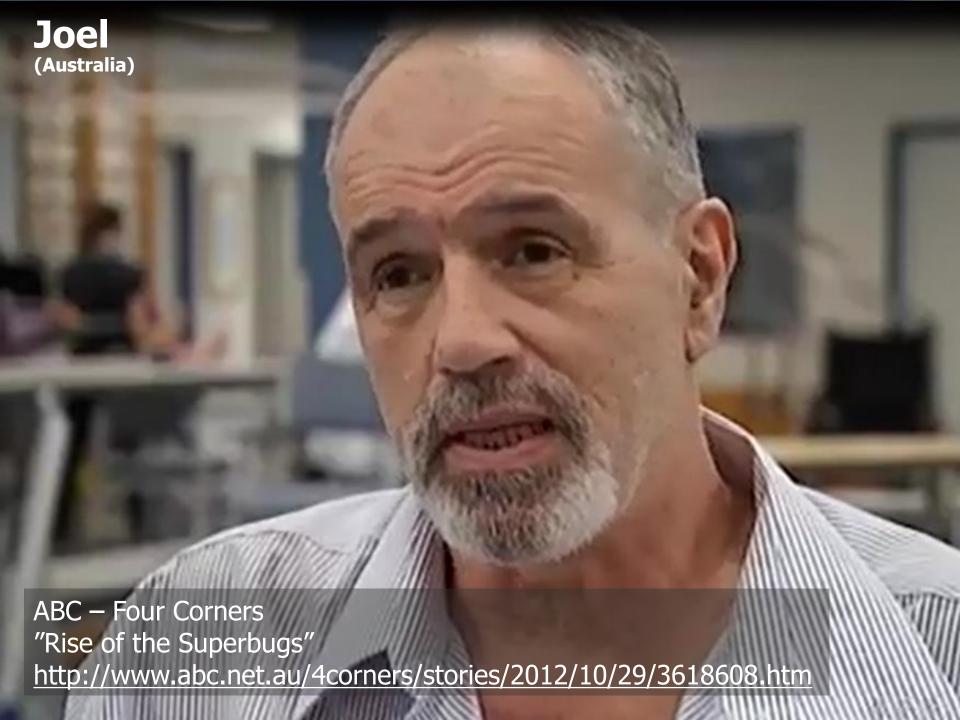
Hip / knee replacement

Organ transplant

Cancer chemotherapy

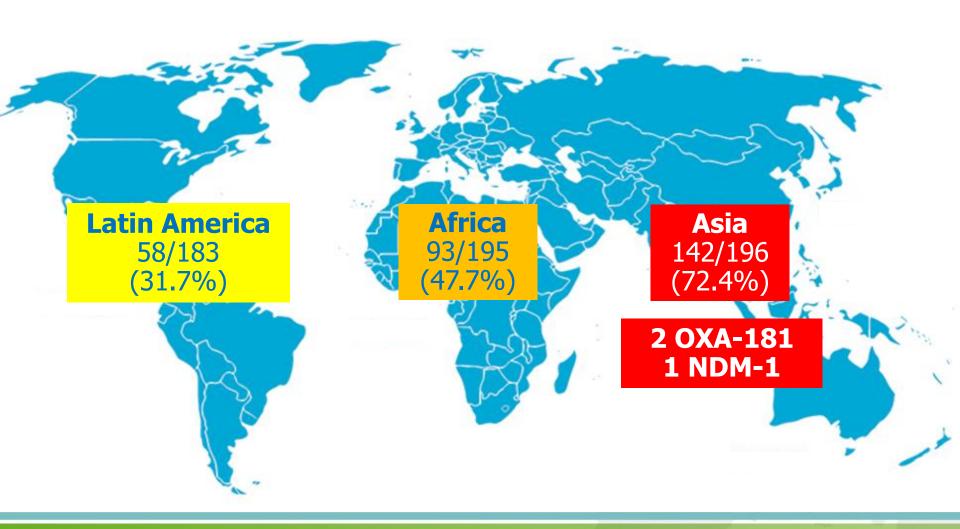
Intensive care

Care of preterm babies



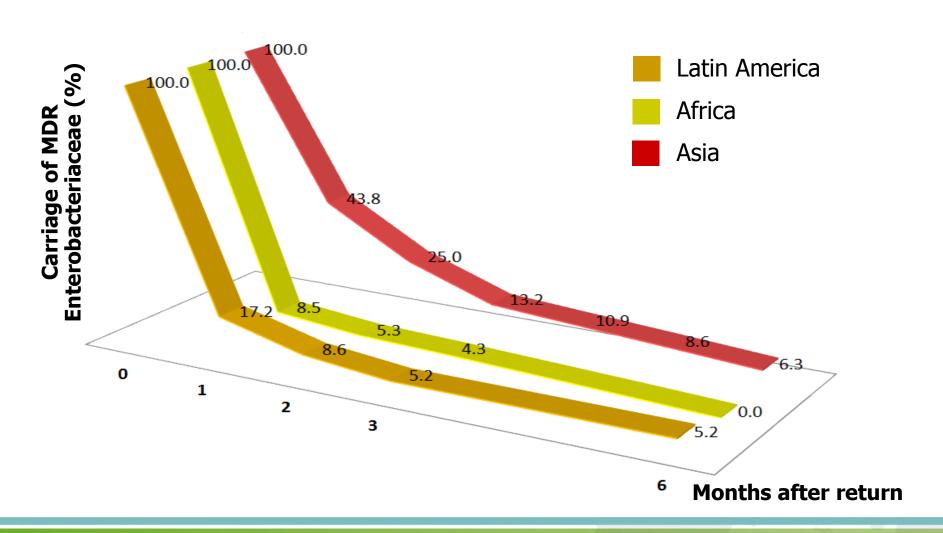
Carriage of multidrug-resistant Enterobacteriaceae in returning travellers, 2012-2013





Carriage of multidrug-resistant Enterobacteriaceae in returning travellers, 2012-2013





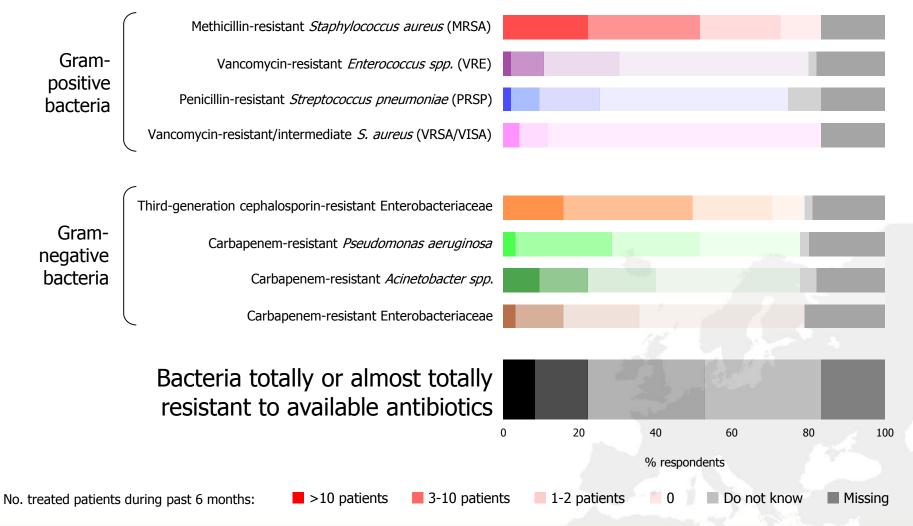
Carbapenemase-producing Enterobacteriaceae (CPE): other issues



- Refugees and war casualties (Libya)
 Pirš M, et al. Euro Surveill. 2011 Dec 15;16(50):20042.
 Hammerum AM, et al. Int J Antimicrob Agents. 2012 Aug;40(2):191-2.
 Kocsis E, et al. Clin Microbiol Infect. 2013 Sep;19(9):E409-11.
- Travelling healthcare workers suspected by Munier E, et al. Am J Infect Control 2014;42:85-6.
- **Environment** (outside of hospitals) carbapenemase-producing *Serratia fonticola* from drinking Water Henriques I, et al. Genome Announc. 2013;1(6). pii: e00970-13.
- Foodborne pathogens carbapenemase-producing *Salmonella* Kentucky Le Hello et al. Lancet Infect Dis. 2013 Aug;13(8):672-9. Seiffert SN, et al. Antimicrob Agents Chemother. 2014 Jan 27.
- NDM-1-producing, colistin-R *K. pneumoniae* in a community patient without history of foreign travel, France Arpin C, et al. Antimicrobial Agents Chemother 2012;56(6):3432-4.

Survey of European intensive care specialists on experience with infections due to resistant bacteria, 2009

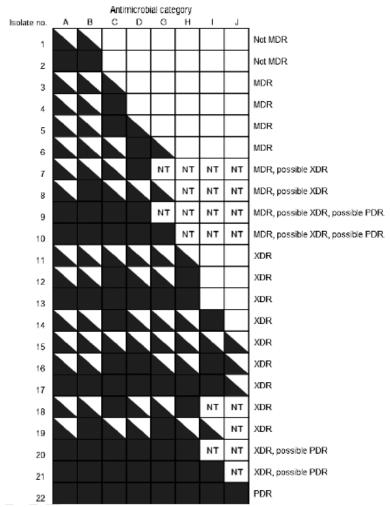




Definitions for multidrug-resistant (MDR), extensively drug-resistant (XDR) and pandrug-resistant (PDR) bacteria: international expert proposal



ORIGINAL ARTICLE 10.11118.1469-0691.2011.03570.x Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance A.-P. Madorakor², A. Sriniyano³, R. B. Carw³, Y. Carmel³, M. E. Falanos⁴², C. G. Girke⁴, S. Harbarth⁷, L. F. Hindler⁸, G. Kahlmeter*, B. Olsson-Uljequist**, D. L. Paterson**, L. B. Roe**, J. Stelling**, M. J. Struelens*, A. Vatopoulos**, J. T. Weber* and D. L. Monnet 1) European Centre for Disease Personian and Control, Stackholm, Sweden, 2) Office of Inflatious Disease, Department of Health and Human Services, Centers for Disease Castral and Prevention, Asianto, GA, USA, 3) Division of Epidemiology, Tel Ante Sauraday Medical Center, Tel Ante, Iarnal, 4) Alfa Institute of Branedical Sciences (ABS), Athers, Greece, 5) Department of Medicine, Tufts University School of Medicine, Boston MA, USA, 6) Department of Cinic d Microbidea: Kordindia University Hapitol. Boditain, Sweden 7) Infection Castal Programmy, University of Green Hospitals, Geneva Sylvaniand, (ii) Department of Pathology and Laboratory Medicine, University of California Las Angeles Medical Center, Las Angeles, CA, USA, 9) Department of Clinical Microbidogr, Gestrá Hospitol, Vinjo, 10 Department of Bosteriology, Swedish Francus for Inflatious Disease Control, Saino, Sweden, 11) The University of Queeraland Centre for Clinical Research, Repail Brishone and Warner's Hospital, Brishone, City Australia, 12) Warner Alpest Medical School of Brown University, Providence, Rt. 13) Department of Medicine, Brighton and Wasser's Hospital, Batton, MA, USA and 14) Department of Microbiology, Mations School of Public Health, Athens, Greece Many different definitions for multidrug-resistant (MDR), extensively drug-resistant (XDR) and pandrug-resistant (PDR) bacteria are being used in the medical literature to characterize the different patterns of resistance thand in healthcare-associated, antimicrobialresistant bacteria. A group of international experts came together through a joint initiative by the European Centre for Disease Prevention and Control (ECDC) and the Centers for Disease Control and Prevention (CDC), to create a standardized international terminidagy with which to describe acquired resistance profiles in Stephylococus oursus, Entercoccus app., Entercoactes across (other than Solmorella and Shigella), Praudomonas ceruginasa and Admetolocier spp., all bacteria often responsible for healthcare-associated infertions and prone to multidrug resistance. Epidemiologically significant antimicrobial categories were constructed for each bacterium. Lists of antimicrobial categories proposed for antimicrobial autospibility testing were created using documents and breakpoints from the Clinical Laboratory Standards Institute (CLSI), the European Committee on Antimicrobial Susceptibley Testing (BUCAST) and the United States Food and Drug Administration (FDA). MDR was defined as acquired non-assemptibility to at least one agent in three or more antimicrobial categories, XDR was defined as non-assorptibility to at least one agent in all but two or fewer antimicrobial categories (i.e. bacterial isolates remain autospoble to only one or two categories) and PDR was defined as non-susceptibility To all agents in all antimicrobial categories. To ensure correct application of these definitions, bacterial isolates should be tested against all or nearly all of the antimicrobial agents within the antimicrobial categories and selective reporting and suppression of results should be avoided. Kleywords: Antimi crobial agents, definitions, extensively drug resistant, multidrug resistant, pandrug resistant Original Submission: 31 broary 2011: Revised Submission: 7 April 2011: Accepted: 22 April 2011 Editor: R. Cantón Cân Microbiol Infect 2011 This information is distributed adely for the purpose of Corresponding author: A.-P. Hagionico, Ton ebodinigen IIIA, 171-63 Stodsholm, Sweden pre-dissemination public comment under applicable information quality guidelines. It has not been formally E-mail: ann a-pelagis, magio rakos (feodo europa, es disseminated by the Centers for Disease Control and Clean Mary States and Lefector CLC | Surgeon Scales of Clean Manufacture and Mary and



Main actions to prevent and control antimicrobial resistance (AMR)





New antimicrobial agents(with a novel mechanism of action, research, development)

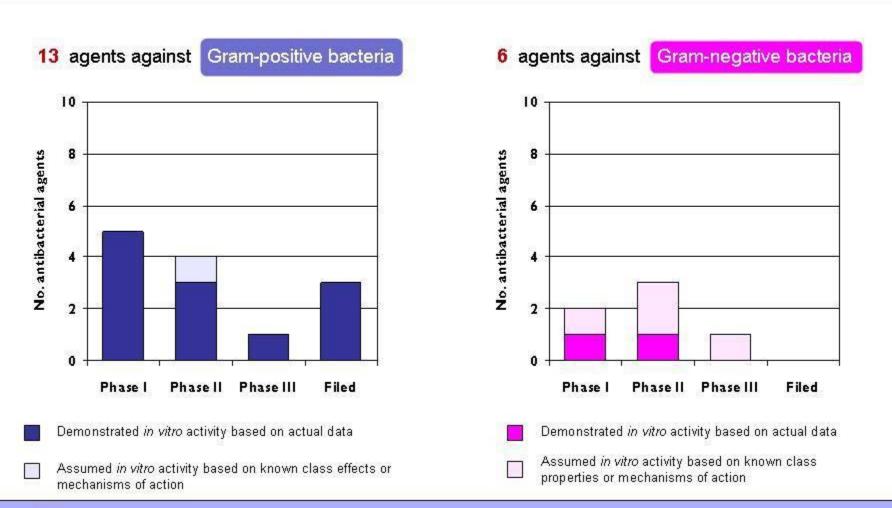


Infection prevention and control (hand hygiene, screening, isolation)



Prudent use of antimicrobial agents (only when needed, correct dose, correct dose intervals, correct duration)

15 novel, systemically administered antibacterial agents in the pipeline





Source: EMEA, 2009.

ECDC point prevalence survey, 2011-2012



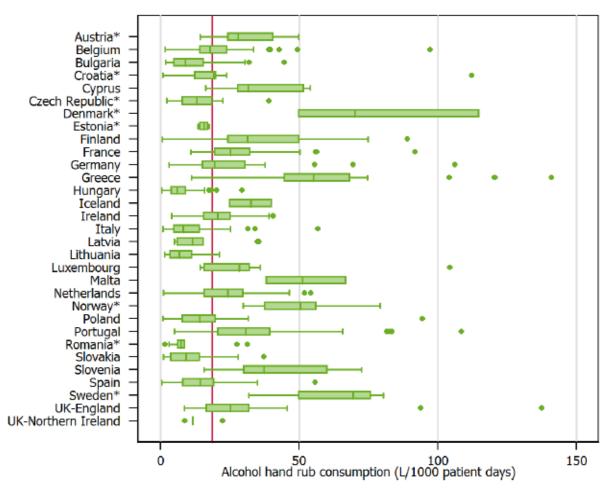
Indicator	Median	MinMax.
MRSA* (% of tested <i>S. aureus</i> isolates)	36	0 – 91
MRSA (no. / 1000 patdays)	1.3	0 – 9.7
Infection prevention and control nurses (FTEs / 250 beds)	1.0	0 – 2.1
Infection prevention and control doctors (FTEs / 250 beds)	0.4	0 – 1.3
Beds in single rooms (% total beds)	11.1	<5 ->50
Alcohol hand rub consumption (L / 1000 patdays)	18.7	<10 ->50



ECDC point prevalence survey in European (acute care hospitals, 2011-2012









^{*}PPS data representativeness was poor in Austria, Croatia, Czech Republic, Estonia, Norway and Romania and very poor in Denmark and Sweden. Red vertical line=median (18.7 litres/1000 patient-days).

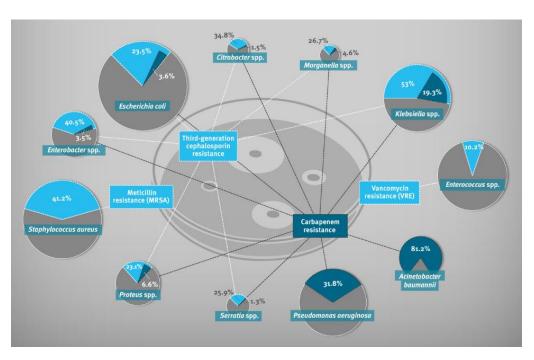
ECDC point prevalence survey, 2011-2012

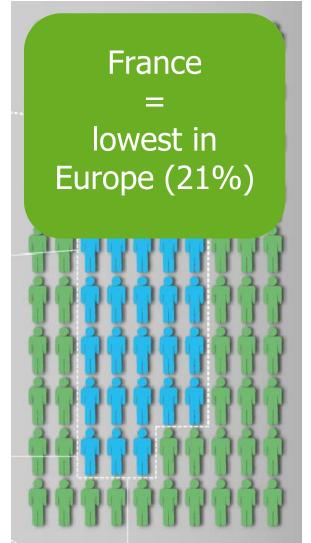


Antimicrobial use in acute care hospitals

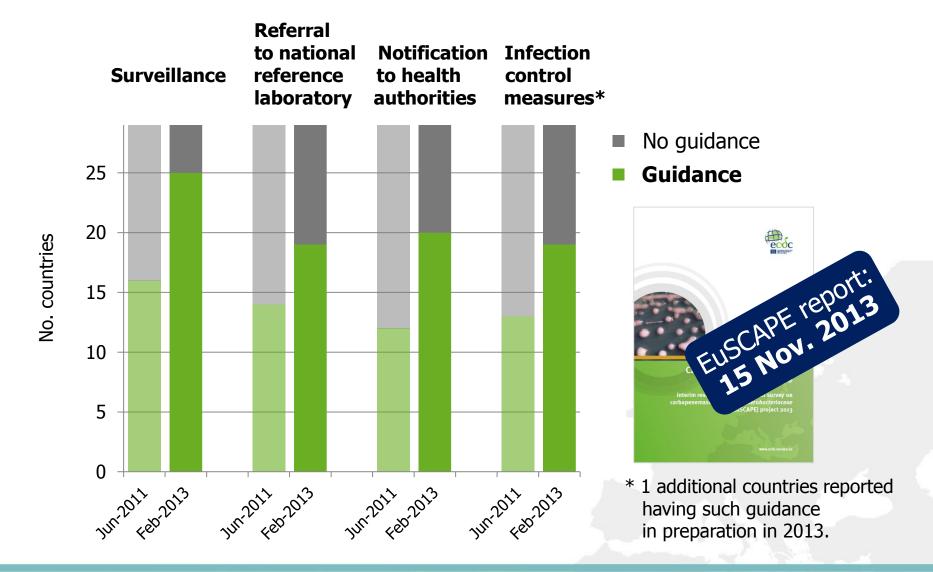
On any given day in EU/EEA hospitals 33% patients [range: 21-55%]

Antimicrobial resistance



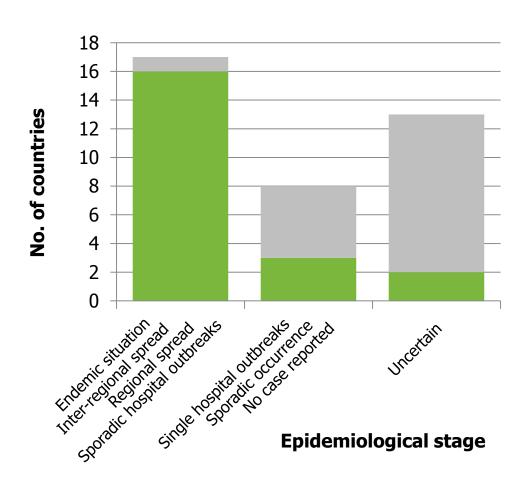


Availability of national guidance documents on CPE, 2011 & 2013



Many EU countries lack guidance on prevention and control of carbapenemase-producing *Enterobacteriaceae* (CPE)





No guidance on infection control measures for CPE

Guidance on infection control measures for CPE



ECDC risk assessment on the spread of carbapenemase-producing *Enterobacteriaceae*: risk factors for patient infection or colonisation

Prior use of antimicrobials

- Any antimicrobial
- **Carbapenems** (associated with a high risk estimate)
- Other antimicrobials (fluoroquinolones, cephalosporins, anti-pseudomonal penicillins, metronidazole)

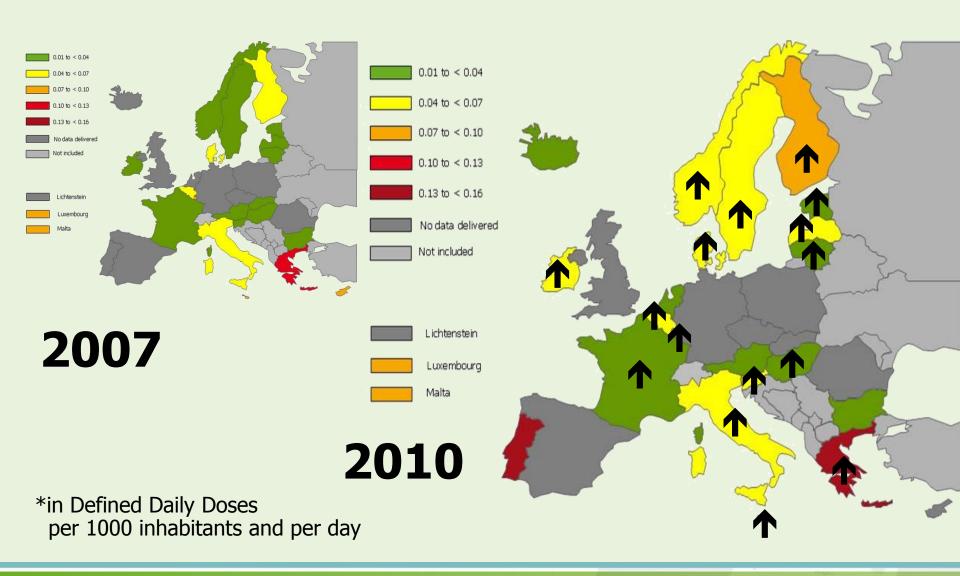
Cross-border transfer of patients

Strong evidence that it is associated with risk for transmission when:

- Patients are transferred from countries with high rates of CPE to healthcare facilities in other countries
- Patients had received medical care abroad in areas with high rates of CPE
- Transfer of patients within units of same hospital
- Immunosuppression, severity of illness, invasive procedures

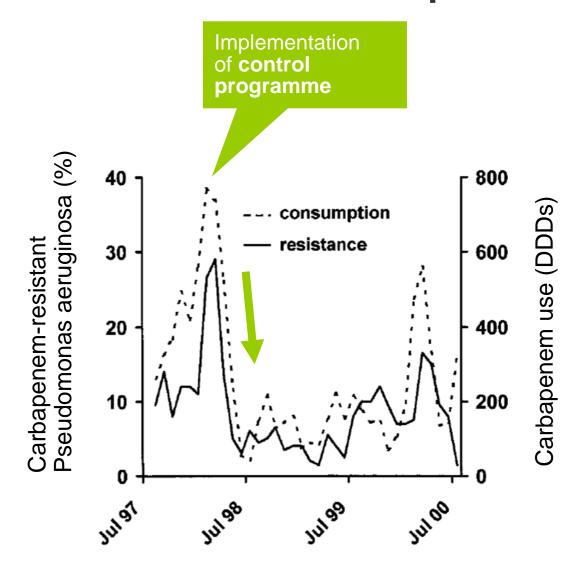
Carbapenem consumption* (for the large majority in hospitals); EU/EEA, 2007-2010





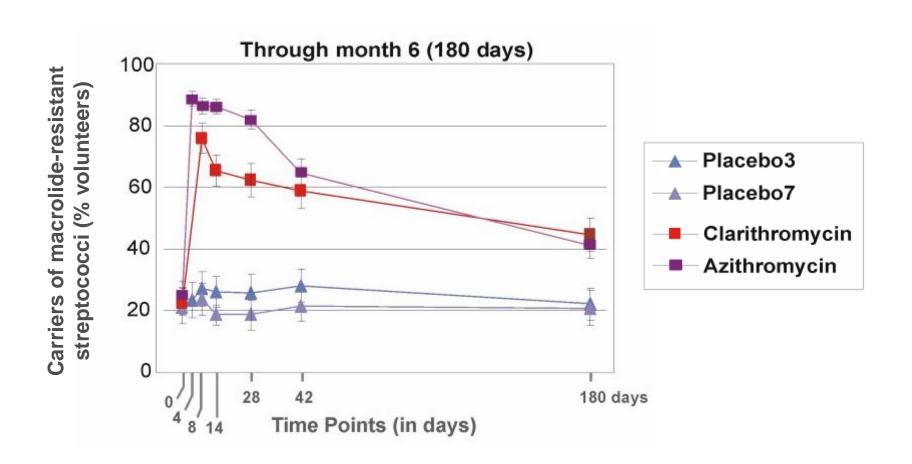
Antimicrobial consumption drives antimicrobial resistance in hospitals





Carriage of resistant bacteria following exposure to antibiotics





Consumption of antibiotics for systemic use (ATC group J01) in the community*; EU/EEA, 2010

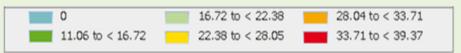


France = highest in Europe

4.8 packages per 1,000 inhabitants and per day

1.8 package per inhabitant and per year

*in Defined Daily Doses per 1000 inhabitants and per day



Greece and Iceland:

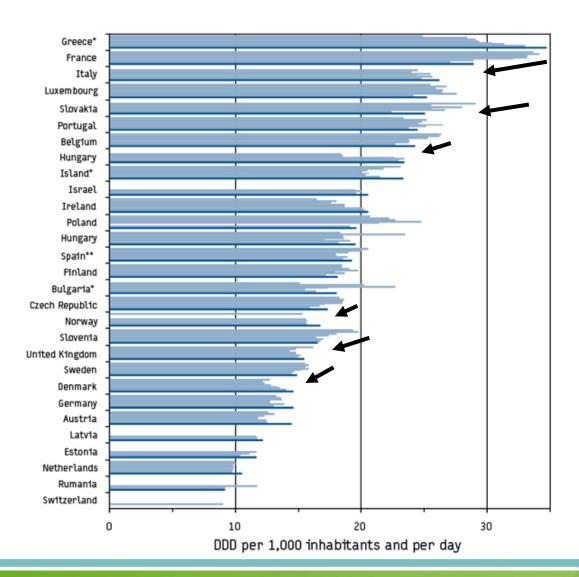
includes both community and hospital sector

Spain: reimbursement data that do not include over-the-counter sales without a prescription



Total outpatient antibiotic use (ATC J01) in 29 European countries, 1998-2005





- ← National media campaign
- **←** Education prog. for paediatricians
- ← National media campaign

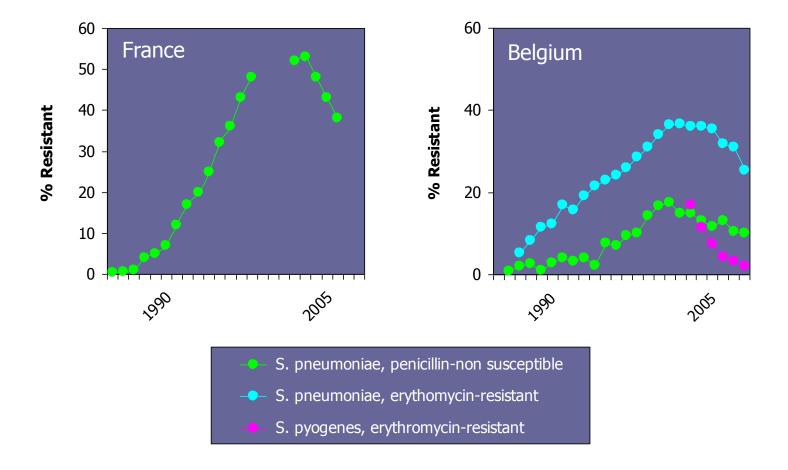
- ← Education prog. for paediatricians
- Media coverage
- Media coverage

^{*}Total use for Bulgaria and Iceland, and for Greece (2004 & 2005 only).

^{**}Reimbursement data, which do not include overthe-counter sales without a prescription.

Decreases in antimicrobial resistance following national media campaigns





European Antibiotic Awareness Day, 2008-2014

- 2008 Materials for the general public 32 countries participated
- 2009 Materials for primary care prescribers
- Materials for hospital prescribers and hospitals

Matched Get Smart week in the U.S. and the campaign in Canada

- 2011 Patient stories and Euronews movie37 countries participated
- 2012 Collaboration with WHO/Europe 43 countries participated Matched campaigns in the U.S., Canada and Australia

2013-2014

New theme: self-medication with antibiotics
Collaboration with WHO/Europe,
student assoc., CPME, PGEU
Collaboration with more countries















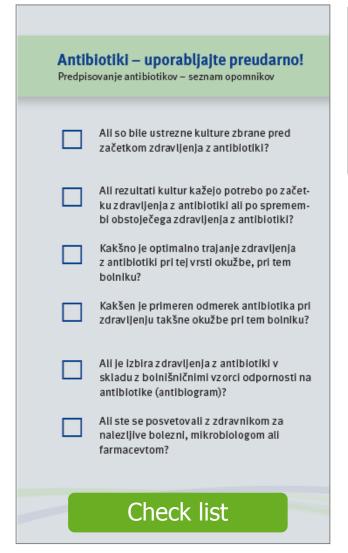
GET WELL WITHOUT ANTIBIOTICS



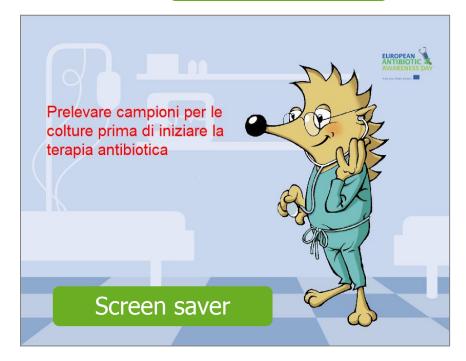
For more information, visit antibiotic.ecdc.europa.eu

European Antibiotic Awareness Day: information materials for hospital prescribers









Scenario planning: key certainties



- Antibiotic resistance will exist as long as antibiotics are used
- New resistance mechanisms will necessarily emerge
- Antibiotics will always be misused to a certain extent
- Compliance with hand hygiene and other infection control measures will never be 100%
- Patients will still be at risk of acquiring infections while in hospitals and other healthcare settings



Photo: FreeFoto.c m

Mapping the future: key uncertainties and their implications



Prevention and control of antimicrobial resistance

Activities in only a few countries

Activities in many countries

New antibiotics with a vel mechanism of action No novel mechanism

Yes

- Must rely on rational use of existing antibiotics and on infection control
- Mitigation an achievable goal?
- New antibiotics always essential
- Focus on rational use of new and other antibiotics
- Re-emphasize infection control

- Must rely on rational use of existing antibiotics and infection control
- Increase awareness of new generations
- Market for new antibiotics mostly empirically for severe infections
- Focus on detection and control of emerging AMR
- Re-emphasize rational use of antibiotics and infection control

Antimicrobial Resistance and Healthcare- Associated Infections (ARHAI) Programme

Highlights of Strategic Multiannual Programme, 2014-2020

- Improved surveillance of AMR, antimicrobial consumption and HAI, by improving data quality and availability
- Integration of EARS-Net, ESAC-Net and HAI-Net (including structure and process indicators) to allow analyses of data at hospital level
- Integration of molecular surveillance to monitor crossborder spread that would require public health intervention
- Promote sharing of experiences, best practice, guidelines and other documents between Member States and from research projects and professional societies
- European Antibiotic Awareness Day, and collaborate with global partners to establish 18 November as a World Day to raise awareness about prudent antibiotic use

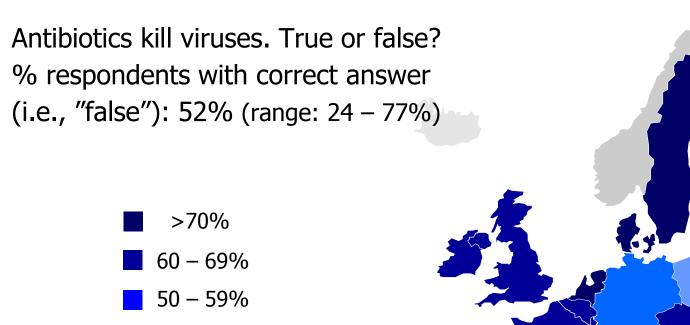
Eurobarometer opinion poll, May-June 2013

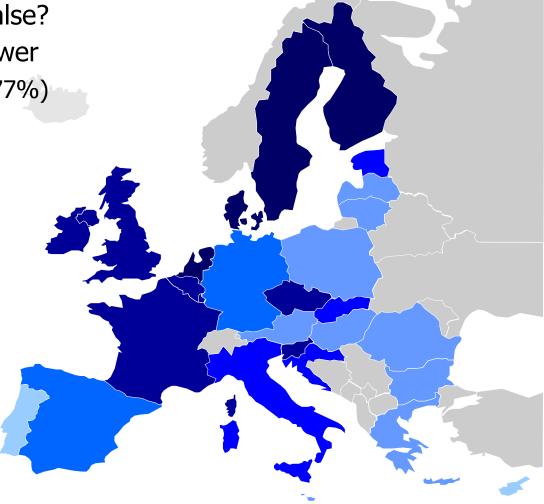
40 - 49%

30 - 39%

<30%



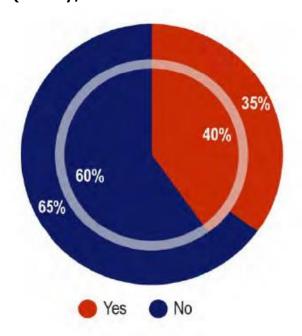




Behaviour of European citizens, 2009-2013: oral antibiotics vs. smoking

Taking antibiotics

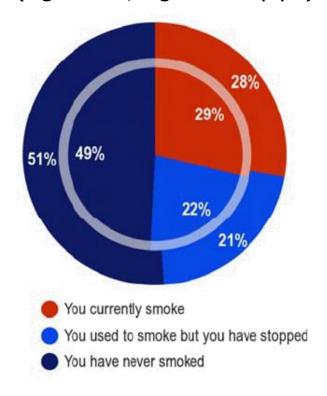
(orally, in the last 12 months)



Inner pie: 2009 (EB72.5 11-12) Outer pie: 2013 (EB79.4 05-06)

Smoking

(cigarettes, cigars or a pipe)



Inner pie: EB72.3 Oct. 2009

Outer pie: EB77.1 Feb.-Mar. 2012

Two major culture shifts from baseline norm: an achievable dream



- Not practicing basic hand hygiene and not having alcohol-based hand rub available becomes socially unacceptable, among professionals and in the general population
- **Antibiotics** are perceived in the general population and by professionals as always bearing the risk of selecting resistant bacteria in one's (a patient's) own flora as much as curing the infection. Patients will be in a position to make an informed choice knowing about this risk.

Thank you!





18 November 2014



Website: http://antibiotic.ecdc.europa.eu

Facebook: EAAD.EU

Twitter: @EAAD EU (#EAAD)