



# Prevention and control of antimicrobial resistance in healthcare settings: raising awareness about best practices

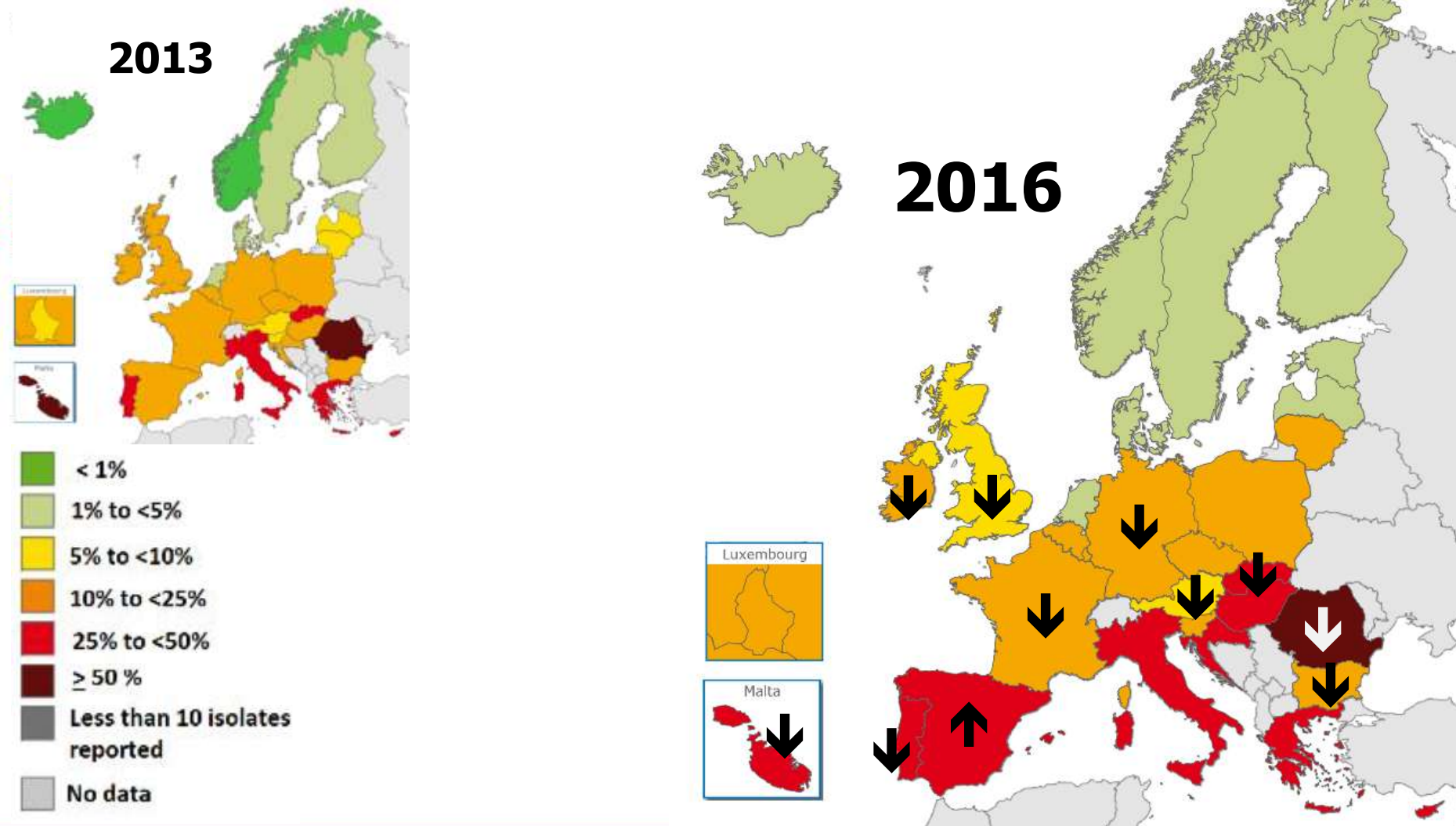
Dominique L. Monnet, on behalf of ECDC Antimicrobial Resistance and Healthcare-Associated Infections (ARHAI) Programme , ECDC

Brussels, 22 November 2017

# Antimicrobial Resistance and Healthcare-Associated Infections (ARHAI) Networks

- **European Antimicrobial Resistance Surveillance Network (EARS-Net)**  
(formerly EARSS, integrated in January 2010)
- **European Surveillance of Antimicrobial Consumption Network (ESAC-Net)**  
(formerly ESAC, integrated in July 2011)
- **Healthcare-Associated Infections surveillance Network (HAI-Net)**  
(formerly HELICS / IPSE, integrated in July 2008)

# *Staphylococcus aureus*: % of invasive isolates with resistance to meticillin (MRSA), EU/EEA, 2013 & 2016

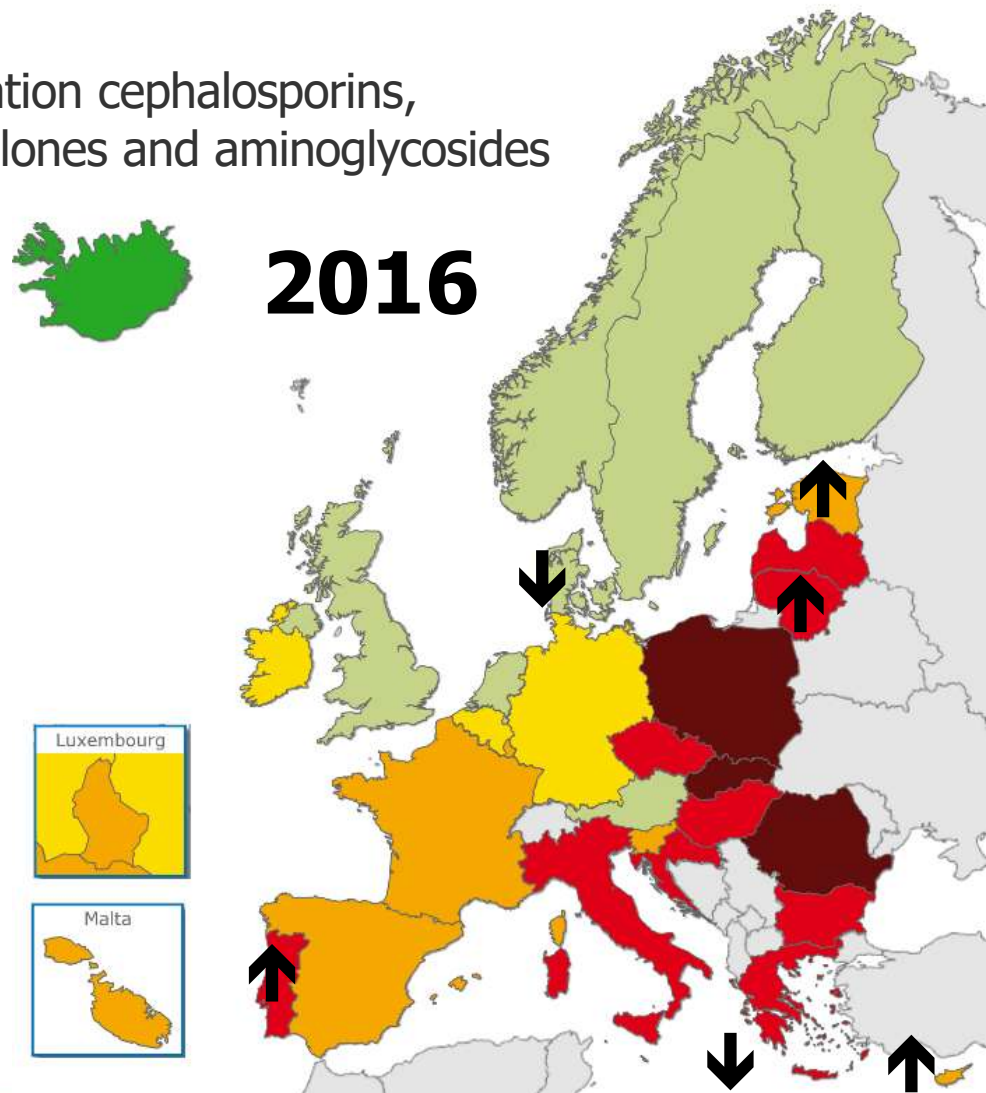
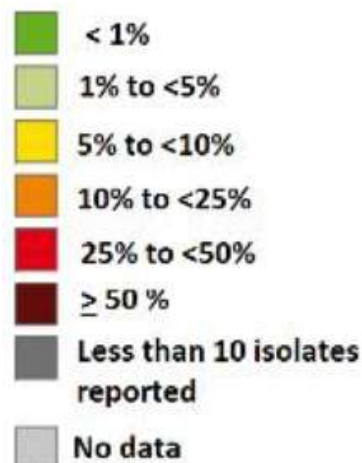


Source: EARS-Net, 2017. The symbols ↑ and ↓ indicate a significant increasing or decreasing trend for the period 2013-2016, respectively. These trends were calculated on laboratories that consistently reported during this period.

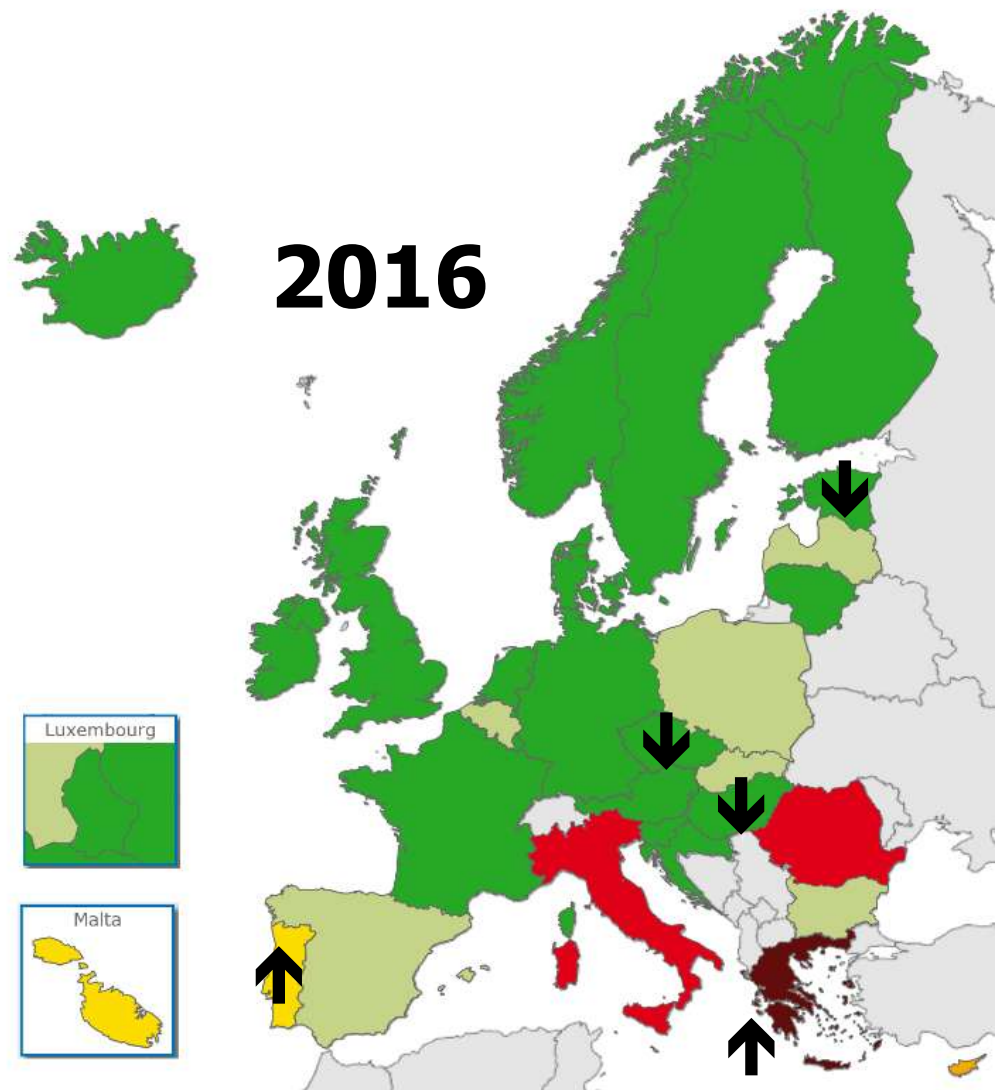
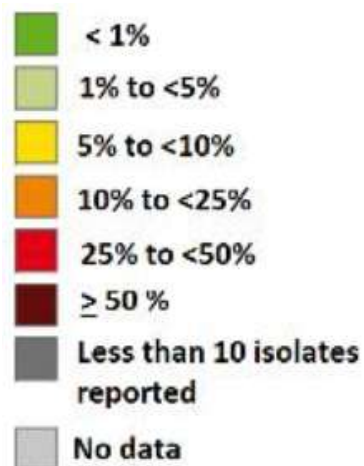


# *Klebsiella pneumoniae*: % of invasive isolates with combined resistance\* EU/EEA, 2013 & 2016

\*Third-generation cephalosporins, fluoroquinolones and aminoglycosides



# *Klebsiella pneumoniae*: % of invasive isolates with resistance to carbapenems EU/EEA, 2013 & 2016



# Carbapenem-resistant infections: a challenge for appropriate patient therapy

## 1. *Klebsiella pneumoniae* ESBL-CARBA > E5 CFU/mL

MIC: Aztreonam = 0.25 mg/L = S

MIC: Colistin = 0.12 mg/L = S

MIC: Kloramfenikol = 256 mg/L = R

MIC: Tobramycin = <256 mg/L = R

MIC: Amikacin = <256 mg/L = R

MIC: Netilmicin = <256 mg/L = R

MIC: Nitrofurantoin = 512 mg/L = R

MIC: Gentamicin = <256 mg/L = R

Obs! Stammen bildar ESBL-CARBA (ICD-10 kod U82.2). Klinisk anmälningsplikt och smittspårningsplikt enl smittskyddslagen. Kontakta alltid vårhygien. För mer information: [www.smittskyddstockholm.se](http://www.smittskyddstockholm.se)

## ANTIBIOTIKUM

Ampicillin.....	R
Piperacillin/tazobaktam.	R
Cefadroxil.....	R
Imipenem.....	R
Meropenem.....	R
Ertapenem.....	R
Aztreonam.....	S
Colistin.....	S
Kloramfenikol.....	R
Tobramycin.....	R
Amikacin.....	R
Netilmicin.....	R
Trimetoprim.....	R
Trimetoprim-sulfa.....	R
Nitrofurantoin.....	R
Cefotaxim.....	R
Ceftazidim.....	R
Gentamicin.....	R
Ciprofloxacin.....	R

### Svarskommentar:

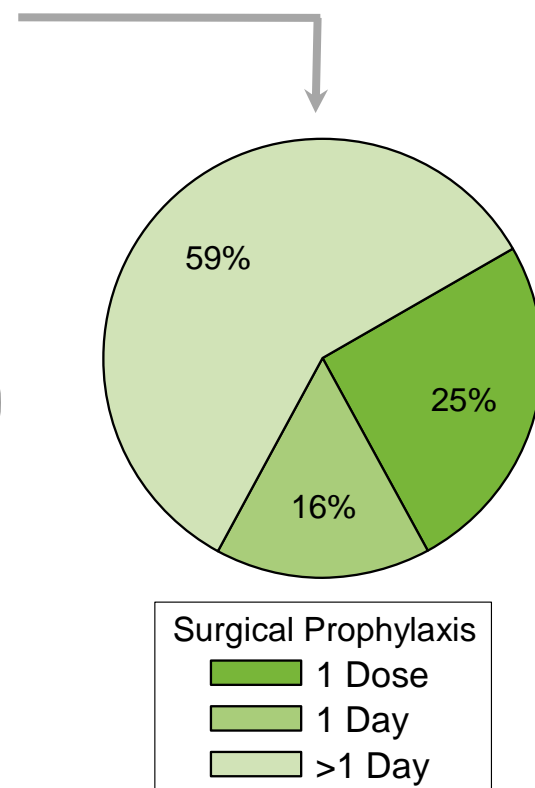
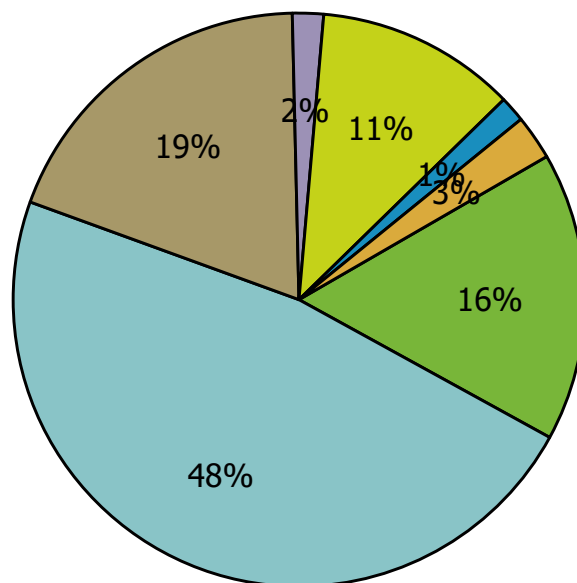
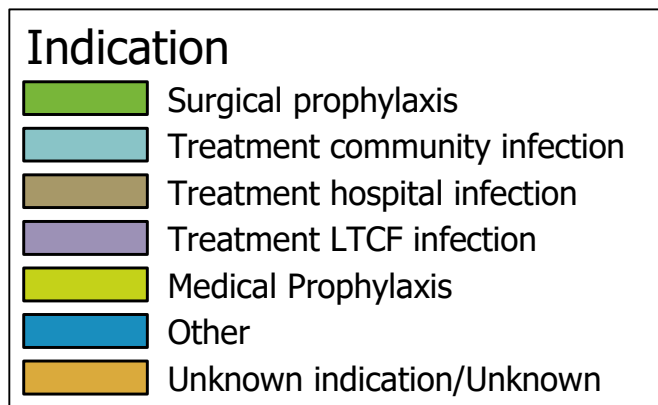
### Sammanfattning/Övrigt:

Obs! Mycket omfattande resistensprofil. Endast känslig för colistin.

# ECDC point prevalence survey, 2011-2012: antimicrobial use in European acute care hospitals



- On any given day: 33% patients [range: 21-55%]
- **59% of surgical prophylaxis > 1 day**

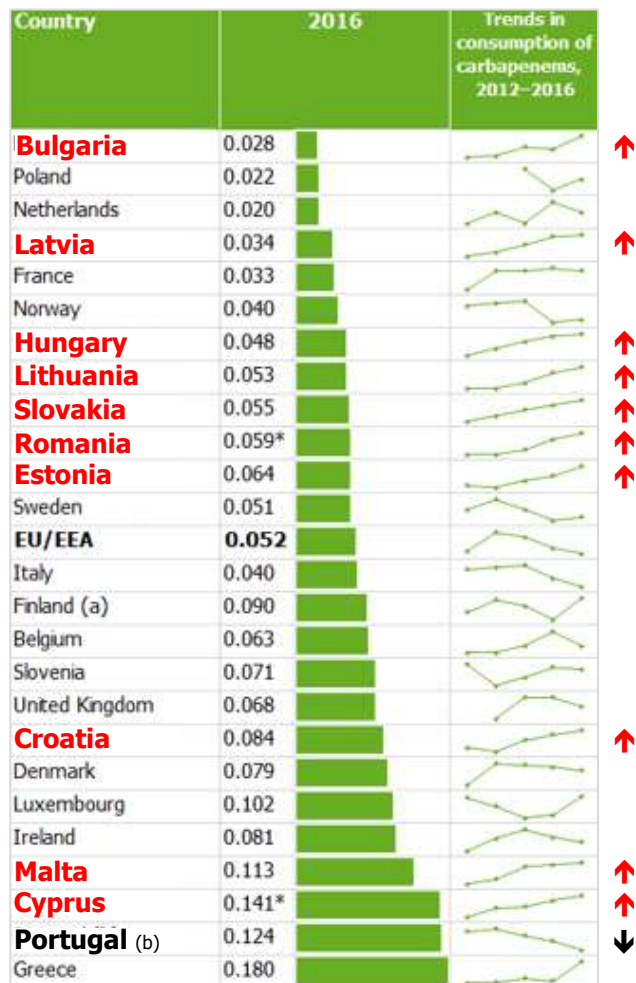




# Consumption of last-line antibiotics in the hospital sector, EU/EEA, 2012-2016

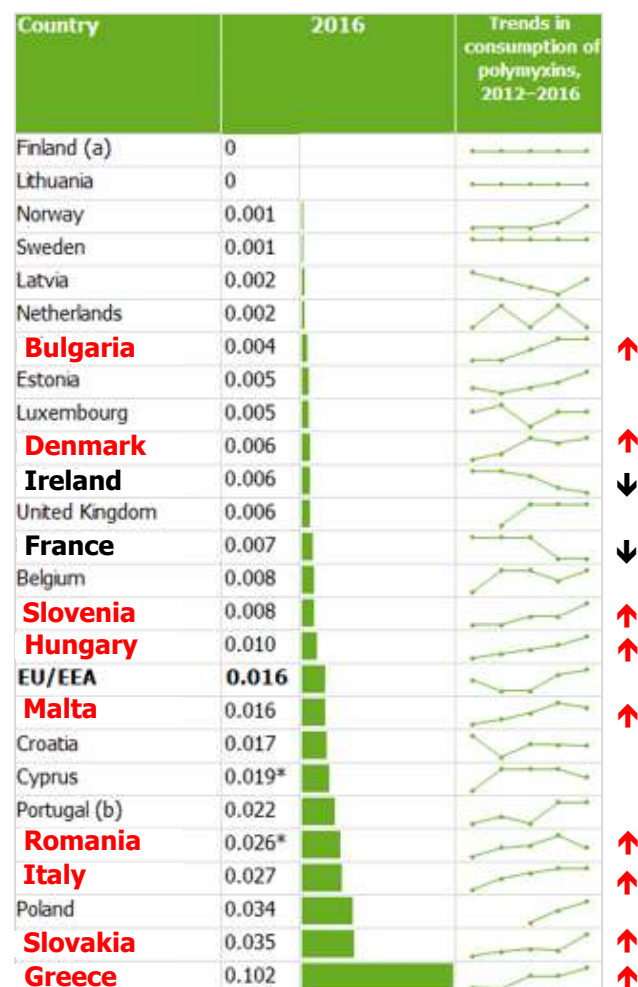
## Carbapenems

(DDD per 1000 inh. and per day)



## Polymyxins (mainly colistin)

(DDD per 1000 inh. and per day)



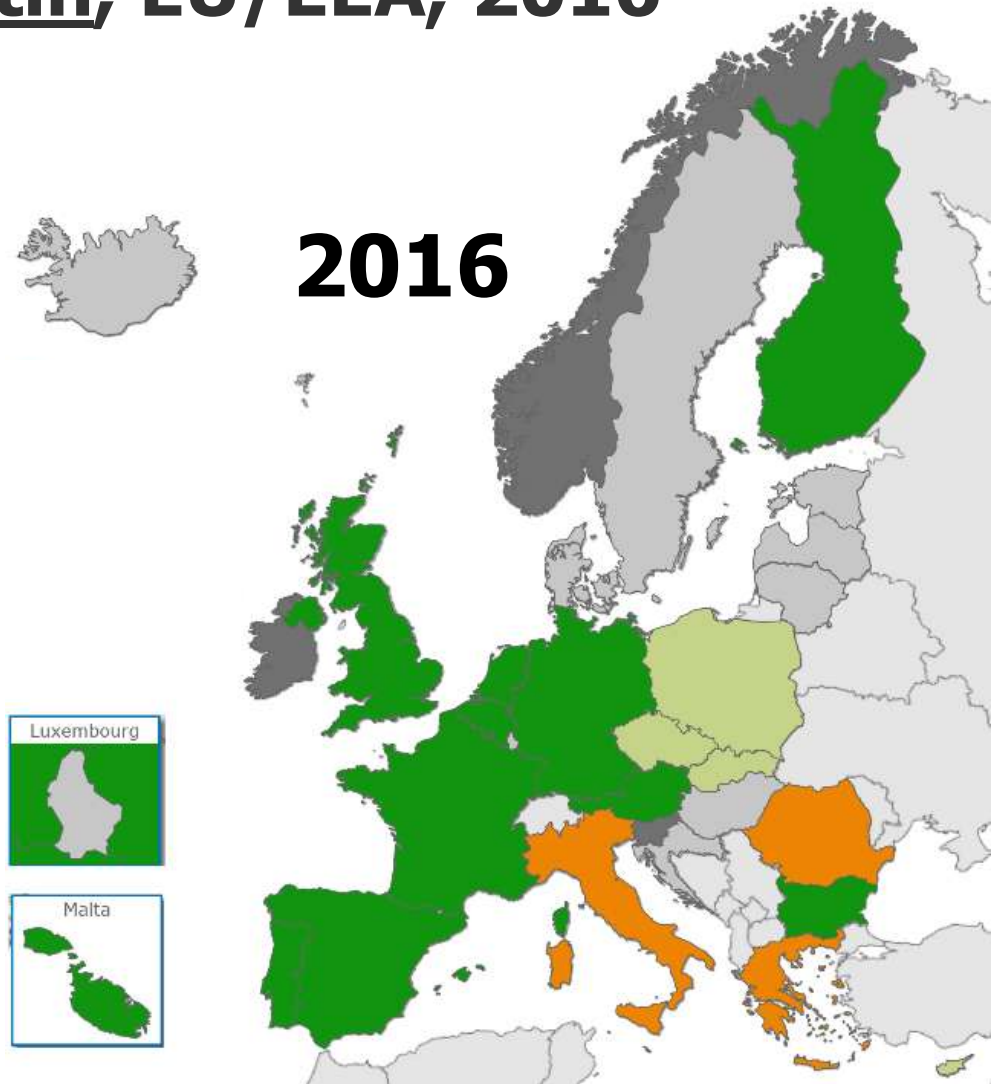
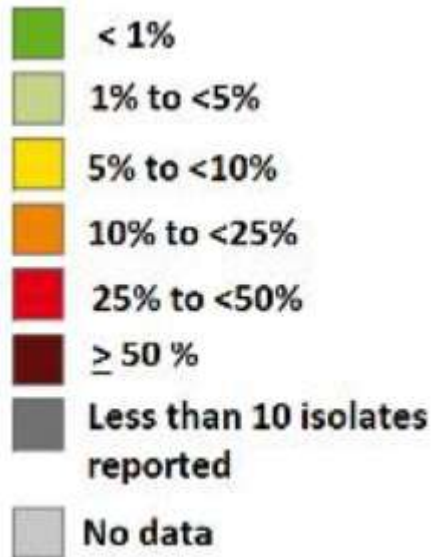
\* Cyprus and Romania: total care data, including consumption in the community. These data were not used to calculate the EU/EEA population-weighted average.

(a) Finland: data include consumption in remote primary healthcare centres and nursing homes.

(b) Portugal: data relate to public hospitals only.



# *Klebsiella pneumoniae*: % of invasive isolates with combined resistance to carbapenems and colistin, EU/EEA, 2016





# European Centre for Disease Prevention and Control

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[Home](#) > [Publications & data](#) > Epidemic Intelligence Information System (EPIS)

← [Publications & data](#)

## Examples

- *Mycobacterium chimaera* cardiovascular infections linked to heater-cooler devices
- *Candida auris* infection
- *optrA* (transferable oxazolidinone and chloramphenicol resistance)

# Epidemic Intelligence Information System (EPIS)

tool



The Epidemic Intelligence Information System (EPIS) is a web-based communication platform that allows nominated public health experts to exchange technical information to assess whether current and emerging public health threats have a potential impact in the European Union (EU).

## Download

📄 [EPIS - specific privacy statement - 2016 - EN - \[PDF-106.53 KB\]](#)

[Access Epis](#) ▶

# 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)



# EU Guidelines for the prudent use of antimicrobials in human health (June 2017)



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# European Centre for Disease Prevention and Control

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## Directory of online resources for prevention and control of antimicrobial resistance (AMR) and healthcare-associated infections (HAI)

tool





The directory lists strategies, guidance documents and training courses on the prevention and control of antimicrobial resistance and healthcare-associated infections available online. These documents were published by ECDC, EUVEEA Member States, international and national agencies and professional societies to support healthcare professionals, hospital administrators and public health professionals. In addition, the directory lists ongoing research projects and their corresponding websites.

ECDC welcomes suggestions and further information on existing guidance. Comments can be provided to: [arhai@ecdc.europa.eu](mailto:arhai@ecdc.europa.eu).

### Guidelines for specific infections and organisms

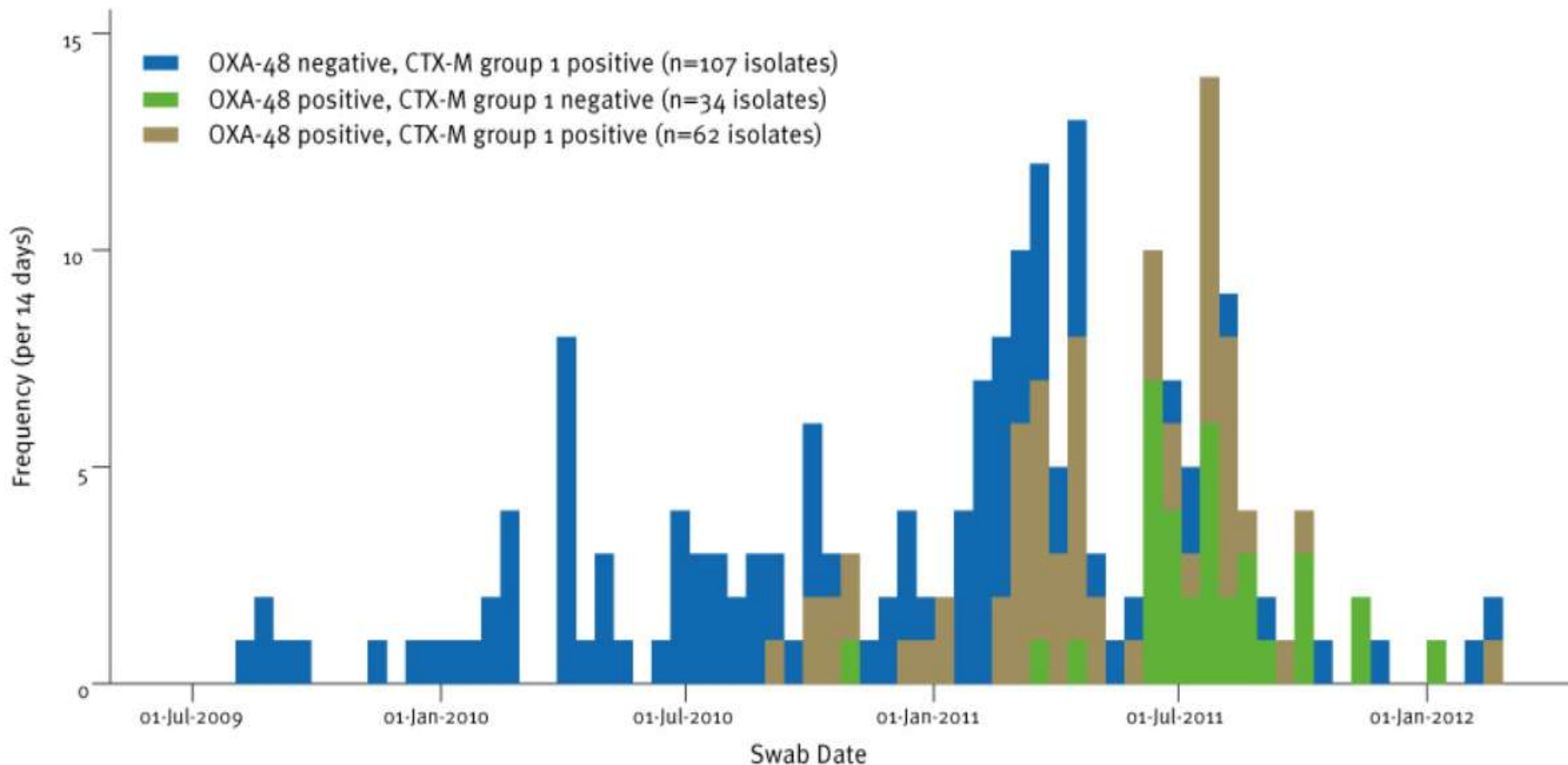
Healthcare-associated infections	Multidrug-resistant organisms
 Carbapenem-resistant Enterobacteriaceae (CRE) >	
 Methicillin-resistant Staphylococcus aureus (MRSA) >	

### Prevention and control measures in healthcare settings

Strategies, action plans, projects	Prudent use of antibiotics	Infection and control measures	Training
 Antimicrobial resistance strategies and action plans >			
 Projects on antimicrobial resistance and healthcare-associated infections >			

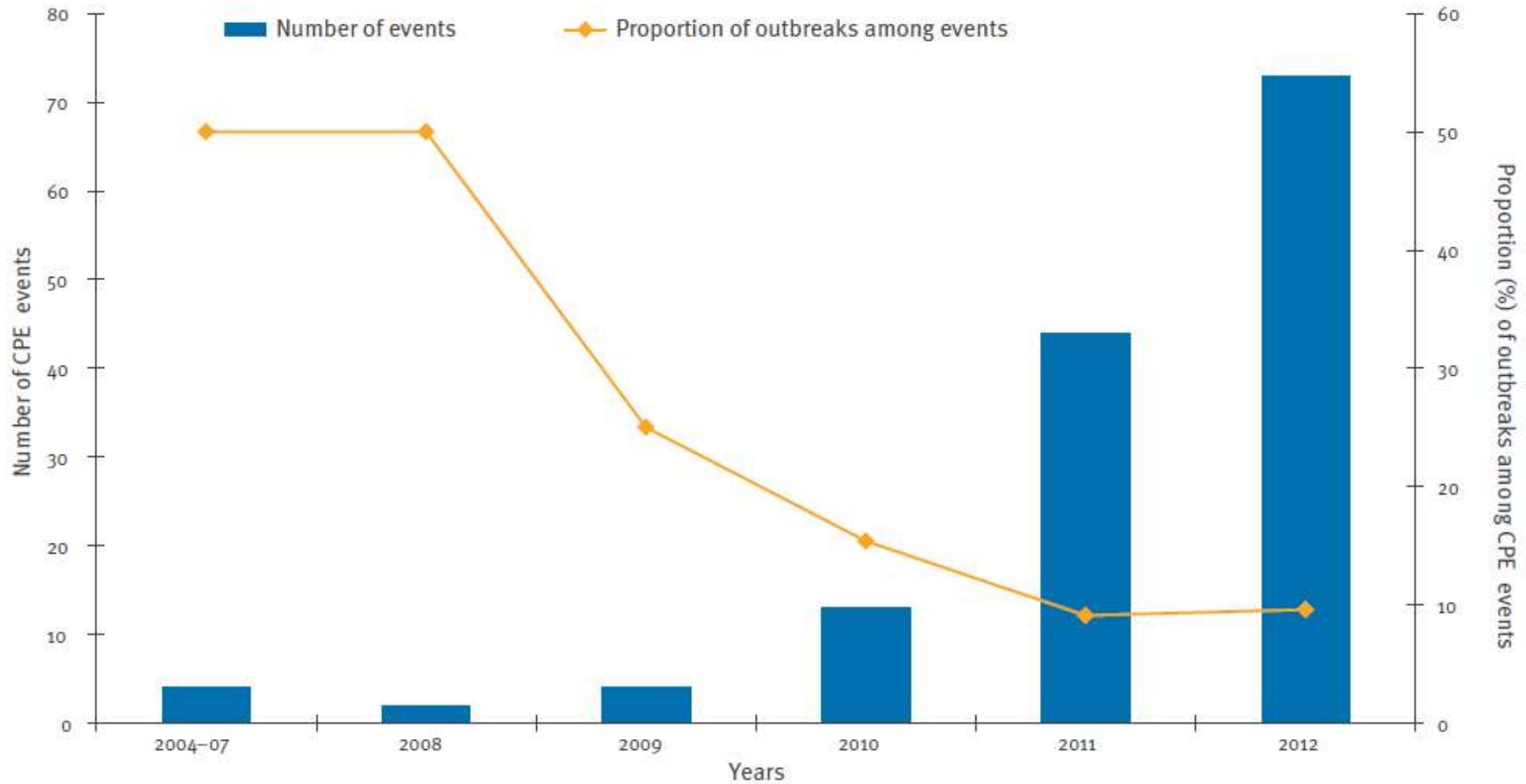
Update :  
15 Nov. 2017

# Control of an outbreak of OXA-48-producing *Enterobacteriaceae*, Maastad Hosp., Rotterdam (NL), 2009-2012





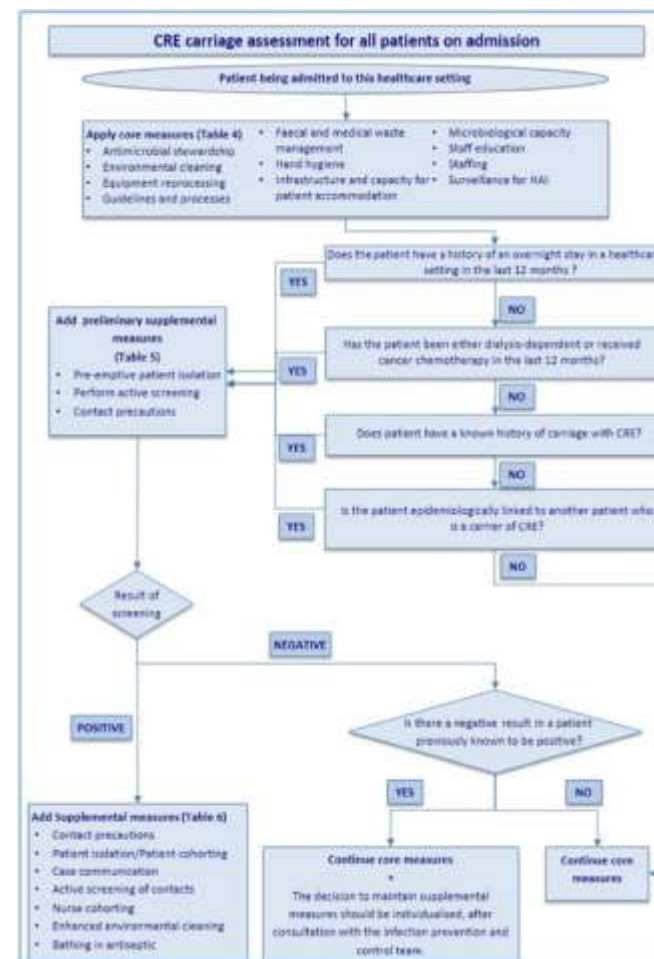
# Carbapenemase-producing *Enterobacteriaceae*: long-term control of hospital outbreaks in Paris, France, 2004-2012



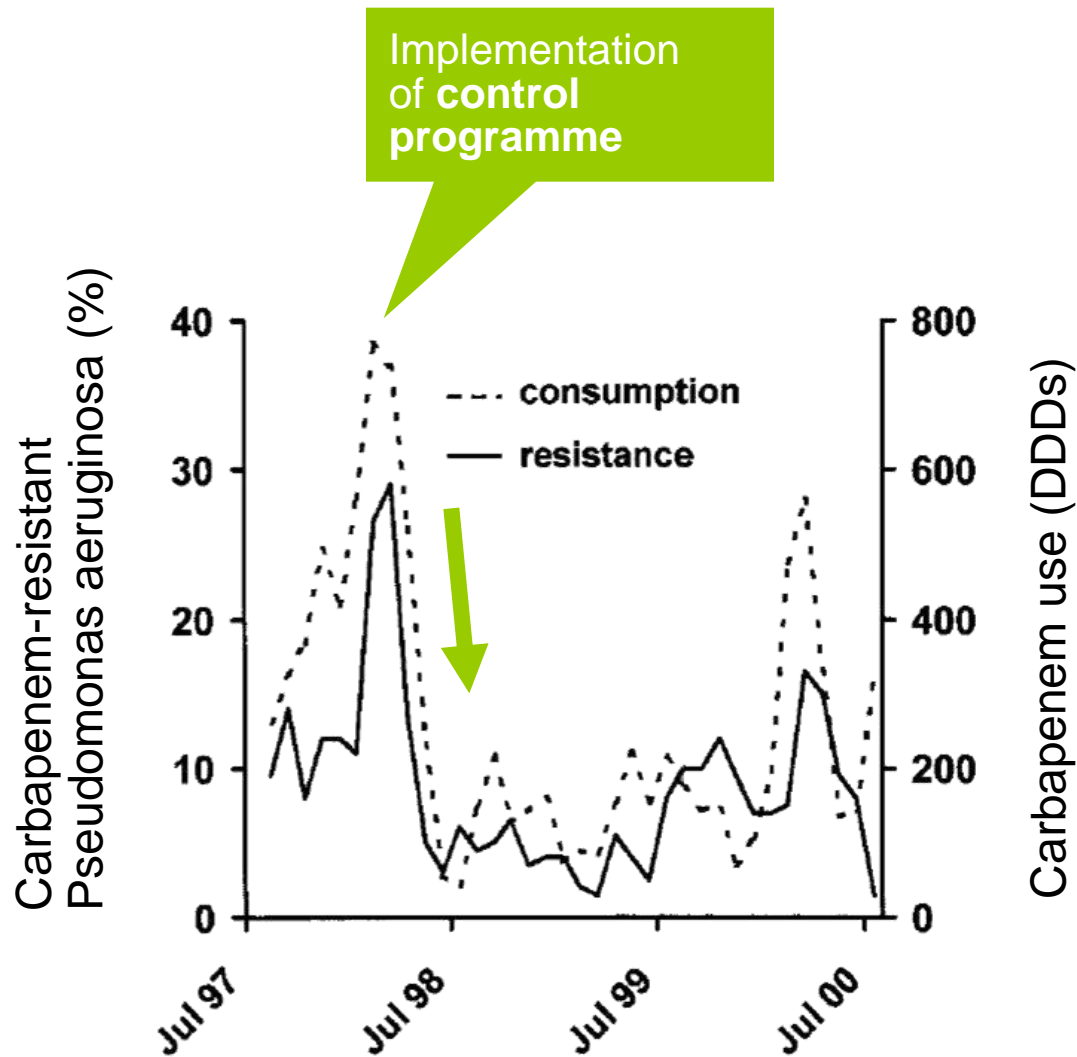
A CPE event was defined as one index case (respectively defined as infected or colonised with CPE), followed or not by secondary case(s).

# Infection prevention and control measures and tools to prevent entry of carbapenem-resistant *Enterobacteriaceae* (CRE) into healthcare settings: ECDC guidance

- **Core measures**
- Profile for **"at risk" patients** who require supplemental measures
- **Preliminary supplemental measures** (at admission, for "at risk" patients)
- **Supplemental measures** (for confirmed CRE-positive patients)

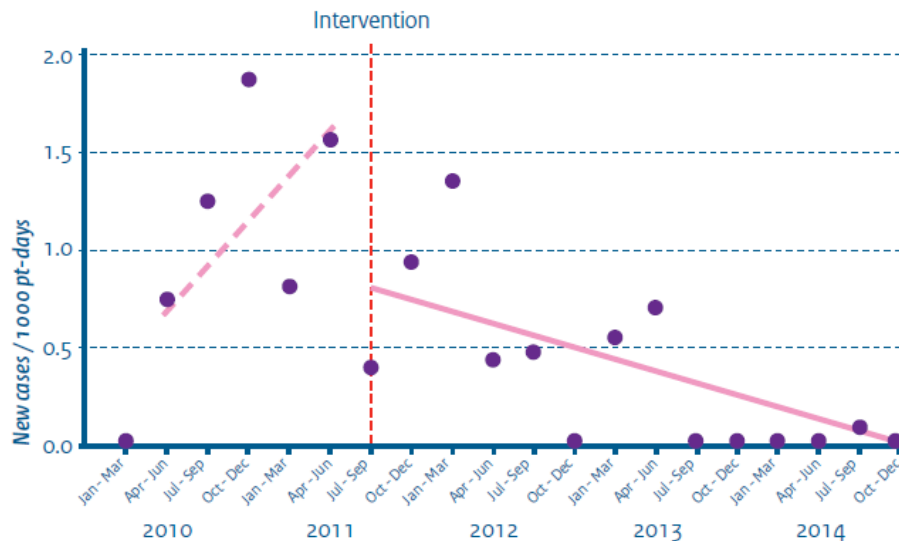


# Antimicrobial consumption drives antimicrobial resistance in hospitals

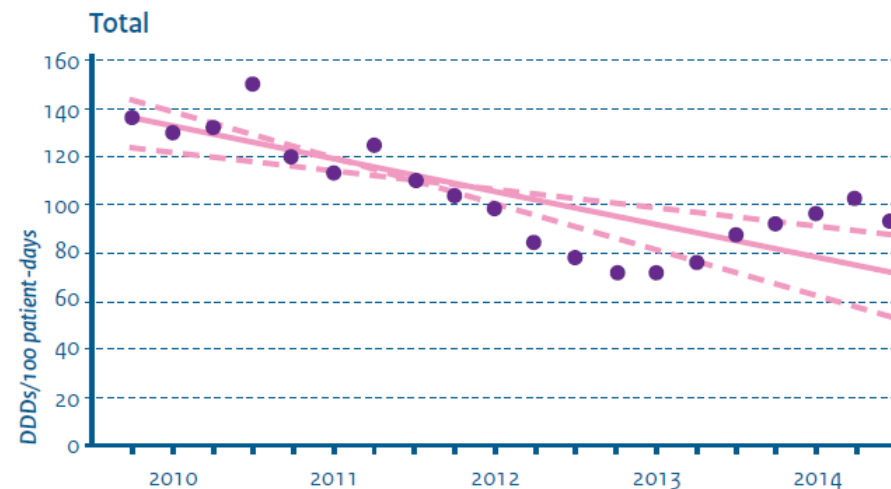




# Intervention to control carbapenem-resistant *Klebsiella pneumoniae*, onco-haematology unit, Greece, 2011-2014



Incidence Rate of CP-Kp BSIs Before and After Intervention



Total Antibiotic consumption

# Example of national initiative on surgical prophylaxis, Belgium, 1997

- Royal Decree: reimbursement of prophylactic antibiotics by surgical procedure, 1997
- Prophylaxis given when indicated:  
from 92.3% (1992-1996)  
to 95.3% (1998-1999)
- Prolonged administration:  
from 19.8% to 9.9%
- Use of more than one antibiotic per procedure:  
from 16.3% to 5.5%





# EUROPEAN ANTIBIOTIC AWARENESS DAY

A EUROPEAN HEALTH INITIATIVE

English (en) ▾



Plan a campaign

For healthcare workers

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## Communicating to professionals in hospitals and long-term care facilities

Up to half of all antibiotic use in hospitals is unnecessary or inappropriate. Antibiotic misuse in hospitals is a major driver of antibiotic resistance. What can be done?

[View materials](#) ▶

New communication toolkit

Patient stories

Data and reports



## #KeepAntibioticsWorking: join us on social media!

As a healthcare professional, **what can you do to keep antibiotics working?** What can a patient association do to contribute? What can policymakers do at European level? What can a parent do? Everyone can join the campaign on European Antibiotic Awareness Day—posting his/her own **message, picture** or **video** using the **#KeepAntibioticsWorking** hashtag. Tell the world what you do, in your professional or personal life, at individual or collective level, to use antibiotics responsibly and **#KeepAntibioticsWorking!**

[Read about the #KeepAntibioticsWorking campaign](#)

<https://antibiotic.ecdc.europa.eu>





< For healthcare workers

Materials for primary care prescribers

Materials for professionals in hospitals and other healthcare settings

## Materials for professionals in hospitals and other healthcare settings



Materials for professionals in hospitals and other healthcare settings, such as long-term care facilities, who have different roles and influence in the use of antibiotics in such settings.

All

Prescribers

Nurses

Long-term care

Intensive care unit

Other professionals



**General key messages for healthcare professionals in hospitals and other healthcare settings** >



Data

**Factsheet for professionals in hospitals and other healthcare settings** >

factsheet, information material, toolkit material



Data

**Infographics about antibiotic stewardship programmes** >

infographic, information material, toolkit material

# New EAAD toolkit (1)



- **Objective**
  - to support efforts to increase prudent use of antibiotics in hospitals and other healthcare settings through dissemination of evidence-based educational and information materials.
- Review of the scientific literature by ECDC experts ("**evidence-based**", 111 references) and extensive consultation and editing process.
- Some of the messages are indicated to be "**expert consensus**": agreement reached by ECDC experts, EAAD Technical Advisory Committee members, and other external experts and stakeholders.

# New EAAD toolkit (2)

- **Key messages**
- Primary target audience: **professionals in hospitals and other healthcare settings**, who have different roles and influence in the use of antibiotics in such settings:
  - Managers/administrators,
  - Infectious disease specialists,
  - Infection prevention and control professionals,
  - Epidemiologists,
  - Prescribers,
  - Junior doctors and students,
  - Pharmacists,
  - Nurses,
  - Clinical microbiologists,
  - Professionals in emergency departments,
  - Professionals in intensive care units,
  - Professionals in long-term care facilities



← [Key messages for professionals in hospitals and other healthcare settings](#)

[All prescribers](#)

[Healthcare professionals in hospitals and other healthcare settings](#)

[Hospital infectious disease specialists](#)

**[Hospital managers / administrators](#)**

[Infection prevention and control professionals and hospital epidemiologists](#)

[Key messages for hospital](#)

## Key messages for hospital managers / administrators



### Tasks

1. Your tasks related to improving antibiotic use include [31,42,56,71,75]:

- a) Establishing a multidisciplinary team for your hospital antibiotic stewardship programme. This team should include infectious disease specialists, clinical microbiologists and pharmacists, and should receive dedicated funding and resources;
- b) Supporting implementation of antibiotic guidelines and infection prevention and control measures;
- c) Implementing targeted educational activities and training that:
  - i. optimise the diagnostic and therapeutic management of patients;

### Things you should know

### Things you can do in your hospital or institution



# New EAAD materials









- Aim at creating a **sense of individual responsibility** in tackling antibiotic resistance and at **empowering professionals to take action**.
- Include one slogan, linking all materials: **“Antibiotics: handle with care”**.
- Available in Adobe InDesign, Microsoft Word and Microsoft PowerPoint, which makes it easy to adapt them by anyone with experience in any of these three software packages.
- Need to be adapted to national contexts to better respond to specific communication needs.

# Antibiotics: handle with care!

Hospital  
prescribers

Up to half of all antibiotic use  
in hospitals is unnecessary or  
inappropriate

As a hospital prescriber, you have a responsibility to use antibiotics prudently and to ensure that they remain effective. In your role, you must:

-  Follow infection prevention and control guidance;
-  Initiate antibiotic treatment as soon as possible in patients with severe infection;
-  Ensure that relevant cultures are taken timely;
-  Re-evaluate treatment after 48–72 hours, or when results from microbiological samples are available;
-  Prescribe according to evidence-based hospital antibiotic guidelines for common infections and for surgical prophylaxis;
-  Inform your patients of any antibiotics prescribed, and their potential adverse effects.

**EUROPEAN ANTIBIOTIC AWARENESS DAY**

Insert logo of national institution

Insert logo of national institution

If you want to know more about the antibiotic stewardship programme in your hospital, contact [email address] or call [phone number]. See more information at [hospital website].

All the statements in this poster are supported by scientific evidence. Visit <https://antibiotic.ecdc.europa.eu> or scan the QR code.









# Antibiotics: handle with care!

Nurses

Antibiotic resistance keeps increasing  
in Europe, threatening patient safety  
in all healthcare settings

As a nurse, you have a responsibility to use antibiotic prudently and to ensure that they remain effective. In your role, you must:

-  Follow infection prevention and control guidance
-  Administer antibiotics to patients according to the prescription
-  Coordinate the taking and sending of microbiological specimen and their reporting back to physicians
-  Report adverse effects of antibiotic therapy to physicians and to appropriate review committees
-  Manage antibiotic stocks on your ward, and ensuring the traces of antibiotic use
-  Provide information on treatments to patients and families

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**Posters**

# Antibiotics: handle with care!

Our hospital

In this hospital we are committed  
to use antibiotics prudently and to  
ensure that they remain effective

-  We follow infection prevention and control guidance;
-  We initiate antibiotic treatment as soon as possible in patients with severe infection;
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**Antibiotics: handle with care!**

**Dear Patient,**

Antibiotics are medicines that kill or stop the growth of bacteria, fungi or parasites. They are used to treat infections. Antibiotics are not effective against viruses, such as the common cold or flu. It is important to take antibiotics exactly as prescribed, for the full course of treatment. Do not stop taking them when you feel better, as this can lead to antibiotic resistance. Antibiotic resistance is a global public health threat that can affect everyone, you, me, our family members, and our community. We all have a responsibility to keep antibiotics working.

**Remember!**

- Antibiotic resistance is a global public health threat that can affect everyone, you, me, our family members.
- Without antibiotics, we will not be able to treat simple infections.
- You have a responsibility to keep antibiotics working!

**European Antibiotic Awareness Day** is marked each year on or around 18 November.

**Website:** [antibiotic.ecdc.europa.eu](http://antibiotic.ecdc.europa.eu)  
**Email:** [antibiotic.ecdc@ec.europa.eu](mailto:antibiotic.ecdc@ec.europa.eu)  
**Follow us on Twitter:** @EASAD\_EU  
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**Antibiotics: handle with care!**

**Remember!**

**European Antibiotic Awareness Day**

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**QR code:**

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**Image:**

**Text:** Nurses

**Letters**

**Antibiotics: handle with care!**

**Antibiotic resistance: You are responsible to ensure that antibiotics remain effective**

**Image:**

**QR code:**

**Text:** This checklist is supported by scientific evidences. Visit <http://antibiotic.ecdc.europa.eu> or scan the QR code.

**A checklist of reminders:**

- Is there a high probability of a bacterial infection, rather than colonization or a viral infection?
- Does the patient have an infection that will respond to antibiotics?
- Have you checked the patient's recent antibiotic use, drug allergies, hospitalisation or institutionalisation, use of immunosuppressive therapy and microbiology results for the previous 3 months?
- Is the patient on the right antibiotics, dosage, and route of administration?
- Can an antibiotic with a narrower spectrum be used to treat the infection?
- Have you prescribed the shortest possible duration of treatment?
- Have the appropriate cultures been taken?
- Do the culture results necessitate starting antibiotic therapy or modifying ongoing the current antibiotic therapy?
- Have you documented the indication of antibiotic treatment, drug choice, dosage, route of administration and duration of treatment in the patient chart?
- Does the choice of antibiotic therapy comply with your hospital's guidelines?
- Does the choice of antibiotic therapy comply with your hospital's antibiotic resistance patterns?

**Text:** If you have doubts, contact [antibiotic stewardship programme, microbiologist, infectious disease specialist] in our hospital. Contact [email address] or call [phone number]. See more information at [hospital website/CAAD website].

**Antibiotics: handle with care!**

**Actions that you can take to tackle antibiotic resistance:**

- Do a watch, you have a responsibility to ensure that antibiotics remain effective. In your role, you can:**
  - Improve antibiotic administration practices in collaboration with doctors and pharmacists.
  - Follow infection prevention and control measures that are established in your setting.
  - Ensure that patients read their medication and/or understand the reasons for antibiotic therapy, and take precautions to avoid antibiotic use, including to:
    - Take antibiotics exactly as prescribed.
    - Never save antibiotics for later use.
    - Never use leftover antibiotics from previous treatments, and
    - Never share leftover antibiotics with other people.
  - Ensure that culture and susceptibility tests are used to the knowledge laboratory, before starting antibiotics.
  - Ensure that laboratory results are promptly communicated to the treating physician.
- Encourage prescribers to document their reasoning for use for all patients on antibiotics after 48-72 hours.**
- Inform the prescriber or pharmacist if you see a patient has an antibiotic prescription which has continued beyond seven days without specified duration.**
- Participate regularly in training courses and meetings on prudent antibiotic use, specimen collection, and infection prevention and control.**

**Image:**

**Leaflets**

**Checklists**

<https://antibiotic.ecdc.europa.eu>

- **Burden of antimicrobial resistance (AMR) for the EU/EEA (Q2 2018)**
- **Annual update on AMR and antimicrobial consumption in humans in the EU/EEA (November 2018)**
- **ECDC point prevalence surveys of HAIs, AMR and antimicrobial use in European acute care hospitals and in long-term care facilities, 2016-2017 (ECDC publications, November 2018)**
- Contribution to the implementation of the **European One Health Action Plan against Antimicrobial Resistance (AMR)**



Thank you!

# EUROPEAN ANTIBIOTIC AWARENESS DAY



A EUROPEAN  
HEALTH INITIATIVE

18 November 2017

EU event, Brussels, 15 November 2017

E-mail: [EAAD@ecdc.europa.eu](mailto:EAAD@ecdc.europa.eu)  
Website: <https://antibiotic.ecdc.europa.eu>  
Facebook: EAAD.EU  
Twitter: @EAAD\_EU (#EAAD)  
Global Twitter: #AntibioticResistance



**WORLD ANTIBIOTIC AWARENESS WEEK**

13-19 NOVEMBER 2017

**ANTIBIOTICS  
HANDLE WITH CARE**

