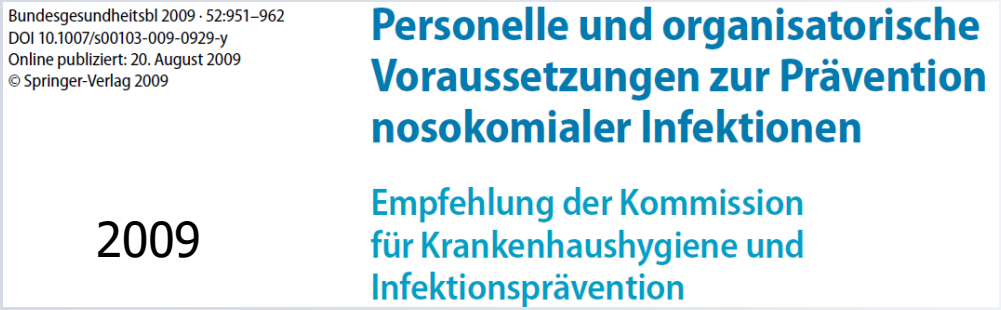
2.4 Hygiene Personnel – Infection Preventionists

- Are there binding requirements for the deployment of hygiene personnel, e.g.
  - physicians responsible for hygiene management
  - hygiene specialists or nurses
  - hospital hygienists or consultants for hygiene and environmental medicine, public health, microbiology

  Yes, KRINKO
- What are the tasks of the hygienic personnel?
  - Detailed description given by KRINKO – and obeyed by the institutions
- Do cleaning and housekeeping personnel receive further education and training in matters of hospital hygiene and infection prevention?
  - KRINKO 2004

2.4 Hygiene Personnel – Infection Preventionists

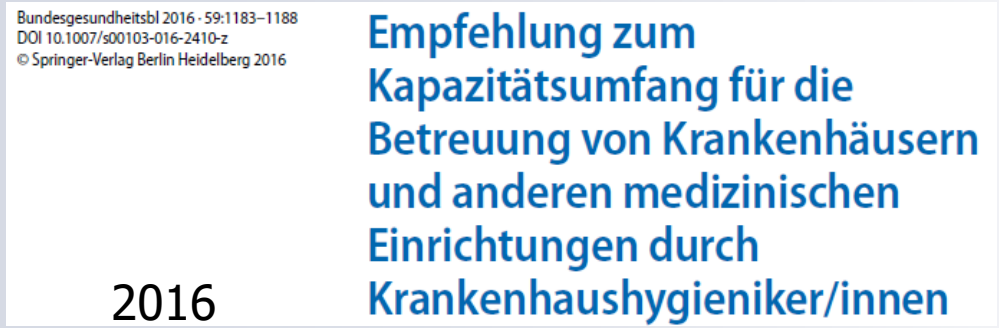

Bundesgesundheitsbl 2009 · 52:951–962
DOI 10.1007/s00103-009-0929-y
Online publiziert: 20. August 2009

Personelle und organisatorische Voraussetzungen zur Prävention nosokomialer Infektionen

Empfehlung der Kommission für Krankenhaushygiene und Infektionsprävention

2009

Personal and organisatory prerequisites to prevent nosocomial infection


Bundesgesundheitsbl 2016 · 59:1183–1188
DOI 10.1007/s00103-016-2410-z

Empfehlung zum Kapazitätsumfang für die Betreuung von Krankenhäusern und anderen medizinischen Einrichtungen durch Krankenhaushygieniker/innen

2016

Guideline on the support of hospitals and other medical institution by hospital hygienists

Bundesgesundheitsbl 2009 · 52:951–962
DOI 10.1007/s00103-009-0929-y
Online publiziert: 20. August 2009

Personelle und organisatorische Voraussetzungen zur Prävention nosokomialer Infektionen

Empfehlung der Kommission für Krankenhaushygiene und Infektionsprävention

Bundesgesundheitsbl 2016 · 59:1183–1188
DOI 10.1007/s00103-016-2410-z

Empfehlung zum Kapazitätsumfang für die Betreuung von Krankenhäusern und anderen medizinischen Einrichtungen durch Krankenhaushygieniker/innen

- **Hospital hygienists** (full-time equivalent)
  - 1/1000 beds risk level A; 1/2000 beds B, 1/5000 beds C
  - +0,01/department with special hygiene risks
  - + addition for complexity: 0,05/100 beds in hospitals >400 beds; 0,1/100 beds in hospitals >800 beds
- **Authorized hygiene practitioners**
  - One per department with special hygiene risks
- **Infection control nurses**
  - 1/100 beds risk level A; 1/200 beds B, 1/500 beds C
  - 1/50.000 ambulatory patients
- **Authorized hygiene care nurses**
  - At least one/ward

KRINKO 2009, 2016

2.6 Surveillance

- Is surveillance of nosocomial infections or nosocomial infectious agents carried out?
- Is this surveillance binding and/or regulated by law?
  - Yes; hospitals, rehabilitation clinics and institutions monitor nosocomial infections, MDRO and Antibiotic consumption (AVS);
  - Special definitions of NI, MDRO and AVS published by the Robert Koch-Institute and KRINKO
  - Public health departments have the right for inspection of these data
- Are nosocomial infections or pathogens, e.g. carbapenem-resistant pathogens, recorded?
- Are the results per hospital and/or per country consolidated annually?

2.6 Surveillance
Infection prevention act

§ 23 (4) Infection prevention act: Hospitals are obliged

- to monitor in special lists
  - defined nosocomial infections (NI)
  - pathogens with special antibiotic resistance (MDRO)
  - Antibiotic consumption (AVS)
- and to assess the data
- to draw conclusions regarding preventive measures
- to inform the personnel on conclusions and measures
- and to implement the measures.

2.6 Surveillance


Bekanntmachungen – amtliche Mitteilungen

Bundesgesundheitsbl 2020 · 63:228–241
https://doi.org/10.1007/s00103-019-03077-8

Surveillance von nosokomialen Infektionen

Empfehlung der Kommission für Krankenhaushygiene und Infektionsprävention (KRINKO) beim Robert Koch-Institut

- In Surgery Units and Intensive Care Units:
  - Surgical site infection (appropriate indicator-operation)
  - catheter-associated septicemia
  - ventilation-associated pneumonia
  - catheter-associated urinary tract infection

  } Device associated infections

- In the hospital (all wards)
  - Nosocomial diarrhoea C-difficile (CDAD)

2.6 Surveillance NRZ: KISS

Bekanntmachungen – amtliche Mitteilungen

Bundesgesundheitsbl 2020 · 63:228–241
https://doi.org/10.1007/s00103-019-03077-8

Surveillance von nosokomialen Infektionen

Empfehlung der Kommission für Krankenhaushygiene und Infektionsprävention (KRINKO) beim Robert Koch-Institut

- Infection surveillance
  - Stationary patients / ambulatory patients
  - Ward-based: ICU KISS, Ward-KISS
  - Patient-based: Neo-KISS, OP-KISS, Onco-KISS
- Pathogen surveillance
  - Ward-based: ICU KISS (MRSA, MRGN, VRE), SARI
  - Hospital based: CDAD-KISS, MRSA-KISS
- Consumption surveillance
  - Stationary patients / ambulatory patients
  - Ward-based /division-based
  - Hand-KISS (consumption of hand disinfection), SARI

2.6. Surveillance

Bekanntmachungen - Amtliche Mitteilungen

Bundesgesundheitsbl 2013 · 56:580–583
DOI 10.1007/s00103-013-1705-6

Bekanntmachung des Robert Koch-Institutes

Surveillance nosokomialer Infektionen sowie die Erfassung von Krankheitserregern mit speziellen Resistenzen und Multiresistenzen

Pathogens with special resistance (I)

S. aureus	**Oxacillin (Cefoxitin), Vancomycin, Linezolid, Daptomycin, Tigecyklin, Teicoplanin als Einzelresistenzen** Bei Vorliegen einer der aufgeführten Einzelresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden
Enterococcus faecalis, E. faecium	Ampicillin (*E. faecalis*), **Vancomycin, Teicoplanin, Linezolid, Tigecyklin als Einzelresistenzen** Bei Vorliegen einer der aufgeführten Einzelresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden [insbesondere auch Gentamicin (Hochresistenz), Streptomycin (Hochresistenz)]
Streptococcus pneumoniae	**Vancomycin, Penicillin (Oxacillin 1 µg), Cefotaxim, Linezolid, Daptomycin, Levofloxacin, Moxifloxacin als Einzelresistenzen** Bei Vorliegen einer der aufgeführten Einzelresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden
Enterobacteriaceae	
Escherichia coli *Klebsiella pneumoniae, Klebsiella oxytoca* *Proteus spp.*	**Ertapenem** oder **Imipenem** oder **Meropenem, Cefotaxim** oder **Ceftazidim als Einzelresistenzen** sowie **Mehrfachresistenz** entsprechend der **KRINKO-Definition (s. Bundesgesundheitsblatt; 10/2012;55:1311–1354)** Piperacillin + (Cefotaxim oder Ceftazidim) + Ciprofloxacin (**3MRGN**) ggf. + Imipenem oder Meropenem (**4MRGN**) Bei Vorliegen der aufgeführten Einzel- oder Mehrfachresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden
Enterobacter cloacae *Citrobacter spp.* *Serratia marcescens* *Klebsiella spp.*[a] *Morganella morganii*	**Imipenem oder Meropenem als Einzelresistenzen** sowie **Mehrfachresistenz** entsprechend der KRINKO-Definition Piperacillin + (Cefotaxim oder Ceftazidim) + Ciprofloxacin (**3MRGN**) ggf. + Imipenem oder Meropenem (**4MRGN**) Bei Vorliegen der aufgeführten Einzel- oder Mehrfachresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden

2.6. Surveillance

Bekanntmachungen - Amtliche Mitteilungen

Bundesgesundheitsbl 2013 · 56:580–583
DOI 10.1007/s00103-013-1705-6

Bekanntmachung des Robert Koch-Institutes

Surveillance nosokomialer Infektionen sowie die Erfassung von Krankheitserregern mit speziellen Resistenzen und Multiresistenzen

Pathogens with special resistance (II)

Pseudomonas aeruginosa	
Pseudomonas aeruginosa	**Imipenem und Meropenem**; sowie **Mehrfachresistenz** entsprechend der KRINKO-Definition Piperacillin + (Cefotaxim und Ceftazidim und Cefepim) + Imipenem und Meropenem (3MRGN) bzw. Piperacillin + Ciprofloxacin + Imipenem und Meropenem (3MRGN) bzw. Piperacillin + (Cefotaxim und Ceftazidim und Cefepim) + Ciprofloxacin (3MRGN) bzw. (Cefotaxim und Ceftazidim und Cefepim) + Ciprofloxacin + Imipenem und Meropenem (3MRGN) bzw. Piperacillin + (Cefotaxim und Ceftazidim und Cefepim) + Imipenem und Meropenem + Ciprofloxacin (4MRGN) Bei Vorliegen der aufgeführten Einzel- oder Mehrfachresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden
Acinetobacter baumannii complex	
Acinetobacter baumannii complex	**Imipenem oder Meropenem als Einzelresistenzen** sowie **Mehrfachresistenz** entsprechend der KRINKO-Definition Piperacillin + (Cefotaxim oder Ceftazidim oder Cefepim) + Ciprofloxacin (3MRGN) ggf. + Imipenem oder Meropenem (4MRGN) Bei Vorliegen der aufgeführten Einzel- oder Mehrfachresistenzen soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden
Stenotrophomonas maltophilia	**Cotrimoxazol als Einzelresistenz** Bei Vorliegen der aufgeführten Einzelresistenz soll weiterhin das gesamte vorliegende Antibiogramm zum Zwecke der besseren Bewertung dokumentiert werden
Candida spp.[b]	**Fluconazol**

Bundesgesundheitsbl 2013 · 56:903–912
DOI 10.1007/s00103-013-1764-8
Online publiziert: 22. Juni 2013

B. Schweickert[1] · W.V. Kern[2] · K. de With[2] · E. Meyer[3] · R. Berner[4] · M. Kresken[5] · M. Fellhauer[6] · M. Abele-Horn[7] · T. Eckmanns[1]

[1] Fachgebiet Nosokomiale Infektionen, Surveillance von Antibiotikaresistenzen und -verbrauch, Robert Koch-Institut, Berlin
[2] Deutsche Gesellschaft für Infektiologie (DGI), Berlin
[3] Nationales Referenzzentrum für Surveillance von nosokomialen Infektionen, Berlin
[4] Deutsche Gesellschaft für Pädiatrische Infektiologie (DGPI), Bremen
[5] Paul Ehrlich Gesellschaft für Chemotherapie (PEG), Rheinbach
[6] Bundesverband Deutscher Krankenhausapotheker (ADKA), Berlin
[7] Deutsche Gesellschaft für Hygiene und Mikrobiologie (DGHM), Hannover

Antibiotika-Verbrauchs-Surveillance

Ausführungen und Erläuterungen zur Bekanntmachung „Festlegung der Daten zu Art und Umfang des Antibiotika-Verbrauchs in Krankenhäusern nach § 23 Abs. 4 Satz 2 IfSG“

Bundesgesundheitsbl 2013 · 56:996–1002
DOI 10.1007/s00103-013-1780-8

Bekanntmachung des Robert Koch-Instituts

Festlegung der Daten zu Art und Umfang des Antibiotika-Verbrauchs in Krankenhäusern nach § 23 Abs. 4 Satz 2 IfSG

Vom RKI gemäß § 4 Abs. 2 Nr. 2b zu erstellende Liste über die Daten zu Art und Umfang des Antibiotika-Verbrauchs[1]

Surveillance of antibiotic consumption

DDD / 100 patient days or cases

GERMAP 2015

Antimicrobial Resistance and Consumption

Report on the consumption of antimicrobials and the spread of antimicrobial resistance in human and veterinary medicine in Germany

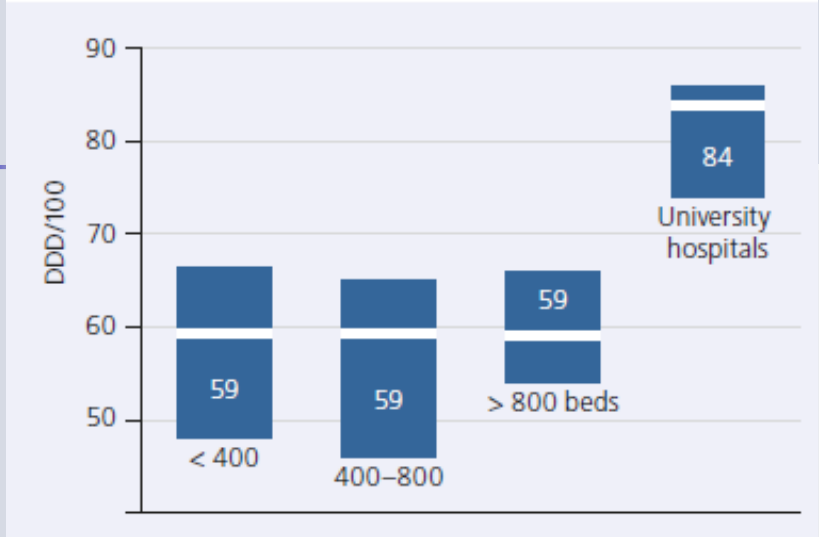


Fig. 2.2.2: Total antimicrobial use density in dependence on the hospital size (number of beds) (medians and interquartile ranges) in 2013/2014 (Source: ADKA-if-DGI Surveillance)

Hospital setting

Ambulatory setting

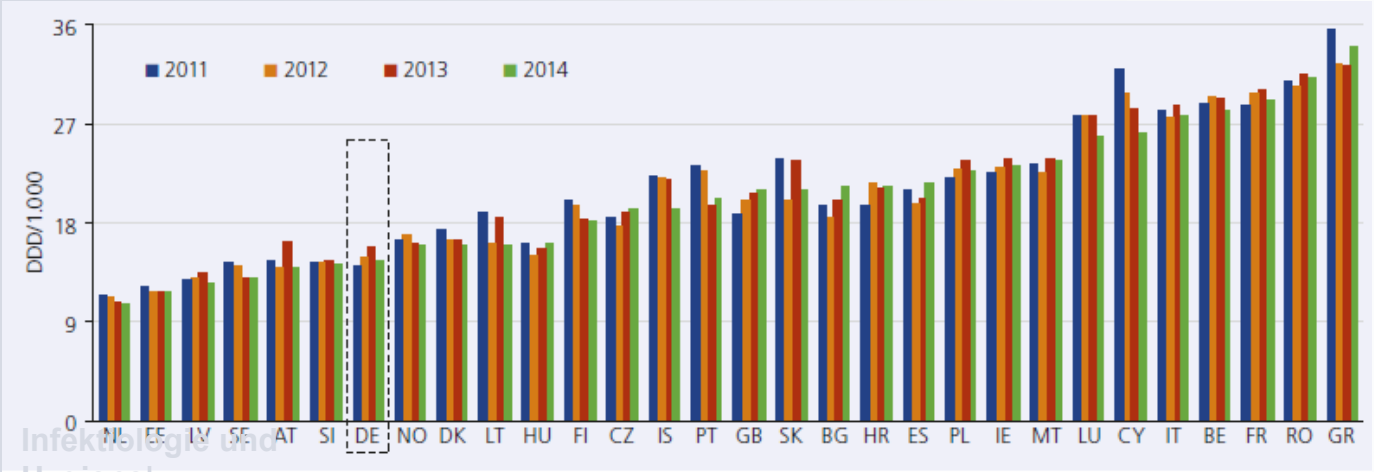


Fig. 2.1.4: Use density of systemic antimicrobials used in outpatient care in Germany (DE, edged) compared to other European countries at population level, expressed as DDD per 1,000 inhabitants and day (Source: ESAC-Net, 2011-2014 data)

2.6 Surveillance

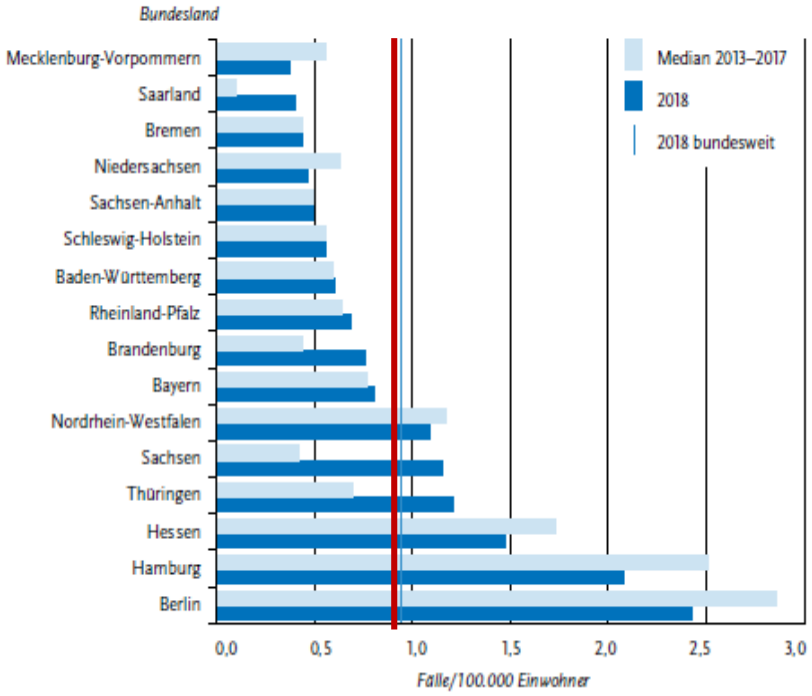
- Are nosocomial infections or pathogens, e.g. carbapenem-resistant pathogens, recorded?
  - Surveillance : Yes, via § 23 (4)
  - Mandatory reporting
    - MRSA, blood and liquor since 2009
    - CRO, (all materials) since 2011 in Hesse, since 2016 in Germany in total
- Are the results per hospital and/or per country consolidated annually?
  - All data on mandatory reporting is published per country (1000.000 inhabitants)

2.6 Surveillance
Mandatory reporting CRO

- What is the epidemiological situation with regard to e.g. carbapenem and - carbapenemase-producing pathogens?

Acinetobacter, CR

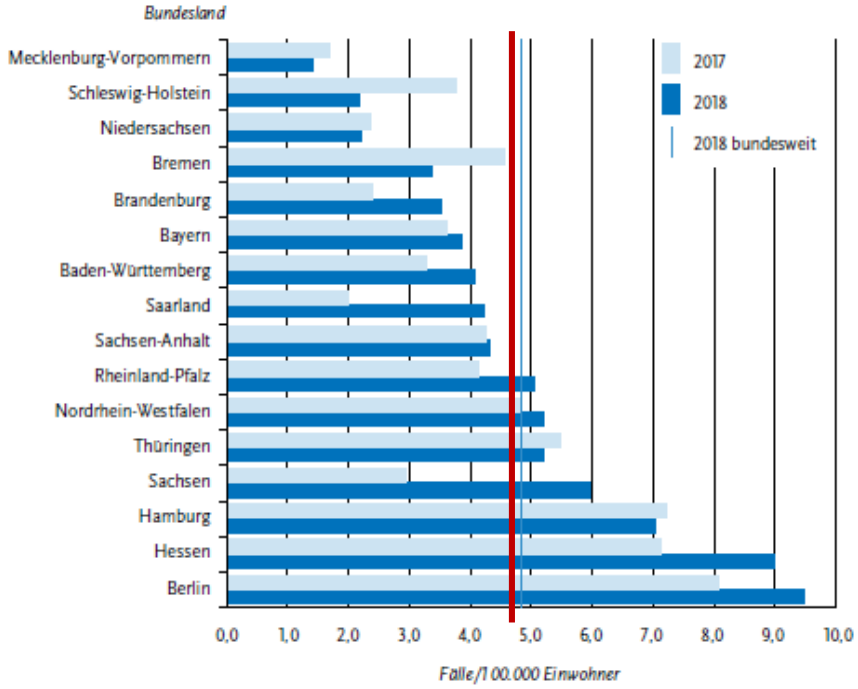
Abb. 6.1.1:
Übermittelte Fälle von *Acinetobacter*-Infektionen oder -Kolonisationen mit Carbapenem-Nichtempfindlichkeit pro 100 Einwohner nach Bundesland, Deutschland, 2018 (n=784) im Vergleich mit dem Vorjahr



Frankfurt: 3,9/100.000 Pop.

Enterobacterales, CR

Abb. 6.15.1:
Übermittelte Fälle von Enterobacteriaceae-Infektionen oder -Kolonisationen mit Carbapenem-Nichtempfindlichkeit pro 100.000 Einwohner nach Bundesland, Deutschland, 2018 (n=3.997)



Frankfurt: 13,7/100.000 Pop.

2.6 Surveillance

- What are the most common nosocomial infections and infectious agents?
  - urinary tract, respiratory tract, surgical site, blood stream infection, C. diff.
- Is it mandatory to report it when patients with antibiotic-resistant pathogens are transferred to another hospital?
  - Yes, and non-obeyance can be punished by a fine
- Are there any recommendations for the preventive isolation and screening of patients from abroad?
  - Yes, KRINKO-Guideline 2012

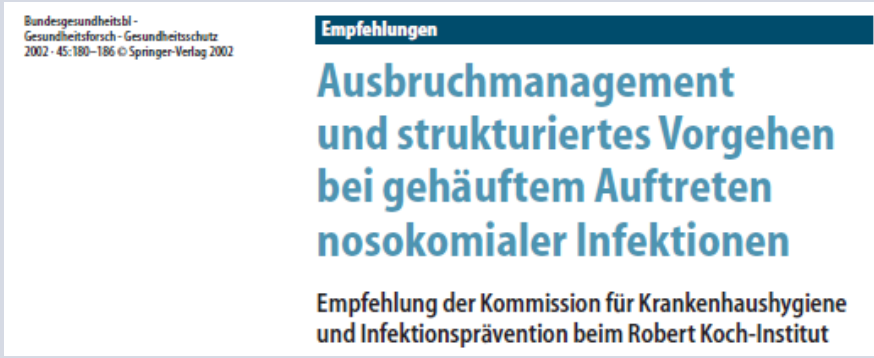
2.10 Outbreak Management

- Are there criteria for the preparation of a systematic outbreak management?
- Are there criteria for outbreak detection?
- Are there fixed rules for outbreak management?

Yes, KRINKO Guideline, 2002

- Is there an obligation to report outbreaks?
  - Yes; Infection prevention act § 6 (3)
- Are there requirements regarding the typing of identified pathogens to compare pathogens from the patient and those from the environment ?
  - National reference centres
- Are there requirements regarding disinfection lists in the event of an epidemic? - RKI-List

2.10 Outbreak Management

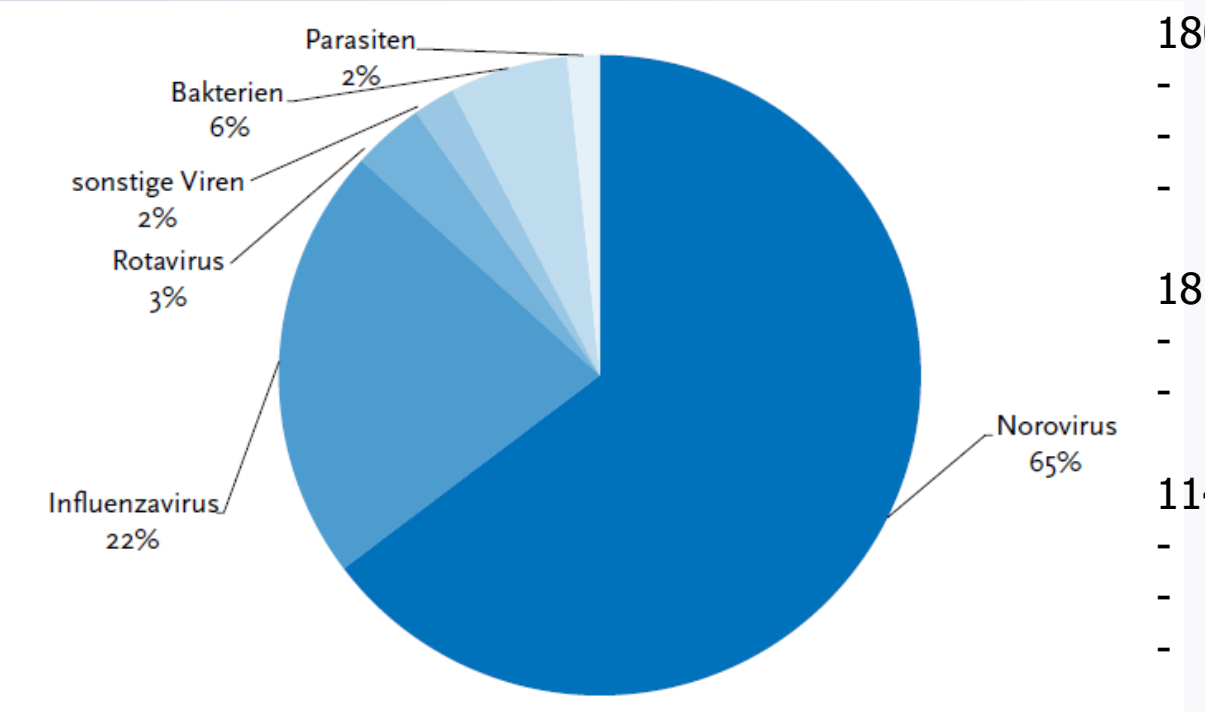


proactive phase
reactive phase

1. Is it an outbreak?
2. Assessment of the situation based on available data
3. Outbreak management team called up; report acc. § 6 (3) IfSG
4. On-site inspection and assessment of the first acute measurements
5. Measurements to prevent transmission (damage control)
6. Looking for the source of the infections
7. Assessment of all gained data; fixing of special measurements with regard to the source
8. End of outbreak management; collaterizing measurements
9. Final evaluation, deficit analysis, and fixing of further preventive strategies
10. Final documentation

2.10 Outbreak Management

Nosocomial outbreaks in Germany, 2018 (Yearbook infectiology, RKI, 2018)



1803 outbreaks
- 92% viral
- 6% bacterial
- 2% parasites

18583 persons
- 15889 viral
- 608 bacterial

114 cases of death
- 59% viral
- 38% bacterial
- 4% parasites or unknown

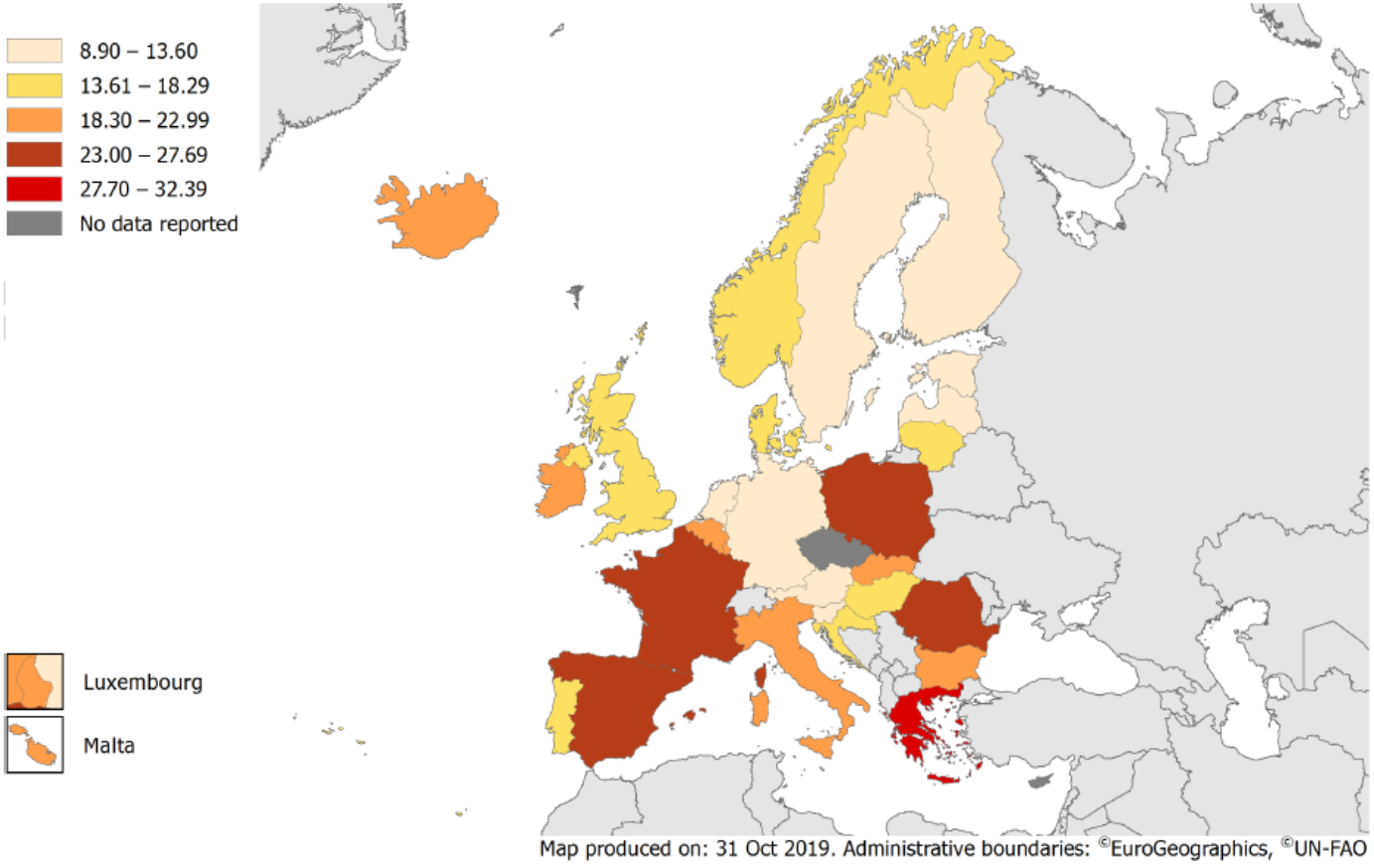
Carbapenemresistant organisms
A baumannii: 10 outbreaks, 28 cases (max 8/outbreak)
Klebsiella spp: 21 outbreaks, 84 cases (max 37/outbreak)

SURVEILLANCE REPORT

Antimicrobial consumption in the EU/EEA

Annual epidemiological report for 2018

Figure 1. Consumption of antibacterials for systemic use (ATC group J01) in the community in EU/EEA countries in 2018 (expressed as DDD per 1 000 inhabitants per day)

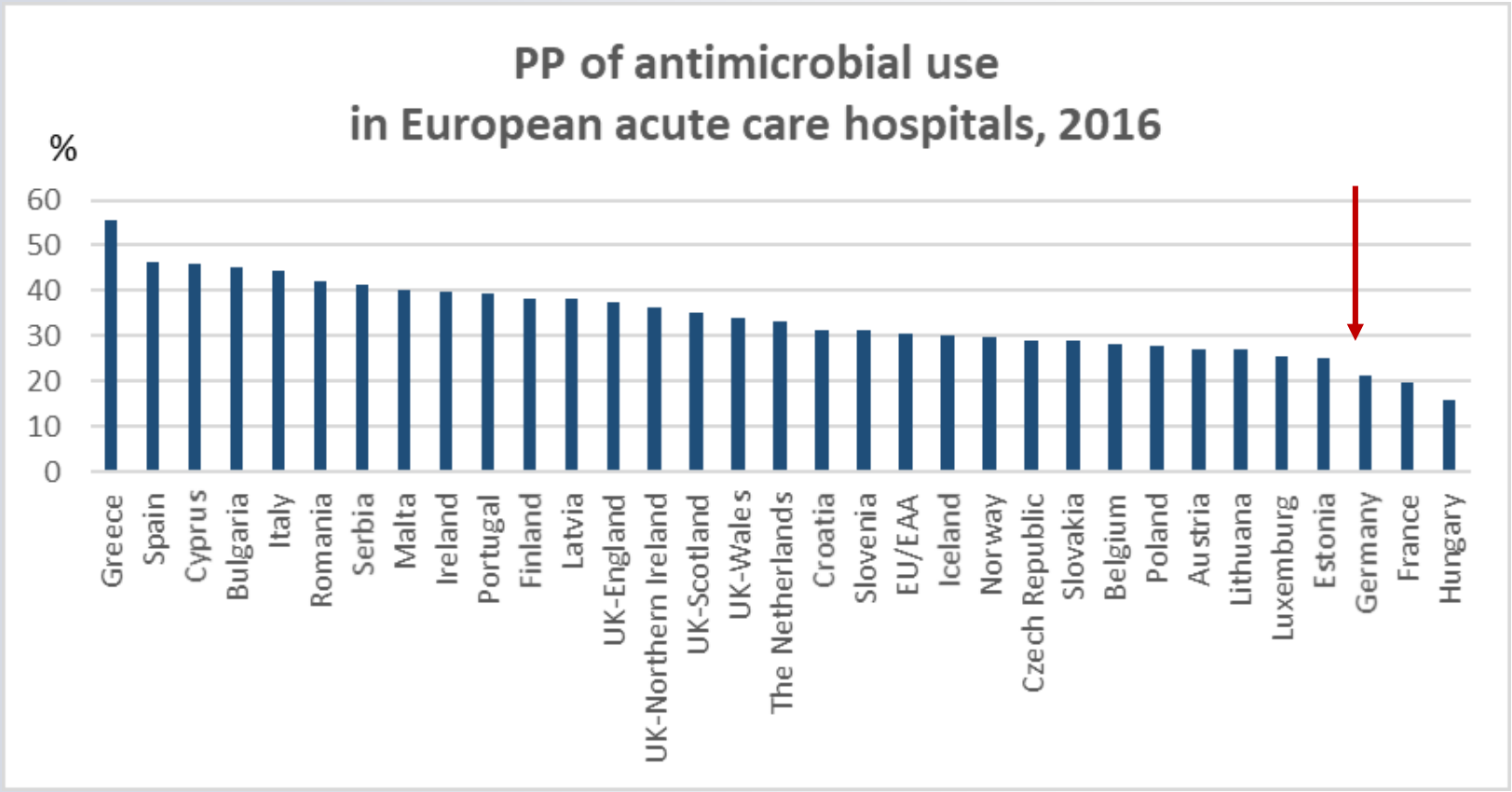


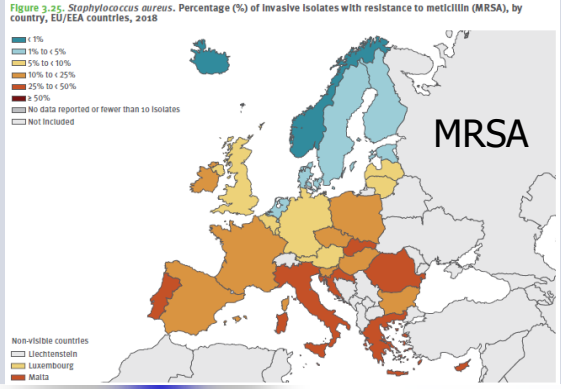
SURVEILLANCE AND OUTBREAK REPORT

Antimicrobial use in European acute care hospitals: results from the second point prevalence survey (PPS) of healthcare-associated infections and antimicrobial use, 2016 to 2017

Diamantis Plachouras[1], Tommi Kärki[1], Sonja Hansen[2], Susan Hopkins[3], Outi Lyytikäinen[4], Maria Luisa Moro[5], Jacqui Reilly[6,7], Peter Zarb[8], Walter Zingg[9], Pete Kinross[1], Klaus Weist[1], Dominique L Monnet[1], Carl Suetens[1], the Point Prevalence Survey Study Group[10]

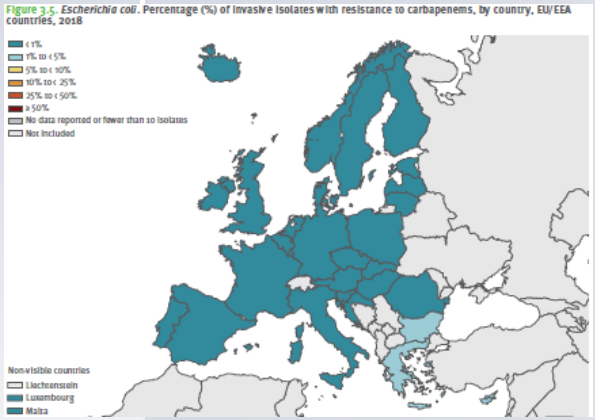
Eurosurveillanmce 15. Nov. 2018

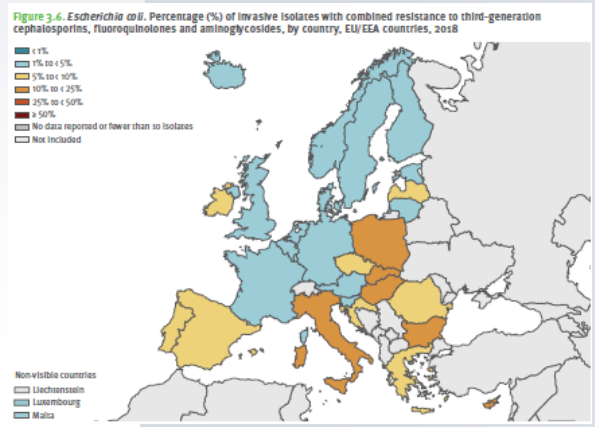




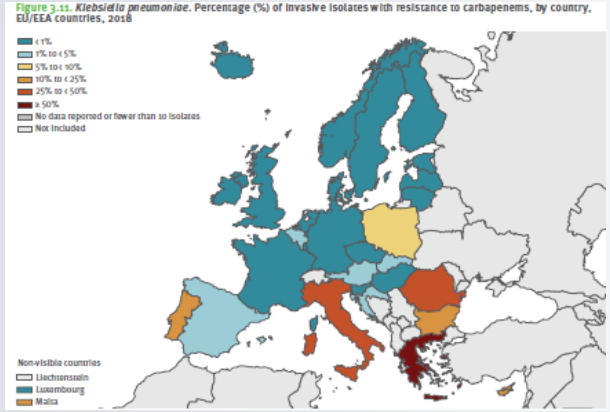
Surveillance of antimicrobial resistance in Europe 2018

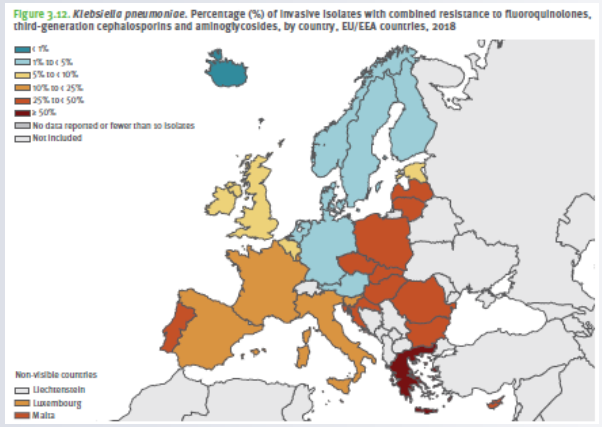
E. coli
Carbapenemes
3.Gen Ceph; Chinolones, Aminoglycosides



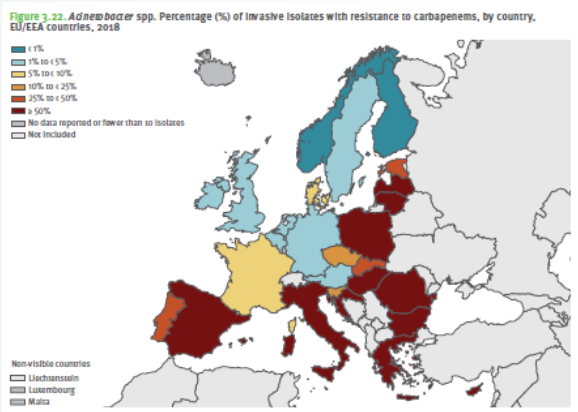


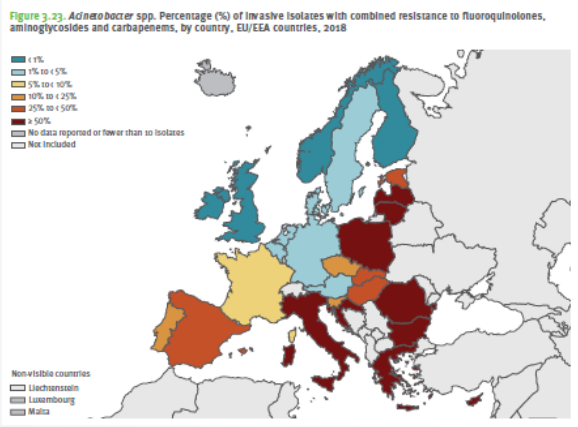
K. pneumoniae
Carbapenems
3.Gen Ceph; Chinolones, Aminoglycosides





A. baumannii
Carbapenems
Chinolones, Aminoglycosides, Carbapenemes



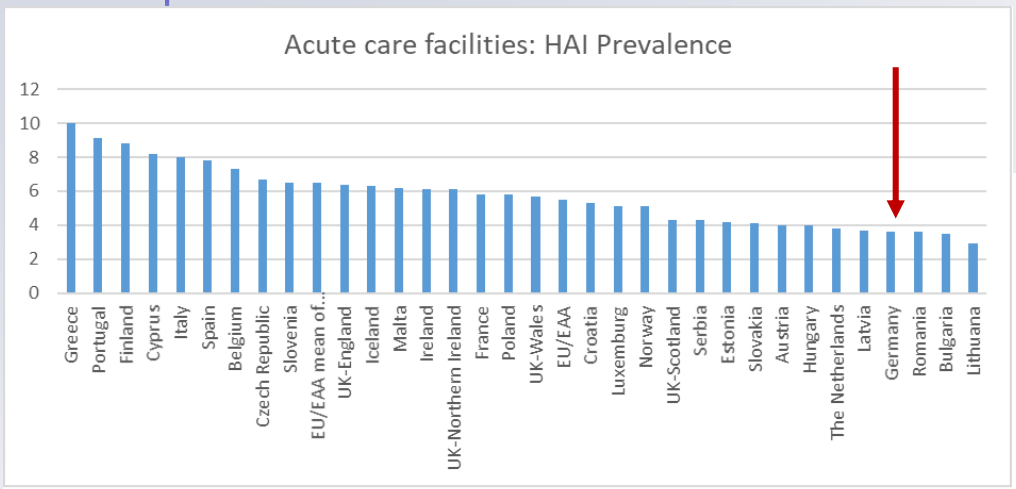


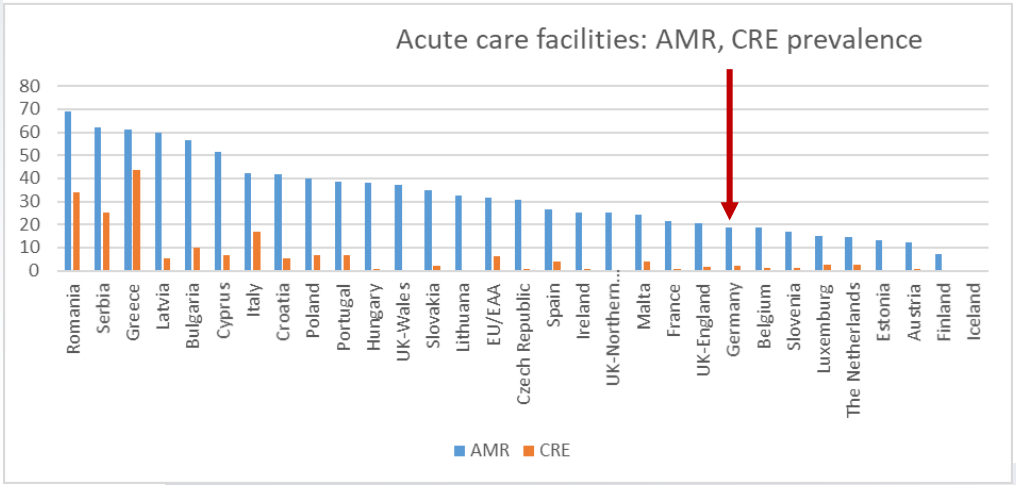
SURVEILLANCE AND OUTBREAK REPORT

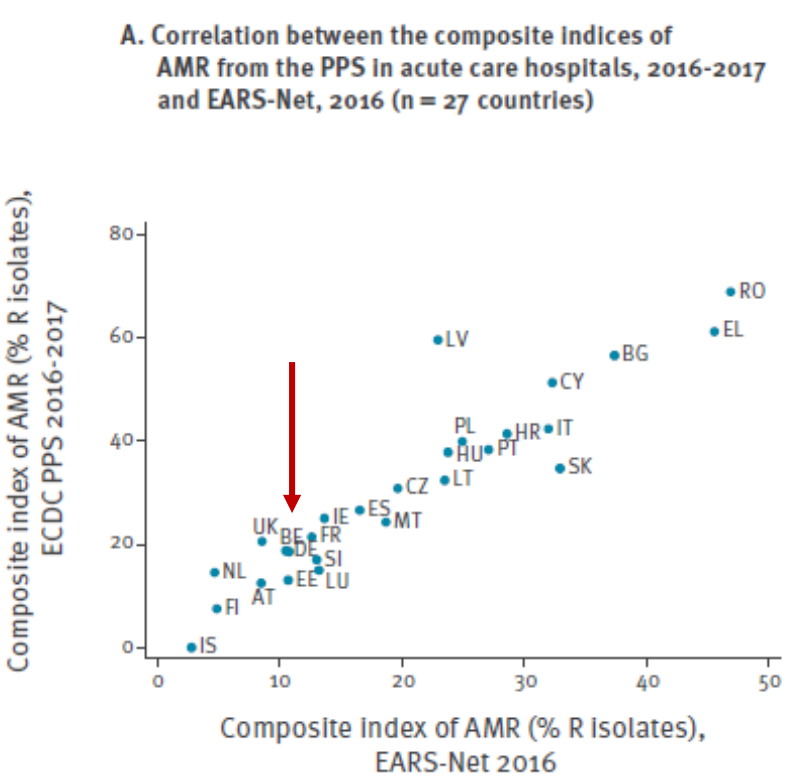
Prevalence of healthcare-associated infections, estimated incidence and composite antimicrobial resistance index in acute care hospitals and long-term care facilities: results from two European point prevalence surveys, 2016 to 2017

Carl Suetens[1], Katrien Latour[2], Tommi Kärki[1], Enrico Ricchizzi[3], Pete Kinross[1], Maria Luisa Moro[3], Béatrice Jans[2], Susan Hopkins[4], Sonja Hansen[5], Outi Lyytikäinen[6], Jacqui Reilly[7,8], Aleksander Deptula[9], Walter Zingg[10], Diamantis Plachouras[1], Dominique L Monnet[1], the Healthcare-Associated Infections Prevalence Study Group[11]

Eurosurveillance, 25 Nov 2018







Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis

Lancet Infect Dis 2019; 19: 56–66

*Alessandro Cassini, Liselotte Diaz Högberg, Diamantis Plachouras, Annalisa Quattrocchi, Ana Hoxha, Gunnar Skov Simonsen, Mélanie Colomb-Cotinat, Mirjam E Kretzschmar, Brecht Devleesschauwer, Michele Cecchini, Driss Ait Ouakrim, Tiago Cravo Oliveira, Marc J Struelens, Carl Suetens, Dominique L Monnet, and the Burden of AMR Collaborative Group**

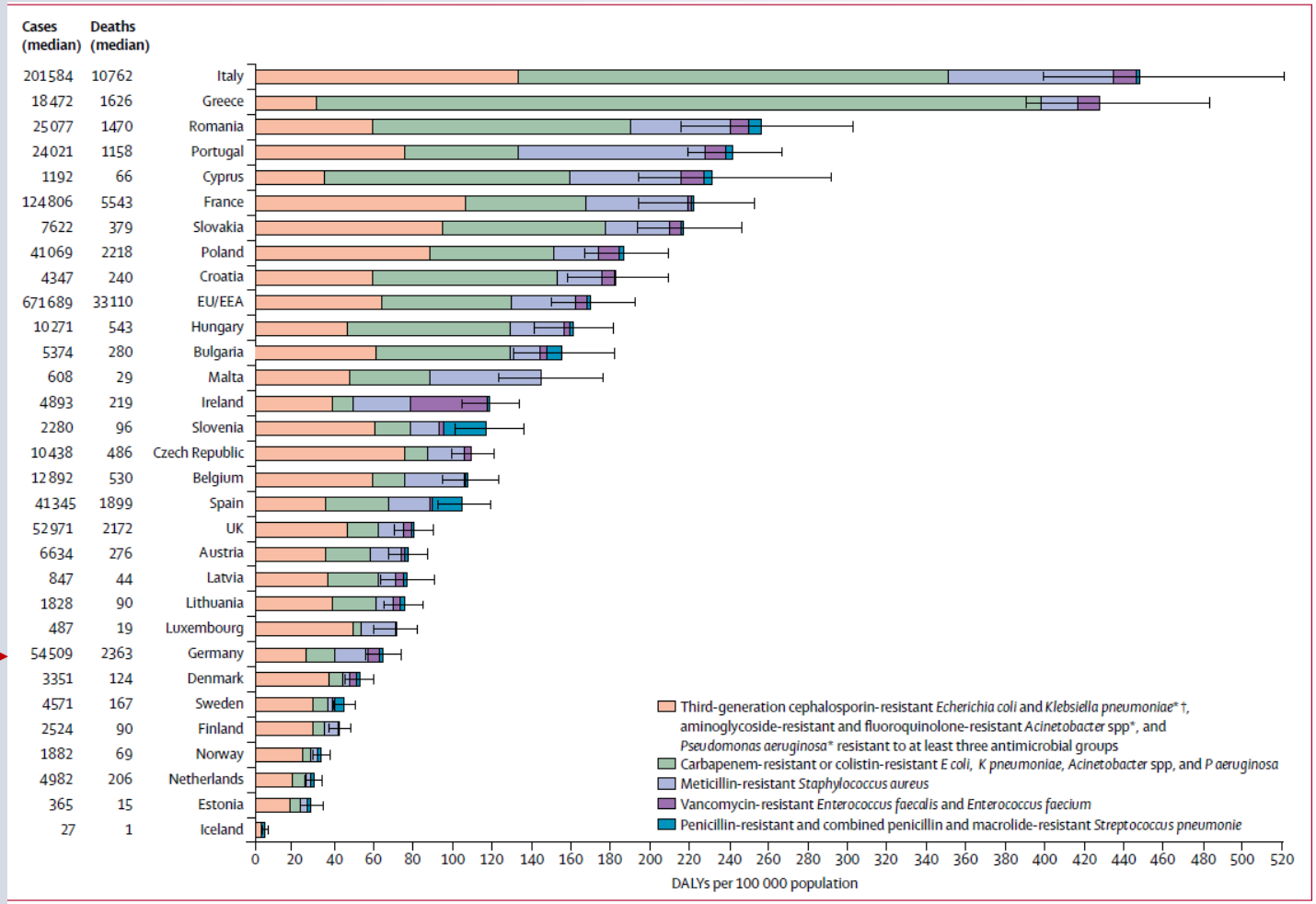


Figure 3: Burden of infections with antibiotic-resistant bacteria in DALYs, EU and European Economic Area, 2015

RESEARCH

Application of a new methodology and R package reveals a high burden of healthcare-associated infections (HAI) in Germany compared to the average in the European Union/European Economic Area, 2011 to 2012

Benedikt Zacher[1,2], Sebastian Haller[1,2], Niklas Willrich[1], Jan Walter[1], Muna Abu Sin[1], Alessandro Cassini[3], Diamantis Plachouras[3], Carl Suetens[3], Michael Behnke[4], Petra Gastmeier[4], Lothar H. Wieler[1], Tim Eckmanns[1]

Eurosurveillance 14. November 2019

Annual burden per 100,000 population of five types of healthcare-associated infections, German PPS sample, German convenience sample and ECDC PPS sample, Germany, EU/EEA, 2011–2012

Annual burden measure	Sample	HAP Point estimate[a] (95% UI)	UTI Point estimate[a] (95% UI)	BSI Point estimate[a] (95% UI)	SSI Point estimate[a] (95% UI)	CDI Point estimate[a] (95% UI)	All Point estimate[a] (95% UI)
HAIs per 100,000	German PPS	132.0 (103.5–170.2)	265.1 (216.8–313.9)	33.4 (20.5–52.3)	115.4 (93.3–141.4)	44.6 (31.1–61.8)	592.1 (521.7–665.8)
	German convenience	162.3 (137.5–190.7)	228.7 (200–260.7)	52.7 (42–66.9)	146.9 (126.5–167.8)	44.5 (35.6–55.4)	636.1 (586.7–689.2)
	ECDC PPS (EU/EEA)	143.7 (136.9–150.8)	174.7 (166.3–182.4)	22.2 (20–25.1)	111.3 (105.4–116.6)	16.0 (14.2–18.3)	467.9 (456.2–480.2)
Attributable deaths per 100,000	German PPS	4.9 (1.4–10.1)	4.5 (1.8–9.3)	4.8 (2.5–8.7)	2.9 (2.3–3.6)	2.4 (0.1–5.6)	20.1 (13.4–28.2)
	German convenience	6.1 (1.4–11.7)	3.9 (1.6–8)	7.9 (4.7–11.8)	3.7 (3.2–4.2)	2.5 (0.1–5.3)	24.4 (17.2–32.6)
	ECDC PPS (EU/EEA)	5.3 (1.3–10.2)	3.0 (1.2–5.9)	3.3 (2.1–4.6)	2.6 (2.4–2.7)	0.9 (0–1.8)	15.3 (10.2–21.2)
DALYs per 100,000	German PPS	86.1 (42.1–145.1)	82.6 (34.5–159.2)	72.2 (38.3–129)	35.7 (28.9–43.7)	25.9 (2.5–61.2)	308.2 (221.2–416.3)
	German convenience	103.4 (51.5–166.5)	69.5 (29.9–127.7)	113.5 (72.2–166)	45.0 (38.8–51.3)	26.5 (2.5–55.6)	359.3 (266.6–461.5)
	ECDC PPS (EU/EEA)	109.8 (55.3–170.5)	57.1 (24.3–102.9)	76.2 (52.6–104.8)	35.1 (33.3–36.8)	10.0 (0.9–19.2)	290.0 (214.9–376.9)

BSI: healthcare-associated primary bloodstream infection; CDI: healthcare-associated Clostridioides difficile infection; DALY: disability-adjusted life year; ECDC: European Centre for Disease Prevention and Control; EU/EEA: European Union/European Economic Area; HAP: healthcare-associated pneumonia; PPS: point prevalence survey; SSI: surgical site infection; UTI: healthcare-associated urinary tract infection.

3. Causes, Deficit Analysis and Need for Optimisation

The most important problem regarding NI in our opinion is the lack of implementation of these regulations and guidelines in practice because of

- Lack of education for doctors and nursing staff in hospital hygiene and infection prevention
- Lack of nursing staff
- Lack of experts specialized on hospital hygiene

Hospital cleaning and disinfection

Antibiotic stewardship (hospital and ambulatory setting)

Too many therapies in hospitals instead in ambulatory settings

We have to ensure compliance with standards and principles

- Standards for assessing compliance with guidelines should be established (conformity assessment)
- Offences and deliberated infringements should be punished in a more powerful way

The EU (Directives) or other European institutions could help to achieve theses targets