Antimicrobial drug consumption and resistance connected: European surveillance programs in man

Universiteit Utrecht

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SDa Autoriteit Diergeneesmiddelen

disclosure

Nothing to declare

content

- Drug utilisation research and technical units of measurement for drug use
- Monitoring of antimicrobial use in EU
- Monitoring of antimicrobial resistance in EU
- Antimicrobial stewardship
  - Examples of implementation in (daily) practice
  - Combined monitoring and “root-cause” analysis

Drug utilisation research

The purpose of the ATC/DDD system is to serve as a tool for drug utilization monitoring and research in order to improve quality of drug use.

One component of this is the presentation and comparison of drug consumption statistics at international and other levels.

ATC – DDD system (WHO)

In order to measure drug use, it is important to have both

- a classification system
- and a unit of measurement.

To deal with the objections against traditional units of measurement, a technical unit of measurement called the Defined Daily Dose (DDD) was developed for use in drug utilization studies.

WHO Collaborating Centre for Drug Statistics Methodology, Guidelines for ATC classification and DDD assignment, 2018. Oslo, 2017.

Anatomical Therapeutic Chemical (ATC) classification system

- active substances are divided into different groups according to the organ or system (A) on which they act and their therapeutic (T), pharmacological and chemical (C) properties

- classified in groups at five different levels.
  - fourteen main groups (1st level)
  - with pharmacological/therapeutic subgroups (2nd level)
  - The 3rd and 4th levels are chemical/pharmacological/therapeutic subgroups and
  - the 5th level is the chemical substance.

http://www.whocc.no/atc/structure_and_principles/

WHO Collaborating Centre for Drug Statistics Methodology

Norwegian Institute of Public Health

Postal address:
WHO Collaborating Centre for Drug Statistics

J ANTIINFECTIVES FOR SYSTEMIC USE
J01 ANTIBACTERIALS FOR SYSTEMIC USE
J01C BETA-LACTAM ANTIBACTERIALS, PENICILLINS
J01CR Combinations of penicillins, incl. beta-lactamase inhibitors

ATC code	Name	DDD	U	Adm.R	Note
J01CR01	ampicillin and beta-lactamase inhibitor	6	g	P	Refers to ampicillin
J01CR02	amoxicillin and beta-lactamase inhibitor	1	g	O	Refers to amoxicillin
		3	g	P	Refers to amoxicillin
J01CR03	ticarcillin and beta-lactamase inhibitor	15	g	P	Refers to ticarcillin
J01CR04	sultamicillin	1.5	g	O	
J01CR05	piperacillin and beta-lactamase inhibitor	14	g	P	Refers to piperacillin
J01CR50	combinations of penicillins				

List of abbreviations

Last updated: 2017-12-20

J ANTIINFECTIVES FOR SYSTEMIC USE
J01 ANTIBACTERIALS FOR SYSTEMIC USE
J01D OTHER BETA-LACTAM ANTIBACTERIALS
J01DB First-generation cephalosporins
J01DC Second-generation cephalosporins
J01DD Third-generation cephalosporins
J01DE Fourth-generation cephalosporins
J01DF Monobactams
J01DH Carbapenems
J01DI Other cephalosporins and penems

https://www.whocc.no/atc_ddd_index/?code=J01CR&show

Last updated: 2017-12-20

Defined Daily Doses (DDD)

- Examples for assignment of DDD:

Dosing of drug A: 1x per day 10 mg = 10 mg (/day)

Dosing of drug B: 4x per day 10 mg = 40 mg (/day)

Dosing of drug C: 1x per week 10 mg =

10/7 = 1.43 mg (/day)

- In case of 70 mg prescription:

Drug A: 70 / 10 = 7 DDD

Drug B: 70 / 40 = 1,75 DDD

Drug C: 70 / 1,43 = 49 DDD (7 weeks of therapy)

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Quantification, Benchmarking and Stewardship of Veterinary Antimicrobial Usage

First International Conference
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Monitoring of antimicrobial use in the EU

Surveillance and disease data

Antimicrobial consumption database (ESAC-Net)

tool

The ESAC-Net interactive database provides European reference data on antimicrobial consumption, both in the community and the hospital sector. The reports of the database are provided through the European Surveillance System (TESSy). The Anatomical Therapeutic Chemical (ATC) classification system is used for the allocation of antimicrobials in groups. Data are presented up to the fourth level of this classification.

Country overview
Overview of antimicrobial consumption in Europe - interactive reports per country and year

Data source overview
Data source overview of antimicrobial consumption in Europe, all countries and years

Geographical distribution
Distribution of consumption by type of antimicrobial, type of care, year

Quality indicators for consumption in the community
Quality indicators for antibiotic consumption in the community (primary care sector) by year

Distribution by antimicrobial group
Distribution of antimicrobial consumption by antimicrobial group - reports by antimicrobial, type of care, year, country

Rates by country
Interactive reports by antimicrobial, type of care, year

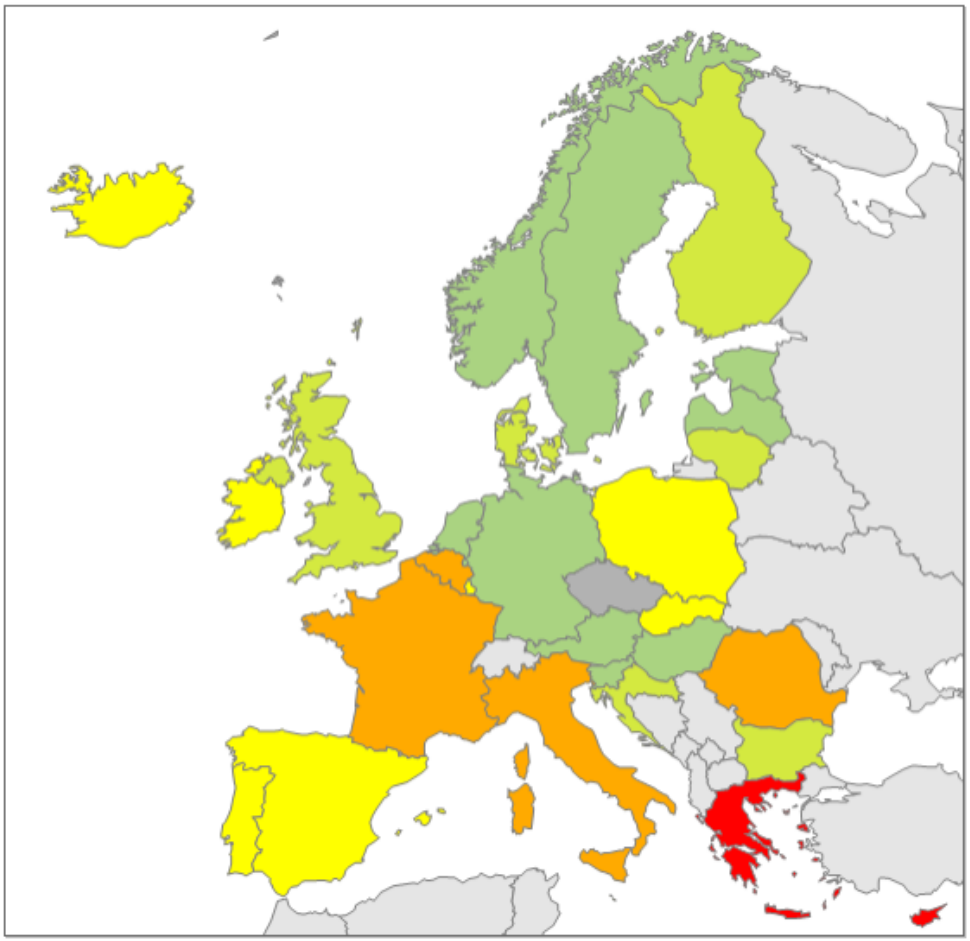
Trend by country
Trend of antimicrobial consumption - reports by antimicrobial, type of care, country, including comparison of data in up to three

Surveillance of medicines consumption

- international method for characterization and quantification of medicinal products:
  - ATC = Anatomical Therapeutic Chemical classification
  - DDD = defined daily dose
- Related to population at risk over time

Geographical distribution of the consumption of Antibacterials for systemic use (ATC group J01) in the community (primary care sector) in Europe, reporting year 2016

Consumption of Antibacterials for systemic use (ATC group J01) in the community (primary care sector) in Europe, reporting year 2016



Liechtenstein	
Luxembourg	
Malta	

No data reported	
Not included	

DDD per 1000 inhabitants and per day

0	15.609 to < 20.771	25.933 to < 31.094
10.447 to < 15.609	20.771 to < 25.933	31.094 to 36.256

Cyprus, Romania provided only total care data.

Indicator: DDD/1000 inhabitants*days

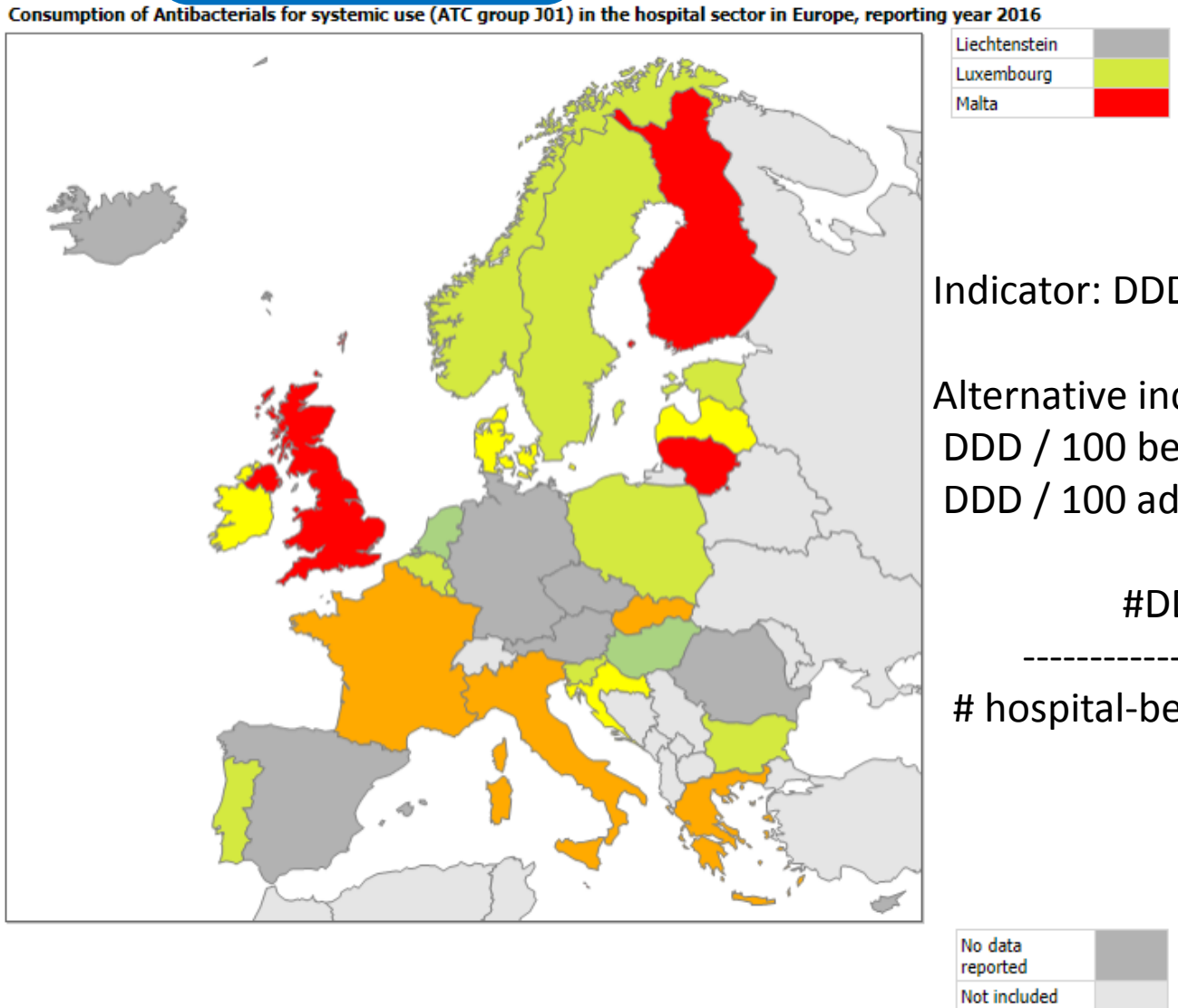
$$\frac{\#DDD}{\#\text{ inhabitants}*365} * 1000$$

10 ~ 1%

~ 3,65/365 inhabitants*days

~ 3,65 per year

Geographical distribution of the consumption of Antibacterials for systemic use (ATC group J01) in the hospital sector in Europe, reporting year 2016



Indicator: DDD/1000 inhabitants*days

Alternative indicators:
DDD / 100 bed-days
DDD / 100 admissions

$$\frac{\#DDD}{\#\text{ hospital-beds}*\text{occupancy-rate}} * 100$$

Table 3.2.1 Ten years use of antibiotics for systemic use (J01) in hospitals (DDD/100 patient-days), 2006-2015 (Source: SWAB).

ATC group*	Therapeutic group	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
J01AA	Tetracyclines	1.6	1.4	1.7	1.6	1.7	1.8	1.7	1.7	1.9	1.9
J01CA	Penicillins with extended spectrum	7.6	7.3	6.5	7.6	7.3	7.3	7.6	8.0	8.4	9.2
J01CE	Beta-lactamase sensitive penicillins	1.4	1.2	1.3	1.6	1.5	1.5	1.7	1.9	2.4	2.4
J01CF	Beta-lactamase resistant penicillins	5.9	5.7	6.4	6.6	6.8	6.7	7.1	8.1	8.7	7.7
J01CR	Combinations of penicillins, incl. beta-lactamase-inhibitors	15.1	14.5	16.2	16.5	16.0	15.8	15.0	14.8	14.5	14.3
J01DB	First-generation cephalosporins	2.0	2.6	2.6	3.0	3.0	3.5	3.6	3.7	4.4	4.6
J01DC	Second-generation cephalosporins	3.8	2.8	3.0	3.6	3.4	3.7	4.1	4.7	5.0	5.3
J01DD	Third-generation cephalosporins	2.7	3.0	3.2	3.5	3.7	3.9	4.4	5.0	5.7	5.5
J01DH	Carbapenems	0.6	0.8	1.0	1.1	1.2	1.4	1.5	1.7	1.6	1.7
J01EA	Trimethoprim and derivatives	0.8	0.5	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.3
J01EE	Combinations of sulfonamides and trimethoprim, including derivatives	2.1	2.3	2.4	2.0	2.0	1.9	1.8	1.9	1.9	1.8
J01FA	Macrolides	2.5	2.8	2.7	2.6	2.7	2.9	2.8	2.6	2.9	2.7
J01FF	Lincosamides	2.0	2.1	2.1	2.4	2.3	2.3	2.2	2.3	2.3	2.4
J01GB	Aminoglycosides	2.5	2.6	3.9	4.2	4.1	3.9	3.3	3.5	3.6	3.7
J01MA	Fluoroquinolones	8.0	7.6	8.8	9.3	9.0	9.2	8.9	8.6	9.0	8.4
J01XA	Glycopeptides	0.7	1.0	1.1	1.3	1.3	1.3	1.4	1.5	1.6	1.6
J01XB	Polymyxins	0.2	0.1	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2
J01XD	Imidazole derivatives	1.7	1.8	1.7	1.8	1.9	2.2	2.3	2.6	2.6	2.6
J01XE	Nitrofuran derivatives	1.0	1.1	1.2	1.1	1.2	1.2	1.2	1.3	1.6	1.4
J01XX08	Linezolid	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	other antibacterials	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1
J01	**Antibiotics for systemic use (total)**	**62.3**	**61.6**	**66.8**	**70.9**	**70.2**	**71.3**	**71.3**	**74.7**	**78.5**	**77.9**
	expressed in DDD/100 admissions:										
J01	**Antibiotics for systemic use (total)**	**335.9**	**337.5**	**344.7**	**321.3**	**315.9**	**306.4**	**295.7**	**307.8**	**326.0**	**330.1**

Dutch hospitals

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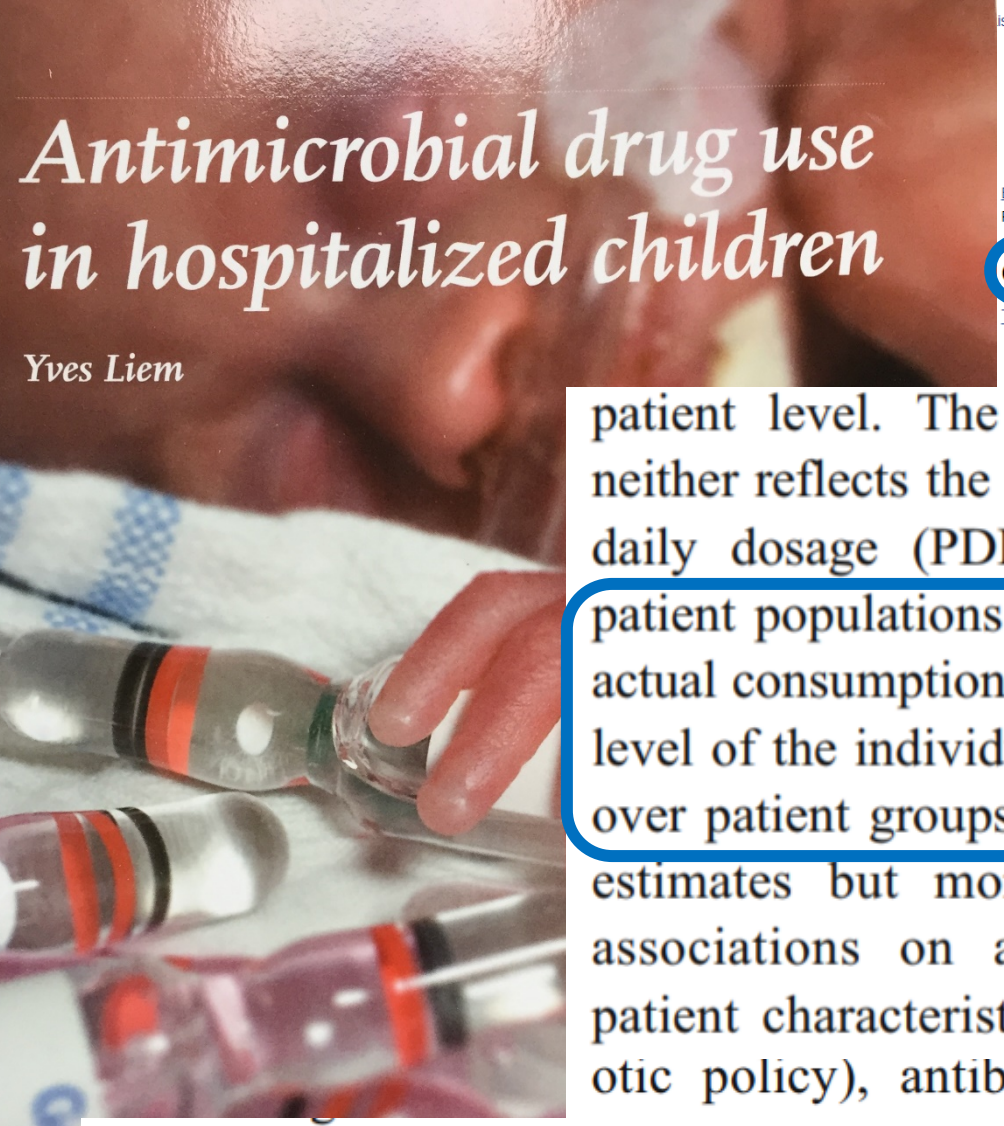

Springer
EUROPEAN JOURNAL OF CLINICAL MICROBIOLOGY & INFECTIOUS DISEASES
springer.com

Eur J Clin Microbiol Infect Dis. 2010 Oct; 29(10): 1301–1303.
Published online 2010 Jun 18. doi: 10.1007/s10096-010-0990-3
PMCID: PMC2937144

Quantifying antibiotic use in paediatrics: a proposal for neonatal DDDs

T. B. Y. Liem,[1] E. R. Heerdink,[2] A. C. G. Egberts,[3] and C. M. A. Rademaker[1]

patient level. The main disadvantage is that the DDD neither reflects the recommended, nor the actual prescribed daily dosage (PDD) for individual patients or specific patient populations [3–7]. Hence, in an ideal situation, the actual consumption of antibiotics should be measured at the level of the individual patient and subsequently aggregated over patient groups and settings. This gives more precise estimates but more importantly also allows study of associations on an individual patient level between patient characteristics, setting characteristics (e.g. antibiotic policy), antibiotic use and clinically relevant out-

[4].

where data at patient level are not available [5]. Problems arise because dosing of antibiotics in children is based on body weight. Therefore, in order to calculate a paediatric DDD, an average body weight for the paediatric popula-

tion needs to be assumed. However, in our opinion, this

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Springer | European Journal of Clinical Microbiology & Infectious Diseases
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Table 1. Overview neonatal DDD's top 10 antibiotics NICU's

Eur J Clin Microbiol Infect Dis. 2010 Oct; 29(10): 1301–1303.
Published online 2010 Jun 18. doi: 10.1007/s10096-010-0990-3
PMCID: PMC2937144

Quantifying antibiotic use in paediatrics: a proposal for neonatal DDDs

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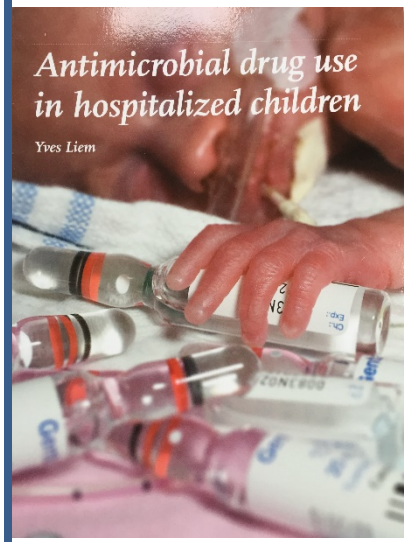
Name of antibiotic	Maintenance dose in mg/kg/day in its main indication for neonates (16)	(17)	(18)	(12)	(11)	(19)	(20)	(21)	Assumed maintenance dose in mg/kg/day in its main indication for neonates	Neonatal DDD (g) (assumed average body weight of 2 kg)	Adult DDD (WHO 2005) (g) (assumed body weight of 70 kg)	Factor (adult vs neonatal DDD)
Ampicillin	n.a.	100	100	100	100-200	100-200	100	200	100	0.2	2	10
Amoxicillin	75-100	n.a.	n.a.	n.a.	100-150	n.a.	n.a.	n.a.	100	0.2	1	5
Amoxicillin and enzyme inhibitor	100	n.a.	n.a.	n.a.	90	n.a.	n.a.	n.a.	100	0.2	3	15
Flucloxacillin	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	0.2	2	10
Ceftazidime	150	150	150	150	75	150	150	150	150	0.3	4	13
Cefotaxime	150	150	150-200	150-200	75-100	150-200	150-200	150	150	0.3	4	13
Meropenem	60	60	60	60	60	60	60	60	60	0.12	2	17
Erythromycin	30	n.a.	n.a.	30	50	n.a.	n.a.	n.a.	30	0.06	1	17
Gentamicin	4	5	5	5	4	5	5	5	4	0.008	0.24	30
Vancomycin	30	30	30	30-60	45	30-60	30	30	30	0.06	2	33

n.a. not available



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Monitoring of antimicrobial resistance in the EU

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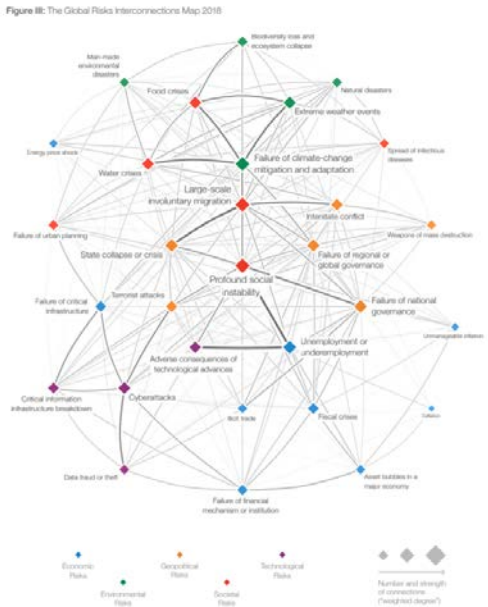
Preface

Executive Summary

Global Risks 2018: Fractures, Fears and Failures



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AMR: likelihood and impact 2018

What is the impact and likelihood of global risks?

Spread of infectious diseases
Likelihood 3.03
Impact 3.50

Weapons of mass destruction
Extreme weather events
Natural disasters
Failure of climate-change mitigation and adaptation
Water crises
Cyberattacks
Biodiversity loss and ecosystem collapse
Large-scale involuntary migration
Spread of infectious diseases
Interstate conflict
Man-made environmental disasters
Average 3.40
Critical information infrastructure breakdown
Profound social instability
Failure of national governance
Fiscal crises
Terrorist attacks
Unemployment or underemployment
Failure of regional or global governance
Data fraud or theft
Asset bubbles in a major economy
Failure of critical infrastructure
State collapse or crisis
Energy price shock
Failure of financial mechanism or institution
Adverse consequences of technological advances
Failure of urban planning
Illicit trade
Unmanageable inflation
Deflation

Impact: 4.0, 3.5, 3.0
Likelihood: 2.5, 3.0, Average 3.48, 4.0, 4.5

The Global Risks Report 2018
13th Edition

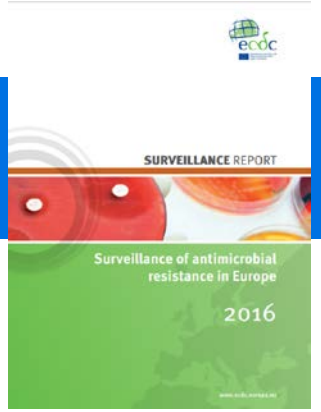
http://www3.weforum.org/docs/WEF_GRR18_Report.pdf

Antimicrobial resistance

Annual surveillance report | Data from the Atlas | Directory: Guidance on prevention and control | European Antibiotic Awareness Day

All updates | Publications | News | Events | Data

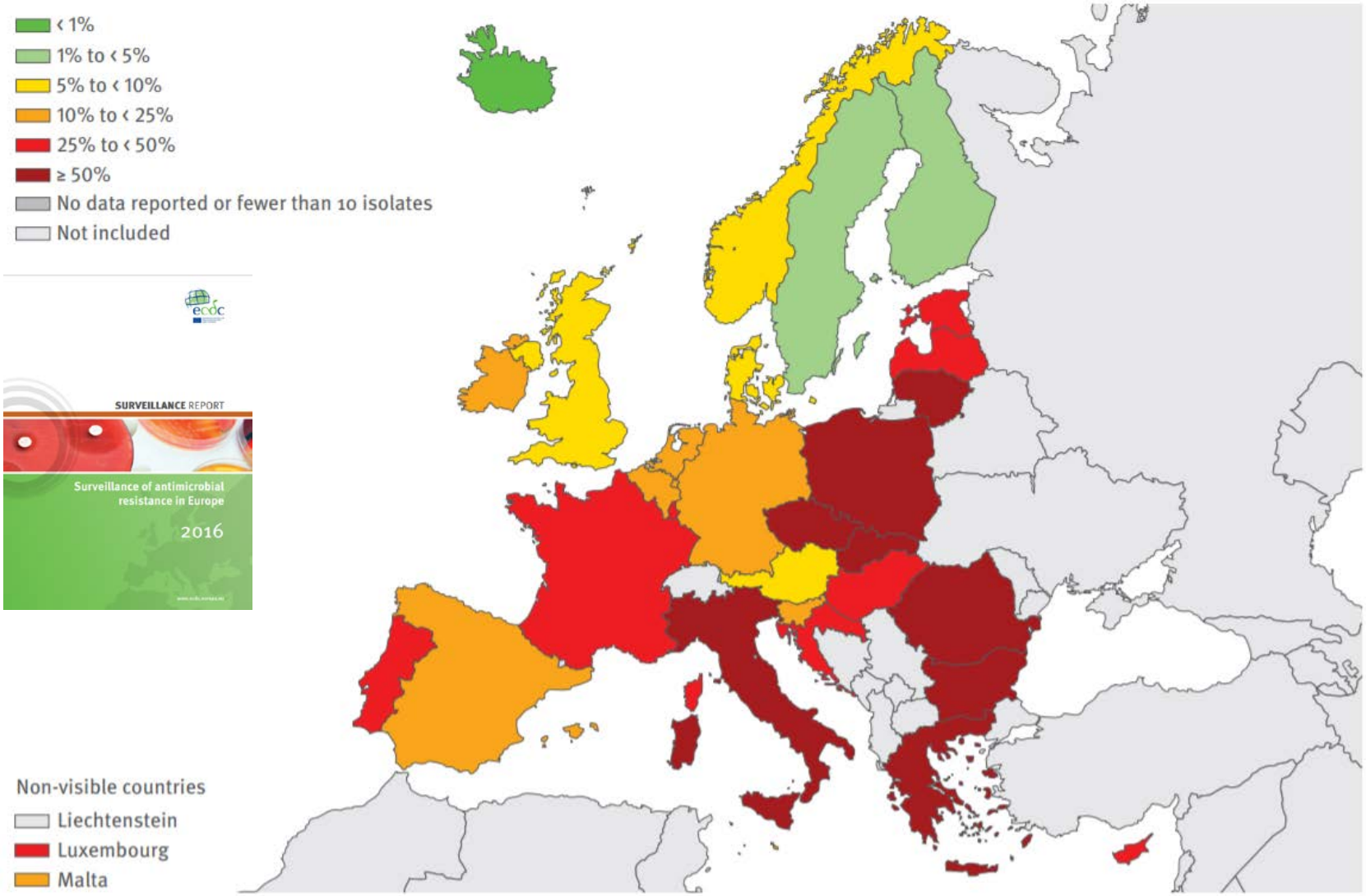
Samples for EARS-Net



Sampling

EARS-Net data are exclusively based on invasive isolates from blood or cerebrospinal fluid. The clinical relevance of indicator organisms isolated from these sites is undisputable. This restriction prevents some of the inconsistencies that arise from differences in clinical case definitions, different sampling frames or heterogeneous healthcare utilisation that would otherwise confound the data analysis if isolates from all anatomical sites were accepted. However, invasive isolates may not be representative of isolates of the same bacterial species from other type of infections, i.e. urinary tract infections, pneumonia, wound infections, etc.

Figure 3.9. ***Klebsiella pneumoniae*****. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2016**



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Antimicrobial stewardship

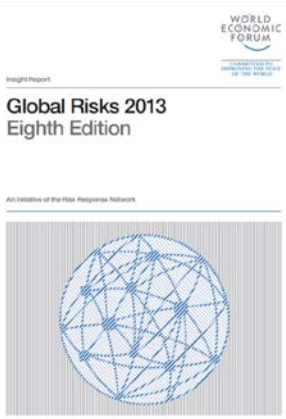
Examples of implementation in (daily) practice

Combined monitoring and “root cause” analysis

Antimicrobial stewardship

The primary goal of these programs was to optimize clinical outcomes while minimizing unintended consequences of AMU, including toxicity, the selection of pathogenic organisms, and the emergence of resistance.

AMU monitoring and stewardship



It is important to remember that antibiotics are not used only to treat infections. They also, by guarding against infection, make possible medical procedures such as heart surgery, organ transplantation, the survival of pre-term babies, and aggressive immune-modulating therapy for auto-immune diseases such as rheumatoid arthritis, as well as for cancers of the blood, bone marrow and lymph nodes. With demographic and lifestyle trends such as ageing populations, changes in diet and declining rates of physical activity, we can expect rising rates of chronic diseases which are currently treated through surgery that would be **impossible without effective antibiotics**.

http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2013.pdf

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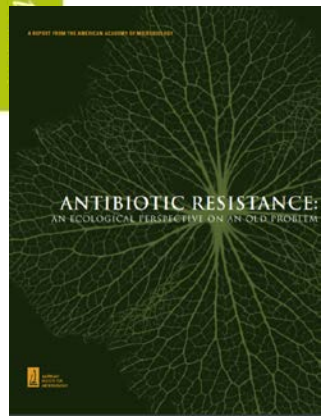
- Improvement and speed of **diagnostic tools**;
- Enhancement of capacity building in most laboratories, particularly in developing countries;
- Development of **infection control** and containment of bacterial transmission;
- Development of **antibiotic stewardship;**
- **Agreement and implementation on "judicious and prudent use" of antibiotics;**
- **Guidance** to **physicians** and to **veterinarians**;
- **Building and coordinating surveillance programs**;
- Development of **communication** initiatives; and
- Control of generic antibiotics.



Antibiotic Resistance: An Ecological Perspective on an Old Problem
A REPORT FROM THE AMERICAN ACADEMY OF MICROBIOLOGY
2009

IMPORTANCE Interventions based on behavioral science might reduce inappropriate antibiotic prescribing.

OBJECTIVE To assess effects of behavioral interventions and rates of inappropriate (not guideline-concordant) antibiotic prescribing during ambulatory visits for acute respiratory tract infections.

DESIGN, SETTING, AND PARTICIPANTS Cluster randomized clinical trial conducted among 47 primary care practices in Boston and Los Angeles. Participants were 248 enrolled clinicians randomized to receive 0, 1, 2, or 3 interventions for 18 months. All clinicians received education on antibiotic prescribing guidelines on enrollment. Interventions began between November 1, 2011, and October 1, 2012. Follow-up for the latest-starting sites ended on April 1, 2014. Adult patients with comorbidities and concomitant infections were excluded.

INTERVENTIONS Three behavioral interventions, implemented alone or in combination: *suggested alternatives* presented electronic order sets suggesting nonantibiotic treatments; *accountable justification* prompted clinicians to enter free-text justifications for prescribing antibiotics into patients' electronic health records; *peer comparison* sent emails to clinicians that compared their antibiotic prescribing rates with those of "top performers" (those with the lowest inappropriate prescribing rates).

MAIN OUTCOMES AND MEASURES Antibiotic prescribing rates for visits with antibiotic-inappropriate diagnoses (nonspecific upper respiratory tract infections, acute bronchitis, and influenza) from 18 months preintervention to 18 months afterward, adjusting each intervention's effects for co-occurring interventions and preintervention trends, with random effects for practices and clinicians.

CONCLUSIONS AND RELEVANCE Among primary care practices, the use of accountable justification and peer comparison as behavioral interventions resulted in lower rates of inappropriate antibiotic prescribing for acute respiratory tract infections.

−18.1%) for accountable justification (difference in differences, −7.0% [95% CI, −9.1% to −2.9%]; $P < .001$); and from 19.9% to 3.7% (absolute difference, −16.3%) for peer comparison (difference in differences, −5.2% [95% CI, −6.9% to −1.6%]; $P < .001$). There were no statistically significant interactions (neither synergy nor interference) between interventions.

CONCLUSIONS AND RELEVANCE Among primary care practices, the use of accountable justification and peer comparison as behavioral interventions resulted in lower rates of inappropriate antibiotic prescribing for acute respiratory tract infections.

Research

Original Investigation

Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices
A Randomized Clinical Trial

Daniella Meeker, PhD; Jeffrey A. Linder, MD, MPH; Craig R. Fox, PhD; Mark W. Friedberg, MD, MPP; Stephen D. Persell, MD, MPH; Noah J. Goldstein, PhD; Tara K. Knight, PhD; Joel W. Hay, PhD; Jason N. Doctor, PhD

Research

Original Investigation

Research Letter

October 10, 2017

Effects of Behavioral Interventions on Inappropriate Antibiotic Prescribing in Primary Care 12 Months After Stopping Interventions

Jeffrey A. Linder, MD, MPH[1]; Daniella Meeker, PhD[2]; Craig R. Fox, PhD[3]; et al

» Author Affiliations | Article Information

JAMA. 2017;318(14):1391-1392. doi:10.1001/jama.2017.11152

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MAIN OUTCOMES AND MEASURES Antibiotic prescribing rates for visits with antibiotic-inappropriate diagnoses (nonspecific upper respiratory tract infe bronchitis, and influenza) from 18 months preintervention to 18 months af each intervention's effects for co-occurring interventions and preintervent random effects for practices and clinicians.

CONCLUSIONS AND RELEVANCE An justification and peer comparison a inappropriate antibiotic prescribing

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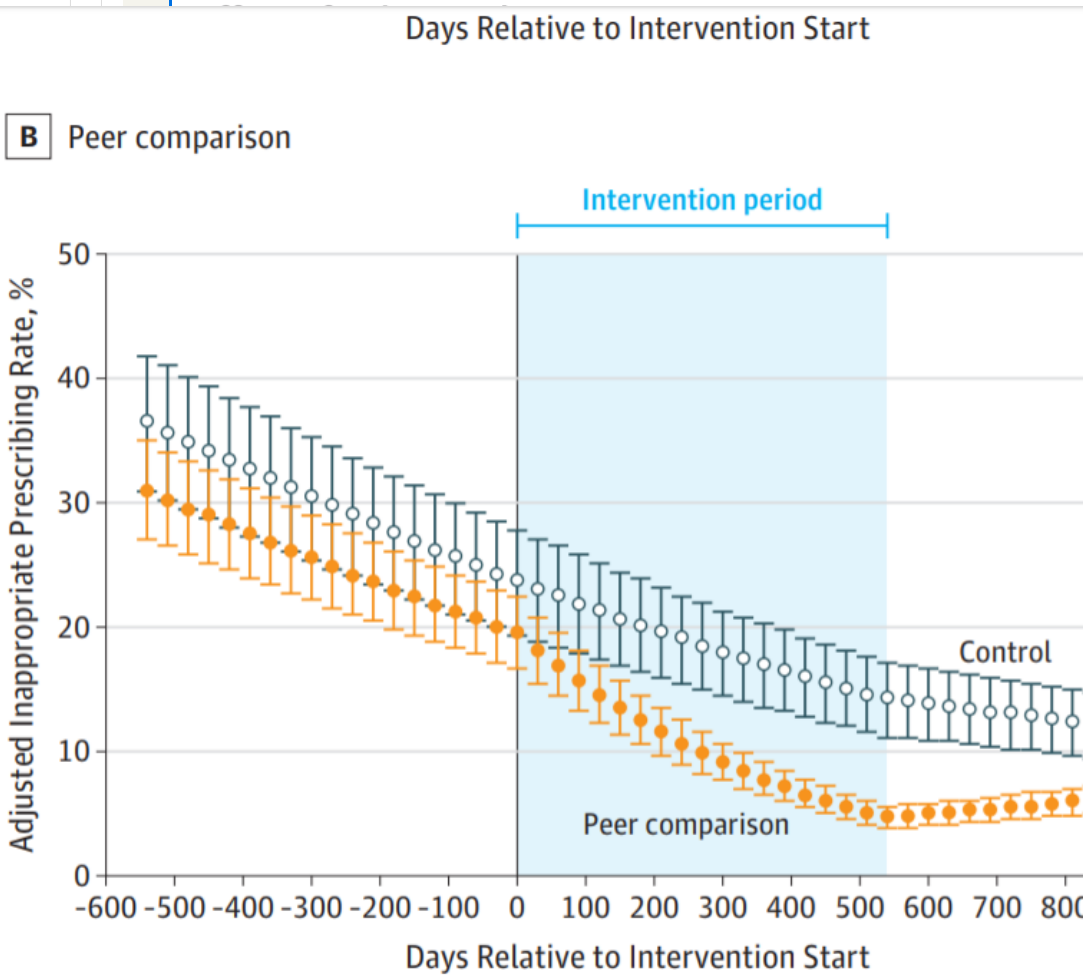

These findings suggest that institutions exploring behavioral interventions to influence clinician decision making should consider applying them long-term.

van Limburg et al. Antimicrobial Resistance and Infection Control 2014, 3:33
http://www.aricjournal.com/content/3/1/33

ANTIMICROBIAL RESISTANCE & INFECTION CONTROL

RESEARCH Open Access

Evaluation of early implementations of antibiotic stewardship program initiatives in nine Dutch hospitals

Maarten van Limburg[1*], Bhanu Sinha[2], Jerome R Lo-Ten-Fo

Abstract

Background: Antibiotic resistance is a global threat to pati stewardship programs to optimise antibiotic use. Expert-ba programs, but local implementations may differ per hospit antibiotic stewardship programs based on expert-based str valid deviations from these expert-based programs.

Aim: To analyse the progress and barriers of local implement in nine Dutch hospitals and to develop a toolkit that guides i

Methods: An online questionnaire based on published guide microbiologists, seven infectious disease physicians and five c

Results: Results show local differences in antibiotic stewardsh Antibiotic guidelines and antibiotic teams are the most exte support and audit-feedback are deemed important interve at academic hospitals or in preparation for application in recommended in guidelines - benchmarking, restriction ar Automatic stop-order, pre-authorization, automatic substitu according to respondents.

Conclusion: There are extensive local differences in the in These differences suggest a need to further explore the ra stewardship programs. Rather than reporting this rationale

NL

pagepress

Infectious Disease Reports 2017; volume 9:6821

A systematic review of quality indicators for appropriate antibiotic use in hospitalized adult patients

Marlot C. Kallen, Jan M. Prins

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Abstract

Many quality indicators for appropriate antibiotic use have been developed. We aimed to make a systematic inventory, including the development methodology and validation procedures, of currently available quality indicators (QIs) for appropriate antibiotic use in hospitalized adult patients. We performed a literature search in the Pubmed interface. From the included articles we abstracted i) the indicators developed ii) the type of infection the QIs applied to iii) study design used for the development of the QIs iv) relation of the QIs to outcome measures v) whether the QIs were validated and vi) the characteristics of the validation cohort. Fourteen studies were included, in which 200 QIs were developed. The most frequently mentioned indicators concerned empirical antibiotic therapy according to the guideline (71% of studies), followed by switch from IV to oral therapy (64% of studies), followed by drawing at least two sets of blood cultures and

However, the extensive use of antibiotics is also the main driving force in the emergence of resistant microorganisms.[2] Worldwide, antibiotic consumption and antibiotic resistance are still on the rise, which, together with the decline in the discovery of new antibiotics, creates one of the greatest current threats to human health.[2-5]

To curb the rise of antibiotic resistance of medically important bacteria, better use of current agents is warranted and a decrease of inappropriate antibiotic use is imperative.[3] Antibiotic stewardship programs are developed to optimize the appropriateness of antibiotic use, in order to maximize the chance of clinical cure or prevention of infection.[6] At the same time, they aim to limit the unintended consequences of antibiotic use, such as the emergence of resistance, adverse drug events, and costs.[6] Antibiotic stewardship programs (APSs) have shown to be effective and financially self-supporting.[7-9] Multidisciplinary local stewardship teams are now established across the world, with the task to design programs in their own hospitals.

A requirement for an effective stewardship program is the ability to measure the appropriateness of antibiotic use in individual patients. Quality indicators (QIs) are measurable elements of practice performance for which there is evidence or consensus that they can be used to assess the quality of antibiotic care provided.[10] A well-known classification to categorize QIs is: structure-, process- and outcome indicators.[11]

For an optimal and reliable use of the developed QIs, their clinimetric properties

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Key words: Quality indicator; Quality improvement; Appropriate antibiotic use; Antibiotic Stewardship.

Contributions: MCK, MD, and JMP, MD PhD, designed the study. Both authors performed the literature search, analysed the data and were involved in the interpretation of the data and writing of the report. MCK designed the figures.

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opment methodology and validation procedures, of currently available quality indicators for appropriate antibiotic use in hospitalized adult patients.

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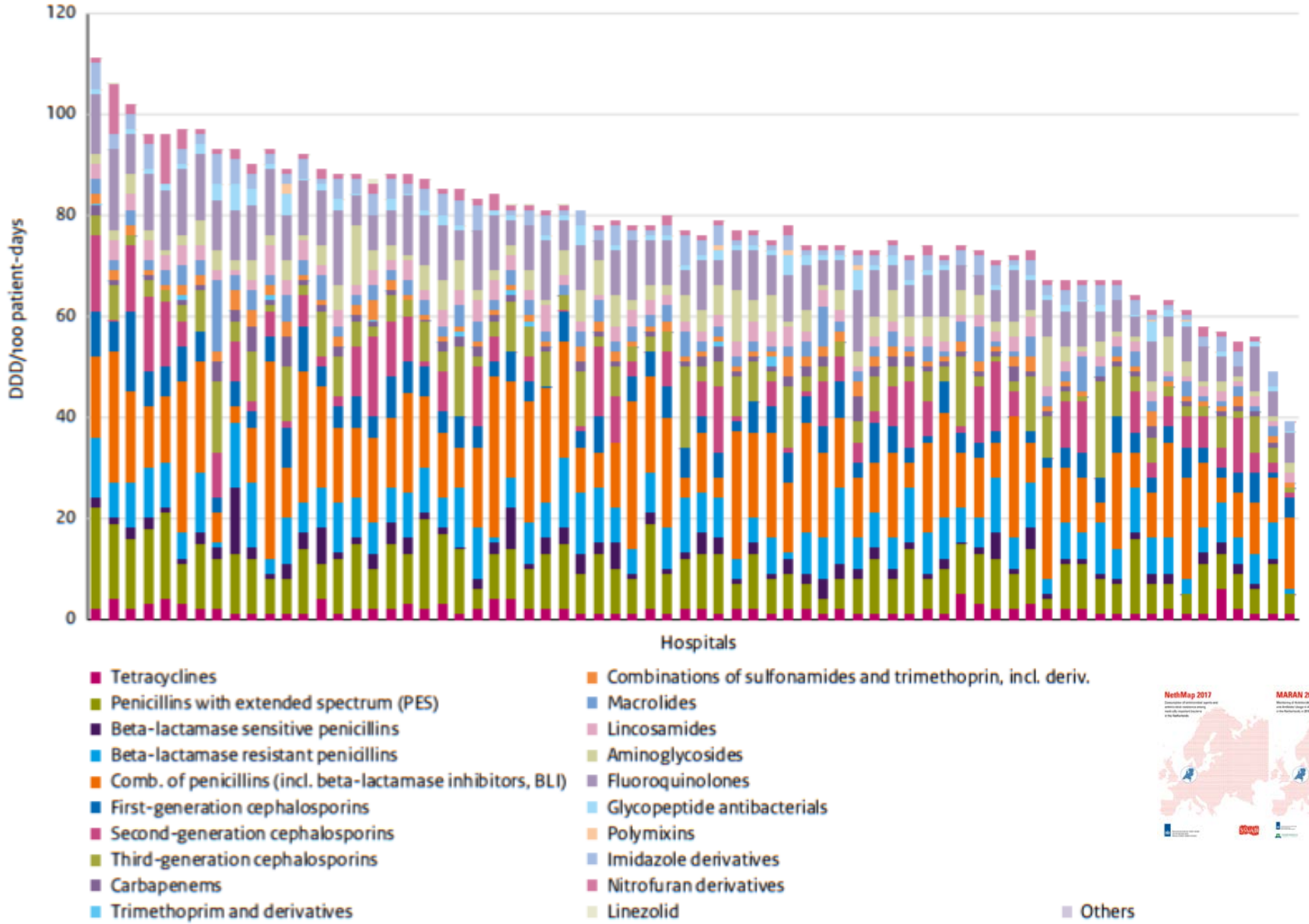
Diergeneesmiddelen

Figure 3.2.4 Comparison of the total systemic antibiotic drug use (J01) across Dutch hospitals in 2015 (Source: SWAB).



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Journal of Antimicrobial Chemotherapy

Improving feedback of surveillance data on antimicrobial consumption, resistance and stewardship in England: putting the data at your Fingertips

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Discussion

The aim of the AMR local indicators profile on Fingertips is to support local action to reduce inappropriate prescribing, AMR and healthcare-associated infections by ensuring that relevant data are made available in an easy to understand format. By sharing these data transparently and openly, PHE aims to stimulate cross-organizational working and learning that may assist in our aim of preserving antibiotics for future generations.

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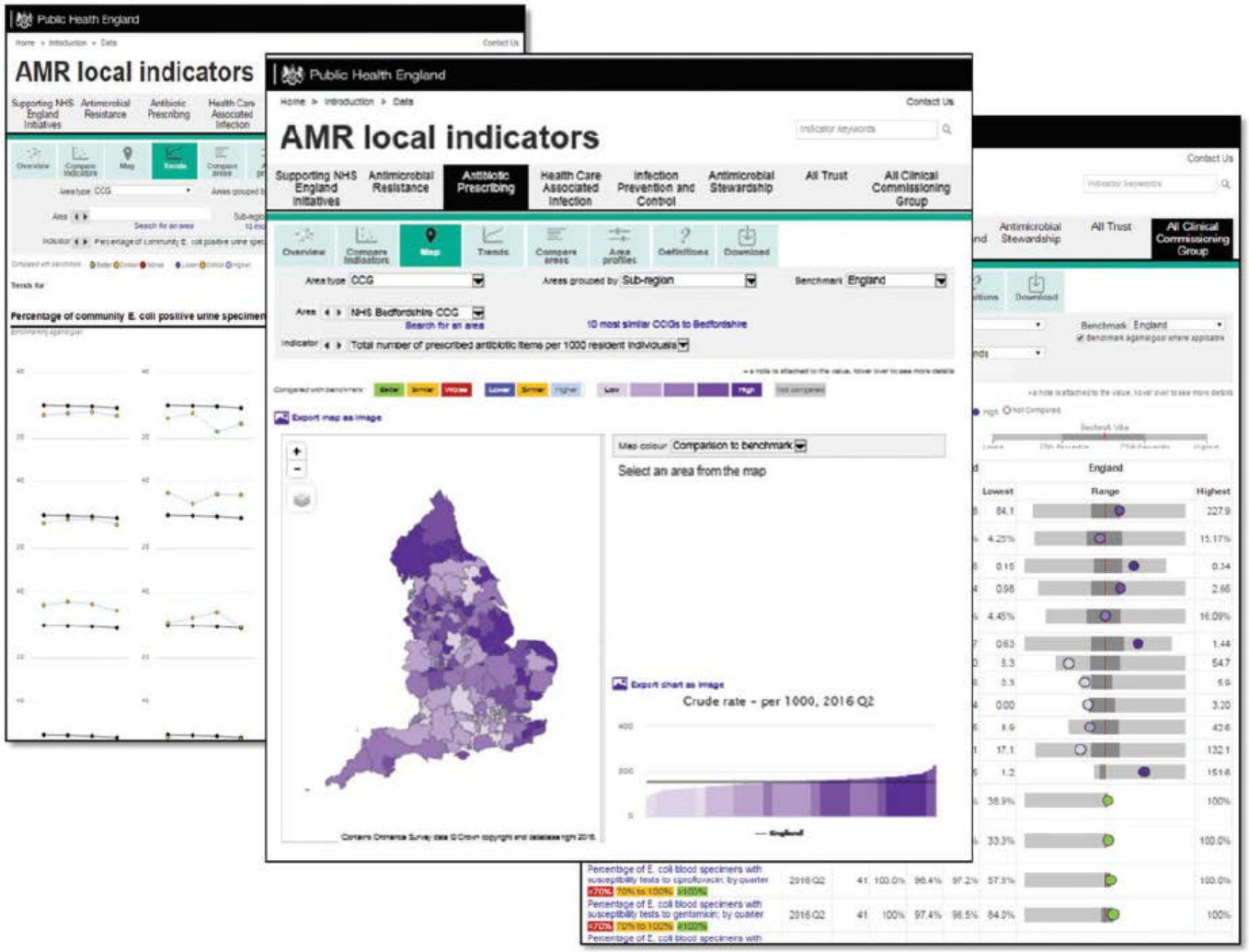

Figure 1. Examples of different formats for viewing data in the AMR local indicators profile on Fingertips.

https://fingertips.phe.org.uk/profile/amr-local-indicators/data#page/0

SCIENTIFIC REPORT

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ECDC/EFSA/EMA second joint report on the integrated analysis of the consumption of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from humans and food-producing animals

Joint Interagency Antimicrobial Consumption and Resistance Analysis (JIACRA) Report

European Centre for Disease Prevention and Control (ECDC),
European Food Safety Authority (EFSA) and
European Medicines Agency (EMA)

1HEALTH 4FOOD

Summary ESBL-Attribution-analysis (ESBLAT)

Searching for the sources of antimicrobial resistance in humans

Project number Topsector TKI-AF 12067

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Thank you for your attention