Patterns to tackle AMR:
Designing effective HAI prevention and control programmes in Europe

Roundtable Debate - 29 January 2019
Welcoming remarks:
MEP Lieve Wierinck
(Belgium, ALDE)
Welcoming remarks:
Amalia Serban
Ministry of Health of Romania
“Next steps towards making the EU a best practice region in combatting AMR: A One Health approach to Infection Prevention and Control”

Dr. Amalia Serban
Mihail Călin
Minister of Health, Romania
Romanian EU Council Presidency
January-June 2019

The citizen – at the core of the Presidency’s General Programme

Health
Guarantee of access to health for all European Citizens

Sectorial priority
Antimicrobial resistance and Healthcare Associated Infections
The conference will focus on further actions needed to improve infection prevention and control in the EU from a One Health perspective. The conference will be followed by Council conclusions that focus on Antimicrobial resistance and Hospital-acquired infections.

We need to find a way for a better implementation of Infection prevention measures such as sanitation, standard procedures for testing and diagnostic, hand washing, food and water safety, and vaccination, education.
Participants

The conference aims to bring together:

- Ministers of Health,
- Ministers Agriculture / Heads of the National Sanitary Veterinary and Food Safety Authorities
- Ministers of Environment
- European Commission, WHO, ECDC, OECD, EMA, EFSA.

First time in the EU that ministers from these 3 policy areas have been invited to an AMR policy discussion.
Ministry of Health

HIGH LEVEL CONFERENCE

Next steps towards making the EU a best practice region in combatting Antimicrobial Resistance
- A One Health Approach -
Cofunded by the Health Programme of the European Union

25,000 Deaths in 2007, 33,000 Deaths in 2015 – Time to reverse the AMR trend

A social event will be hosted by the Romanian Minister of Health, Ms. Sorina Pintea, on the evening of 28 February 2019
Thank you!
Exchange of views:
Infection prevention and control programmes in Europe

Moderated by MEP José Inácio Faria
(Portugal, EPP)
Exchange of views:
Infection prevention and control programmes in Europe

Adopting and implementing PREVENTION strategies
(1) Prevention of surgical site infections

Benedetta Allegranzi
WHO #infectionprevention global unit
Prevention of Surgical Site Infections

Benedetta Allegranzi
IPC Global Unit, WHO HQ

Patterns to tackle AMR: Designing effective HAI prevention and control programmes in Europe. European Parliament, 29 January 2019
Awareness of the problem

STOP INFECTIONS AFTER SURGERY

WHAT’S THE PROBLEM?

Patients develop infections when bacteria get into incisions made during surgery. These affect patients in both:

LOW- AND MIDDLE-INCOME COUNTRIES

- More than 100,000 people who have surgery in low-income countries get an infection each year
- Nearly 1 in 5 people who have surgery in low-income countries get an infection each year
- Each year, nearly 1 in 5 people who have surgery in low-income countries get an infection each year

HIGH-INCOME COUNTRIES

- More than 500,000 people get an infection each year
- Each year, more than 500,000 people get an infection each year
- Each year, more than 500,000 people get an infection each year

Stop infections after surgery. It can save lives.
SSI epidemiology and burden

- **Second and third most frequent** type of HAI in Europe and the USA
- Most frequent type of HAI on admission (67% in the USA, 33% in Europe)
  - **SSI incidence** (per 100 procedures)
    - USA 2014: 1.9%
    - Europe 2013–14: 0.6–9.5%
  - ➢ 18.3% of all HAIs
  - ➢ 800 000 SSIs leading to over 16 000 deaths, annually
  - ➢ EUR 1.5 billion-19 billion: total annual extra cost to health systems
- **AMR**: 39–51% of SSI pathogens are resistant to standard prophylactic antibiotics in the USA

**Sources:**
SSI incidence in LMICs (1995–2015, 107 studies)

Pooled cumulative incidence: 11.2% per 100 surgical patients (95% CI: 9.7–12.8)
5.9 per 100 surgical procedures (95% CI: 4.8–7.1)
$\mathbb{I}^2 = 99.8\%$

SSI pooled incidence in LMICs in:
– caesarean sections:
  11.7%* (95% CI: 9.1–14.8)
– prosthetic orthopaedic surgery:
  9.7%** (95% CI: 5.3–15.3)
* in Europe: 2.7%
** in Europe: 0.7% (knee prosthesis) to 1.0% (hip prosthesis)

Impact of increasing AMR on SSI

- Scenarios of 10% and 100% reduction in the effectiveness of surgical antibiotic prophylaxis:
  - From 44,000 to 439,000 additional postoperative infections would occur each year in the EU (increases of 5% and 50% relative to current estimates, respectively)
- 307,000 post-intervention deaths would occur each year if no effective antimicrobial treatment was available

- Surveillance of surgical site infections and prevention indicators in European hospitals HAI-Net SSI protocol, version 2.2 Surveillance of surgical site infections and prevention indicators in European hospitals, ECDC, http://dx.doi.org/10.2900260119
1. Awareness of the problem
2. Evidence-based recommendations
WHO Guidelines, updated 2018

• 28 systematic reviews & meta-analyses
• 29 recommendations
• 30 core chapters
SSI prevention recommendations (1)

DO THE RIGHT THING AT THE RIGHT TIME TO STOP SURGICAL SITE INFECTION
Recommendations for safe surgical care

WHO recommendations for SSI prevention (2)
WHO recommendations for SSI prevention (3)
WHO recommendations for SSI prevention (4)
HANDLE ANTIBIOTICS WITH CARE IN SURGERY

Misuse of antibiotics puts all surgical patients at risk

— World Health Organization

WHO SHOULD BE INVOLVED IN ENSURING APPROPRIATE ANTIBIOTIC USE IN SURGERY

WHEN SHOULD HEALTH WORKERS DO TO PREVENT AMR IN SURGERY?

- **Give intravenous SAP**
  - When recommended, depending on the type of operation
  - Within 120 minutes preceding surgical incision

FOR EFFECTIVE SAP, ADEQUATE ANTIBIOTIC TISSUE CONCENTRATIONS SHOULD BE PRESENT AT THE TIME OF SURGICAL INCISION AND THROUGHOUT THE PROCEDURE. THUS, ANTIBIOTICS WITH A SHORT HALF-LIFE SHOULD BE ADMINISTERED CLOSER TO INCISION TIME.

WHO SHOULD YOU NOT DO?

- **Avoid prolonging SAP postoperatively**
- **Avoid antibiotic wound irrigation**
- **Avoid continuing antibiotic prophylaxis if there is a drain (evaluate each case)**
- **Avoid giving antibiotic treatment unless there is a proven or suspected SSI or other infection**

IMPROVEMENT OF ANTIBIOTIC USE IN SURGICAL SERVICES SHOULD BE PART OF THE ANTIMICROBIAL STewardship programme

www.who.int/infection-prevention/publications/ssi-guidelines/en/
1. Awareness of the problem
2. Evidence-based recommendations
3. Implementation strategies
Translating guidelines to action
IPC improvement strategy: multimodal thinking

In other words, the WHO multimodal improvement strategy addresses these five areas:

1. Build it (system change)
   - What infrastructure, equipment, supplies, and other resources (including human) are required to implement the intervention?
   - Does the physical environment influence health-seeking behavior? How can experience and human factors be addressed at the intervention phase?
   - Are certain types of health workers needed to implement the intervention?

2. Teach it (training & education)
   - Who needs to be trained? What type of training should be used to ensure that the intervention is first implemented in line with evidence-based policies and how frequently?
   - Does the facility have master trainers, trainers, and the necessary equipment?

3. Check it (monitoring & feedback)
   - How can you identify the gaps in IPC practices or other indicators in your setting when to prioritize your interventions?
   - How can you be sure that the intervention is being implemented consistently and safely, including at the bedside?
   - What are the methods in place to observe or track the results?

4. Sell it (reminders & communications)
   - How are you promoting an intervention so that there are cues to action at the point of care and messages are reinforced to health workers and patients?
   - Do you have capacity funding to develop promotional messages and materials?

5. Live it (culture change)
   - Is there demonstrable support for the intervention at every level of the health system? For example, do senior managers provide funding for equipment and other resources? Are they willing to be champions and take models for other IPC implementers?
   - Are teams involved in co-developing or adopting the intervention? Are they empowered and do they feel ownership and the need for accountability?

Multidisciplinary team

Source: http://www.who.int/infection-prevention/tools/core-components/cc-implementation-guideline.pdf?ua=1
Helping health facilities succeed in implementation

Locally tailored step-wise action plan
Pilot testing the approach

A multimodal infection control and patient safety intervention to reduce surgical site infections in Africa: a multicentre, before-after, cohort study


Supplementary appendix

This appendix forms part of the original submission and has been peer reviewed. We provide it as supplied by the authors.
Document presenting a range of **tested approaches to achieve successful SSI prevention** implementation at the facility level, including in the context of a broader surgical safety climate

- Original section on the **surgical safety checklist use worldwide**
- Section on **WHO pilot testing**
- Results of a comprehensive **systematic review**

http://www.who.int/infection-prevention/tools/surgical/en/
Ariyo P, et al. ICHE 2019, in press
Operational manual for the WHO SSI prevention recommendations.

This implementation manual is designed to be used by all persons concerned by the prevention of SSI in all health care settings, irrespective of the country.

Launched in December 2018

http://www.who.int/infection-prevention/tools/surgical/en/
Bringing improvement to life

- Example Scenario
- Problem
- Case study

<table>
<thead>
<tr>
<th>What has to be addressed to make the improvement required?</th>
<th>Why?</th>
<th>When?</th>
<th>Who should be involved to make sure improvement happens?</th>
<th>How should you make the improvement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM CHANGE (build it)</td>
<td>• Involves clear instructions about SAP discontinuation within the locally adapted SAP protocol.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Put in place/improve a sustainable system to ensure that SAP orders are not confirmed after the operation (connected to electronic patient records, if existing).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAINING AND EDUCATION (teach it)</td>
<td>• Put in place/improve a reliable mechanism for producing/using updated training resources and information for staff (surgical team, nursing staff and pharmacy) on appropriate SAP according to the local protocol, with an emphasis on the need for SAP discontinuation, including the available evidence.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Put in place/improve a monitoring, reporting and feedback system (including rules and responsibilities) regarding:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- staff knowledge and perception about prolonging SAP;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- frequency and reasons for SAP prolongation;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- SSI rates.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MONITORING AND FEEDBACK (check it)</td>
<td>• In collaboration with staff, develop/adapt reminders and agree upon their most relevant placement to highlight discontinuation of SAP. Develop in various formats targeted to individuals (or teams) who consistently prolong SAP.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMMUNICATIONS AND REMINDERS (tell it)</td>
<td>• Engage leaders and champions among surgical and anaesthesia staff to drive change on SAP discontinuation;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Organize meetings and focus group discussions with all the right people to discuss the reasons for discontinuing SAP in the context of the local protocol.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Engage senior management to issue messages on a regular basis to support SAP discontinuation that are also linked to reducing AMR in the facility.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAFETY CLIMATE AND CULTURE CHANGE (live it)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

http://www.who.int/infection-prevention/tools/surgical/en/
New WHO implementation package for SSI prevention

http://www.who.int/infection-prevention/tools/surgical/en/
New WHO SSI Prevention Implementation Package

Fact sheets on SSI recommendations

http://www.who.int/infection-prevention/tools/surgical/en/

NEW IMPLEMENTATION PLATFORM
Launching Soon!
STOP INFECTIONS AFTER SURGERY

WHAT'S THE SOLUTION?

A range of precautions - before, during and after surgery - reduces the risk of infection

PREOPERATIVE SURGICAL SITE SKIN PREPARATION

How to perform

SURGICAL WOUND EVALUATION AND DRESSING

An educational video produced by the World Health Organization

http://www.who.int/infection-prevention/tools/surgical/en/
Training package

Advanced Infection Prevention and Control (IPC) Training

Prevention of surgical site infection (SSI)

2018

WHO Global IPC Init 2018

- Slides deck
- Trainer’s manual
- Student’s handbook
- Videos
- E-learning module

http://www.who.int/infection-prevention/tools/core-components/en/
WHO protocol and forms for SSI surveillance

Example adaptive tools – addressing the culture

CUSP for Safe Surgery
Perioperative Staff Safety Assessment

Purpose of this form: The purpose of this form is to tap into your experiences at the frontlines of patient care to find out what risks jeopardize patient safety in your clinical area.

Who should complete this form: All staff members.

How to complete this form: Provide as much detail as possible when answering the 4 questions. Drop off your completed safety assessment form in the location designated by the SUSP team.

When to complete this form: Any staff member can complete this form at any time.

CUSP for Safe Surgery (SUSP)
Safety Issues Worksheet for Senior Executive Partnership

Date of Safety Rounds:

Unit:

Attendees:
1. 5.
2. 6.
3. 7.
4. (Please use back of form for additional attendees.)

CUSP for Safe Surgery (SUSP)
Executive Safety Rounds Kickoff Template

The Learning From Defects Tool

Sources: Toolkit to promote safe surgery [website]. Rockville, MD: Agency for Healthcare Research and Quality; 2018
WHO Global Survey 2019
Use the two tools*, calculate your score, show your progress!

16 Jan – 16 May 2019!

Prepare: read the tools and documents¹-⁴
Take part in WHO webinars, hear more about using the tools and how to take part in the global survey⁵
Jan-Feb - complete IPCAF³, act on your results and submit your results to WHO online
Mar-Apr – complete HHSAF⁴, act on your results and submit your results to WHO online

Part of the SAVE LIVES: Clean Your Hands WHO annual campaign
5 May 2019

*Facility level tools to be used: IPC Assessment Framework (IPCAF), Hand Hygiene Self Assessment Framework (HHSAF)

3. http://www.who.int/infection-prevention/tools/core-components/IPCAF-facility.PDF?ua=1
4. http://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf?ua=1
Thank you for participating in the WHO 2019 Global Survey on Infection Prevention and Control and Hand Hygiene

Learn more at:
Send a request to participate and enquiries to:
who_ipcGlobalsurvey@who.int
Exchange of views:
Infection prevention and control programmes in Europe

Adopting and implementing PREVENTION strategies
(1) Prevention of surgical site infections

José Maria Balibrea
Hospital Clínic de Barcelona
Adopting and implementing prevention strategies
Surgical site infection prevention

Brussels, 29 January 2019

José M. Balibrea M.d. Ph.D.
Surgical minds...

SSI are the most easily preventable H.A.I.
Pre-intra-post operative measures...

“To be a great surgeon you must have a terrible memory” Henry marsh
High-reliability health care

Invited Commentary

Bundling for High-Reliability Health Care
Ira L. Leeds, MD, MBA; Elizabeth C. Wick, MD

Complex environment
unspected adverse events
Fewer accidents...

Complexity awareness
...failure?
...simplification?

Experts
Commitment
Honesty
Who’s in your team?

High morbi-mortality
Longer stays
Specific nursery teams
Shared experience
Shared objectives

Surgical teams as “High-reliability teams”

“Down to up” model

Multidisciplinary

Shared ownership

Champion

front-line
Spanish surgical society strategy

Our goal:

Ownership of preventive measures
"There is great variability in the level of awareness and application of the main measures of SSI prevention among Spanish surgeons. Several areas for improvement have been detected, as core prevention measures are not in common use, and discontinued practices are continued to be used. These practices should be addressed by the AEC by drafting specific recommendations for the prevention of SSI in Spanish hospitals"
Paradigm Shift
Spanish observatory for infection in surgery

Surgical taskforce
grade of implementation of SSI Preventive measures
Dissemination strategies
Current survey >1100 responders
Up to 50% cases no feedback of ssi rates
Low-grade awareness guidelines recommendations
Several areas for improvement
• Conclusions of meta-analysis, systematic reviews & guidelines can be different...

• Not all the measures can be evaluated...

• Different grading for evidence

• Conflict of interest

• Not all the measures are applicable

• Sometimes experts generate bias
Spanish surgical society strategy

- Conclusions of meta-analysis, systematic reviews & guidelines can be different...
- Not all measures can be evaluated...
- Different grading for evidence...
- Conflict of interest...
- Not all measures are applicable...
- Sometimes experts generate bias...

**Core measures**
- High-Level evidence

**Complementary measures**
- Moderate-Level evidence

**Balance between evidence & pragmatism**

**Reviewing evidence**

**What you put in is what you put out!**

"Garbage in, garbage out"—the importance of detailing methodological reasoning in orthopaedic meta-analysis

Caroline K. Hing
Surgical site infection prevention: bundles

Colorectal surgery

Appropriate antibiotic prophylaxis
Oral antibiotics
Mechanical bowel preparation
Laparoscopic surgery
Normothermia
Double-ring wound retractor
Surgical site infection prevention: bundles

Colorectal surgery

Appropriate antibiotic prophylaxis

Oral antibiotics

Mechanical bowel preparation

Laparoscopic surgery

Normothermia

Double ring wound retractor

ILQ a cirurgia colo-rectal electiva a Catalunya

2017
• 3987 operacions
• Incidència ILQ: 402/3987 = 10,1 %

<table>
<thead>
<tr>
<th></th>
<th>Registres</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profilaxi ATBiv</td>
<td>1580</td>
<td>99,9%</td>
</tr>
<tr>
<td>Profilaxi ATVvo</td>
<td>1441</td>
<td>91,1%</td>
</tr>
<tr>
<td>Preparació mecànica</td>
<td>1389</td>
<td>87,8%</td>
</tr>
<tr>
<td>Normotèrmia</td>
<td>997</td>
<td>63%</td>
</tr>
<tr>
<td>Laparoscòpia</td>
<td>1582</td>
<td>100%</td>
</tr>
<tr>
<td>Protector parell</td>
<td>1264</td>
<td>80%</td>
</tr>
</tbody>
</table>
It’s All about strategies...

Create their own learning systems

Demand dynamic & training channels

Re-definition of so called “surgical academia”

require easy & free access to educational resources
And It’s All about marketing...

C.a.t.s. decrease surgical site infection

Clippers  *(hair removal)*  
Antibiotics  
Temperature  
Sugar
Thank you!

questions?

JOSE BALIBREA
www.aecirujanos.es
balibrea@gmail.com
Twitter: @BalibreaJose
Adopting and implementing PREVENTION strategies

2) Prevention of catheter-associated urinary tract infections

Birgitta Lytsy
Representative of JAMRAI WP6.2
Prevention of Catheter-Associated Urinary Tract Infections (CAUTI)

Birgitta Lytsy, Uppsala University Hospital, Sweden
Health Care Associated Infections (HCAI) are the most common adverse event in healthcare globally.

HCAI cause 16 millions of deaths every year globally.

www.who.int
Health Care Associated Infections (HCAI) are the most common adverse event in Europe

65 000 new cases every year
SKL 2017 www.skl.se

2,6 million new cases every year
Cassini 2016
Most European countries are high-income countries in several aspects of health care

”No country, no health-care facility even within the most advanced and sophisticated health care systems can claim to be free of the problem of health-care associated infections.”

”The need for having IPC programmes nationally and at the facility level is clearly reinforced within the WHO 100 Core Health Indicators list.”
Is it dangerous to be a patient?

Sweden:
65,000 patients every year acquire an HCAI

10% of budget for somatic care for HCAI

Four deaths every day in Sweden

Swedish hospital
"It may seem a strange principle to enunciate that the very first principle in a Hospital that it should do the sick no harm."

Notes on Hospitals, 1863
Fostering synergies to keep antibiotics working
What is EU-JAMRAI?

- EU-JAMRAI: European Union Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections
- 44 partners
- Coordinated by the French National Institute of Health and Medical Research (Inserm)
- Opportunity to strengthen and coordinate efforts directed to both AMR and HCAI issues, following a One Health approach.
OBJECTIVE

Support EU Member States develop and implement effective ‘One Health’ policies to combat Antimicrobial Resistance and reduce Healthcare-Associated Infections.
EU-JAMRAI - work package 6.2

Participating EU-countries (8)
Belgium, Czech Republic, Estonia, Latvia, Lithuania, Netherlands, Slovenia, Sweden

Non EU-countries (3) funded by the Swedish Institute
Georgia, Moldova, Ukraine

Reduce the risk of CAUTI
Cathter-Associated Urinary Tract Infections

Together with SSI the most common HCAI in the European Union
Cassini 2016
CAUTI are predominately caused by anti-microbial resistant bacteria

Health-care associated UTIs are cased by the gut flora - Gram negatives - which are becoming more and more resistant to antibiotics

*E. coli, Klebsiellas, Enterobacter, Proteus, Pseudomonas, Acinetobacter*
Klebsiella pneumoniae in Europe
Urinary catheters in European patients

- 25% of patients in hospitals get a urinary catheter
- 5% of patients in elderly homes get a urinary catheter
- 60% of all urinary catheters are unnecessary and in place too long

Saint 1999, Jain, 1995
70% of CAUTI can be prevented Umscheid 2011
Bundle of activities to reduce CAUTI

- Avoid unnecessary catheters
- Closed collection system
- As small size as possible
- Insertion - aseptic technique
- Maintenance - aseptic technique
- Review daily and remove if not indicated
WP6.2 Bottom-up approach

Point-of-care professionals
Experienced
Experts
Honor in saving lives

Deserves respect for their knowledge

NOT NOVICES
Implementation model to overbridge the gap

www.ihi.org
Gap

Laws, rules based on evidence and best practice

Actual work with patients on the floor
Thank you!

Birgitta Lytsy
Exchange of views:
Infection prevention and control programmes in Europe

Adopting and implementing successful CONTROL strategies

Andrea Ammon
European Centre for Disease Prevention and Control (ECDC)
Healthcare associated infections - adopting and implementing effective control strategies in Europe

Dr Andrea Ammon, ECDC Director
29 January 2019, European Parliament, Brussels
Prevalence and estimated number of healthcare-associated infections in acute care hospitals and long-term care facilities, EU/EEA, 2016-2017

<table>
<thead>
<tr>
<th>Patients/residents with a least one healthcare-associated infection on any given day</th>
<th>Acute care hospitals</th>
<th>Long-term care facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.5%</td>
<td>3.9%</td>
</tr>
<tr>
<td></td>
<td>1 in 15 patients</td>
<td>1 in 26 residents</td>
</tr>
<tr>
<td></td>
<td>98 000 patients</td>
<td>130 000 residents</td>
</tr>
</tbody>
</table>

Healthcare-associated infections each year (estimated total)

<table>
<thead>
<tr>
<th></th>
<th>Acute care hospitals</th>
<th>Long-term care facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.5 million</td>
<td>4.4 million</td>
</tr>
</tbody>
</table>

Composite index* of antimicrobial resistance (AMR) in healthcare-associated infections from acute care hospitals, EU/EEA countries and Serbia, 2016-2017

*Percentage of isolates resistant to first-level antimicrobial resistance markers in healthcare-associated infections, i.e.:
- *Staphylococcus aureus* resistant to meticillin (MRSA),
- *Enterococcus faecium* and *Enterococcus faecalis* resistant to vancomycin,
- Enterobacteriaceae resistant to third-generation cephalosporins,
- *Pseudomonas aeruginosa* and *Acinetobacter baumannii* resistant to carbapenems.

* Bulgaria and the Netherlands: poor national representativeness of acute care hospital sample;
** Norway: national protocol;
Norway and UK-Scotland did not collect microbiological data.

Burden of infections with antibiotic-resistant bacteria is comparable to burden of influenza, TB & HIV/AIDS combined

671 689 infections with antibiotic-resistant bacteria
33 110 attributable deaths
170 DALYs* per 100 000 population

- 75% due to healthcare-associated infections
- 70% due to 4 top-ranking antibiotic-resistant bacteria
- 39% due to carbapenem- and/or colistin resistance

Main actions to prevent and control antimicrobial resistance

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

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

New antimicrobial agents
(with a novel mechanism of action, research, development)
Prevalence of antimicrobial use in acute care hospitals, EU/EEA and Serbia, 2016-2017

1 in 3 patients in acute care hospitals in EU/EEA countries received at least one antimicrobial on any given day

* Bulgaria, the Netherlands: poor national representativeness of acute care hospital sample;
** Norway: national protocol.

Plachouras D, et al. Eurosurveillance 15 November 2018
Countries with a higher prevalence of antibiotic have a higher composite index of AMR

\[ r = 0.51 \]
\[ p = 0.004 \]

Proportion of broad-spectrum antimicrobials in acute care hospitals, EU/EEA countries & Serbia, 2016–2017

Surgical antibiotic prophylaxis in acute care hospitals, by duration (single dose, one day, more than one day), EU/EEA countries and Serbia, 2016-2017

54% surgical antibiotic prophylaxis courses in EU/EEA countries were prescribed for more than one day

Countries with more resources for infection prevention and control have a lower composite index of AMR

Economic assessment* of a ‘mixed-intervention’ package†
Just a few dollars more lead to substantial savings in healthcare expenditure

†‘Mixed-intervention’ package:
- Improve hospital hygiene (starting with hand hygiene)
- Antimicrobial stewardship
- Rapid diagnostic tests (bacterial vs. viral infection)
- Delayed prescription
- Public awareness campaigns

*Including effect on susceptible infections.

Source: OECD. Stemming the Superbug Tide: just a few dollars more. 2018. oe.cd/amr-2018
Humans + Animals + Environment = One Health

Prudent use of antibiotics.
Everyone is responsible!
Exchange of views:
Infection prevention and control programmes in Europe

Adopting and implementing successful CONTROL strategies

Jesús Rodríguez Baño
European Society of Clinical Microbiology and Infectious Diseases
Adopting and implementing successful control strategies

Jesús Rodriguez Baño
ESCMID President
Head of Infectious Diseases division, HUV Macarena, Seville, Spain
The role of scientific societies

• For members and scientific community
  • Training, education
  • Research promotion
  • Science dissemination and guidelines
  • Career promotion

• For society and policy makers
  • Data and guidance to help decisions
  • Information
  • Advocacy
  • Implementation tools
Training in infection control in Europe

• Heterogenous in
  • Background: hygienists, epidemiologists, clinical microbiologists, infectious diseases specialists...
  • Training curriculum: from full specialisation/board certified to nothing
Heterogeneity in IC training: an example

Presence of a national curriculum or programme for training of infection control and hospital hygiene doctors and nurses in European countries, 2006 (IPSE; 31 countries) and 2010 (TRICE; 33 countries)

A. For IC/HH doctors, IPSE, 2006

B. For IC/HH doctors, TRICE, 2010

C. For IC/HH nurses, IPSE, 2006

D. For IC/HH nurses, TRICE, 2010

Brusaferro et al, Surveill 2014
Agreement is possible

Core competencies for infection control and hospital hygiene professionals in the European Union, by area and domain, 2010

<table>
<thead>
<tr>
<th>Area</th>
<th>Domain</th>
<th>Number of competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme management</td>
<td>Elaborating and advocating an infection control programme</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Management of an infection control programme, workplan and projects</td>
<td>20</td>
</tr>
<tr>
<td>Quality improvement</td>
<td>Contributing to quality management</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Contributing to risk management</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Performing audits of professional practices and evaluating performance</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Infection control training of employees</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Contributing to research</td>
<td>2</td>
</tr>
<tr>
<td>Surveillance and Investigation of healthcare-associated infections</td>
<td>Designing a surveillance system</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Managing (implementation, follow-up, evaluation) a surveillance system</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Identifying, investigating and managing outbreaks</td>
<td>7</td>
</tr>
<tr>
<td>Infection control activities</td>
<td>Elaborating infection control interventions</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Implementing infection control procedures in healthcare</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Contributing to reducing antimicrobial resistance</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Advising appropriate laboratory testing and use of laboratory data</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Decontamination and sterilisation of medical devices</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Controlling environmental sources of infections</td>
<td>2</td>
</tr>
</tbody>
</table>
Certification of infection control in Europe

EU countries (national societies)
- ECDC (European Centre for Disease Prevention and Control)
  - SIGHT (Organization of Hospital Infection Control Programmes)
  - TRICE/TRICE-IS (Training in Infection Control in Europe)

ESCMID (European Society of Clinical Microbiology and Infectious Diseases)

EUCIC (European Committee on Infection Control)

Non-EU countries (national societies)

UEMS (European Union of Medical Specialties)
- EACCME
- ECAMISQ
- CESMA
### Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus

**Lancet Infect Dis 2015; 15: 212–24**

<table>
<thead>
<tr>
<th>Key component</th>
<th>Indicators</th>
<th>Quality of evidence</th>
<th>Ease of implementation</th>
<th>EU-wide applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 An effective infection control programme in an acute-care hospital must include as a minimum standard at least one full-time specifically trained infection-control nurse per up to 250 beds, a dedicated physician trained in infection control, microbiological support, and data management support</td>
<td>Continuous review of surveillance and prevention programmes, outbreaks, and audits; infection-control committee in place; inclusion of infection control on the hospital administration agenda, and defined goals (eg, HAI rates); and appropriate staffing and budget for infection control</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2 Ward occupancy must not exceed the capacity for which it is designed and staffed; staffing and workload of frontline HCWs must be adapted to acuity of care, and the number of pool or agency nurses and physicians used kept to a minimum</td>
<td>Average bed occupancy at midnight; average numbers of frontline workers, and the average proportion of pool or agency professionals</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3 Sufficient availability of and easy access to materials and equipment, and optimisation of ergonomics</td>
<td>Availability of alcohol-based hand rub at the point of care and sinks stocked with soap and single-use towels</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4 Use of guidelines in combination with practical education and training</td>
<td>Adaptation of guidelines to local situation, number of new staff trained with the local guidelines, teaching programmes are based on local guidelines</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5 Education and training involves frontline staff and is team and task oriented</td>
<td>Education and training programmes should be audited and combined with knowledge and competency assessments</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6 Organising audits as a standardised (scored) and systematic review of practice with timely feedback</td>
<td>Measurement of the number of audits (overall, and stratified by departments/units and topics) for specified time periods</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7 Participating in prospective surveillance and offering active feedback, preferably as part of a network</td>
<td>Participation in national and international surveillance initiatives, number and type of wards with a surveillance, regular review of the feedback strategy</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8 Implementing infection-control programmes following a multimodal strategy, including tools such as bundles and checklists developed by multidisciplinary teams, and taking into account local conditions</td>
<td>Verification that programmes are multimodal; measurement of process indicators (eg, hand hygiene, care procedures); measurement of outcome indicators (eg, HAI rates, MDRO infections and transmission)</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>9 Identifying and engaging champions in the promotion of intervention strategies</td>
<td>Interviews with frontline staff and infection-control professionals</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10 A positive organisational culture by fostering working relationships and communication across units and staff groups</td>
<td>Questionnaires about work satisfaction, crisis management, and human resource assessments of absenteeism and HCW turnover</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Key component</td>
<td>Indicators</td>
<td>Quality of evidence</td>
<td>Ease of implementation</td>
<td>EU-wide applicability</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>1. An effective infection control programme in an acute-care hospital must</td>
<td>Continuous review of surveillance and prevention programmes, outbreaks, and audits; infection control committee in place, inclusion of infection control on the hospital administration agenda, and defined goals (e.g., HAI rates); and appropriate staffing and budget for infection control</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>include as a minimum standard at least one full-time specifically trained infection-control nurse per up to 250 beds, a dedicated physician trained in infection control, microbiological support, and data management support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ward occupancy must not exceed the capacity for which it is designed and staffed; staffing and workload of frontline HCWs must be adapted to acuity of care, and the number of pool or agency nurses and physicians used kept to a minimum</td>
<td>Average bed occupancy at midnight, average numbers of frontline workers, and the average proportion of pool or agency professionals</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sufficient availability of and easy access to materials and equipment, and optimisation of ergonomics</td>
<td>Availability of alcohol-based hand rub at the point of care and sinks stocked with soap and single-use towels</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Use of guidelines in combination with practical education and training</td>
<td>Adaptation of guidelines to local situation, number of new staff trained with the local guidelines, teaching programmes are based on local guidelines</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Education and training involves frontline staff and is team and task oriented</td>
<td>Education and training programmes should be audited and combined with knowledge and competency assessments</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Organising audits as a standardised (scored) and systematic review of practice with timely feedback</td>
<td>Measurement of the number of audits (overall, and stratified by departments/units and topics) for specified time periods</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Participating in prospective surveillance and offering active feedback, preferably as part of a network</td>
<td>Participation in national and international surveillance initiatives, number and type of wards with a surveillance, regular review of the feedback strategy</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Implementing infection-control programmes following a multimodal strategy, including tools such as bundles and checklists developed by multidisciplinary teams, and taking into account local conditions</td>
<td>Verification that programmes are multimodal; measurement of process indicators (e.g., hand hygiene, care procedures); measurement of outcome indicators (e.g., HAI rates, MDRO infections and transmission)</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Identifying and engaging champions in the promotion of intervention strategies</td>
<td>Interviews with frontline staff and infection-control professionals</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>A positive organisational culture by fostering working relationships and communication across units and staff groups</td>
<td>Questionnaires about work satisfaction, crisis management, and human resource assessments of absenteeism and HCW turnover</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
TABLE 1. Summary of minimum requirements in infection control (for details, see the text)

Infection control is considered to be an **institutional priority**
Multidisciplinary infection control committee
Infection control programme including objectives and indicators, with periodical evaluations
Multidisciplinary infection control teams, including at least epidemiologists, infectious disease specialists, microbiologists, and infection control nurses, and liaisons with other key actors, such as intensive-care or surgical specialties. These teams must be share members and be closely coordinated with the antimicrobial stewardship team, of which pharmacists are also key members
One full-time or equivalent infection control nurse per 100 beds in acute-care centres and per 150–205 beds in long-term-care facilities, according to complexity
Definition of competencies for infection control team components, and specific accredited training according to those competencies
Access to electronic charts and tools
Appropriate cleaning and disinfection/sterilization services
Appropriate ward staffing levels, and education for ward staff in infection control-related issues
Appropriate architectonic structure and related aspects (such as enough individual rooms, clean–dirty circuits where needed, and access to hand hygiene points)
Access to appropriate microbiological support and tools, both for rapid identification and susceptibility testing of pathogens causing infections, and for molecular typing of isolates whenever needed, in a timely manner
Implementation: from regional to local

- Regional level
  - Prioritisation
  - Training
  - Quality standards, accreditation

- Local level: IC specific
  - Leadership and commitment
  - High-level, specialised training
  - Self-imposed excellence
  - Operational: organisation, objectives, evaluation

- Local level: general
  - Staffing, structure, tools

A safety issue
Long-term control of hospital-wide, endemic multidrug-resistant *Acinetobacter baumannii* through a comprehensive “bundle” approach

Am J Infect Control 2009

“The 3/3 Strategy”: A Successful Multifaceted Hospital Wide Hand Hygiene Intervention Based on WHO and Continuous Quality Improvement Methodology

PLoS ONE 2012

Long-Term Control of Endemic Hospital-Wide Methicillin-Resistant *Staphylococcus aureus* (MRSA): The Impact of Targeted Active Surveillance for MRSA in Patients and Healthcare Workers

Infect Control Hosp Epidemiol 2010; 31(8):786-795

Eradication of an extensive outbreak in a neonatal unit caused by two sequential *Klebsiella pneumoniae* clones harbouring related plasmids encoding an extended-spectrum β-lactamase

Journal of Hospital Infection (2009) 73, 157–163

Wastewater drainage system as an occult reservoir in a protracted clonal outbreak due to metallo-β-lactamase-producing *Klebsiella oxytoca*


Análisis de la calidad de uso de antimicrobianos en el servicio de urgencias de un hospital de tercer nivel

Emergencias 2018;30:297-302
<table>
<thead>
<tr>
<th></th>
<th>Spain EARS, 2016</th>
<th>HUV Macarena, BSI, 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin-R Enterococcus</td>
<td>2.1%</td>
<td>0</td>
</tr>
<tr>
<td>Methicillin-R S. aureus</td>
<td>25.8%</td>
<td>11.6%</td>
</tr>
<tr>
<td>CephR-E. coli</td>
<td>15.0%</td>
<td>9.1%</td>
</tr>
<tr>
<td>CephR-K. pneumoniae</td>
<td>22.3%</td>
<td>7.5%</td>
</tr>
<tr>
<td>CR-K. pneumoniae</td>
<td>2.1%</td>
<td>0</td>
</tr>
<tr>
<td>CR-P. aeruginosa</td>
<td>21.4%</td>
<td>8.5%</td>
</tr>
<tr>
<td>CR-A. baumannii</td>
<td>62.3%</td>
<td>0</td>
</tr>
</tbody>
</table>
Exchange of views:
Infection prevention and control programmes in Europe

Active screening programs in Europe
Create and monitor national targets for the surveillance and reduction of AMR/HAIs

Belgium

Herman Goossens
University of Antwerp
“If you cannot measure it, you cannot improve it”

Lord Kelvin, 1824-1907
1. Tackling Antibiotic Use and Resistance in the Community in Belgium
Antibiotic Consumption in Ambulatory Care in the EU in 2001

Goossens et al, Lancet 2005
Awareness campaigns: Do they work?
Outpatient Antibiotic Use in Belgium
1997-2018 in Packages per 1,000 Inhabitants per Day (PID) – July-June

Year


Packages per 1,000 inhabitants per day

-4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 -0.0

Penicillins (J01C)
Cephalosporins (J01D)
Macrolides (J01F)
Quinolones (J01M)
Tetracyclines (J01A)
Sulphonamides (J01E)
Others

Urinary antiseptics (J01X)
Outpatient Antibiotic Use in Belgium 1997-2018 in Euros per 1,000 Inhabitants per Day (PID) – July-June

Reimbursement from Class B to C on 1/5/2017
Evolution of the proportion of resistant *Streptococcus pneumoniae* isolates over time in Belgium

Source: University of Leuven, Reference centre for *S. pneumoniae*
# Measures for antibiotic consumption in ambulatory care and level of targets set in different countries

<table>
<thead>
<tr>
<th></th>
<th>BE</th>
<th>DK</th>
<th>FR</th>
<th>IR</th>
<th>IT</th>
<th>JP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packages per 1000 inhabitants per year</td>
<td>600 by 2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>400 by 2025</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescriptions per 100 patients per year</td>
<td></td>
<td></td>
<td>-12% by 2016 (vs 2010)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescriptions per 1000 inhabitants per year</td>
<td></td>
<td></td>
<td>350 by 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescriptions per 1000 inhabitants per day</td>
<td></td>
<td></td>
<td></td>
<td>-10% by 2021 (vs 2016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defined daily doses per 1000 inhabitants per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≤ -10% by 2020 (vs 2016)</td>
<td>-33% by 2020 (vs 2013)</td>
</tr>
<tr>
<td>Defined daily doses per 1000 inhabitants per year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: WHO, 2018
Measures for antibiotic consumption in ambulatory care and level of targets set in different countries

<table>
<thead>
<tr>
<th>Package</th>
<th>NO</th>
<th>PT</th>
<th>KR</th>
<th>SE</th>
<th>TH</th>
<th>TU</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packages per 1000 Inhabitants per year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescriptions per 100 patients per year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≤ -25% by 2024 (vs 2013)</td>
</tr>
<tr>
<td>Prescriptions per 1000 inhabitants per year</td>
<td></td>
<td>250 by 2020</td>
<td></td>
<td>250 by 2014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescriptions per 1000 inhabitants per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defined daily doses per 1000 inhabitants per day</td>
<td>-30% by 2020 (versus 2012)</td>
<td>20% by 2020 (versus 2015)</td>
<td>-20% by 2021 (vs 2016)</td>
<td>-35% by 2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defined daily doses per 1000 inhabitants per year</td>
<td>≤ -5% by 2015 (vs 2011)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: WHO, 2018
1. Tackling Antibiotic Resistance in Hospitals in Belgium
Staphylococcus aureus: percentage of invasive isolates resistant to meticillin (MRSA); EU/EEA, 2002
Handhygiene campaigns in Belgian hospitals (73-89% participation)

<table>
<thead>
<tr>
<th>Campaign</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>First (2005)</td>
<td>Hand hygiene, just do it... and with alcohol rubs</td>
</tr>
<tr>
<td>Second (2007)</td>
<td>Hand hygiene, do it correctly</td>
</tr>
<tr>
<td>Third (2009)</td>
<td>Hand hygiene, without jewels and with appropriate use of gloves</td>
</tr>
<tr>
<td>Fourth (2011)</td>
<td>Doctor, don’t forget, it works and you are a role model</td>
</tr>
<tr>
<td>Fifth (2013)</td>
<td>Hand hygiene, do it certainly before any contact with the patient</td>
</tr>
<tr>
<td>Sixth (2015)</td>
<td>Hand hygiene, together with the patient</td>
</tr>
<tr>
<td>Seventh (2017)</td>
<td>Hand hygiene, all together with the patient</td>
</tr>
</tbody>
</table>
Hand Hygiene campaigns: Do they work?
"It is amazing what you can accomplish if you do not care who gets the credit." – Harry Truman
Handhygiene compliance before vs after campaign

Observance HDM (%)

+22%
MRSA in Belgian acute care hospitals

proportion of \textit{S. aureus} clinical isolates and incidence of nosocomial acquisition

\textbf{Source: National surveillance, B. Jans}

Mean of rates in cohort of hospitals with min. 5 participations since 1994
Staphylococcus aureus: percentage of invasive isolates resistant to meticillin (MRSA); EU/EEA, 2002–2016 (EARS-Net)
Exchange of views:
Infection prevention and control programmes in Europe

Active screening programs in Europe
Create and monitor national targets for the surveillance and reduction of AMR/HAI

Netherlands
Edwin Oberjé
University of Amsterdam
Antimicrobial Stewardship Initiatives across Europe

European Parliament Bruxelles | Tuesday 29th January 2019

dr. Edwin Oberjé | edwin.oberje@zuyd.nl
Antimicrobial stewardship initiatives throughout Europe: proven value for money

Edwin J.M. Oberlij,1 Marit A.C. Tanke,2 Patrick P.T. Jeuringse,3

1Faculty of Healthcare, Zuyd University of Applied Sciences, Heerlen; 2Radboud University Medical Center, Ceus; 3Academic Center for Sustainable Healthcare, Nijmegen; 4Department of Macroeconomic Issues and Labor Market, Ministry of Health, Welfare and Sports, the Hague, the Netherlands

Key words: Antimicrobial resistance; antimicrobial consumption; EU countries; healthcare

Antimicrobial stewardship is encouraged in all European countries in order to slow the spread of antibiotic-resistant microorganisms. It has also become evident that antimicrobial resistance is a problem that cannot be tackled by single institutions or countries. Prevention of antimicrobial resistance is an important public health priority, but local, national and international efforts are needed. Countries can learn from each other and possibly transfer best practices across borders to prevent antimicrobial resistance. The aim of this study was to highlight some of the success stories of European countries and discuss the lessons that can be learned from them. The study is based on recent data from the European Centre for Disease Control and Prevention (ECDC) and the European Healthcare Surveillance Network (EHSAN). The information presented in this report is based on the publication of the European Union (EU)/European Economic Area (EEA) report on antimicrobial resistance in the EU/EEA in 2016.

The European Union (EU) and the European Economic Area (EEA) have taken steps to address the issue of antimicrobial resistance. In 2012, the EU adopted a strategy to combat antimicrobial resistance, which included monitoring and surveillance of antibiotic use and resistance. The strategy also set ambitious targets for reducing the level of antibiotic use in the EU. These targets were set to be achieved by 2020.

Infectious Disease Reports 2017; volume 9

Antimicrobial stewardship initiatives throughout Europe: proven value for money

Edwin J.M. Oberlij,1 Marit A.C. Tanke,2 Patrick P.T. Jeuringse,3

1Faculty of Healthcare, Zuyd University of Applied Sciences, Heerlen; 2Radboud University Medical Center, Ceus; 3Academic Center for Sustainable Healthcare, Nijmegen; 4Department of Macroeconomic Issues and Labor Market, Ministry of Health, Welfare and Sports, the Hague, the Netherlands

Key words: Antimicrobial resistance; antimicrobial consumption; EU countries; healthcare

Antimicrobial stewardship is encouraged in all European countries in order to slow the spread of antibiotic-resistant microorganisms. It has also become evident that antimicrobial resistance is a problem that cannot be tackled by single institutions or countries. Prevention of antimicrobial resistance is an important public health priority, but local, national and international efforts are needed. Countries can learn from each other and possibly transfer best practices across borders to prevent antimicrobial resistance. The aim of this study was to highlight some of the success stories of European countries and discuss the lessons that can be learned from them. The study is based on recent data from the European Centre for Disease Control and Prevention (ECDC) and the European Healthcare Surveillance Network (EHSAN). The information presented in this report is based on the publication of the European Union (EU)/European Economic Area (EEA) report on antimicrobial resistance in the EU/EEA in 2016.

The European Union (EU) and the European Economic Area (EEA) have taken steps to address the issue of antimicrobial resistance. In 2012, the EU adopted a strategy to combat antimicrobial resistance, which included monitoring and surveillance of antibiotic use and resistance. The strategy also set ambitious targets for reducing the level of antibiotic use in the EU. These targets were set to be achieved by 2020.
Five Business Cases

3. University Medical Center Groningen
   Antimicrobial Stewardship Teams

4. Nursing home De Riethorst
   Control of an Outbreak of Multi-Resistant Klebsiella Pneumoniae
Antimicrobial Stewardship Team

Day 0

Patient enters hospital

Start antimicrobial therapy
Antimicrobial Stewardship Team

Antimicrobial use on a urology department before and after implementation of the A-team
Infection Prevention in Nursing Homes

Yearly budget for infection prevention: €75,000
= 0.15% of total budget
Proposition

The benefits of infection prevention and antimicrobial stewardship teams outweigh the costs
Study Team

Edwin Oberjé, PhD | *Zuyd University of Applied Sciences*
Marit Tanke, PhD | *Dutch Ministry of Health, Welfare, and Sports*
Patrick Jeurissen, PhD | *Dutch Ministry of Health, Welfare, and Sports*
Exchange of views:
Infection prevention and control programmes in Europe

Active screening programs in Europe
Create and monitor national targets for the surveillance and reduction of AMR/HAIs

United Kingdom
Karen Shaw
Public Health England
National targets for the surveillance and reduction of HCAI and AMR in England

European Parliament Brussels
29 January 2019

Karen Shaw
Infection Prevention and Control Lead
Public Health England National Infection Service
HCAI & AMR Division
Clinical Fellow NHS Improvement
# Mandatory HCAI Surveillance: Timeline

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S. aureus bacteraemia</strong> (aggregate counts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MRSA bacteraemia</strong> (enhanced, real-time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>S. aureus bacteraemia</strong> (enhanced, real-time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Post Infection Review (PIR) for MRSA bacteraemia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C. difficile infection over 65s</strong> (quarterly aggregate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C. difficile infection over 2s</strong> (enhanced, real-time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GRE bacteraemia</strong> (quarterly aggregate counts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Surgical site infection</strong> (orthopaedics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>E. coli bacteraemia</strong> (enhanced, real-time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Klebsiella and Pseudomonas aeruginosa bacteraemia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
S. aureus
Surveillance and Interventions

- **Introduction of care for catheters, cannulae & tubes**
- **Clean your hands campaign**
- **Towards cleaner hospitals campaign**

- **Screening of high risk & certain elective pre-operative patients for MRSA**

- **Screening of high risk, all elective & emergency admissions patients for MRSA**

- **Post Infection Review initiated**

- **Enhanced MSSA surveillance**

- **National MRSA BSI target reduce by 50% (over 3 years)**

- **CQC inspections**

- **Saving Lives bundles**

- **Introduction of national legislation for Infection Prevention and Control – Code of Practice.**

*Graph showing number of bacteraemia reports from 2002 to 2017.*
CDI
Surveillance and Interventions

Count of toxin-positive CDI cases reported per year to SGSS between 2000 and 2018, England

- National target to reduce CDI by at least 30% by March 2011
- Introduction of national IPC legislation (Code of practice)
- CDRN established
- CDI guidance updated

Surveillance system
- Mandatory
- SGSS

Data from PHE.
Limited to isolates with toxin detected
AMR Local Indicator

Ambition to reduce E.coli BSI by 50% by 2020/21

National target to reduce CDI by at least 30% by March 2011

National MRSA BSI target reduce by 50% (over 3 years)

Ambition to reduce E.coli BSI by 50% by 2020/21

Data: Public Health England
Reduce Inappropriate Prescribing

Reduction targets were based on 2013/14 performance.

April 2015 Introduce improvement scheme to reduce inappropriate antibiotic use in primary care all England.

April 2018 Introduce lower England reduction target to achieve by 2020/21.

National prescribing toolkit – TARGET 2011
Start Smart then Focus – 2011
Antibiotic Guardian – 2014
NICE Guidelines AMS – 2015
NICE Guidelines – infection – 2017
Quality Premium – 2015 – 2019
CQUIN 2016- 2019

Elizabeth.beech@nhs.net National Project Lead AMR NHS Improvement England
Reduce Inappropriate Prescribing

QI scheme to reduce Piperacillin-tazobactam and carbapenems
Acknowledgements:

Russell Hope
Simon Thelwall
Elizabeth Beech
Emma Cramp
Diane Ashiru-Oredope
Mark Wilcox
Susan Hopkins
Exchange of views:
Drivers and barriers to prevent and reduce HAIs

Moderated by John Bowis
HFE co-Patron
Exchange of views:
Drivers and barriers to prevent and reduce HAIs

Arjon Van Hengel
DG RTD, European Commission
Tackling AMR - guided by the EU One Health Action Plan

Arjon van Hengel, PhD
European Commission
DG Research and Innovation
Health Directorate

‘Fighting infectious diseases and advancing public health’
ANTIMICROBIAL RESISTANCE:
NEW EU ONE HEALTH ACTION PLAN

MAKING THE EU A BEST PRACTICE REGION ON AMR

BOOSTING RESEARCH, DEVELOPMENT AND INNOVATION ON AMR

SHAPING THE GLOBAL AGENDA ON AMR

Launched on 29 June 2017

#EUAMRaction
1. Improve knowledge on detection, effective infection control and surveillance
2. Develop new therapeutics and alternatives
3. Develop new preventive vaccine
4. Develop novel diagnostics
5. Develop new economic models and incentives
6. Close knowledge gaps on AMR in the environment and on preventing transmission
Out of the box... but inside the grid

The ecosystem for innovation development
Current methods do not allow doctors to reliably distinguish between life-threatening bacterial infection and trivial viral illness.

PERFORM aims to detect bacterial infections via the pattern of genes and proteins activated by the child’s immune system in response to the infection. It will study around 60,000 children across Europe and West Africa who arrive at hospitals and clinics with a high fever. It will identify and validate markers of infection and will develop a management plan for such children which will decrease unnecessary use of antibiotics.

- Budget €18 million
- Start date January 2016
- Duration 60 months
SME targeted calls deliver results

• **BACATTACK**
  Developed novel **antimicrobial catheters** to prevent catheter-associated urinary tract infections.
  The BACATTACK SME Biomodics, developed a new semipermeable catheter that allows antibiotic delivery via a novel hybrid material.

• **RID-RTI**
  Developed a novel rapid **diagnostic tool** for hospital acquired pneumonia.
  The RID-RTI SME Mobidiag now receives InnovFin ID funding (EC + European Investment Bank) for further development of rapid diagnostics.
Developing a global research agenda

Continue collaborative research with sub-Saharan Africa in the context of EDCTP, in particular in relation to TB, HIV, malaria and NID

- funds for instance 4 projects on clinical trials developing new TB vaccines, that started in 2018 (€37 million)

Support the establishment of a virtual research institute under JPIAMR

- Connecting research performers and generate scientific evidence addressing AMR, and informing policy and guidelines

Improve global coordination of research activities by promoting dialogue and collaboration between international research initiatives

- building on TATFAR, JPIAMR etc
The fight against AMR: one challenge, many instruments

- Collaborative projects
  - Public-private partnership with big pharma
    - IMI (Innovative Medicines Initiative)
- Public-public partnerships with EU Member States & beyond
  - One health EJP
- Blue sky research
- Knowledge triangle: Higher education, business, R&I
  - Grants for small businesses
    - SME Instrument
  - Loans for small and big R&I companies
    - InnovFin EU Finance for Innovators
  - European Strategy Forum on Research Infrastructures
  - European Research Council
  - Innovative Life
Exchange of views:
Drivers and barriers to prevent and reduce HAIs

Wilfried von Eiff
Center for Hospital Management and
Member of the EU initiative
“health-i-care” for Infection Prevention
Exchange of views:
Drivers and barriers to prevent and reduce HAIs

Patriq Fagerstedt
JPIAMR
Joint Programming of Research for Patient Safety – JPIAMR

Patriq Fagerstedt
JPIAMR Secretariat
Swedish National Research Programme on Antibiotic Resistance
Swedish Research Council
Joint Programming Initiative on Antimicrobial Resistance

- an international AMR research coordination platform

Joint Actions with a One Health perspective:

- Identification of knowledge gaps and research priorities
- Mapping of research funding and output
- Joint Strategic Research and Innovation Agenda
- Alignment of national research funding
- Coordination of AMR research and funding on a global scale
- AMR international policy actions
- JPIAMR Virtual Research Institute
JPIAMR - A Global Organisation

The European Commission (DG Research) is a full non-voting member

JPIAMR member states

The European Commission (DG Research) is a full non-voting member

JPIAMR member states
Diagnostics and Surveillance of Antimicrobial Resistance

Funding research projects addressing the development of diagnostic and surveillance tools, technologies and methods to detect AMR. Projects should address the diagnosis of AMR infections in clinical and veterinary settings or the surveillance of AMR in humans, animals and the environment.

Promoting projects with impact in LMIC settings in Asia and Africa by funding researchers from 40+ countries
JPIAMR One Health SRIA (update 2019)
Mapping of funding

JPIAMR Member Country National Funding

JPIAMR Funding

62 projects, 340+ research groups 65 M€ from JPIAMR
21 networks, 800+ researchers/experts 2 M € from JPIAMR
Example Network: JPIAMR supported network AMR Rapid Diagnostic Tests (AMR-RDT)

50 key individuals and organisations from 15 countries worldwide that are active in the field of diagnostics and antimicrobial resistance.

Schematic overview of the development process for products in the in vitro diagnostics market

The network published a detailed analysis of the barriers to timely development and implementation of novel and rapid AST (Antimicrobial Susceptibility Test) platforms.

Will help to facilitate a dialog between AST developers and users about the features that would facilitate uptake and usage of AST devices.
Other JPIAMR-funded Research Networks

2017
- Behavioural approaches to optimise antibiotic stewardship in hospitals
- Consensus group on the design, analysis and reporting of antibiotic stewardship trials
- AMR Rapid Diagnostic Tests (AMR-RDT)

2019
- Bridging the gap between human and animal surveillance data, antibiotic policy, and stewardship (ARCH)
- National health care infrastructures, health care utilization and patient movements between hospitals: Networks working to improve surveillance (NEVIS)
- Intensive Care Airway and Lung Microbiome Network (ICALM)
- Global Antimicrobial resistance Platform for ONE Burden Estimates (GAP-ONE)
- Antimicrobial Resistance in Intensive Care (AMRIC)
JPIAMR Virtual Research Institute

- Connecting AMR researchers under the JPIAMR priority topics in a One Health approach
- Building capacity and strengthening capability
- Facilitating access to scientific information and infrastructures
- Global reach: Bridging geographic borders in the research community
- Breaking practical barriers between fields of research
- Increasing awareness and visibility of the AMR issue
- Producing scientific evidence for developing policy and guidelines
Thank you!

www.jpiamr.eu

@jpiamr

Facebook.com/JPIAMR
Open debate
Moderated by John Bowis
HFE co-Patron
Closing remarks
by John Bowis HFE co-Patron
Thank you!