

Surveillance of Antimicrobial Resistance and Healthcare-associated Infections in Europe

Carl Suetens, ECDC

Presented by Håkan Hanberger

Message/Questions from C Suetens to Workshop 7, MIE2009 Advanced Computer Methods for Patient Safety



How could ECDC support the implementation of electronic surveillance in Member States?

- Through a Call for Tender?
- By providing training?
- By making an assessment of the capacity or the diversity of existing IT systems in the hospitals all around the EU?

The MIE 2009 workshop might generate some first ideas that could be further explored at a future meeting.

Carl Suetens, ECDC

OPINION | AUGUST 12, 2009, 11:36 A.M. ET

Don't Forget the Bacterial Threat

Antibiotic resistance is a much bigger problem than swine flu.

In contrast to the flu, most of these infections receive little or no public attention. The only exception has been methicillin-resistant *Staphylococcus aureus* (MRSA). This microbe is now receiving significant public attention—but this attention has come some three decades after its spread in the U.S. first began. That delay allowed MRSA to spread uncontrollably, and more than 18,000 people are now estimated to die each year in the U.S. from this bug, according to the Journal of the American Medical Association.

Yet the spread of these and other resistant bacteria has met with almost no coordinated effort to fight them in the U.S. Very few resources have been allocated to combat antimicrobial resistance. Last fiscal year, for example, the U.S. government budgeted just \$16.9 million for the Centers for Disease Control and Prevention to spend fighting antibiotic resistance, about 1% of the total funding requested for swine flu.

The response to the swine flu outbreak has been impressive. This response should be seen as a blueprint for how we fight other deadly outbreaks.

Burden of Healthcare-Associated Infections and Multidrug Resistance in Europe (preliminary estimate)



- **Healthcare-associated infections (HCAI)**
 - approximately 4 million per year
 - approx. 37,000 directly attributable deaths each year
- **Multidrug-resistant bacteria**
 - approximately 1/2 of the deaths attributable to HCAI

This is an underestimate!

Source: Suetens C & Monnet DL, ECDC
(preliminary estimate)

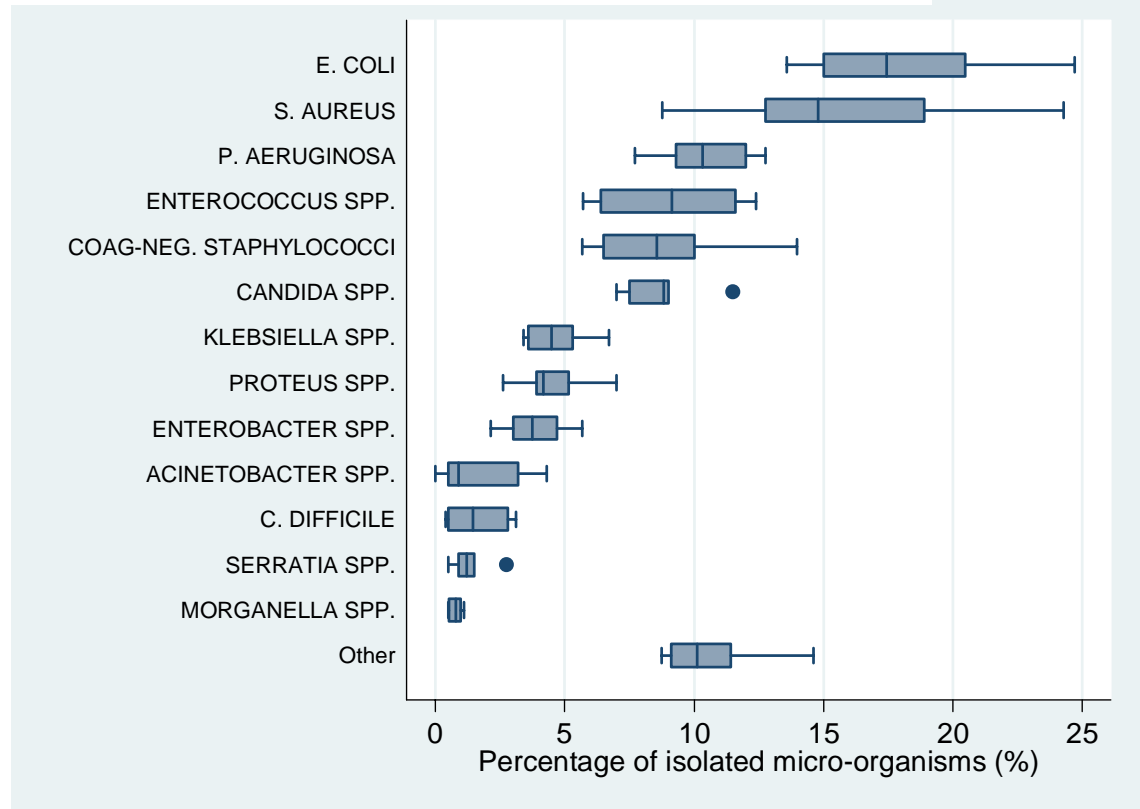
Burden of Healthcare-Associated Infections and Multidrug Resistance in Europe (preliminary estimate)



- Review of recent multicentre HCAI prevalence surveys in acute care hospitals (varying methods)
- Mean HCAI prevalence = 7.2%

$$I = P * LA / (LN - INT)$$

Incidence = 5.1% * 81M hospital admissions/year in EU27 (Eurostat)
 ⇒ 4,131,000 patients with HCAI (95% CI 3,483,000-4,779,000),
 ⇒ 37,179 direct deaths (0.9%; 95%CI 31347-43011) + 111,000 indirect deaths



EU surveillance networks



- Antimicrobial resistance: EARSS
 - Coordinated at RIVM, Bilthoven, NL (H. Grundmann et al.)
 - DG Sanco support from 1999 to Aug 2006
 - Outsourced by ECDC until Dec 2009; Transition to ECDC ?



EARSS

EUROPEAN ANTIMICROBIAL RESISTANCE SURVEILLANCE SYSTEM



- Antimicrobial use: ESAC
 - Coordinated at Univ. of Antwerp, BE (H. Goossens et al.)
 - DG Sanco support from 1999 to Aug 2007
 - Outsourced by ECDC until Aug 2010; Transition to ECDC Sep 2010



- Healthcare-associated infections: IPSE/HELICS

- Consortium coordinated by Univ. Claude Bernard Lyon (J. Fabry et al.)
- DG Sanco support from 2000 to June 2008
- Hosted by ECDC since July 2008



Improving Patient Safety in Europe

ECDC IPSE Transition Plan: background



- ECDC mandate: ECDC responsible for the surveillance of diseases lined out in Decision 2000/96/EC, incl. activities of Dedicated Surveillance Network (DSN's)
- Transfer to ECDC and/or outsourcing (or discontinuing activities) mainly depends on:
 - Priorities of the future enhanced EU surveillance system and surveillance objectives
 - Results of evaluation and assessment of the network
 - Staff capacity at ECDC
- DSN's: change status from « project » (EC DG Sanco) to « programme » (ECDC)

The IPSE project (2005-June 2008)

EU (DG-SANCO) Funded



IPSE-ECDC transition overview

IPSE

Improving Patient Safety in Europe

ECDC CfP HCAI surveillance in LTCF (HALT)

WP7
HCAI in Nursing Homes

WP1
Infection Control Training

2 ECDC CfT:
 ☞ IC training needs assessment
 ☞ PPS training module

WP2
Standards & Indicators

ECDC - SPI surveillance

WP6
ICU tools (molecular typing)

WP3
Nosocomial Event Warning

ECDC EPIS

ECDC CfT MRSA typing

WP5
CARE-ICU (AMR & antibiotics)

WP4
HELICS-SSI & HELICS-ICU

ECDC HCAI surveillance :
 ☞ 1 ICU-module in TESSy
 ☞ SSI surveillance
 + HELICSwIn support, TESSy training

ECDC:
 ☞ EU PPS of HCAI (& AB use) in hospitals
 ☞ Call concordance study HCAI case definitions

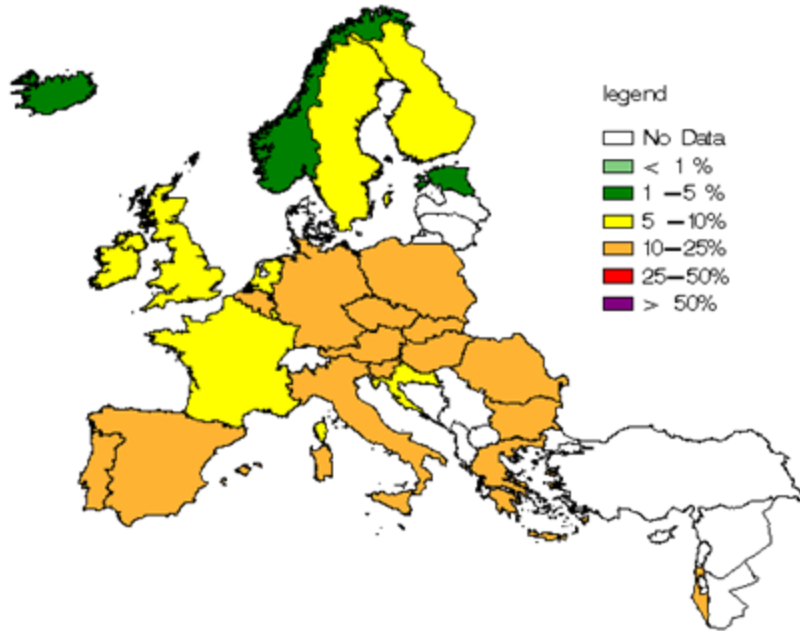
Surveillance of Antimicrobial Resistance in Europe

Carl Suetens, ECDC

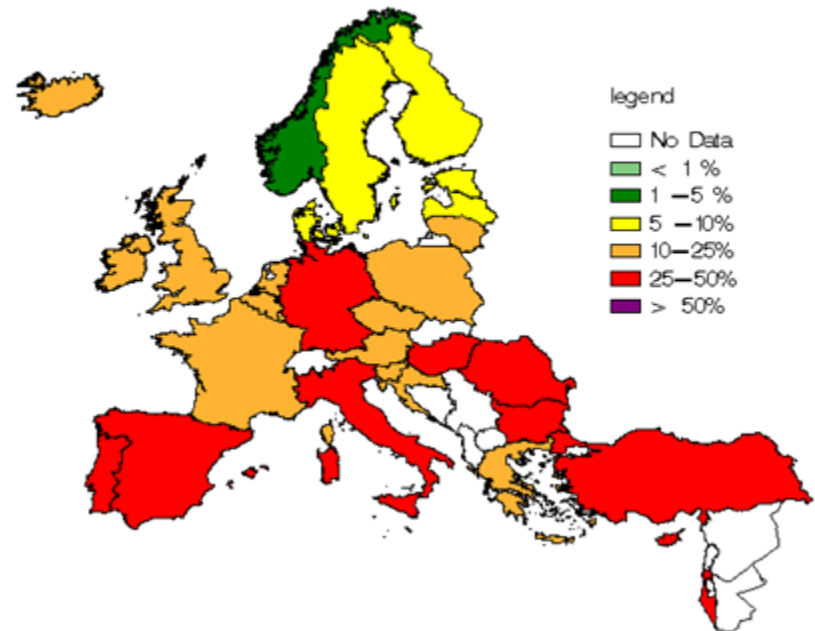
Presented by Håkan Hanberger

Fluoroquinolone-Resistant *Escherichia coli*, Blood and Spinal Fluid

2002



2006



EARSS

EUROPEAN ANTIMICROBIAL RESISTANCE SURVEILLANCE SYSTEM

rivm

National Institute
for Public Health and
the Environment

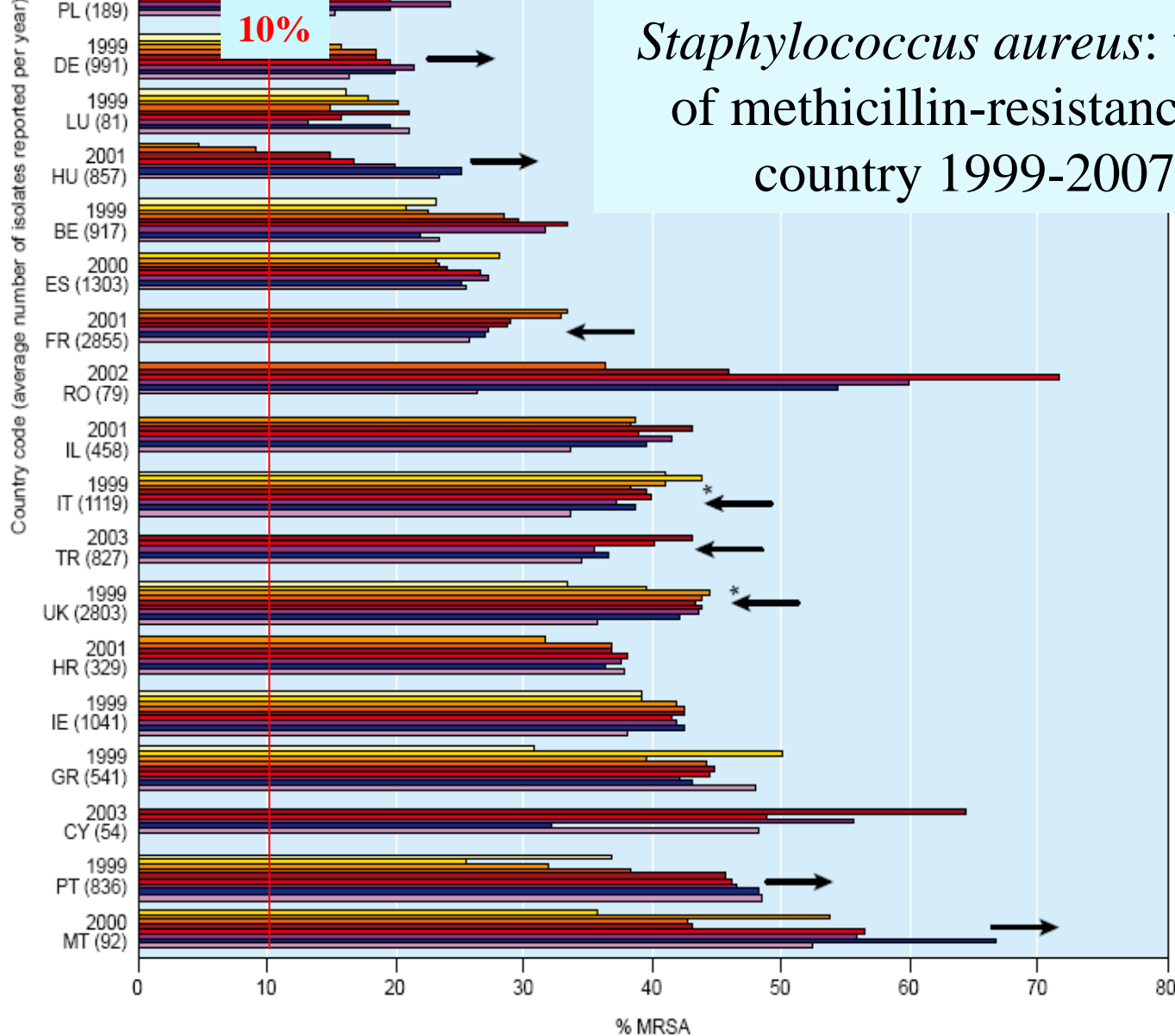
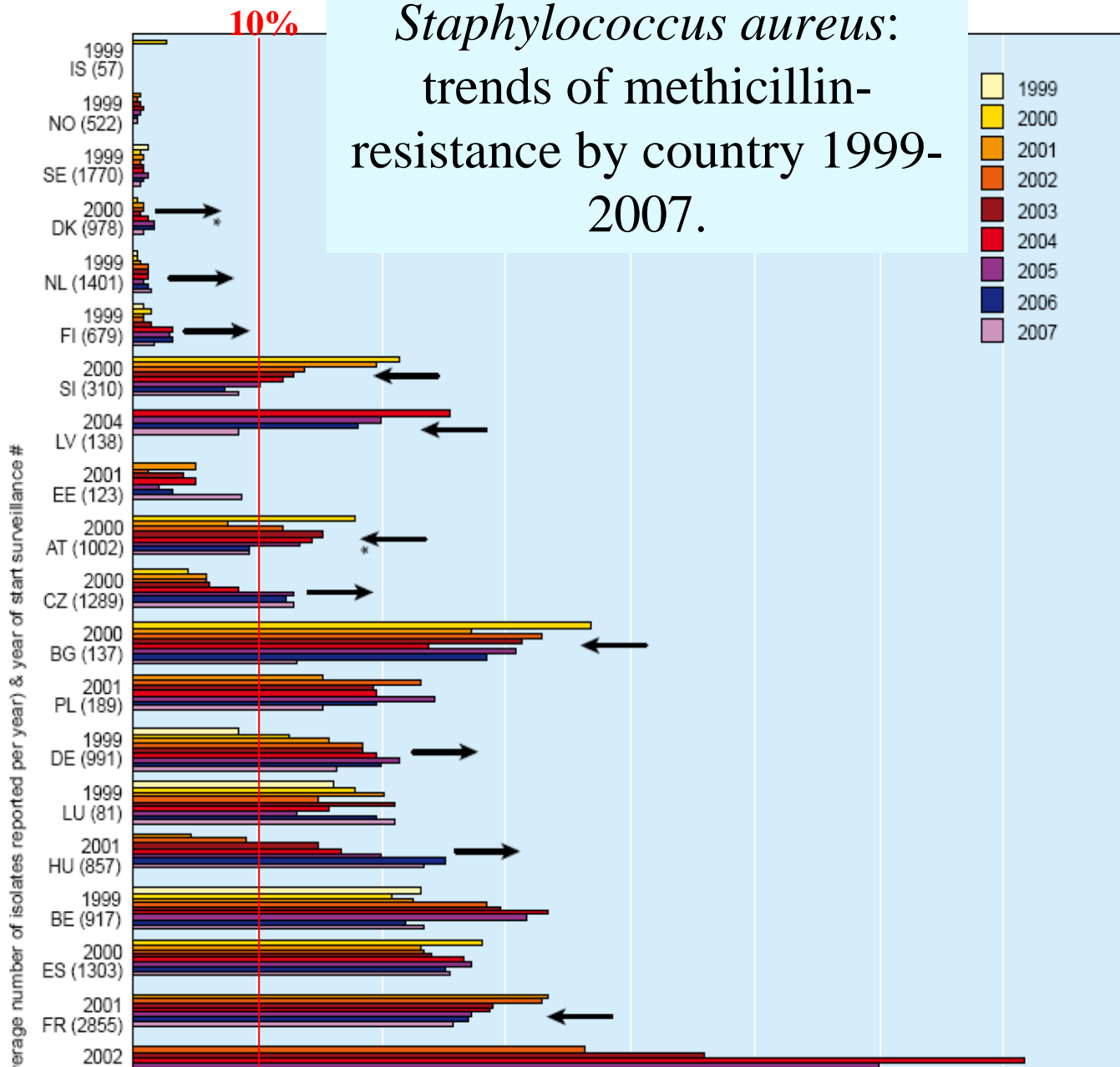


Figure 4.9. *Staphylococcus aureus*: trends of methicillin-resistance by country 1999-2007. Only the countries that reported 20 isolates or more per year and reported at least three years were included. The arrows indicate significant trends. The asterisks indicate significant trends in the overall national data that were, non-significantly, supported by data from laboratories reporting all nine years.

Either the first year of surveillance or the first year with 20 or more isolates reported.

Staphylococcus aureus: trends of methicillin- resistance by country 1999- 2007.



Antimicrobial Resistance in Bacteria Isolated from Blood and Spinal Fluid

Species, Antimicrobial resistance	% Resistant, EU, 2006 median [range]	No. countries with:	
		Upward trend ^a	Downward trend ^a
<i>Streptococcus pneumoniae</i> , Penicillin- R/I (PNSP)	7 [<1 - 39]	0	4
<i>S. pneumoniae</i> , Erythromycin-R	16 [<1 - 47]	3	1
<i>Escherichia coli</i> , Aminopenicillin-R	55 [29 - 84]	14	0
<i>E. coli</i> , Third-generation cephalosporin-R	5 [<1 - 40]	16	0
<i>E. coli</i> , Aminoglycoside-R	7 [2 - 40]	12	0
<i>E. coli</i> , Fluoroquinolone-R	20 [7 - 42]	21	0
<i>Staphylococcus aureus</i> , Methicillin-R (MRSA)	21 [1 - 67]	9	2
Enterococcus faecium, Aminoglycoside-HLR	46 [12 - 85]	- ^b	-
<i>Enterococcus faecium</i> , Vancomycin-R	<1 [0 - 43]	3	2
<i>Klebsiella pneumoniae</i> , Third-gen. cephalosporin-R	14 [1 - 94]	-	-
<i>K. pneumoniae</i> , Carbapenem-R	0 [0 - 33]	-	-
<i>Pseudomonas aeruginosa</i> , Ceftazidime-R	10 [3 - 42]	-	-
<i>P. aeruginosa</i> , Carbapenem-R	14 [2 - 48]	-	-

^aOnly countries with significant trends are reported; ^b-, not available.

Source: EARSS, 2007.

MRSA : 3 epidemiological patterns

Healthcare-associated MRSA



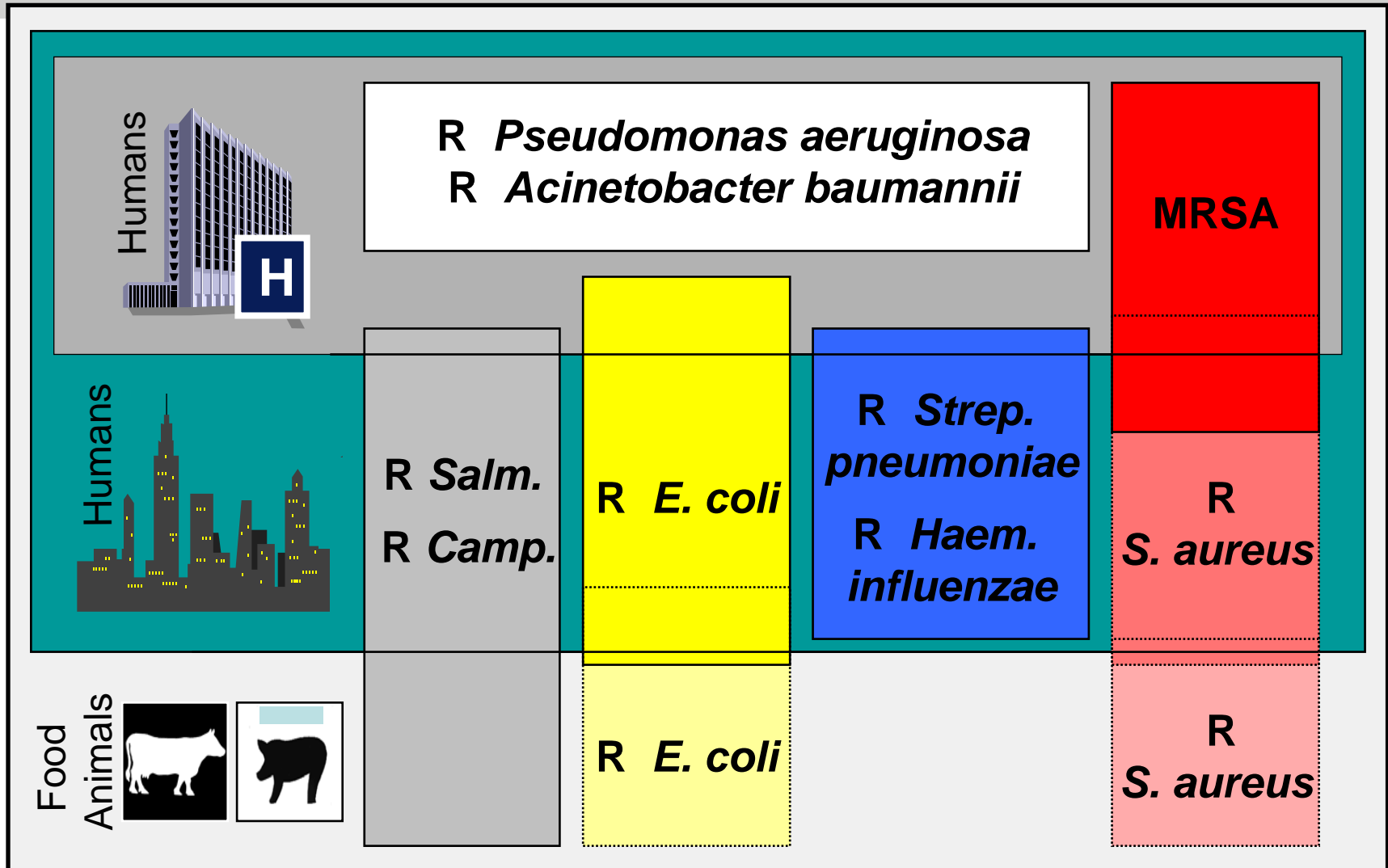
Community-associated MRSA



Animal MRSA



The World (of Antimicrobial Resistance) According to... Human Bacterial Pathogens and Their Habitat



Surveillance of Healthcare-associated Infections (HCAI) in Europe

Healthcare-associated infections, antimicrobial resistance: Overlapping, but not identical

Healthcare-associated infections

Antimicrobial resistance

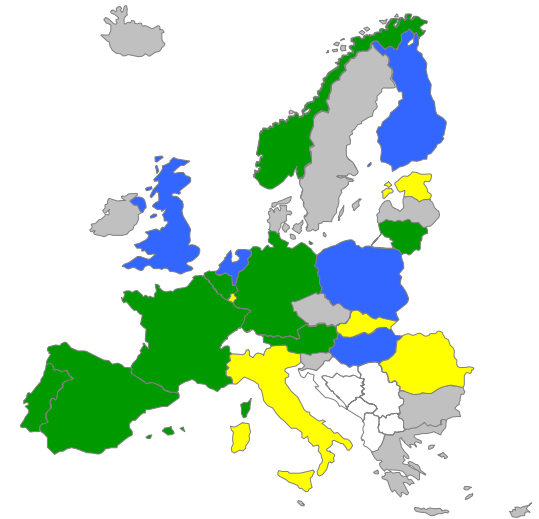


Community-acquired infections

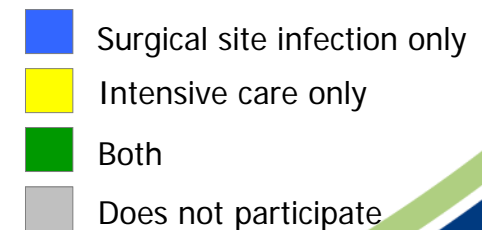
Surveillance of healthcare-associated infections (HCAI)



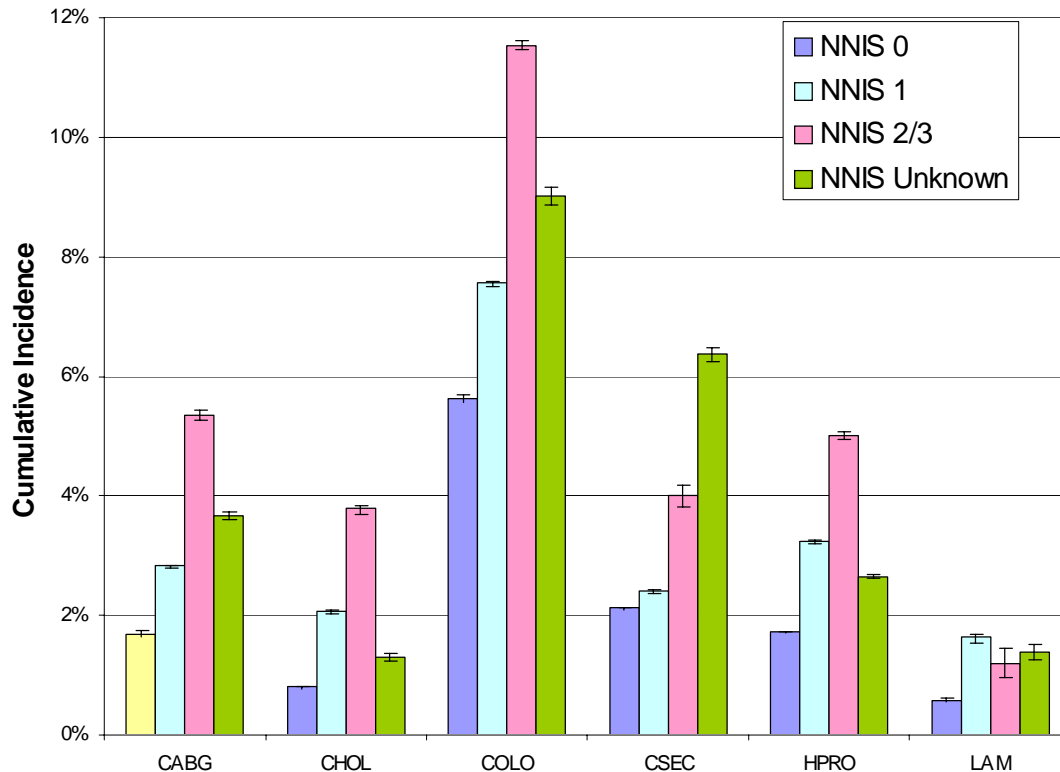
- Now integrated as part of ECDC activities
- Several HCAI surveillance options:
 - Surgical site infections (see map)
 - HCAI & AMR in intensive care (see map)
 - HCAI in long-term care facilities (2009)
 - Structure and process indicators for infection control (2010)
- European point prevalence survey on HCAI and antibiotic use in hospitals (2010–2011)
 - Procedures to be agreed in 2009
 - Survey in 2010–2011



Participation in European HCAI surveillance, 2006



Surgical site infections by operation type and NNIS risk index, cumulative incidence (= "% SSI")



Box 1: Components of NNIS Risk Index

Each operation is allocated a score between 0 and 3 depending on the number of factors present (each factor scores 1 point)⁷

- Wound class of contaminated or dirty
- ASA score >3
- Duration of surgery > T time

CABG: Coronary Artery Bypass Graft

CHOL: Cholecystectomy

COLO: Colon Surgery

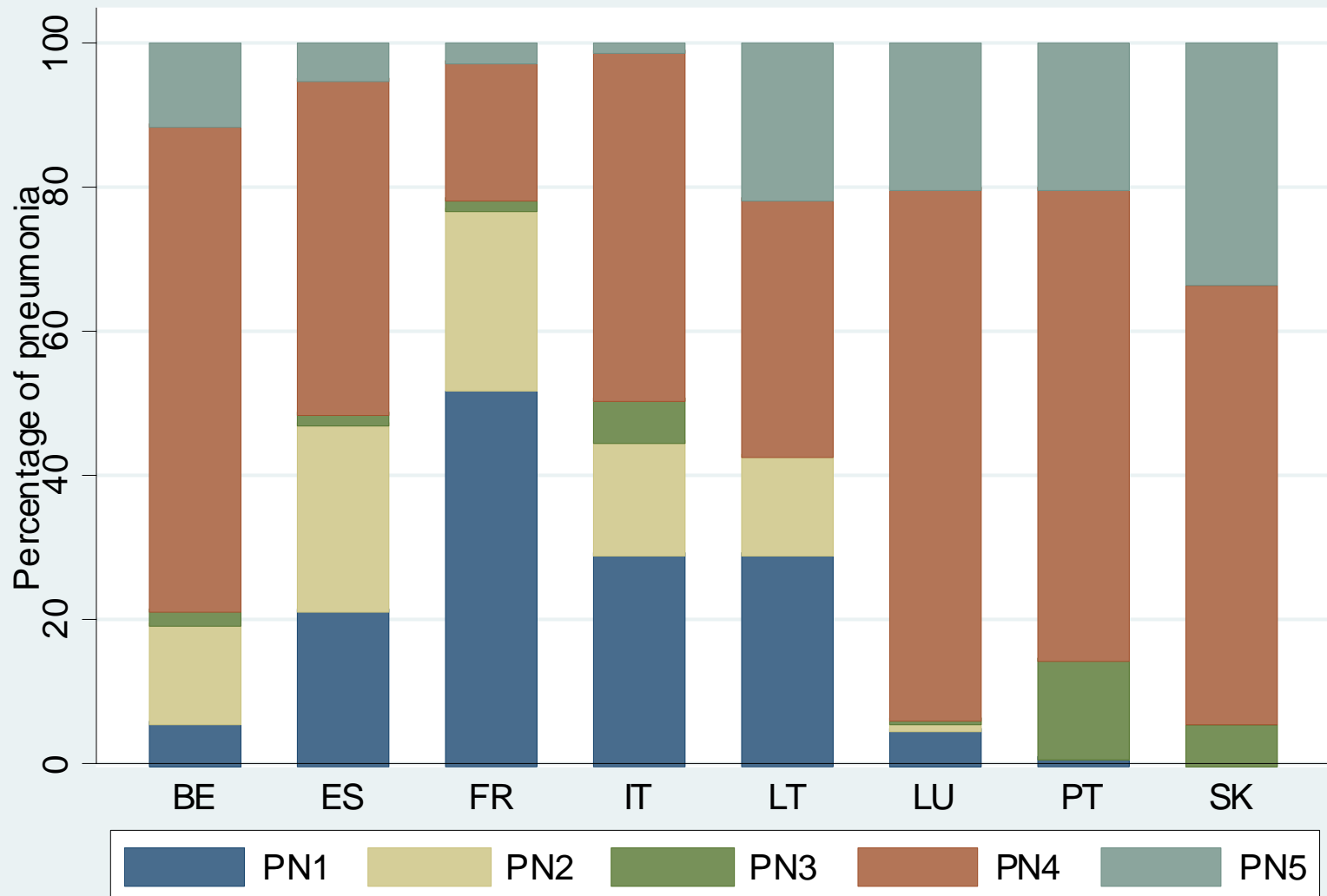
CSEC: Caesarean Section

HPRO: Hip prostheses

KPRO: Knee prostheses

LAM: Laminectomy

Differences in diagnostic practices of ICU-acquired pneumonia, 2004-2006



Diagnostic categories of ICU-acquired pneumonia by country, HELICS-ICU 2004-2006

Two Main Actions to Prevent and Control Antimicrobial Resistance

- **Prudent use of antimicrobials**
(only when needed, correct dose / dose intervals / duration)
- **Infection control**
(hand hygiene, screening, isolation)



Message/Questions from C Suetens to Workshop 7, MIE2009 Advanced Computer Methods for Patient Safety



How could ECDC support the implementation of electronic surveillance in Member States?

- Through a Call for Tender?
- By providing training?
- By making an assessment of the capacity or the diversity of existing IT systems in the hospitals all around the EU?

The MIE 2009 workshop might generate some first ideas that could be further explored at a future meeting.

Carl Suetens, ECDC

Thank you



www.ecdc.europa.eu | info@ecdc.europa.eu