



# Prevention of nosocomial infection and antibiotic resistance in Europe results from **IPSE-WP5/CareICU**

**Advanced Computer Methods for Patient Safety Workshop 7, MIE2009**

Sarajevo, August 2009

# The IPSE project (2005-June 2008) EU (DG-SANCO) Funded



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Type	Species distribution
Status	Submitted
Year	Created
Hospital name	Submitted
ICU name	Public
ICU name	Hidden
Created by	careicuedu

**IPSE-CareICU** - a web-based programme, developed by ICU-Strama, for the coordinated collection and feed back of information on

- **Antibiotic Policies**
- **Antibiotic Use**
- **Antibiotic Resistance**
- **Infection Control Practices**

in participating ICUs



# CARE-ICU IPSE WP5

## Started 2005 as a large pilot in 35 ICUs

- Croatia (4 ICUs)
- Czech republic (3 ICUs)
- Estonia (3 ICUs)
- Hungary (8 ICUs)
- Malta (3 ICUs)
- Romania (1 ICU)
- Sweden (10 ICUs)
- Turkey (3 ICUs)

**Transition to  
European Centre for  
Disease Prevention  
and Control (ECDC)  
during 2009**

# First report from CareICU IPSE

Intensive Care Med  
DOI 10.1007/s00134-008-1237-y

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## Surveillance of microbial resistance in European Intensive Care Units: a first report from the Care-ICU programme for improved infection control

Received: 27 February 2008  
Accepted: 30 June 2008

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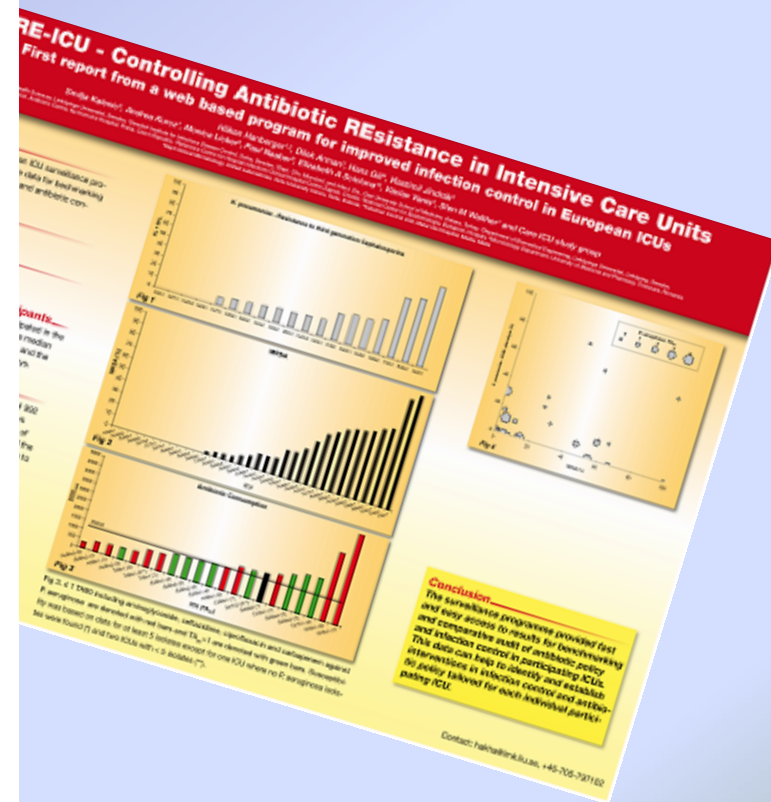
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**Abstract Purpose:** To report initial results from a European ICU surveillance programme focussing on antibiotic consumption, microbial resistance and infection control. **Methods:** Thirty-five ICUs participated during 2005. Microbial

resistance, antibiotic consumption and infection control stewardship measures were entered locally into a web-application. Results were validated locally, aggregated by project leaders and fed back to support local audit and benchmarking. **Results:** Median (range) antibiotic consumption was 1,254 (range 348–4,992) DDD per 1,000 occupied bed days. The proportion of MRSA was median 11.6% (range 0–100), for ESBL phenotype of *E. coli* and *K. pneumoniae* 3.9% (0–80) and 14.3% (0–77.8) respectively, and for carbapenem-resistant *P. aeruginosa* 22.5% (0–100). Screening on admission for alert pathogens was commonly omitted, and there was a lack of single rooms for isolation. **Conclusions:** The surveillance programme demonstrated wide variation in antibiotic consumption, microbial resistance and infection control measures. The programme may, by providing rapid access to aggregated results, promote local and regional audit and benchmarking of antibiotic use and infection control practices.

**Keywords** Intensive care · Antibiotic consumption · Microbial resistance · Infection control



**Surveillance of microbial resistance in European Intensive Care Units: a first report from the Care-ICU programme for improved infection control.** Hanberger H, Arman D, Gill H, Jindrák V, Kalenic S, Kurcz A, Licker M, Naaber P, Scicluna EA, Vanis V, Walther SM. **Intensive Care Med.** 2008 Aug 1.

# First report from CareICU IPSE

## Summary

..... **demonstrated wide variation in antibiotic consumption, microbial resistance and infection control measures.**

- **Antibiotic consumption** 1,254 (range 348–4,992) DDD per 1,000 occupied bed days.
- **MRSA:** 11.6% (range 0–100),
- **ESBL phenotype of *E. coli*:** 3.9% (range 0–80)
- **ESBL phenotype of *K. pneumoniae*** 14.3% (range 0–77.8)
- **Carbapenemresistant *P. aeruginosa*** 22.5% (range 0–100)

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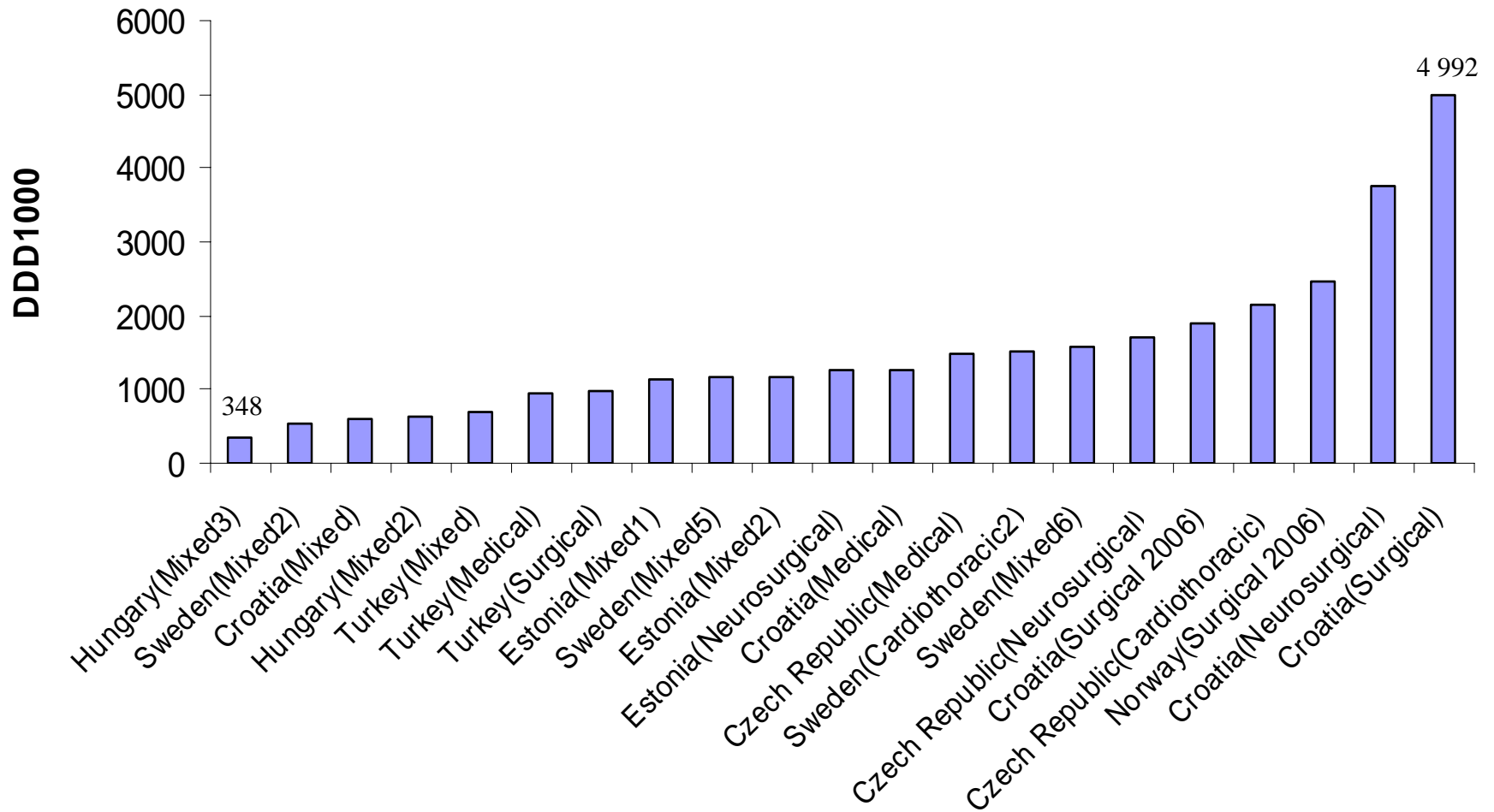


# Antibiotic Consumption

## in IPSE CareICU

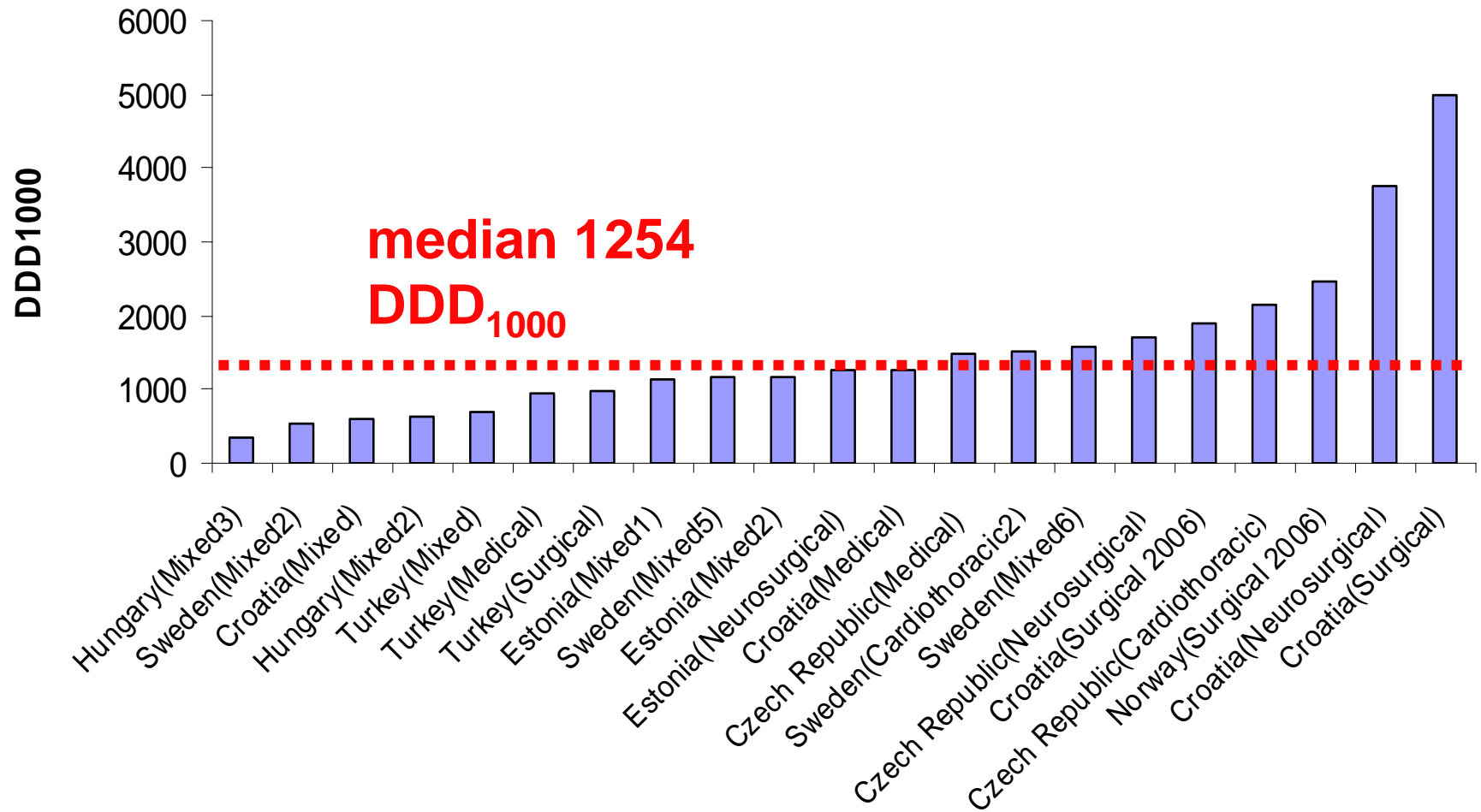


# AB consumption 2005 (2006)

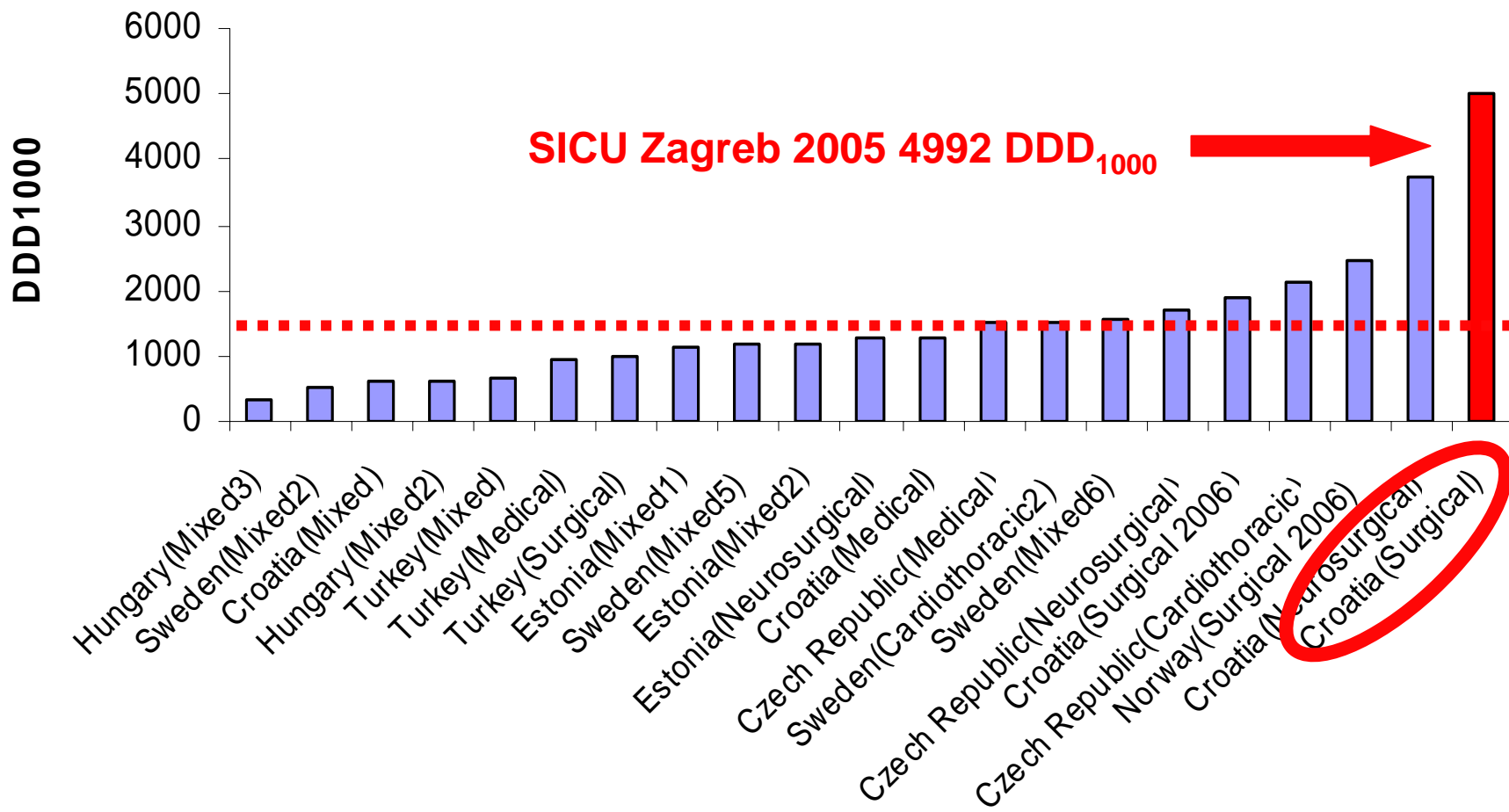




## AB consumption 2005 (2006)



## AB consumption 2005 (2006)



# Action taken in SICU Croatia

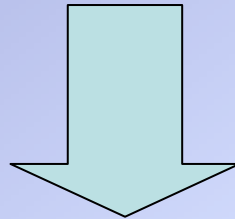
## 1. Validation of data

## 2 Identification of over/misuse of antibiotics

- Prolongation of perioperative prophylaxis with cephalosporins + metronidazole +/- gentamicin
- if broad-spectrum prophylaxis failed: - new antibiotics were added without ending the prolonged “prophylaxis”!

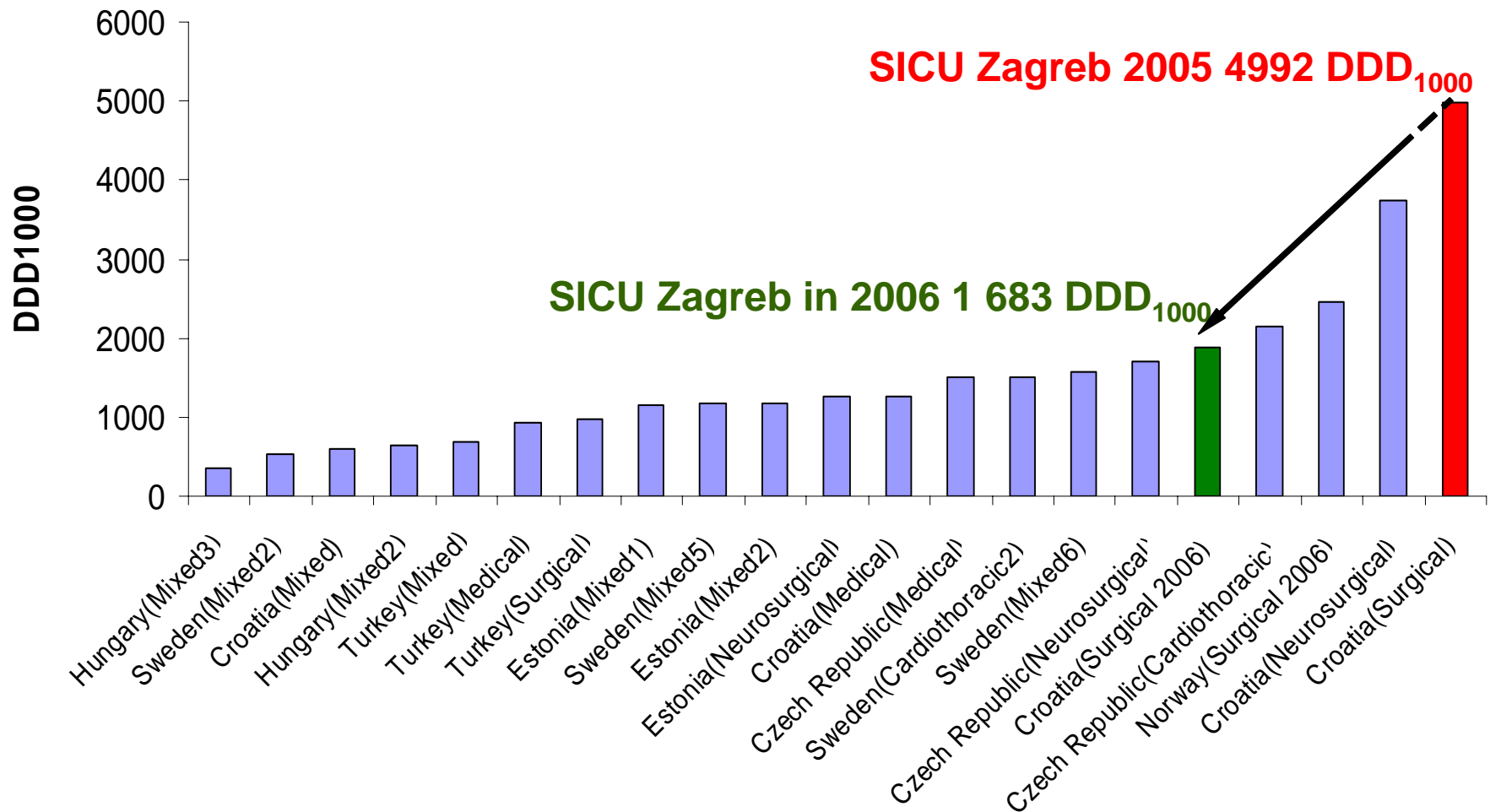
# Intervention in 2006

## A local audit

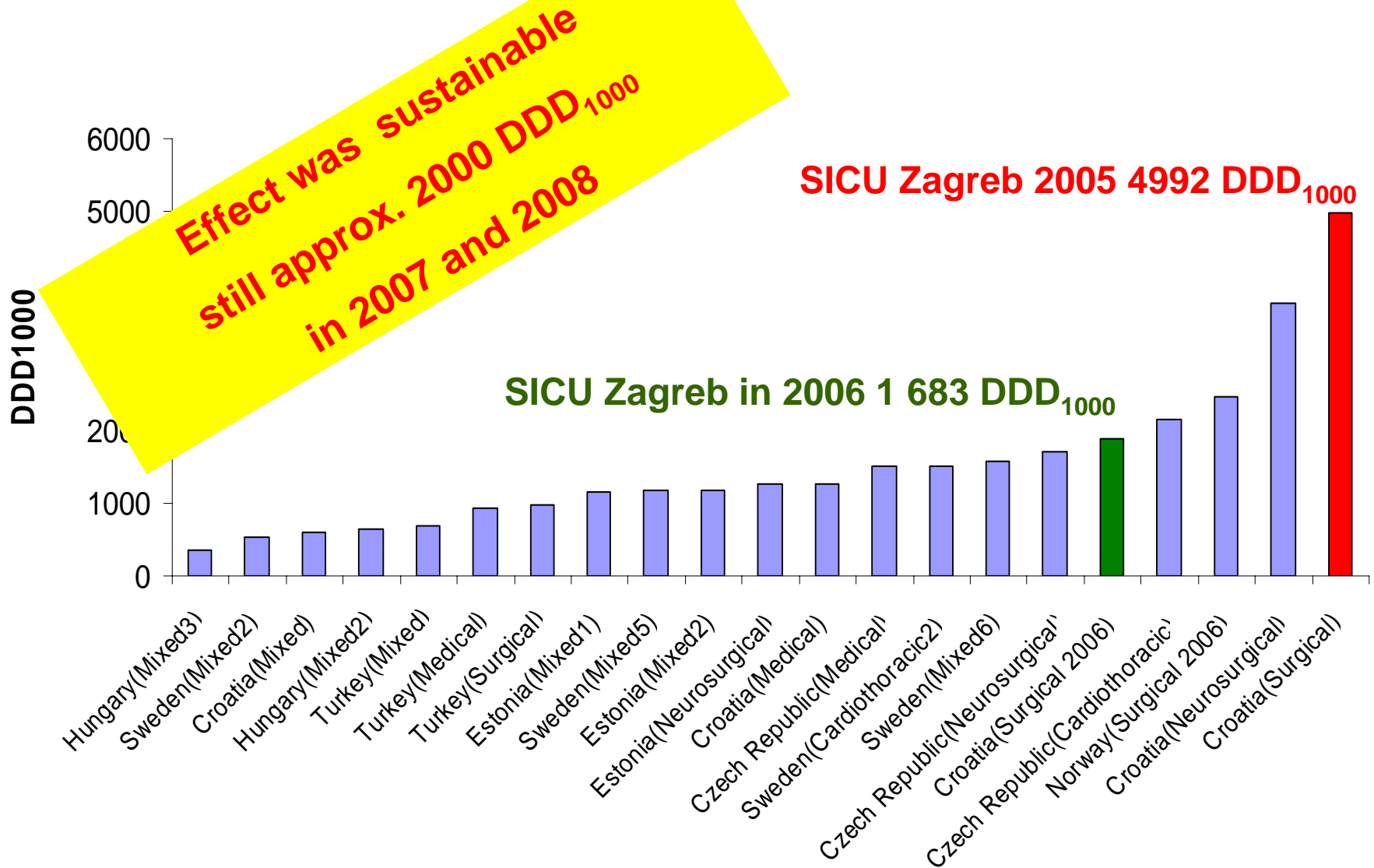


- Stop orders for surgical prophylaxis and parenteral antibiotic therapy
  - Daily visits by the IC team

# Effect of intervention in SICU Zagreb



# Effect of intervention in SICU Zagreb





*Continued use of the CareICU application.....*

**Antibiotic consumption in Swedish ICUs 2008  
VS  
SMR (Standardised Mortality Risk)**





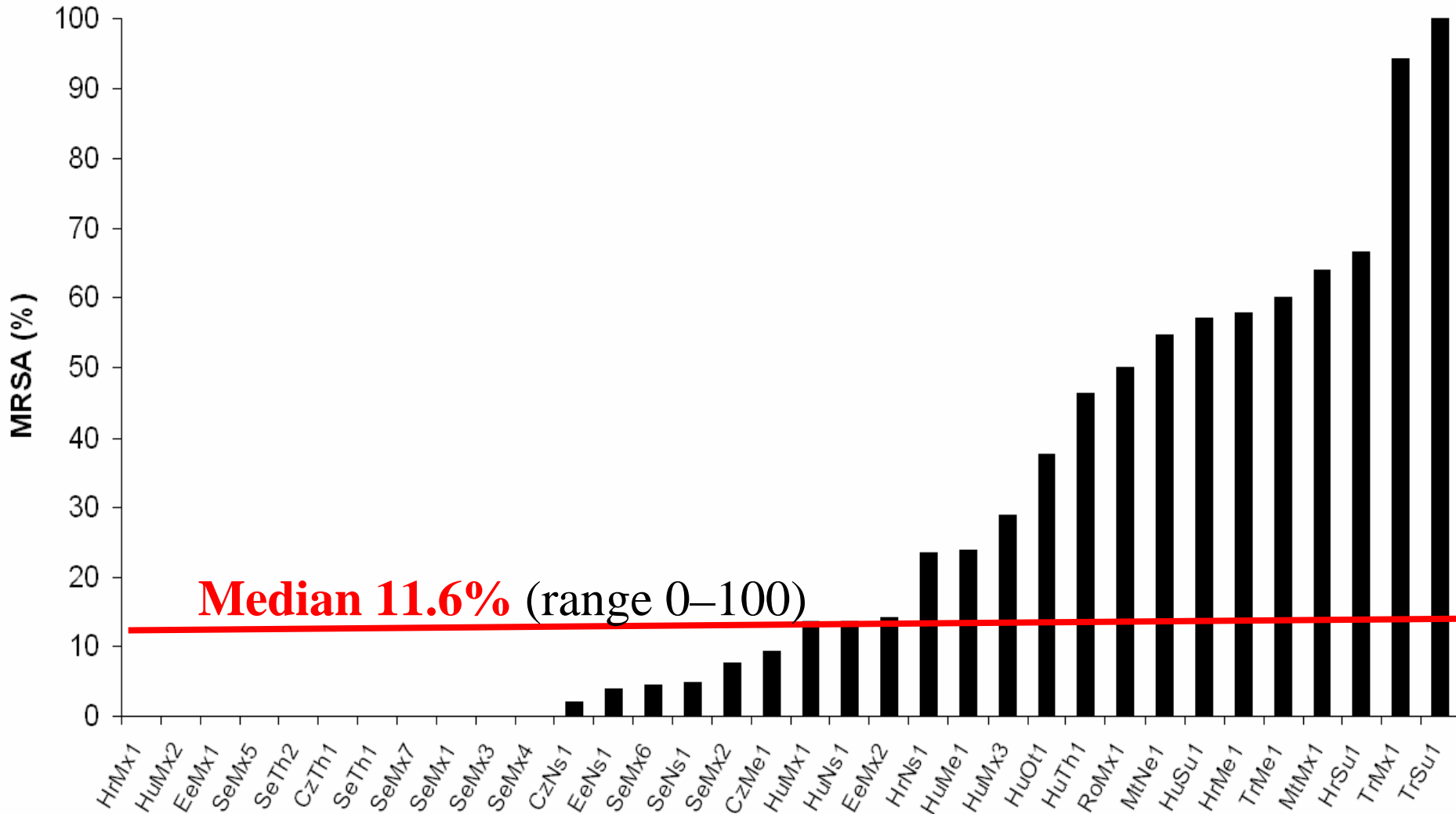


# Microbiology

## in IPSE CareICU

# MRSA in European ICUs

## CareICU 2005

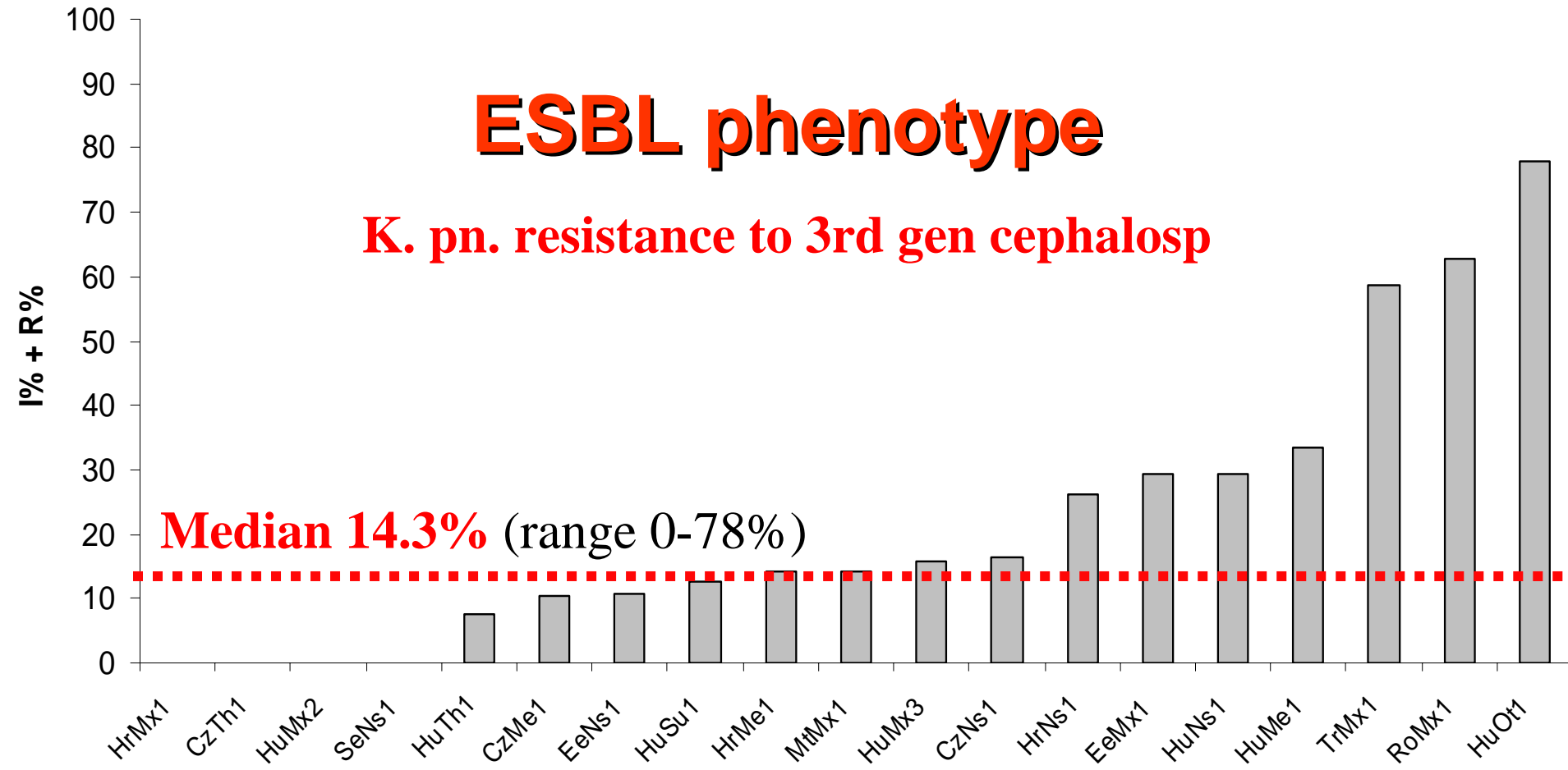


## *K. pneumoniae* - Resistance to third gen Cephalosporins 2005

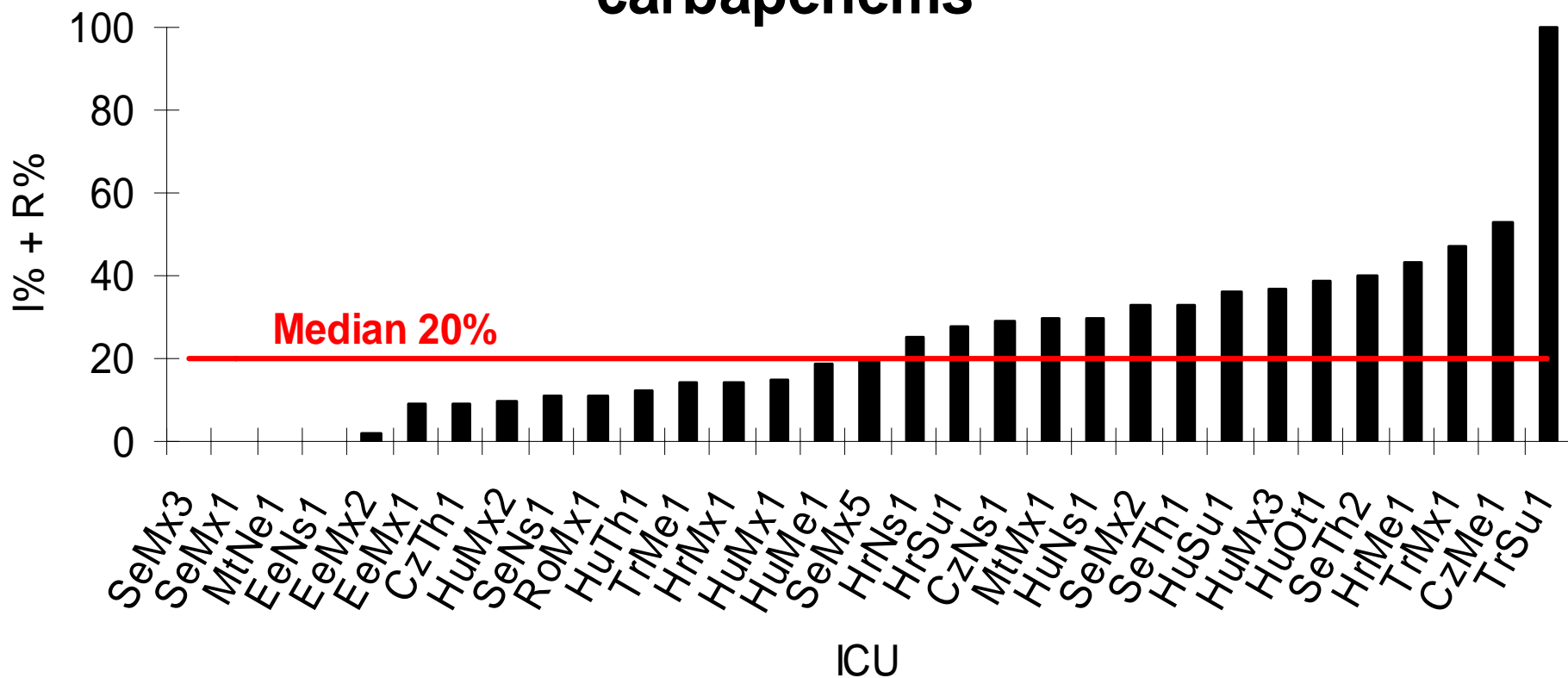
# ESBL phenotype

*K. pn.* resistance to 3rd gen cephalosp

Median 14.3% (range 0-78%)



# *Pseudomonas aeruginosa* Decreased susceptibility (I+R) to carbapenems

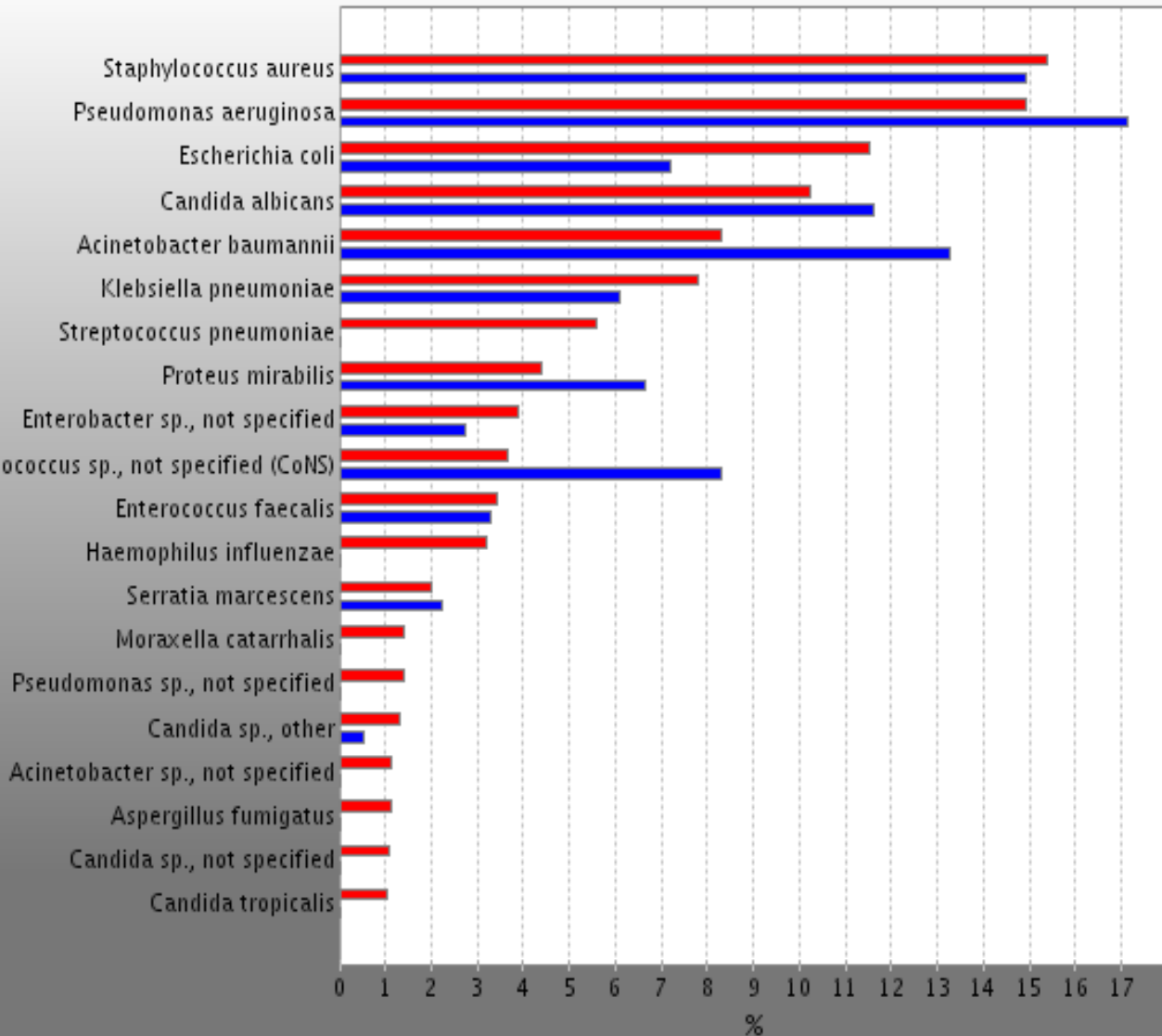




# Feed back of data from CarelCU.....

Presentation files – can easily be down loaded and put in ppt

Speciesdistribution - total 2006

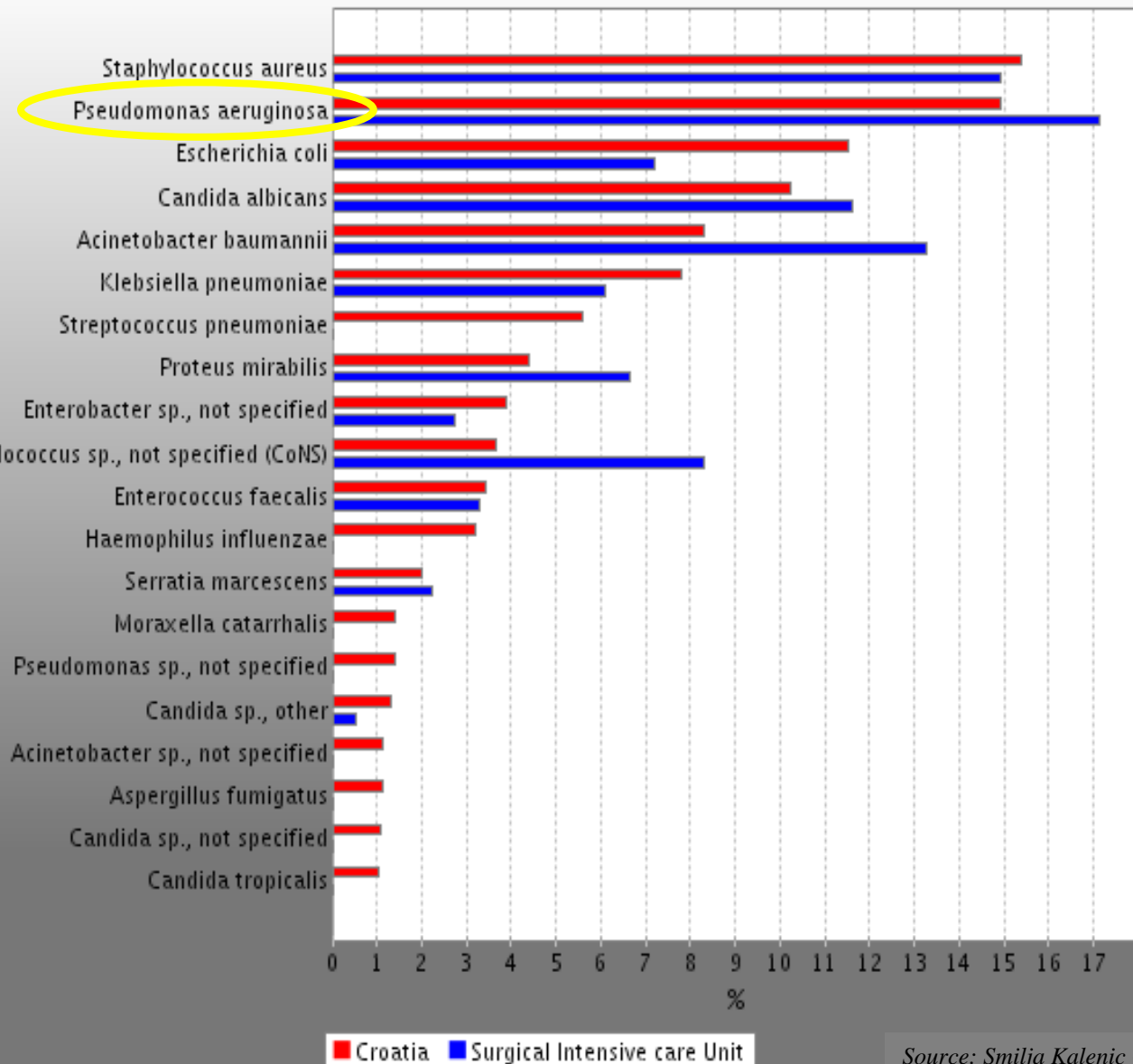


■ Croatia ■ Surgical Intensive care Unit

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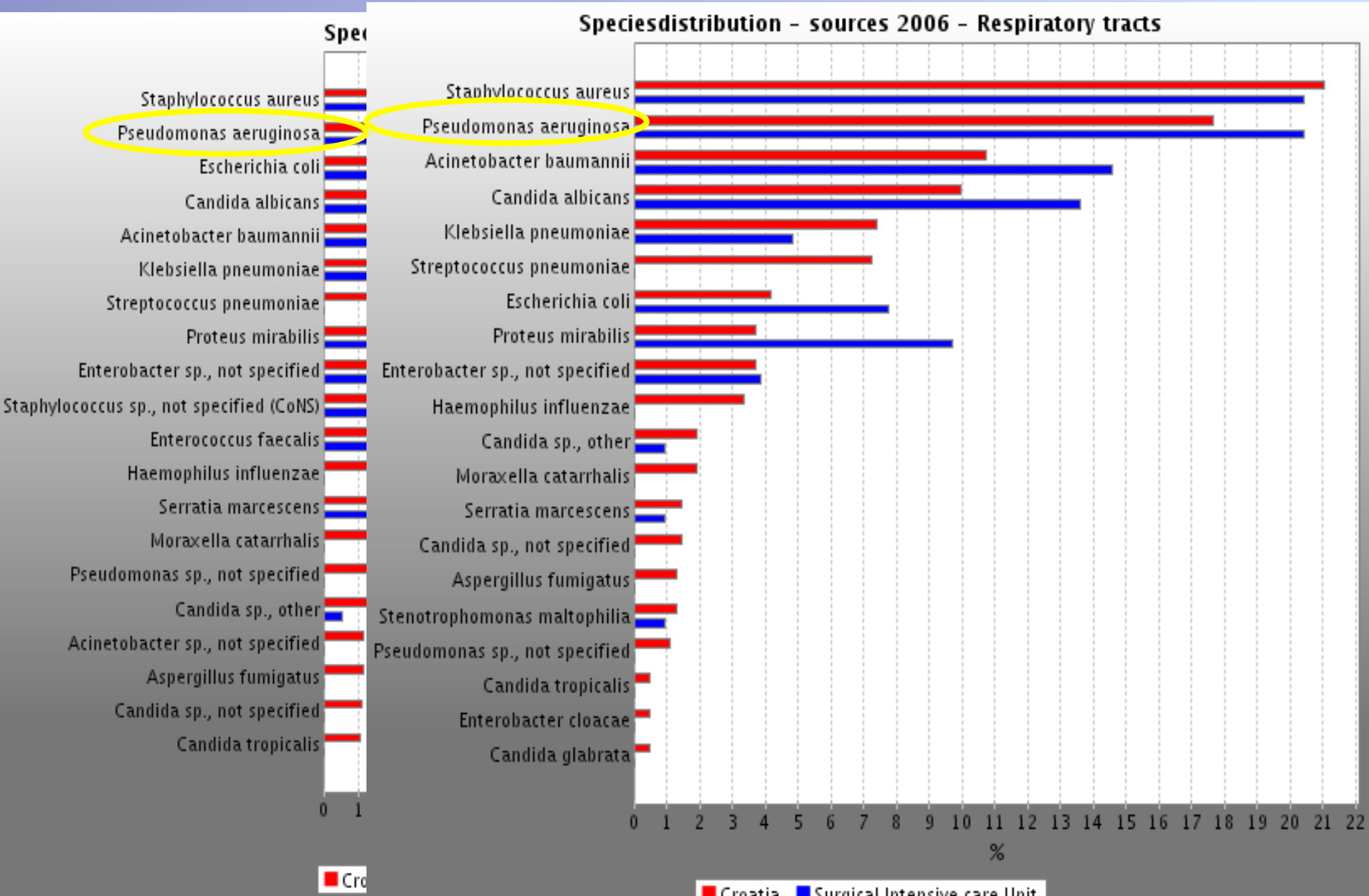
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Speciesdistribution - total 2006



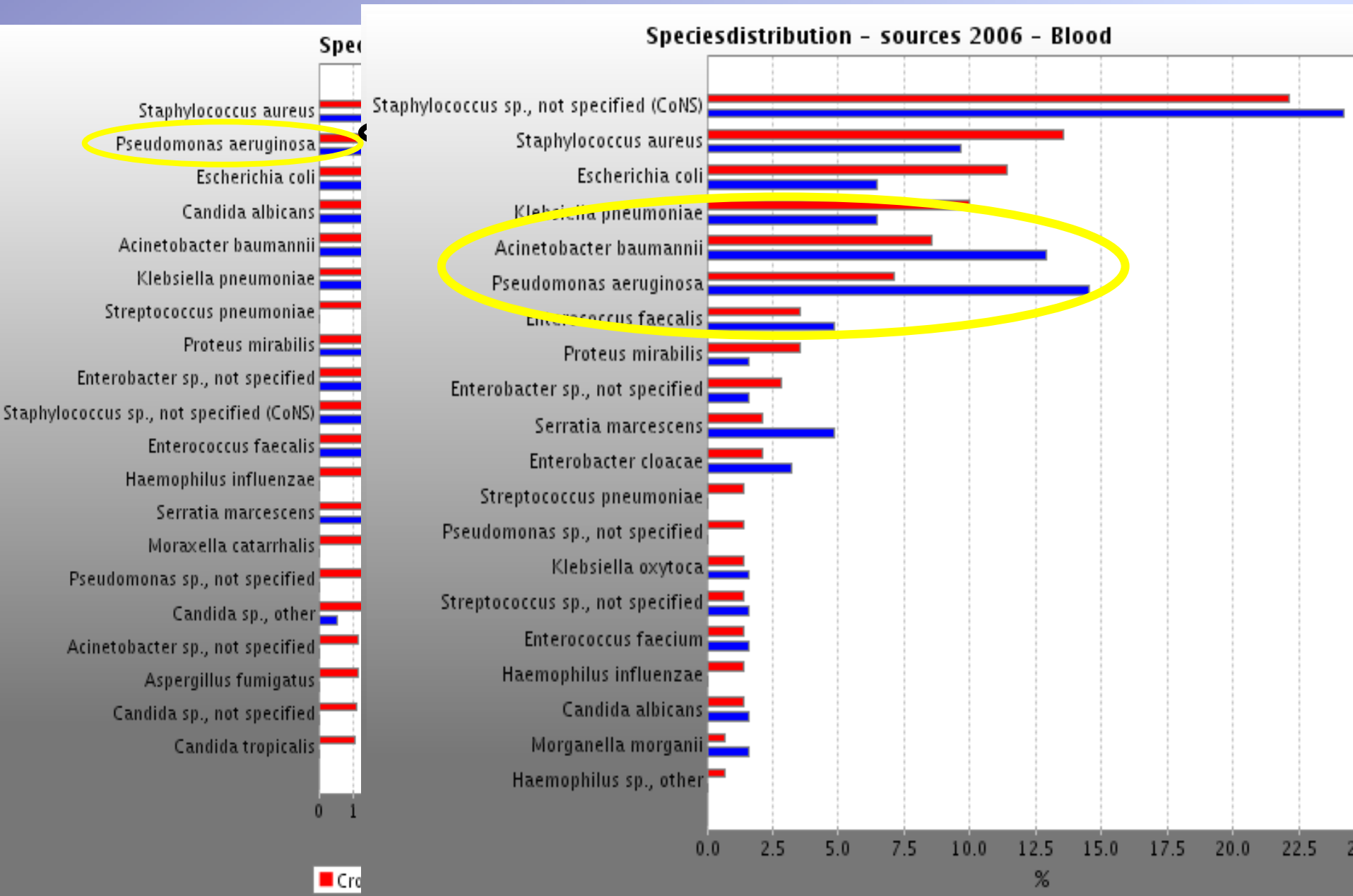
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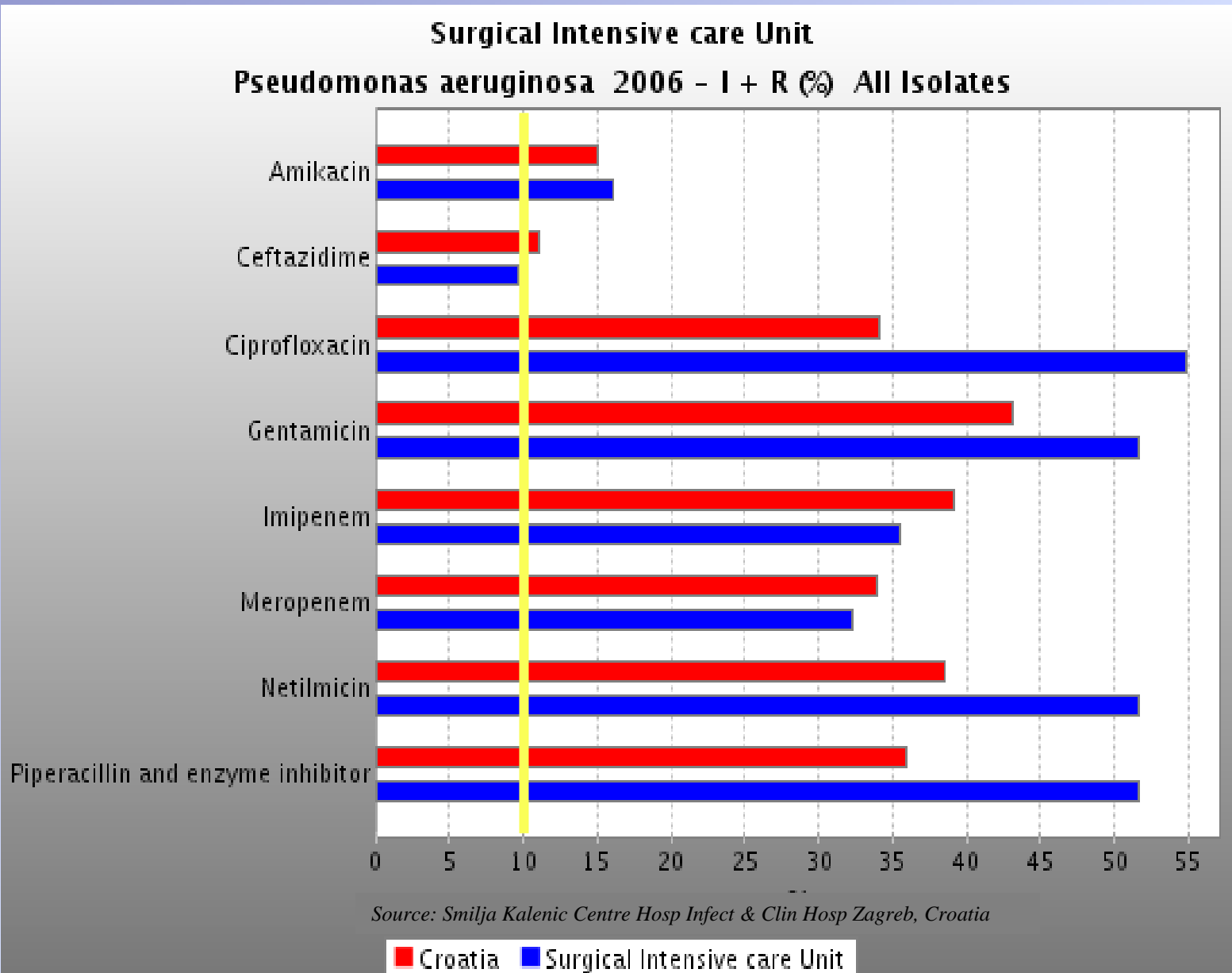
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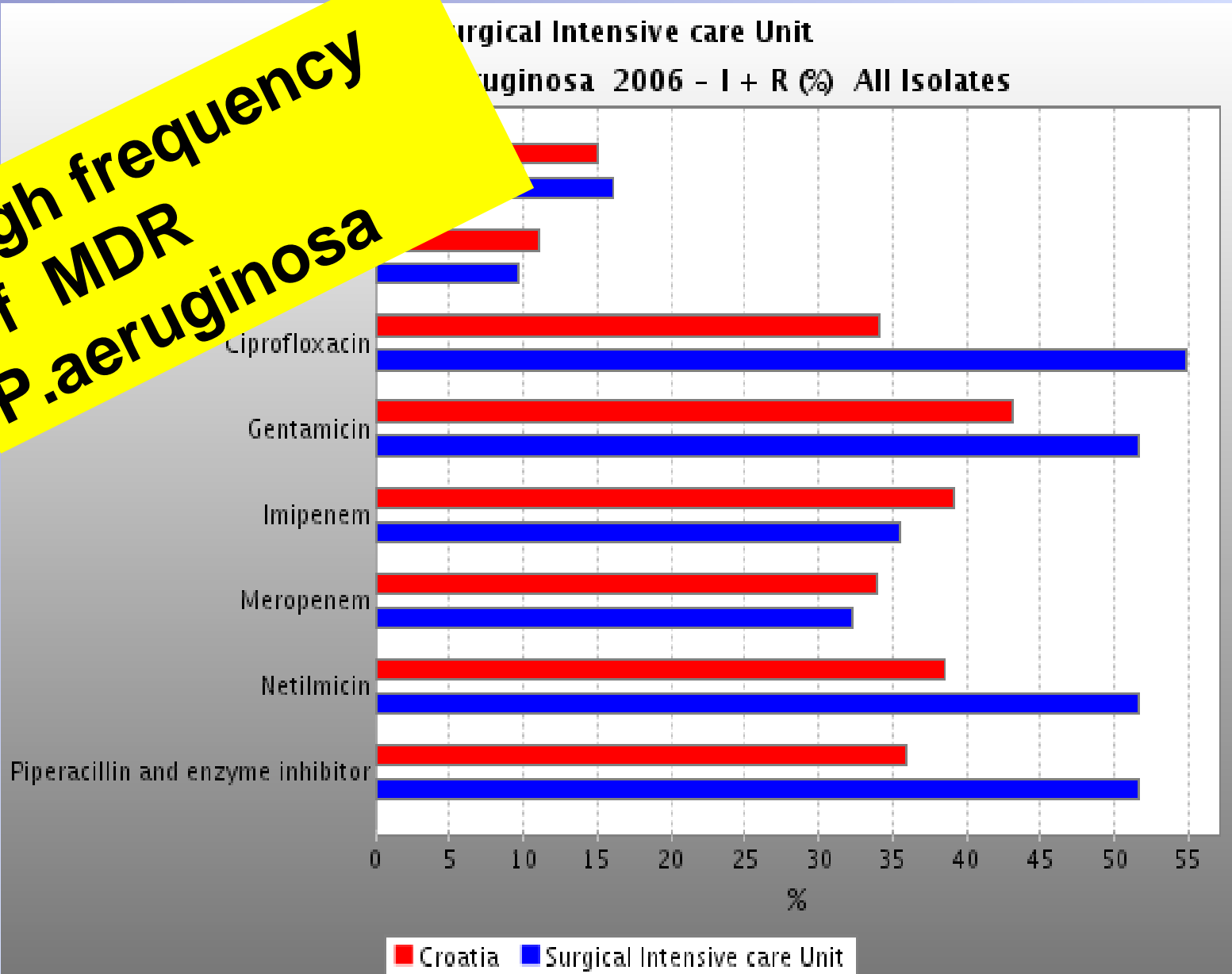
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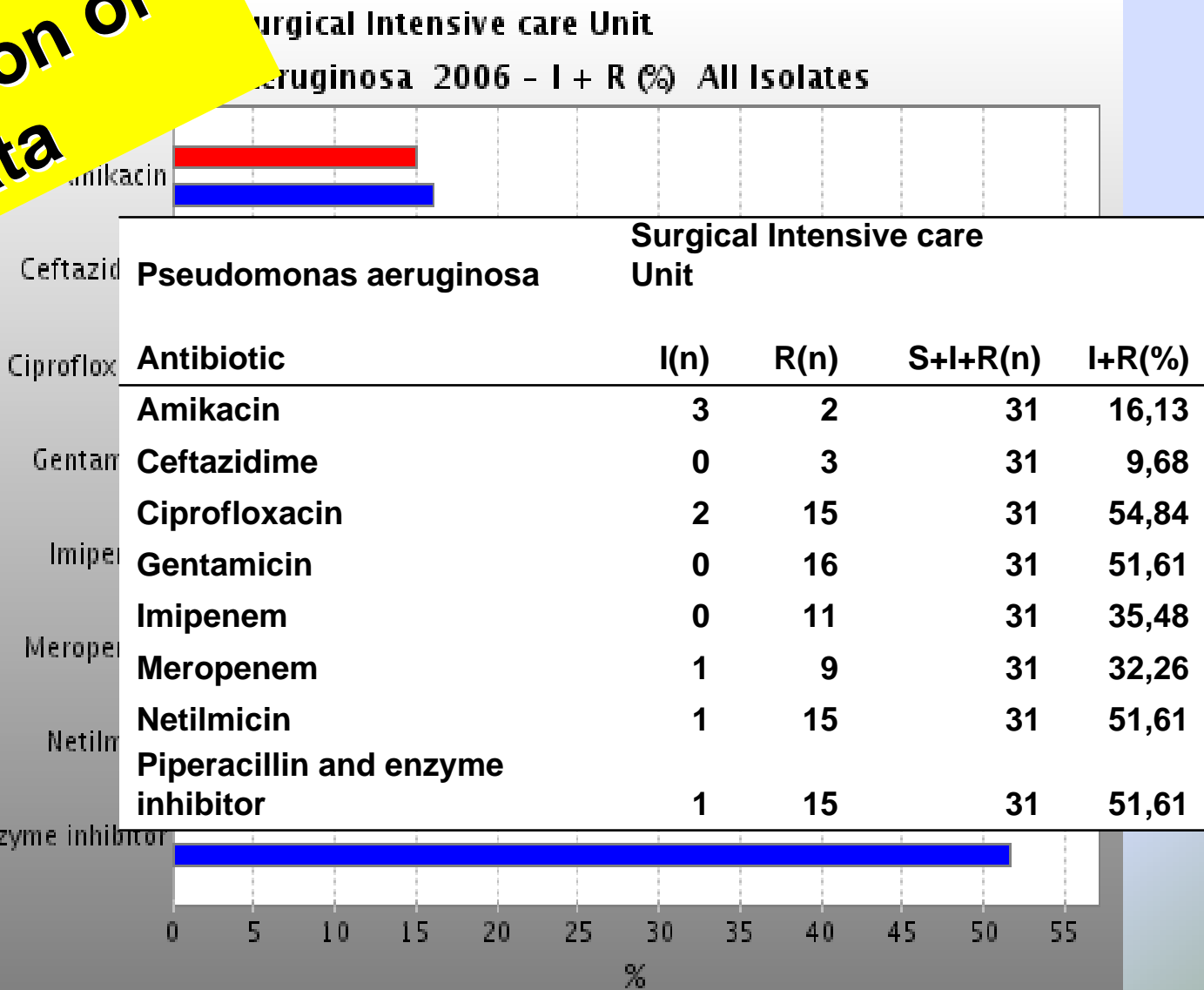
**High frequency  
of MDR  
P.aeruginosa**



# Feed back of data from CarelCU.....

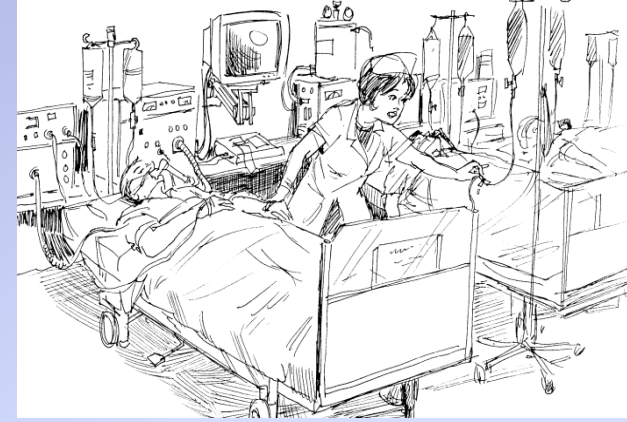
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**Validation of data**



		Surgical Intensive care Unit			
	Pseudomonas aeruginosa	I(n)	R(n)	S+I+R(n)	I+R(%)
Ciprofloxacin	<b>Antibiotic</b>				
	<b>Amikacin</b>	3	2	31	16,13
Gentamicin	<b>Ceftazidime</b>	0	3	31	9,68
	<b>Ciprofloxacin</b>	2	15	31	54,84
Imipenem	<b>Gentamicin</b>	0	16	31	51,61
	<b>Imipenem</b>	0	11	31	35,48
Meropenem	<b>Meropenem</b>	1	9	31	32,26
	<b>Netilmicin</b>	1	15	31	51,61
Netilmicin	<b>Piperacillin and enzyme inhibitor</b>	1	15	31	51,61

■ Croatia ■ Surgical Intensive care Unit



# Indicators for Infection Control Structure & Education in IPSE CareICU



**Revised IPSE WP 5 (CareICU) Questionnaire**

**Indicators for Infection Control Structure & Education**

[ST] Staff in ICU

[RS] Risk score

[BE] Beds, incl isolation beds

[AP] Antibiotic Policy: [AB Formulary/Guidelines](#)

[RP] Reports on AB consumption and AB resistance

[RO] Routines for consultation in antibiotic treatment

[IC] Infection Control; [\[IC.8\] -- Consumption of hand disinfectant \(liters/year\)](#)

[IC.A] Screening index for alert organisms

[IC.B] Isolating patients and preventing cross-transmission of Alert organisms

**Examples of questions**

[\[IC.D1\]](#) Is there an emergency plan to close down the ICU for outbreak management?

[\[IC.11\]](#) Infection control - staff screening; Do you routinely test Health Care Workers (HCW) for MRSA carriage?

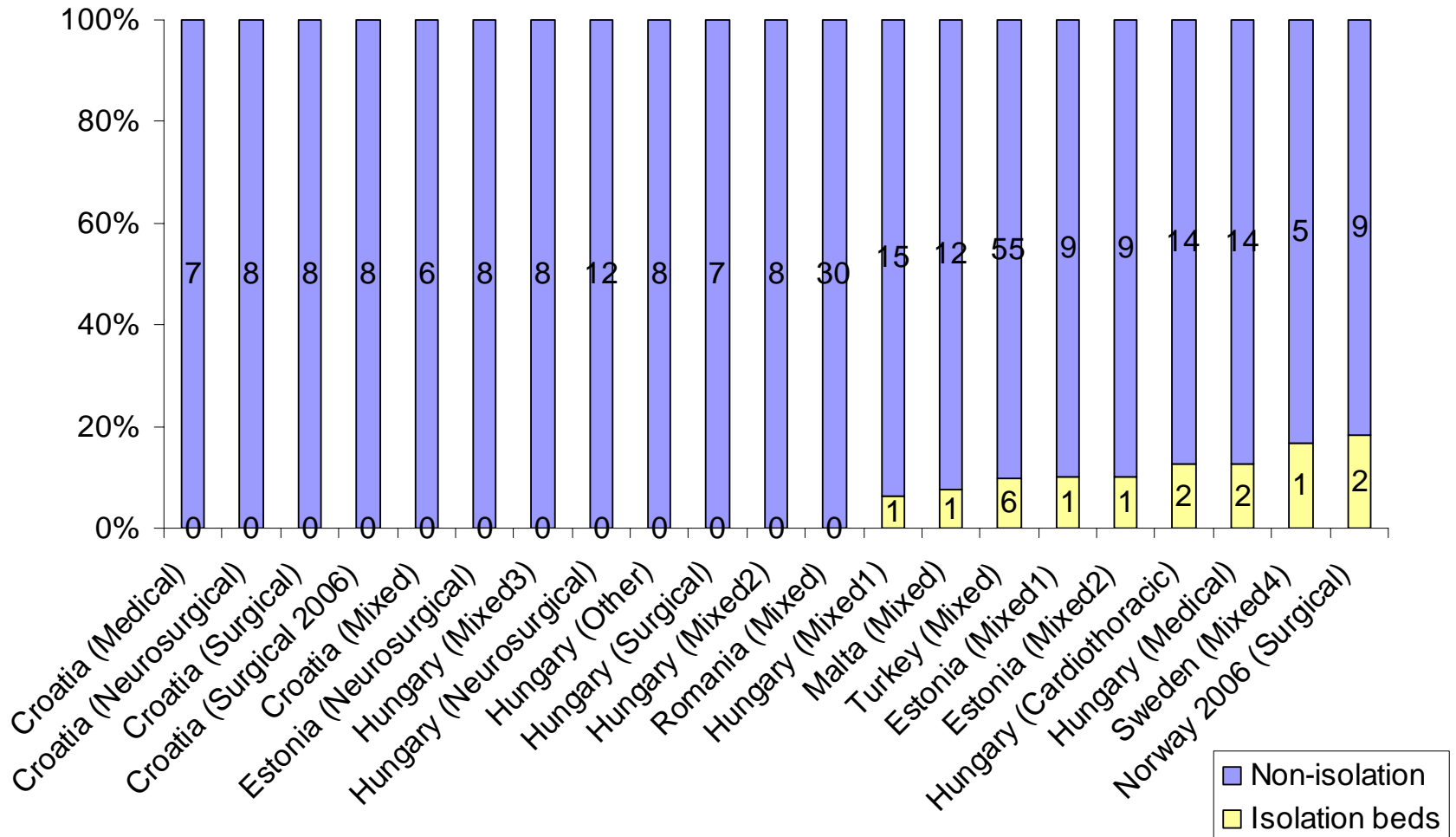
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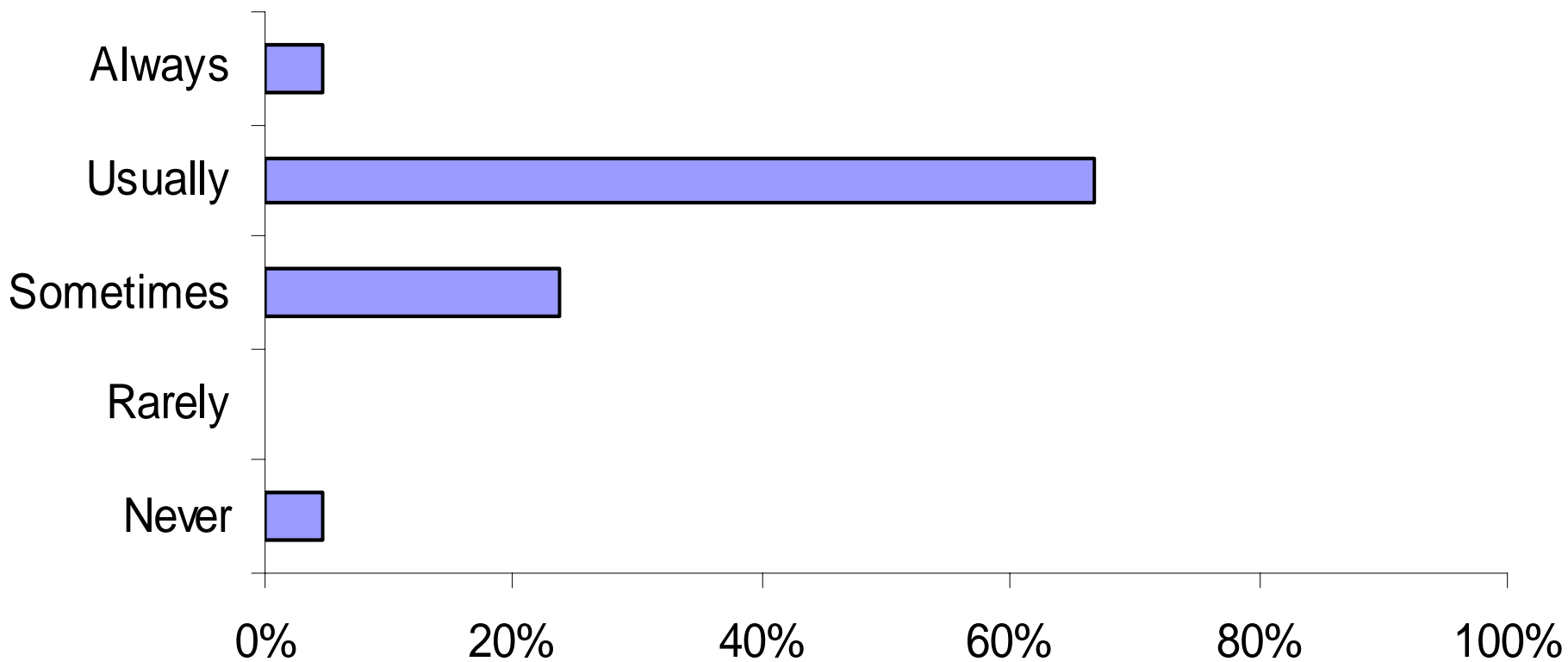
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<http://www.hanberger.nu> <http://www.strama.se/dyn//,165,54.html>  
<http://www4.smittskyddsinstitutet.se/careicu>

## Isolation beds

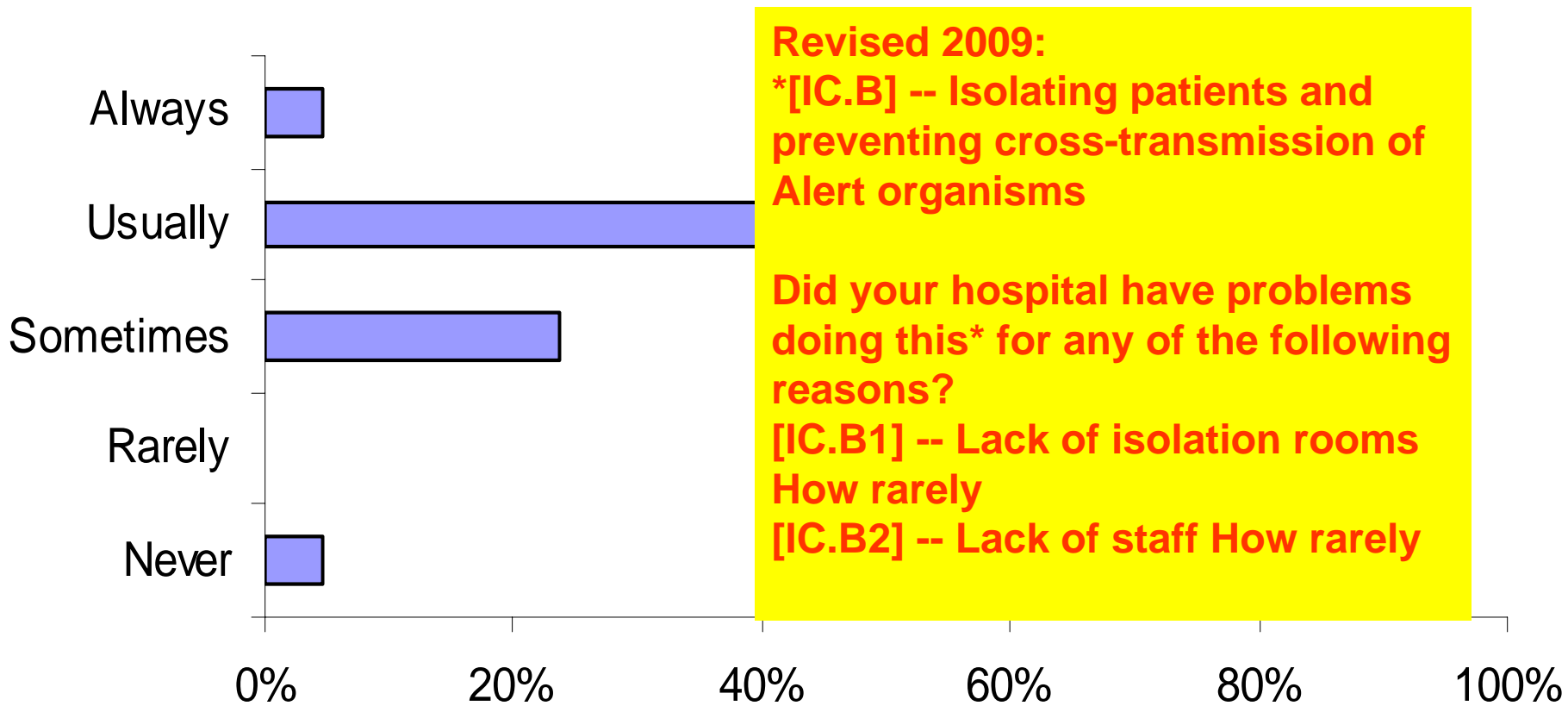


**Did your ICU have problems isolating patients and preventing cross transmission of (resistant) Alert organisms due to lack of isolation rooms ?**



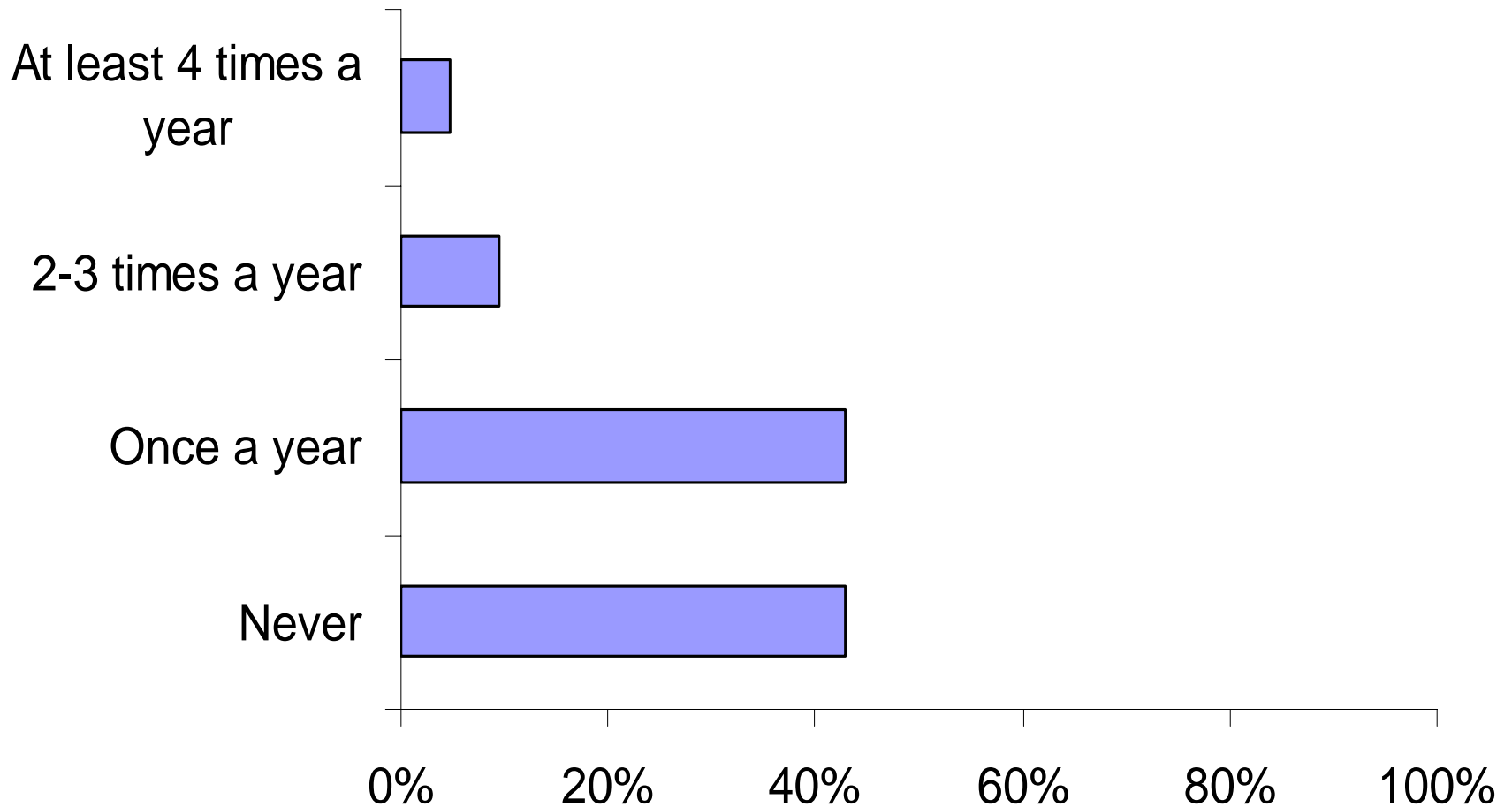
**Definition:** Isolation room is defined as a single room

### Did your ICU have problems isolating patients and preventing cross transmission of (resistant) Alert organisms due to lack of isolation rooms ?



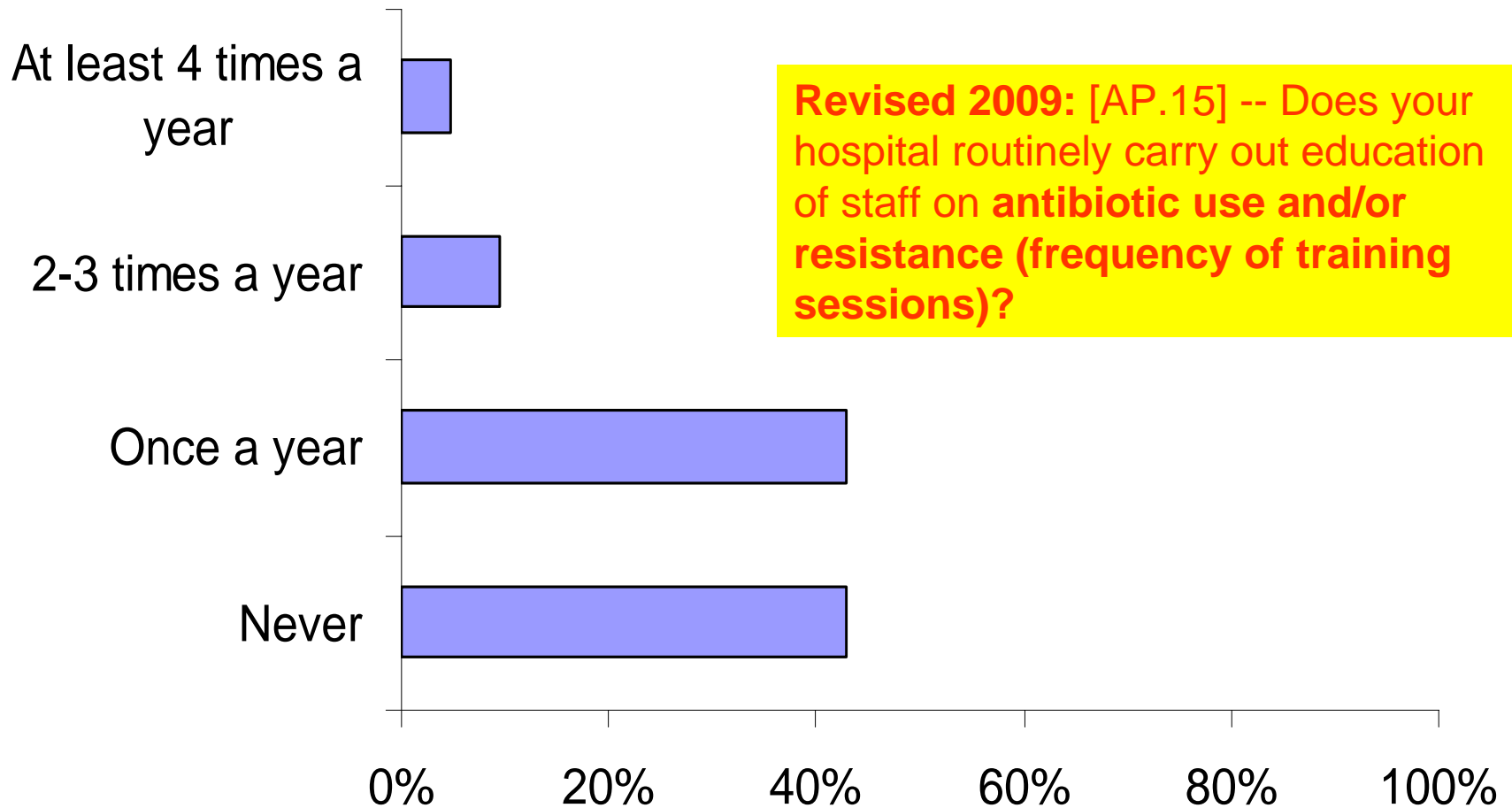
## How often does your hospital routinely carry out education of ICU staff on antibiotic use?

**Definition:** education is defined as a lecture/seminar/workshop or e.g. practical instruction/training session



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# IPSE WP 5 - CarelCU Tool for combating antibiotic resistance in intensive care units



# Acknowledgements

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