Combating AMR in a country with high resistance prevalence

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AMR and HAI

AMR – antibiotic usage in hospitals and community

HAI – infection control measures

Action plans of combating AMR (WHO)

1. Awareness about lack of access to ATB and AMR consequences
2. AMR monitoring and evaluation
3. Resources mobilisation
4. Multisectoral action

Different points of AMR view?

***Bacteria:** attractive destinations to live at*

***Medical doctors:** responsibility, extra education...*

***Hospital staff:** extra workload*

***Patients:** egoism, individual interests*

***Professional societies:** guidelines, regulations*

***Health insurance companies:** increased funding*

***Health care authorities:** legislation, economic interests*

***Government:** unpopular for governmental programs*

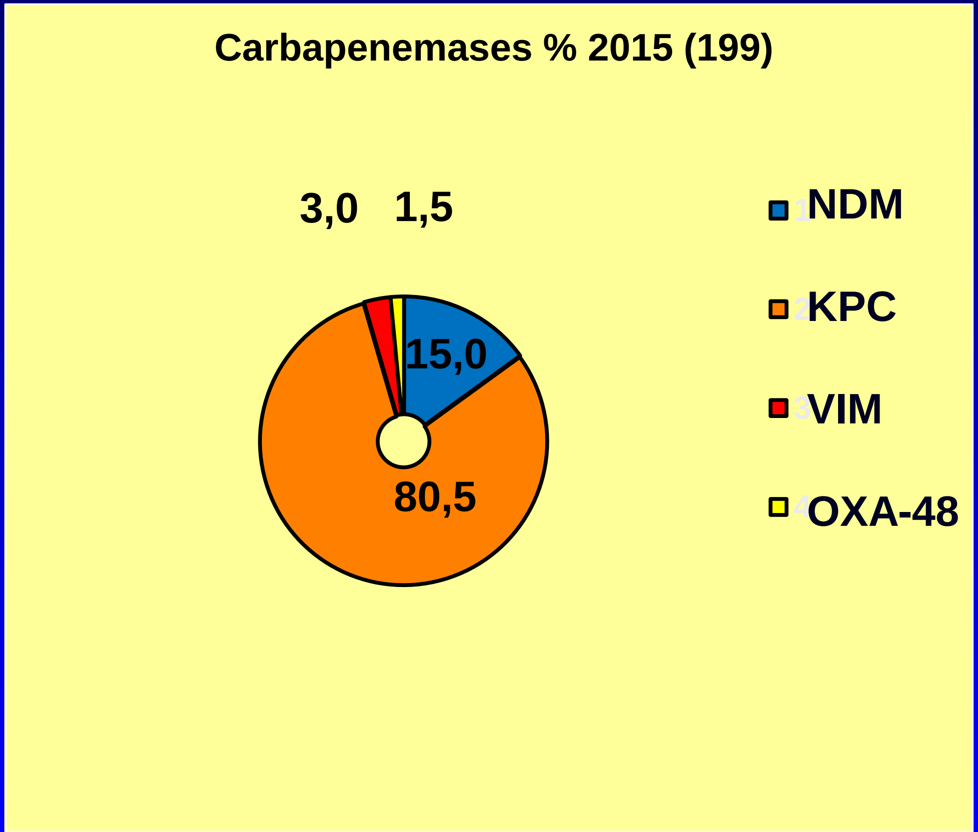
***Society:** prefer easy, uncomplicated life*

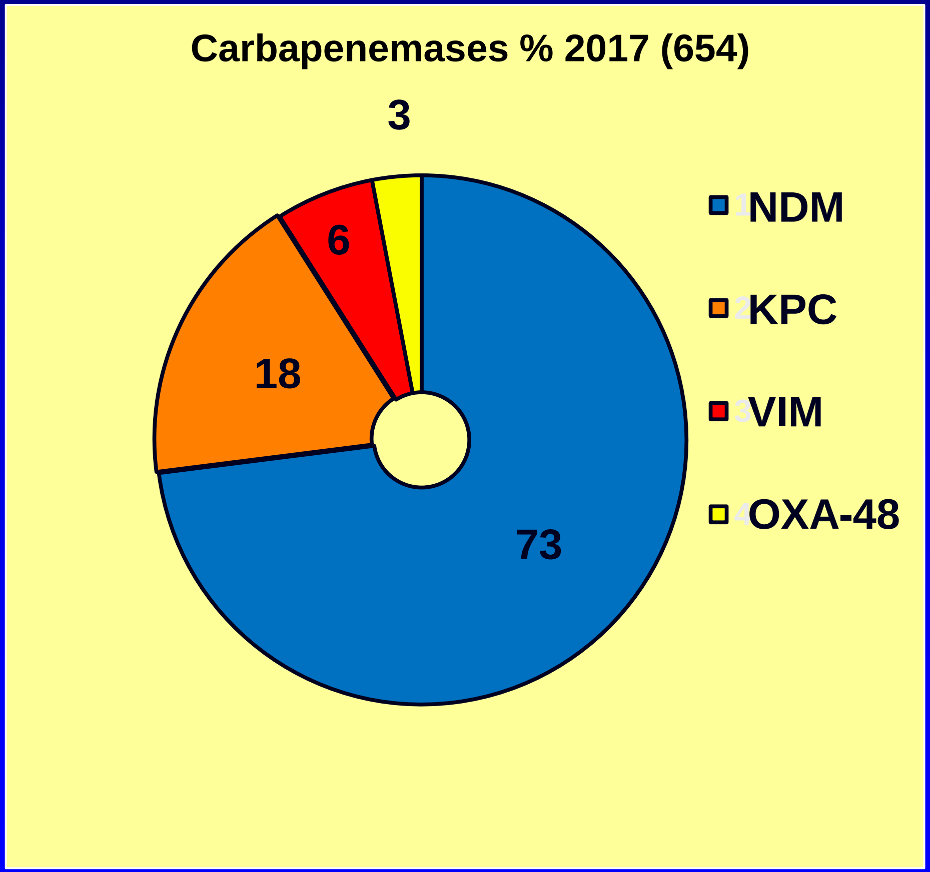
Bacteria

adapt to survive and to multiply

1980-2018 SK	K. pneumoniae Naiv 1980	K. pneumoniae ESBL + 1985	K. pneumoniae ESBL+AmpC... 2000	K. pneumoniae karba KPC 2014	Ps. aeruginosa MDR 2015	Acinetobacter baumannii 2017	K. pneumoniae NDM 2018
ATB		Interpret. MIC	Interpret. MIC	Interpret. MIC	Interpret. MIC	Interpret. MIC	Interpret. MIC
ampicillin	>32 R	>32 R	>32 R	>32 R	>32 R	>32 R	>32 R
ampicillin+sul.	2,0 S	8-16 S/R	>32 R	>32 R	>32 R	>32 R	>32 R
piperacillin+taz.	1,0 S	8-32 S/R	>32 R	>32 R	>32 R	>32 R	>32 R
cefuroxime	4,0 S	>32 R	>32 R	>32 R	>32 R	>32 R	>32 R
cefotaxíme	0,25 S	>32 R	>32 R	>32 R	>32 R	>32 R	>32 R
ceftazidime	0,25 S	>32 R	>32 R	>32 R	>32 R	>32 R	>32 R
sulperazon	0,25 S	8 S	>32 R	>32 R	>32 R	>32 R	>32 R
ertapenem	0,25 S	0,25 S	>4 R	>4 R	>4 R	>4 R	>4 R
imipenem	≤0,25 S	≤0,25 S	>16 R	>16 R	>16 R	>16 R	>16 R
meropenem	≤0,25 S	≤0,25 S	4-8 I / R	>16 R	>16 R	>16 R	>16 R
gentamicin	0,5 S	0,5 S	0,5 S	0,5-2 S / > 8 R	>16 R	>16 R	>16 R
tobramycin	0,5 S	0,5 S	>16 R	>16 R	>16 R	>16 R	>16 R
amikacin	1,0 S	1,0 S	>16 R	>16 R	>16 R	>16 R	>16 R
ciprofloxacin	<0,03 S	>4 R	>16 R	>16 R	>16 R	>16 R	>16 R
tetracyklin	1,0 S	>16 R	>16 R	>16 R	>16 R	>16 R	>16 R
tigecyklin	0,5 S	0,5 S	0,5 S	0,5 S / >2 I /R	>4 R	>4 R	>4 R
kolistin	0,5 S	0,5 S	1,0 S	0,5 S / >4 R	0,5 S	0,5 S	>8 R
trimethop/sulfo	0,5 S	>4 R	>4 R	>4 R	>4 R	>4 R	>4 R

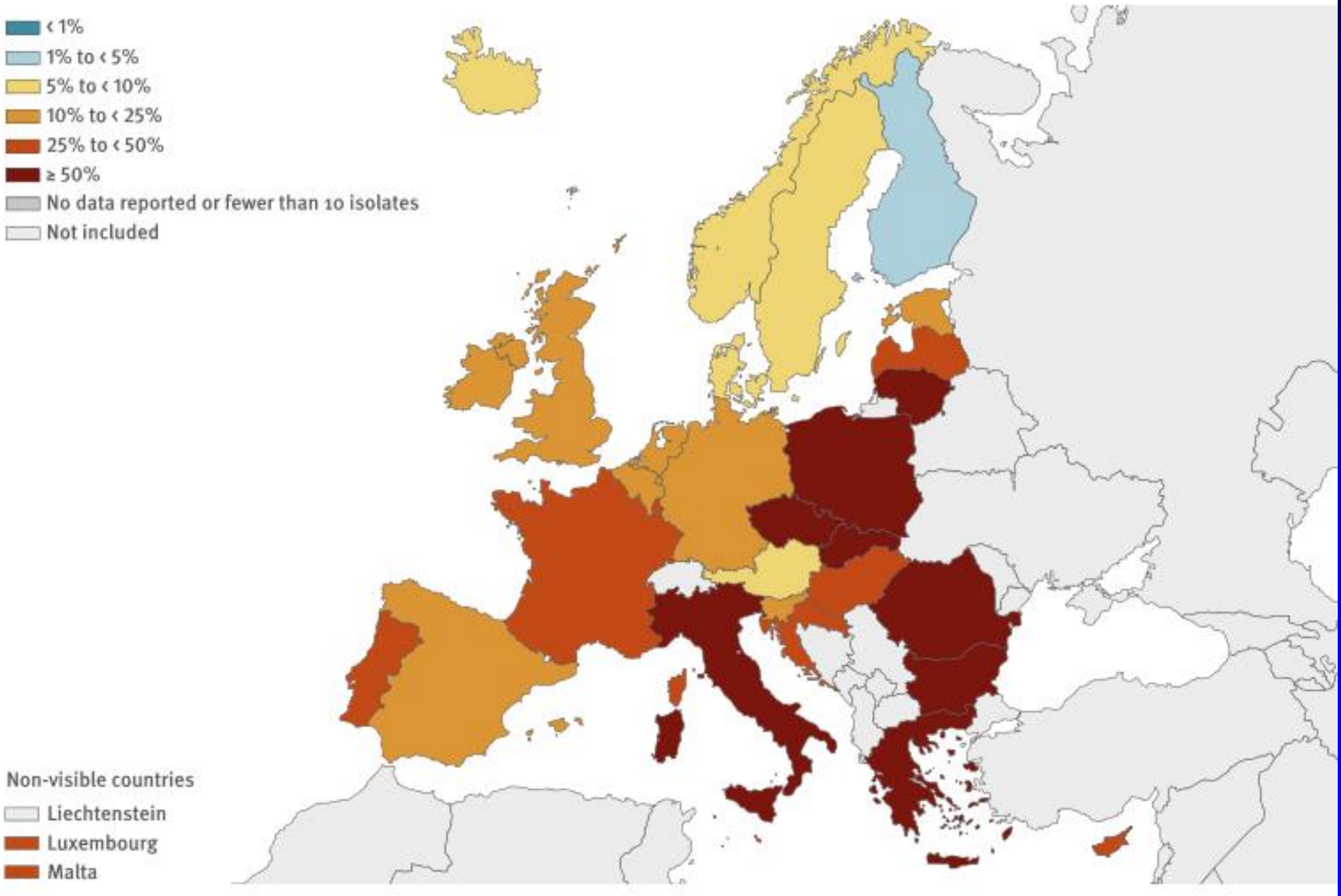
Bacterial competition: „succesful“ strains spread faster





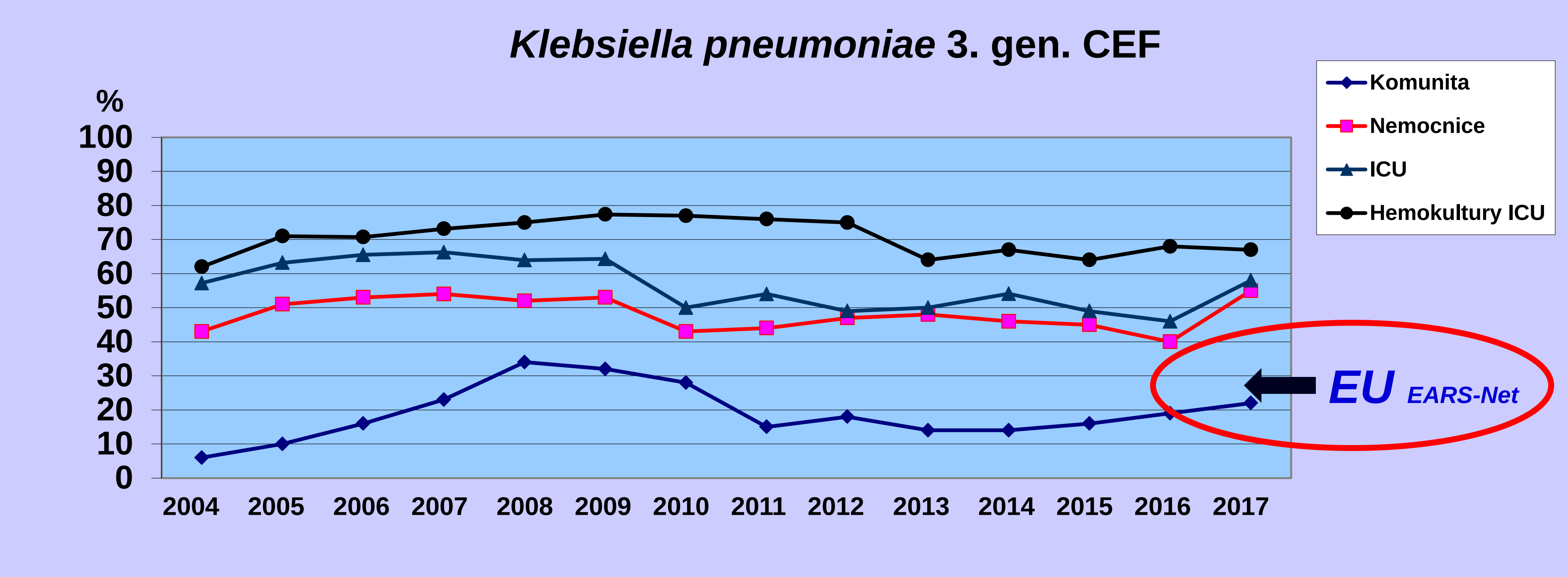
EARS-Net 2017 *K. pneumoniae 3-rd gen ceph.*

Figure 3.9. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2017



Slovakia

https://www.snars.sk/



„Objective“ factors

Point Prevalence Study 2011-2012

ECDC

Isolation beds SK

< 2% !

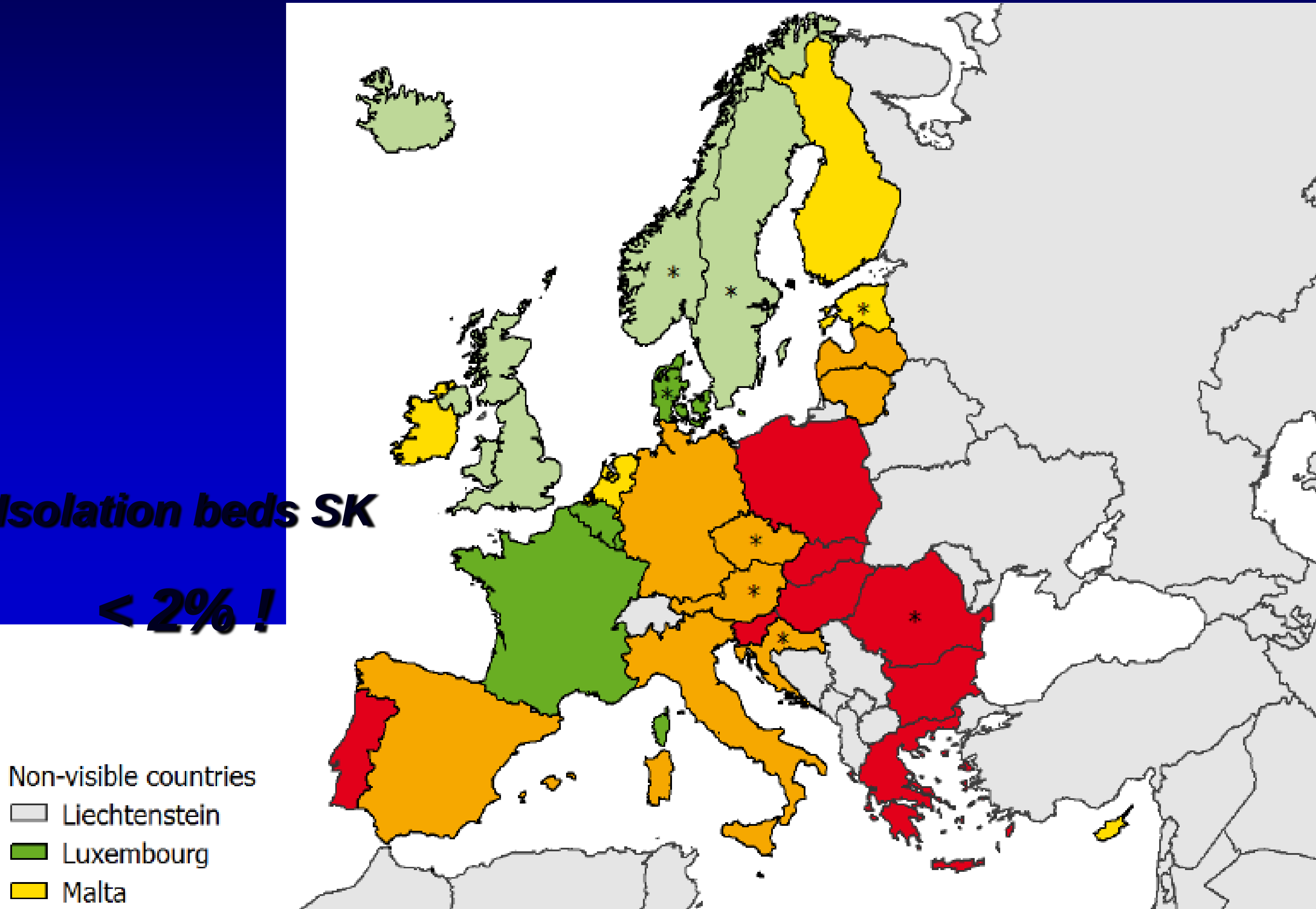


Figure 21. **Median number of infection prevention and control doctor full-time equivalents (FTE) per 250 hospital beds (n=779 hospitals), ECDC PPS 2011–2012**

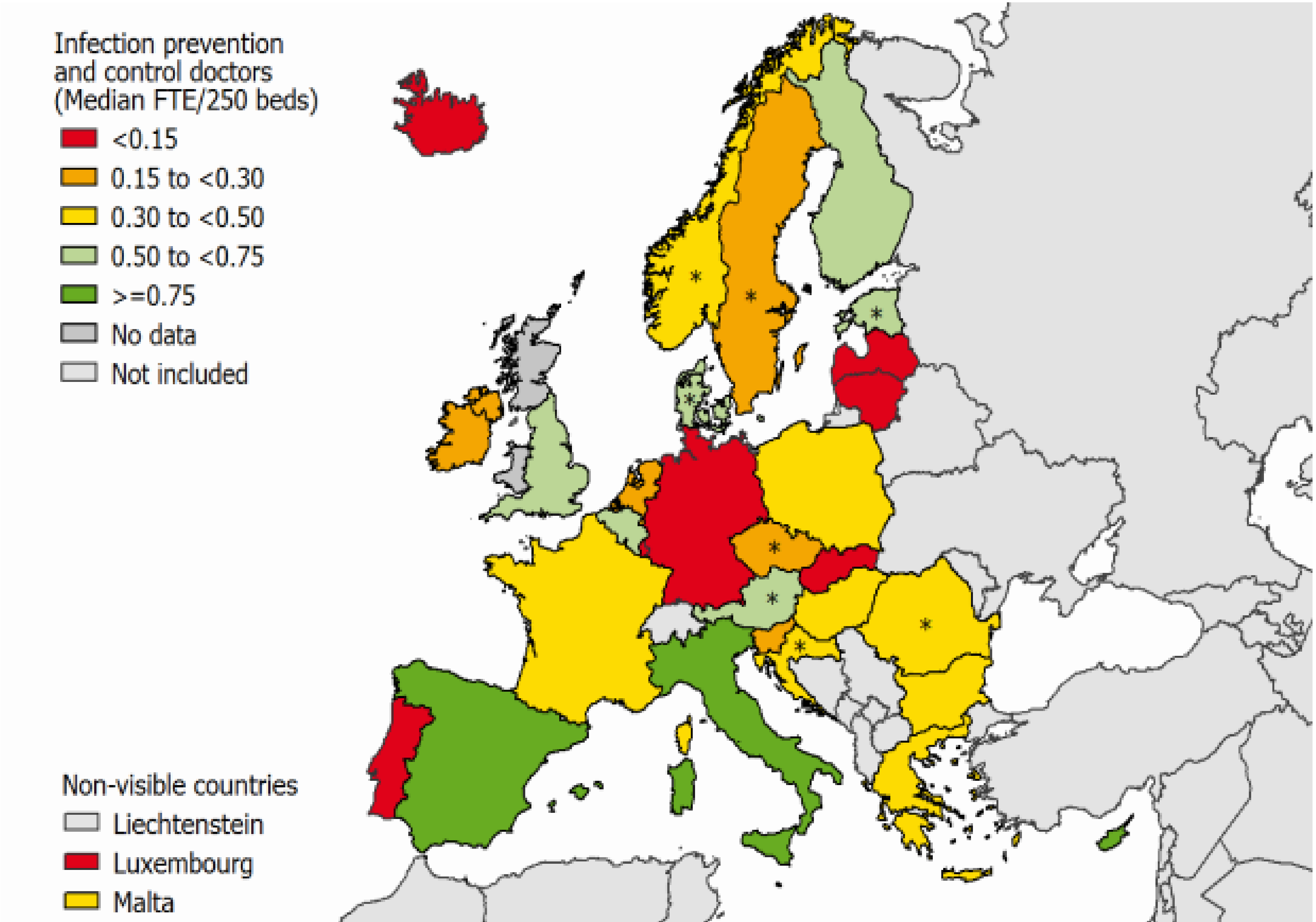
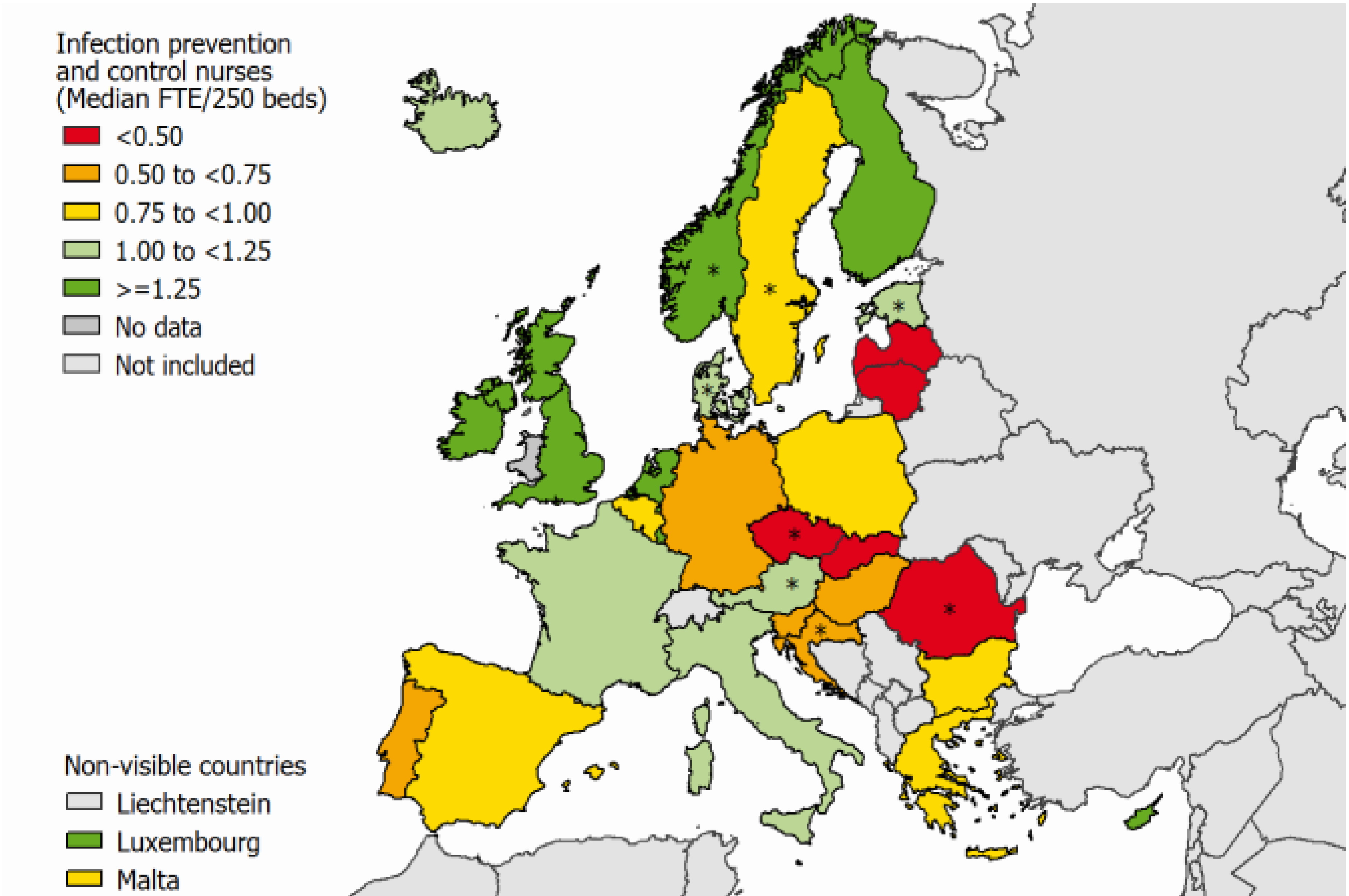
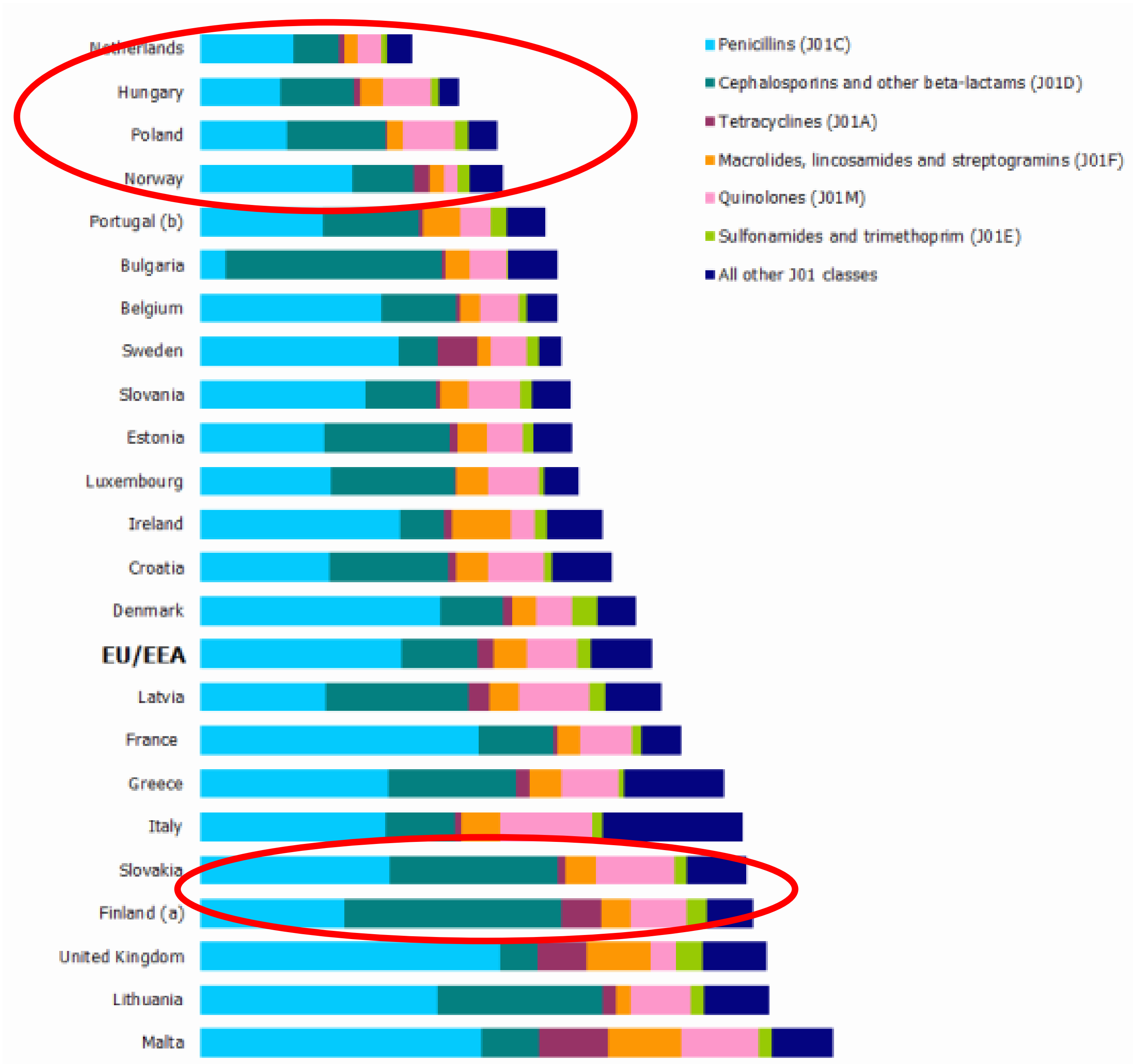


Figure 19. Median number of infection prevention and control nurse full-time equivalents (FTE) per 250 hospital beds (n=866 hospitals), ECDC PPS 2011–2012



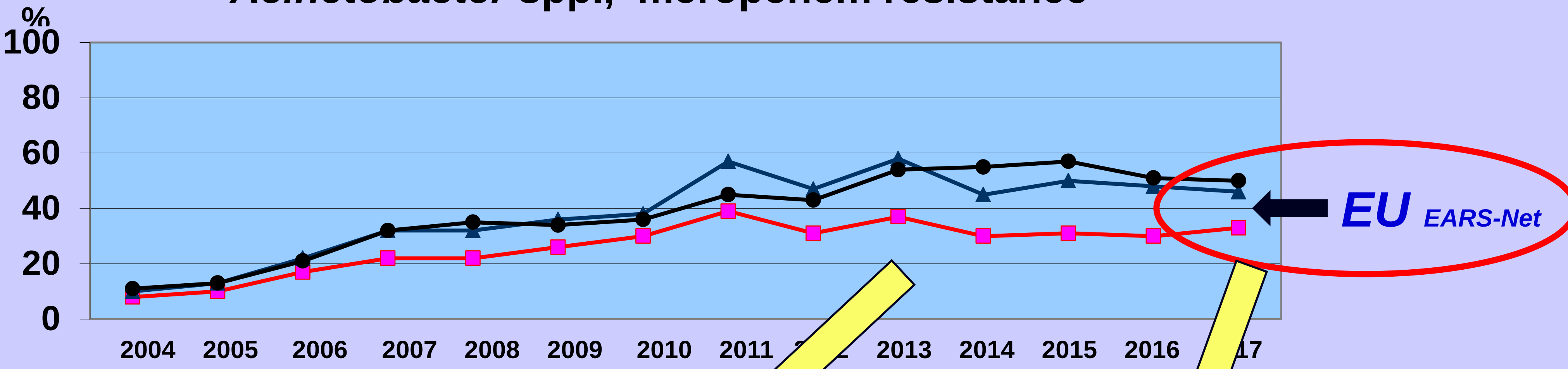
Hospital antibiotic consumption - a straightforward factor driving AMR?

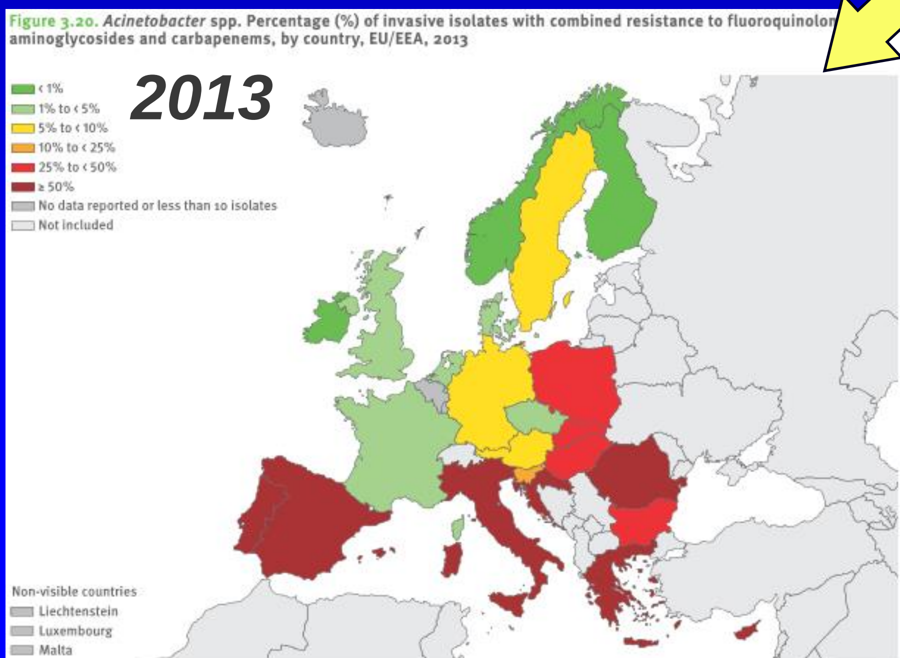
Figure 5. Consumption of antibacterials for systemic use (ATC group J01) in the hospital sector, by ATC group, EU/EEA countries, 2016, expressed as DDD per 1 000 inhabitants per day

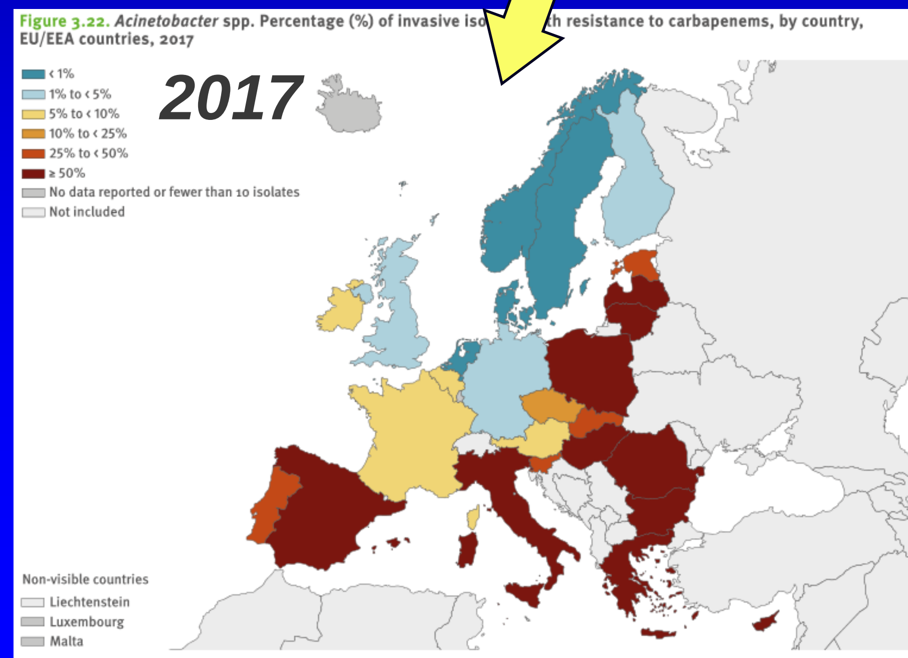


AMR – other, not known factors?

Acinetobacter spp., meropenem resistance





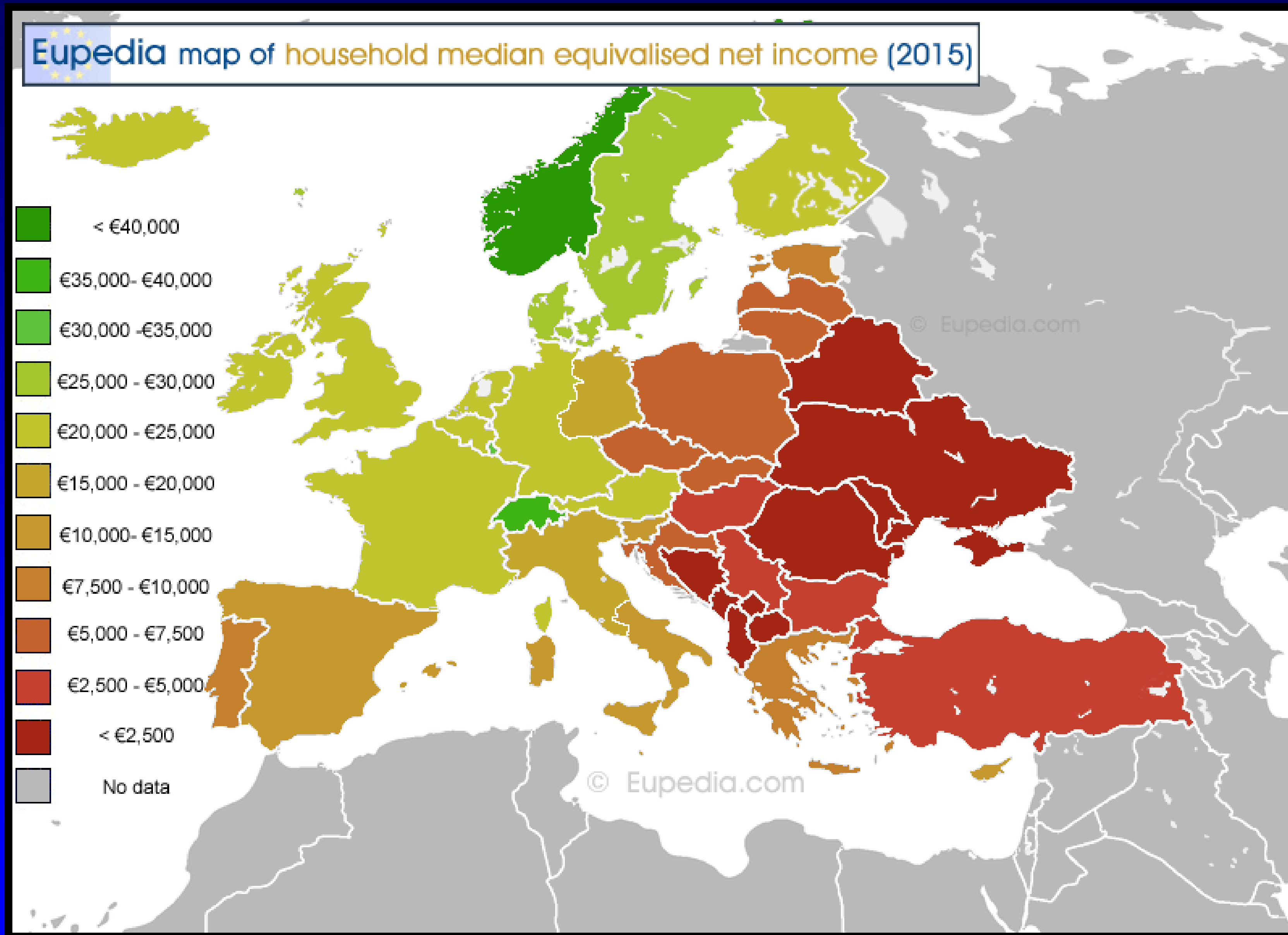


What role plays country economy?

Google search

AMR → economy	***4 180 000 hits***
economy → AMR	***few if any***

North→South and West → East gradients....



EU (Slovakia): free trade principles

Different commodities: monopolisation, uncontrolled behaviour of greatest providers

communication technologies (EU regulations effective)
food chains (EU regulations at progress)
energy, fuels
health care ....

Free trade autoregulation in health care setting?
Special legislation needed?

Consequences of free trade on health care system

Patient: treatment → client processing
Hospitals: high bed occupancy rates, insufficient investments, savings

Infection control measures: restricted (expensive, extra staff required)

Qualified staff: absent - look for better paid jobs

Health insurance companies: make profit, intentional limitation of diagnostic procedures where possible

Antimicrobial drugs: misuse of new expensive molecules, generics prioritisation, cheap narrow drugs sometimes not available

Microbiology diagnostics: hospital clinical microbiology laboratories rare
clinical microbiology captured by clinical biochemistry,
„economic optimisation“ - formation of big laboratory chains based on automation,
high workload, insufficiently qualified personnel,
no results interpretation is provided....
?antibiotic stewardship?

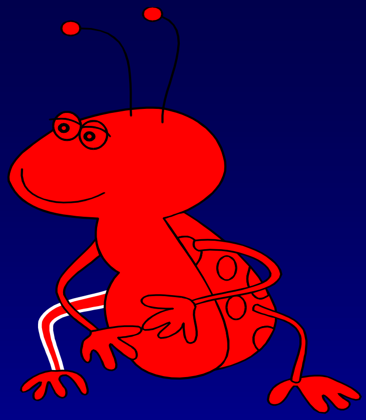
Incomming problems:

„New“ system of hospital financing (DRG), SK version:

- ***no screening of MDR bacteria on patient´s admission***
- ***price calculations neglect frequent infection complications***
- ***infection control measures ignored despite high level of AMR***

How hospitals will manage such conditions?

Conclusions



Bacterial adaptability and rapid evolution of AMR does not tolerate insufficient measures to control antibiotic resistance

New aspect: economical trends of free trade ignore professional arguments and may predominate in health care system

Legislative regulations should be estabilished to prevent negative free trade economy consequences on health care systems