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Министерство за здравство  
на Република Македонија

# КАМПАЊА ЗА РАЦИОНАЛНА УПОТРЕБА НА АНТИБИОТИЦИ

## ANTIMICROBIAL RESISTANCE IN MACEDONIA COMPARED WITH BALKAN REGION AND EUROPE: RESULTS OF CAESAR NETWORK

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AMR focal point

Institute of Public Health of R. Macedonia

Bangkok, 29 January 2018

## “Golden age of antibiotics”

- Fleming, Nobel Lecture, December 11, 1945 -  
“The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily underdose himself and **by exposing his microbes to non-lethal quantities of the drug make them resistant.**
- Although with best intention still ongoing:
  - **Easy access and availability**
  - **Irrational prescribing**
  - **Misuse**



# ANTIBIOTIC RESISTANCE THE GLOBAL THREAT

Antibiotic resistance – when bacteria change and cause antibiotics to fail – is happening **RIGHT NOW**, across the world

The full impact is unknown. There is no system in place to track antibiotic resistance globally



Without urgent action, many modern medicines could become obsolete, turning even common infections into deadly threats.



## A GROWING CRISIS WORLDWIDE

In the EUROPEAN UNION,  
antibiotic resistance  
causes 25,000 deaths per year  
and 2.5m extra hospital days<sup>1</sup>



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# AMR – global threat

“Antimicrobial resistance is increasingly widespread in the WHO European Region as **resistant microbes know no borders.**”

Effective infection prevention and control is one of our most powerful weapons to address this global health threat.”

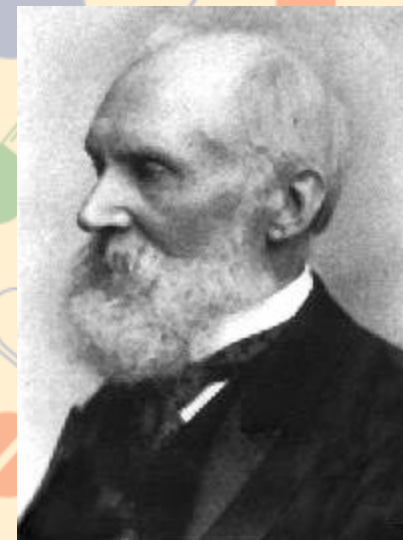


**Dr Zsuzsanna Jakab**  
WHO Regional Director for Europe



# AMR and actions in R. Macedonia

**“If you cannot measure it, you cannot improve it”**



Lord Kelvin,  
1824-1907

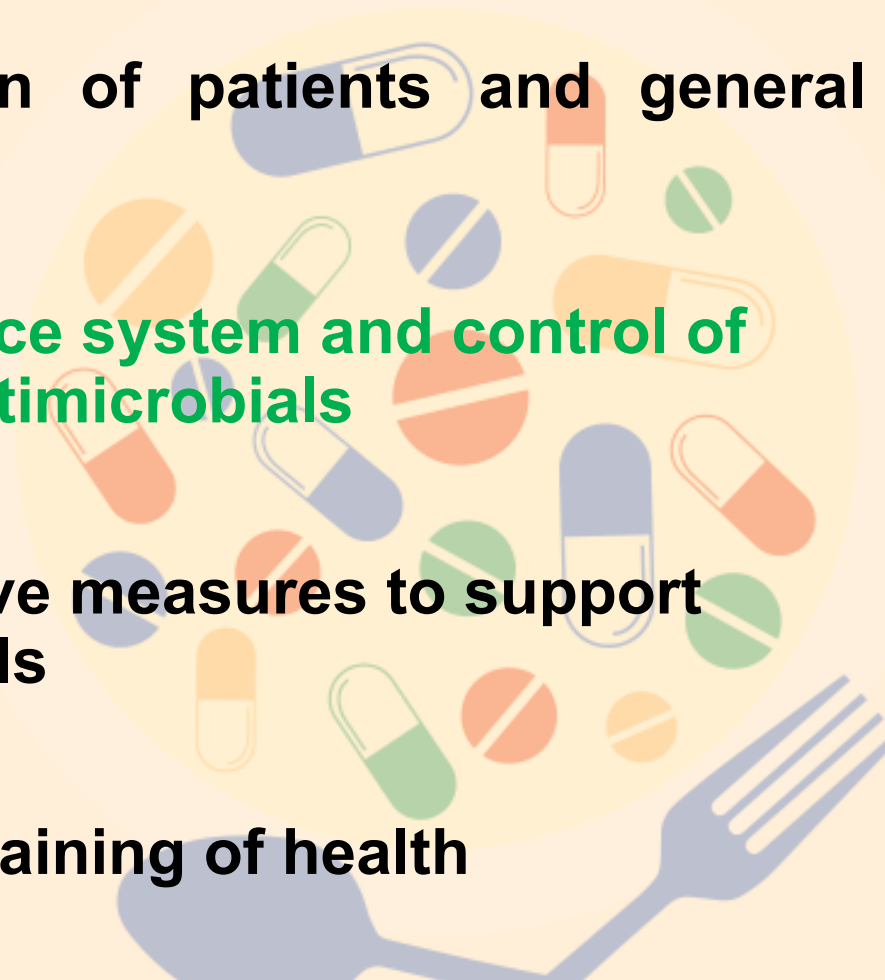
## AMR and actions in R. Macedonia

- November 2008 – Awareness campaign
- 06.05.2009 - Multisectorial commission for surveillance of antimicrobial resistance established
- WHO partnership
- **26.04.2011– Government of RM adopted National strategy with action plan for control of antimicrobial resistance in RM 2012-2016**



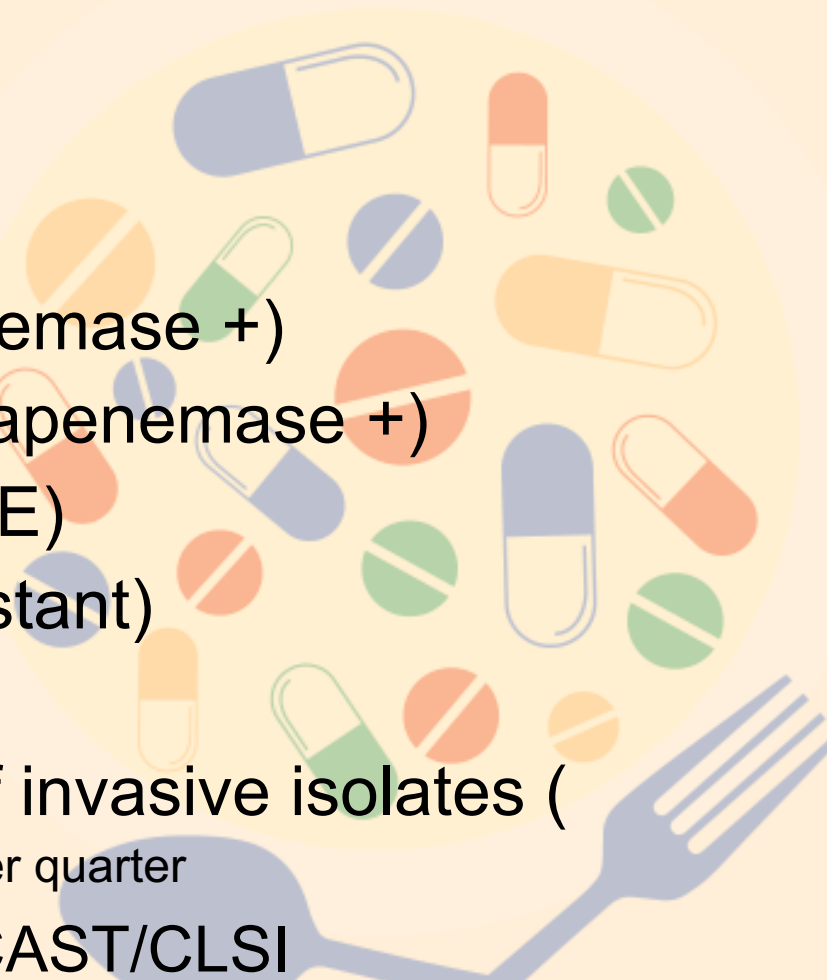


# National strategy with action plan for control of antimicrobial resistance in RM 2012-2016

1. Information and education of patients and general population
  2. Strengthening the surveillance system and control of AMR and consumption of antimicrobials
  3. Use of control and preventive measures to support prudent use of antimicrobials
  4. Continuous education and training of health professionals
- 

# Central Asian and Eastern European Surveillance of Antimicrobial Resistance (CAESAR )

- Microorganisms:
  - *S. aureus* (MRSA)
  - *Str. pneumoniae* (Pen R)
  - *E. coli* (ESBL+, carbapenemase +)
  - *K. pneum.* (ESBL +, carbapenemase +)
  - *E. faecium* и *faecalis* (VRE)
  - *Ps. aeruginosa* (multiresistant)
  - *Acinetobater spp.*
- Susceptibility test results of invasive isolates ( **blood and CSF** ) - per patient per quarter
- International standards - EUCAST/CLSI



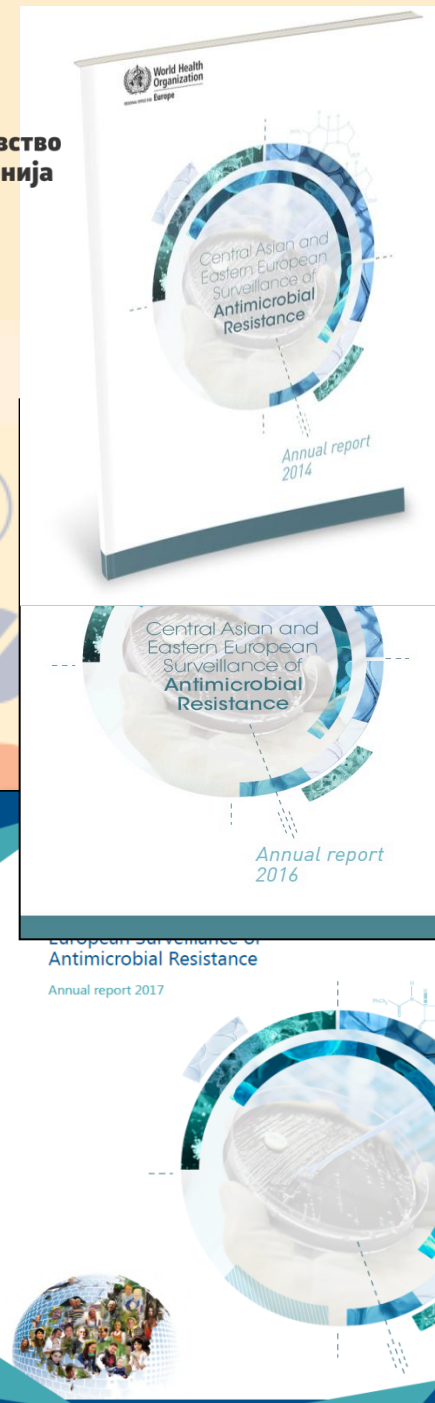


# CAESAR annual reports

## 2017 report

- **9** reporting countries vs 7 in 2016
- Updated **maps** of AMR in the whole European region, joint with EARS-Net (ECDC)
- **Progress** in CAESAR network countries

• <http://www.euro.who.int/en/health-topics/disease-prevention/antimicrobial-resistance/publications/2017/central-asian-and-eastern-european-surveillance-of-antimicrobial-resistancecaesar.-annual-report-2017>



# Progress in CAESAR network countries

Since 2016:

- More **national AMR reference laboratories** in place
- 2 more countries provided national data (Georgia and Montenegro)
- **Data quality improved** from level B to level A in 2 countries (Bosnia and Herzegovina and Serbia)
- **One more pathogen under surveillance added (*Salmonella*)**
- Participation in **external quality assessment** increased and results improved



# WHO Global AMR surveillance system (GLASS)

Sample	Priority pathogens
blood	<i>E. coli</i> <i>K. pneumoniae</i> <i>A. baumannii</i> <i>S. aureus</i> <i>S. pneumoniae</i> <i>Salmonella spp</i>
urine	<i>E. coli</i> <i>K. pneumoniae</i>
faeces	<i>Salmonella spp.</i> <i>Shigella spp.</i> <i>Clostridium diff.</i>
Urethral and cervical swabs	<i>N. gonorrhoeae</i>

-Patients in the hospitals and in the community

- continuous

-Macedonia join to GLASS in 2017

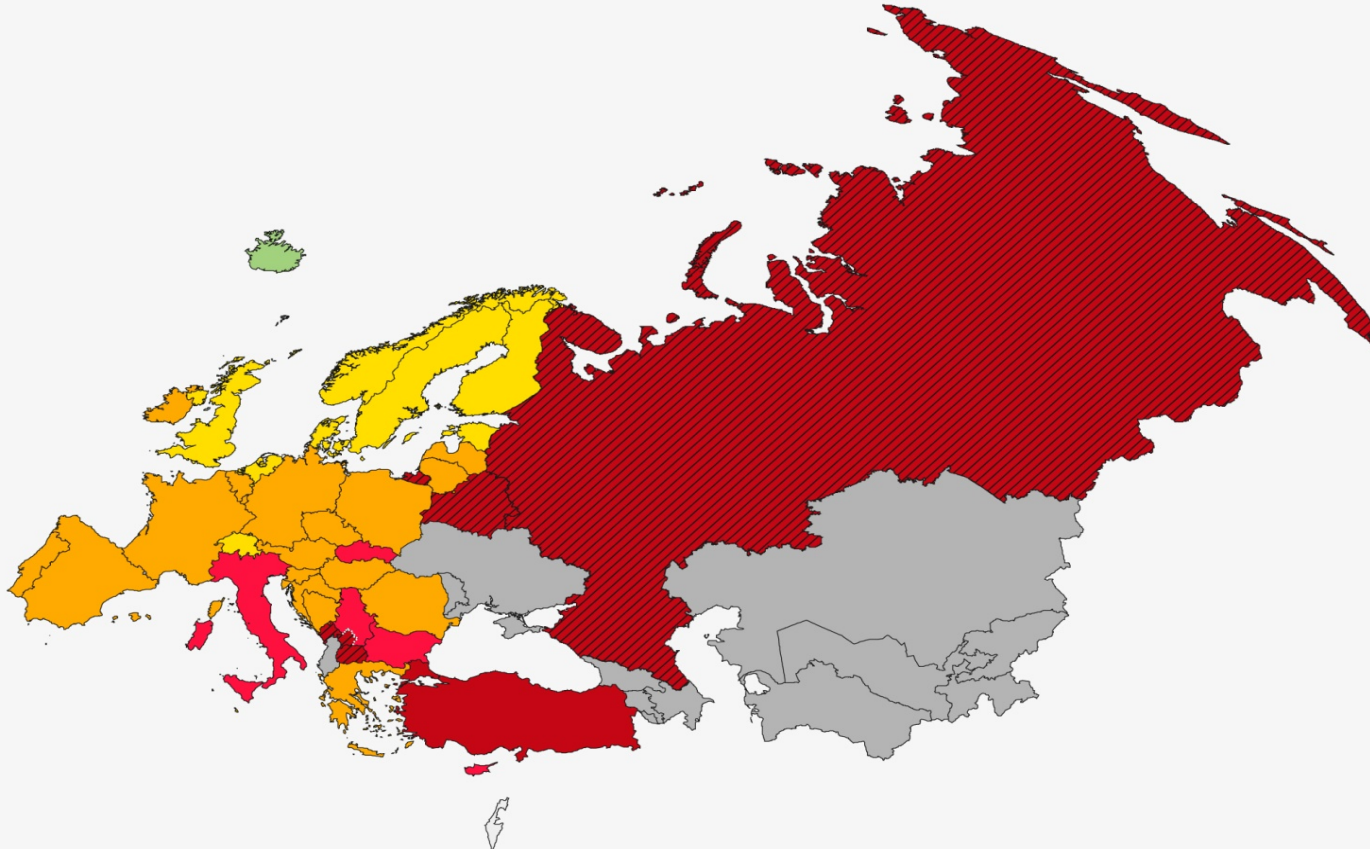
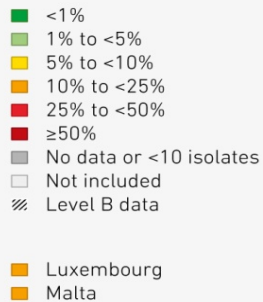


## Total number of isolates and % of resistance – Limitation – evidence level B

2013 2014 2015 2016	<i>S. aureus</i>	<i>Str. pneumon.</i>	<i>Ent. faecalis</i>	<i>Ent. faecium</i>	<i>E. coli</i>	<i>Kl. pneumon.</i>	<i>Acinetobacter</i>	<i>P. aeruginosa</i>
<b>Total number</b>	225	28	88	56	226	121	110	42
<b>Resistance</b>	<b>MRSA</b>	<b>PNSP</b>	<b>VRE</b>	<b>VRE</b>	<b>ESBL</b>	<b>ESBL</b>	<b>CRAB</b>	<b>CRPA</b>
<b>% of resistance</b>	48	30	1,7	65	73	85,6	84	36,0



# Third generation cephalosporin resistant *E. coli*



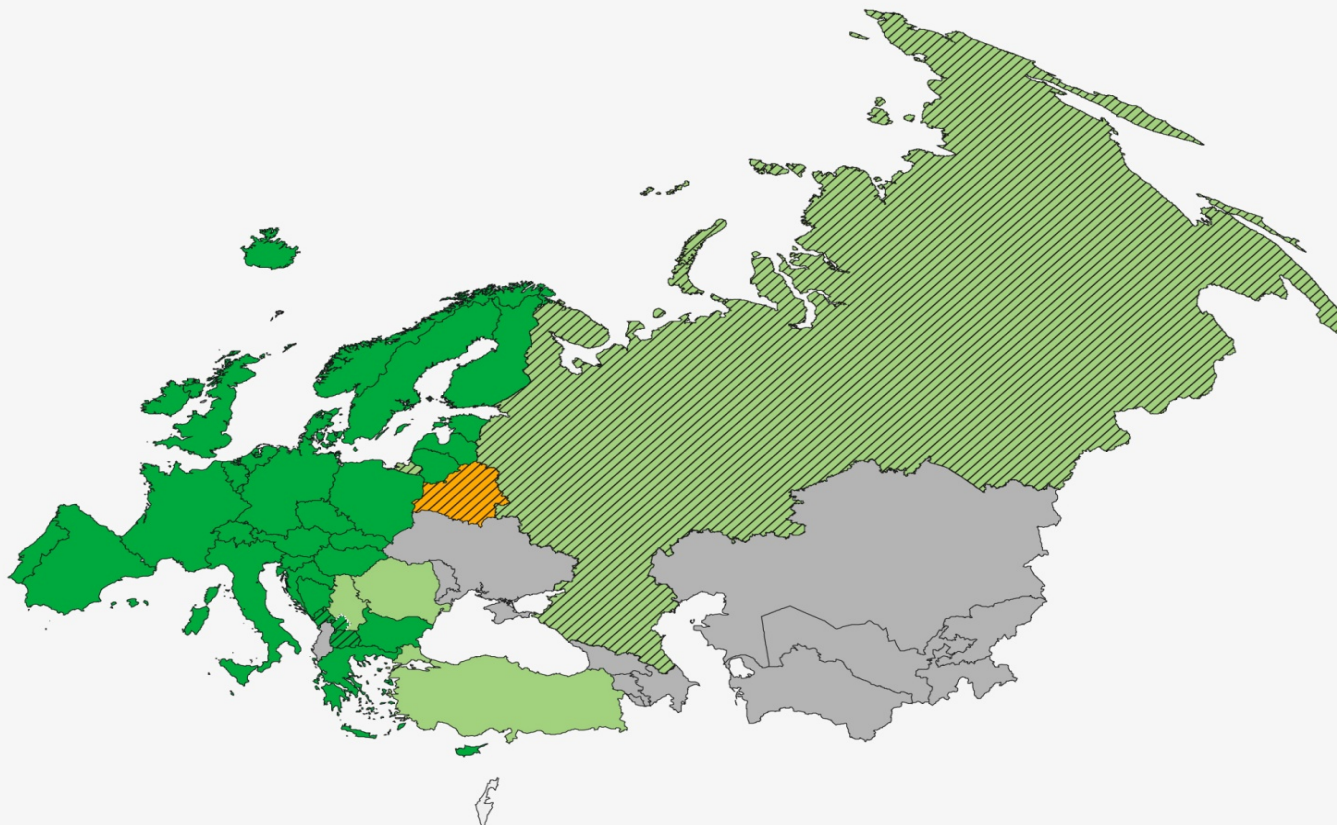
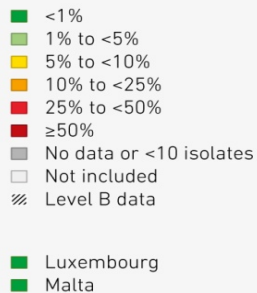
Level B data: the data provide an indication of the resistance patterns present in clinical settings in the country or area, but the proportion of resistance should be interpreted with care. Improvements are needed to attain a more valid assessment of the magnitude and trends of AMR in the country or area. For more information about levels of evidence, see section 4.2 Levels of evidence are only provided for CAESAR countries and areas.

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Data sources: 2016 data from the Central Asian and Eastern European Surveillance of Antimicrobial Resistance (CAESAR, ©WHO 2017) and 2016 data from the European Antimicrobial Resistance Surveillance Network (EARS-Net, ©ECDC 2017).

# Carbapenem resistant *E. coli*



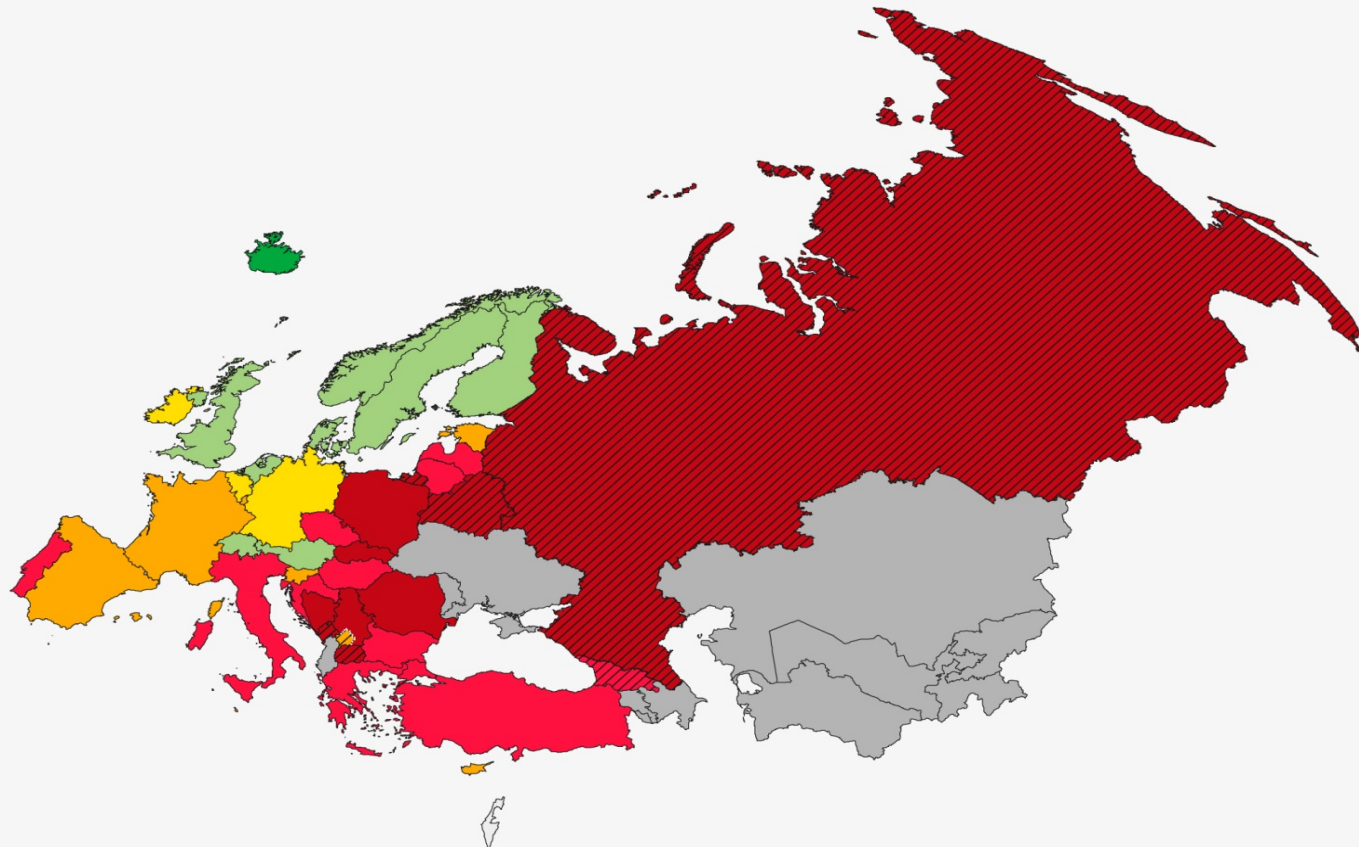
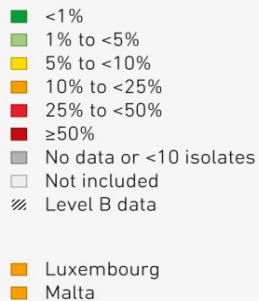
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## Multidrug-resistant (combined resistance to third-generation cephalosporins, fluoroquinolones and aminoglycosides) *K. pneumoniae*



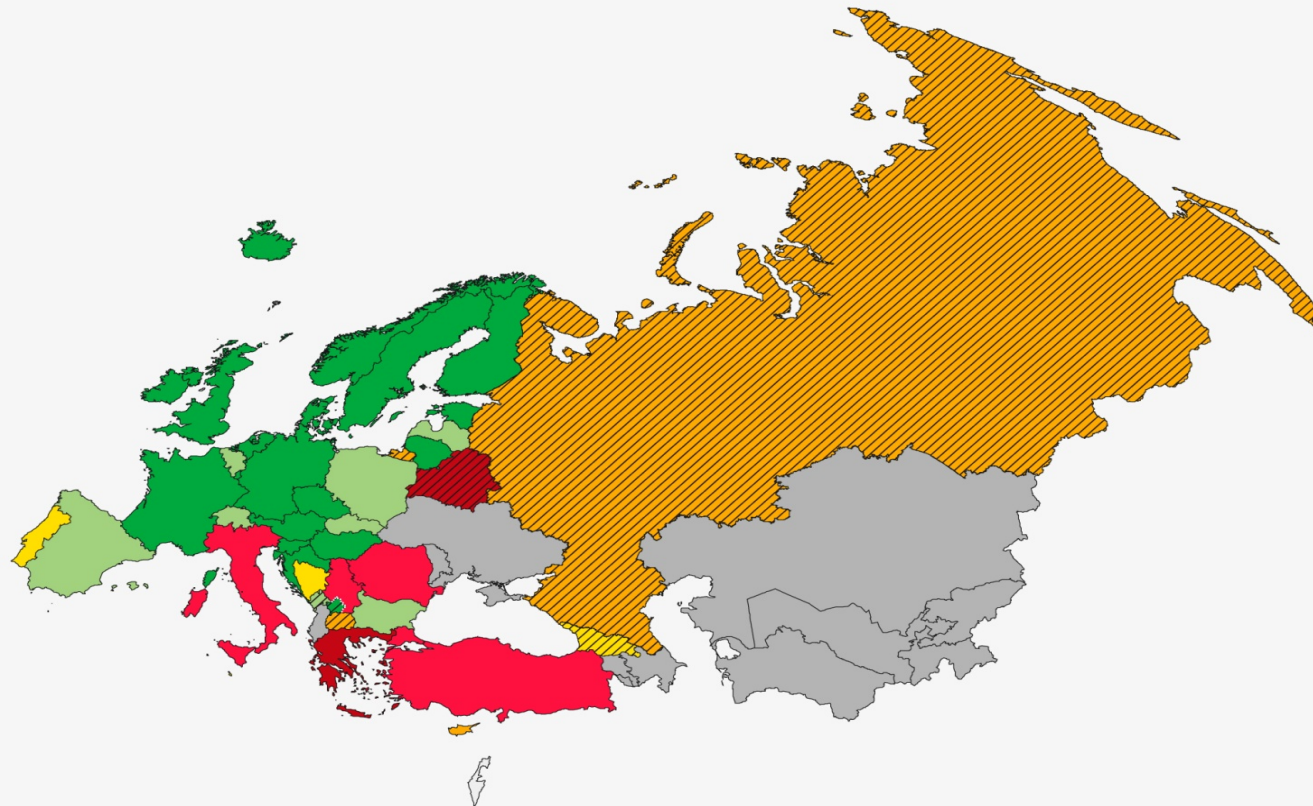
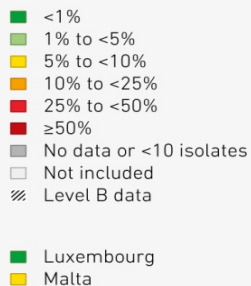
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# Carbapenem resistant *K. pneumoniae*



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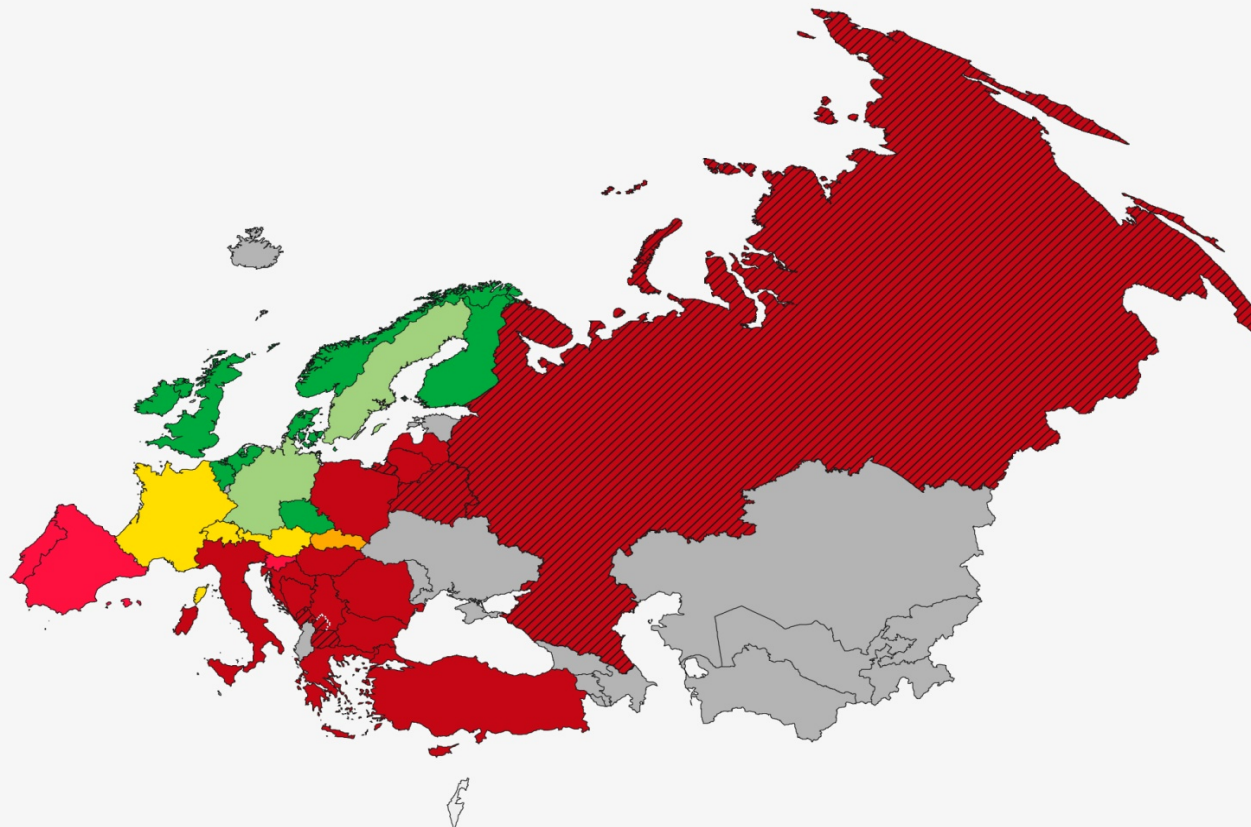
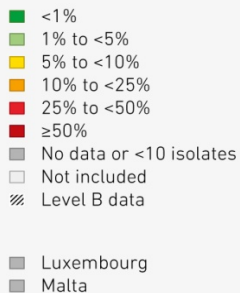
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## Multidrug-resistant (combined resistance to fluoroquinolones, aminoglycosides and carbapenems) *Acinetobacter spp.*



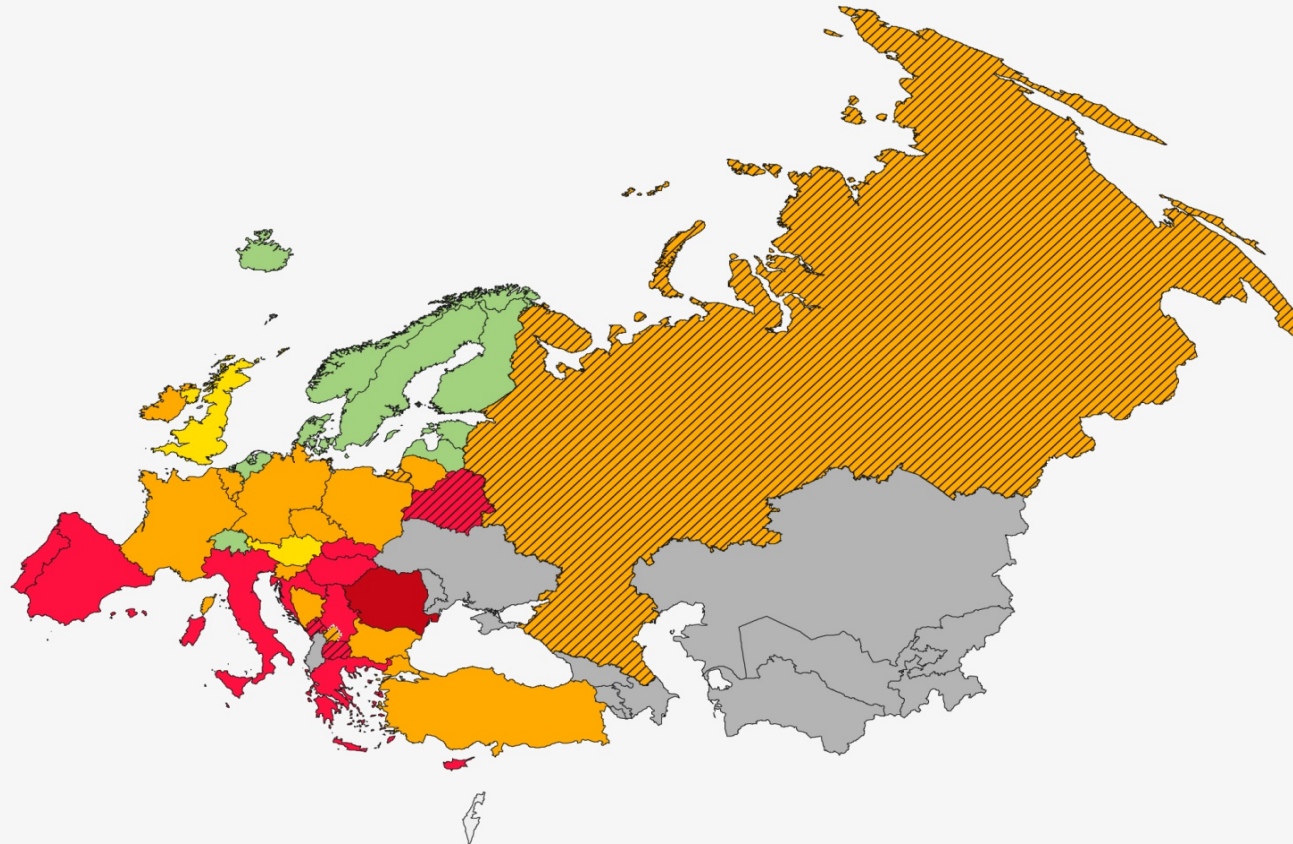
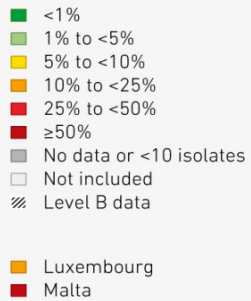
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# MRSA in Europe



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## Conclusion

- Significant increase in third-generation cephalosporin resistance of *E.coli*
- Emergence of carbapenem resistant *E. coli*!!!!
- Multidrug-resistant *K. pneumoniae* has become common in the European Region
- **High proportions of multidrug resistance and carbapenem resistance *K. pneumoniae* and multidrug-resistant *Acinetobacter spp* - reflect the dissemination of resistant clones in the health care settings and indicate the serious limitation in treatment options**
- **Increasing levels of community-associated MRSA**



## Conclusion

- Support countries that are building or strengthening their national AMR surveillance
- Stimulate development of early warning system in case of MDR strain and rapid sharing information/data between countries
- Providing timely AMR data is critical for policy decisions and rapid actions – national, regional and international

## A coordinated response is urgently needed



« Nobody is exempt from the problem  
nor  
from playing a part in the solution»

(WHO Global Strategy for Containment of Antimicrobial Resistance)



# Acknowledgement

- 1. Ministry of Health
- 2. Institute of Public Health
- 3. WHO –Europe
- 4. WHO office Skopje
- 5. Medical faculty Skopje - Institute of microbiology and parasitology
- 6.. Health Insurance fund
- 7. Macedonian medical agency
- 8. Macedonian Microbiological Society
- 9. Macedonian association for control of intrahospital infections
- 10. Faculty of veterinary medicine
- 11. Food and veterinary agency
- 12 . Center for regional policy and research Studiorum
- 13. Mayor of the city Shtip
- 14. Microbiological laboratories
- 15. Center for family medicine
- 16. Medical faculty Shtip .

