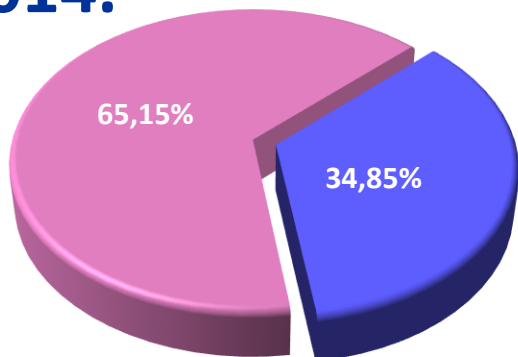


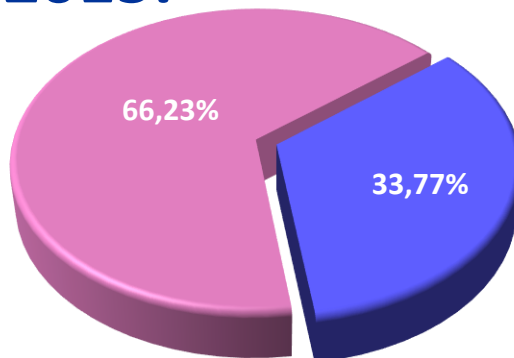
# Broj primoizolata invazivnih bakterija u periodu 2014-2019. godine

**2014.**



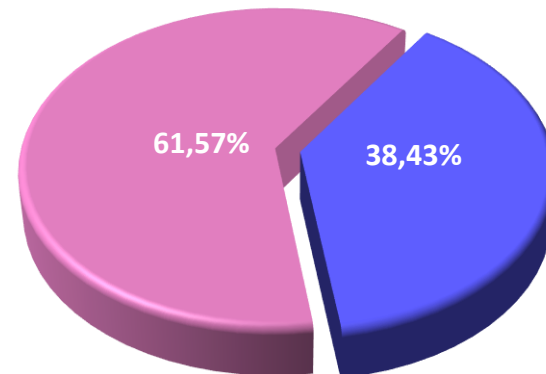
**1590 izolata**

**2015.**



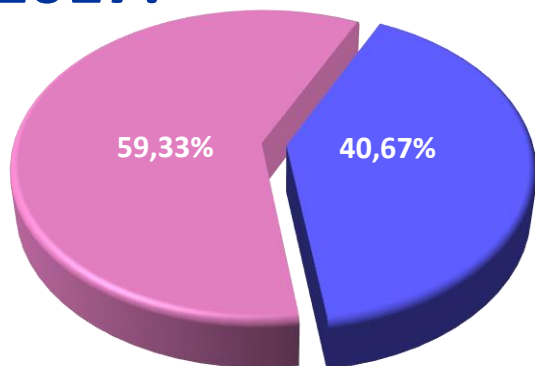
**1919 izolata**

**2016.**



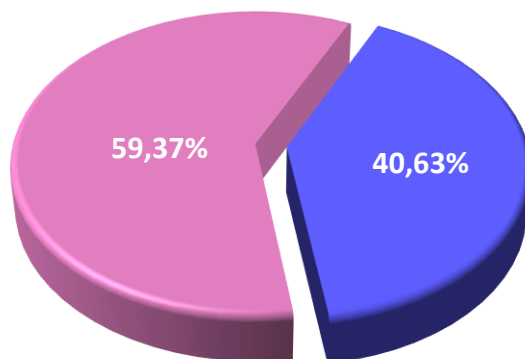
**2235 izolata**

**2017.**



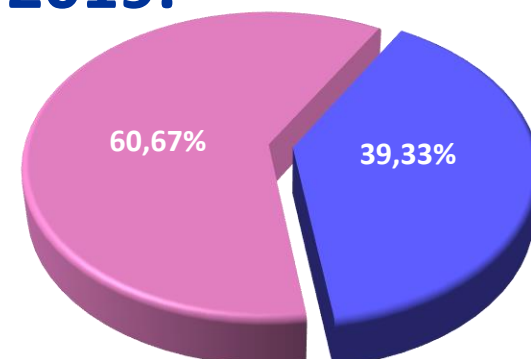
**2336 izolata**

**2018.**



**2811 izolata**

**2019.**

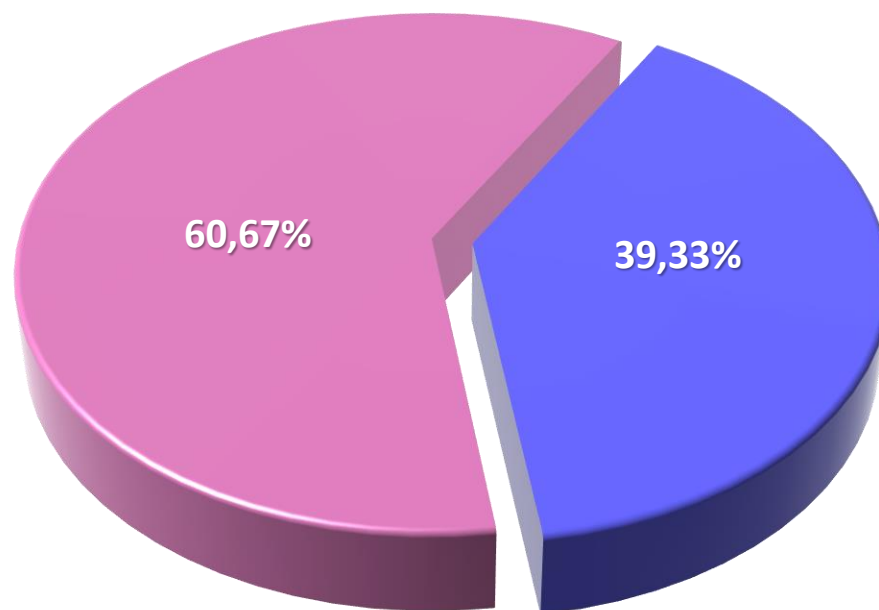


**2909 izolata**

 Gram-negativne bakterije  
 Gram-pozitivne bakterije

# Broj i vrsta ispitanih izolata bakterija u periodu 01.01.2019 - 31.12.2019.

Vrsta bakterije	Broj primoizolata
<i>Acinetobacter</i> spp.	532
<i>E. faecalis</i>	272
<i>E. faecium</i>	159
<i>E. coli</i>	510
<i>K. pneumoniae</i>	513
<i>P. aeruginosa</i>	196
<i>S. aureus</i>	628
<i>S. pneumoniae</i>	85
<i>Salmonella</i> spp.	14
<b>Ukupan br. izolata</b>	<b>2909</b>

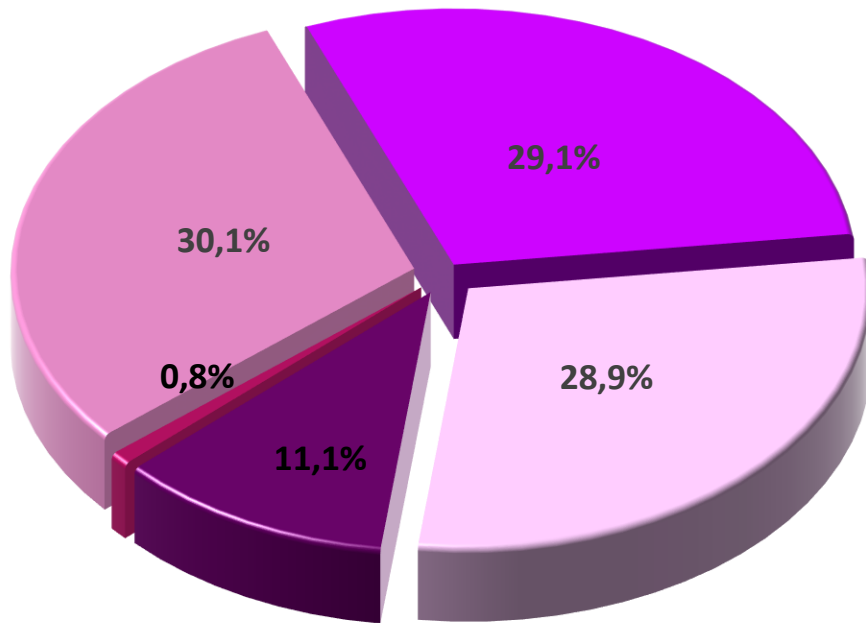


■ Gram-negativne bakterije ■ Gram-pozitivne bakterije

- Od ukupnog broja od **2909 primoizolata** invazivnih bakterija prijavljenih za 12 meseci
  - **1765 Gram-negativne**
  - **1144 Gram-pozitivne**

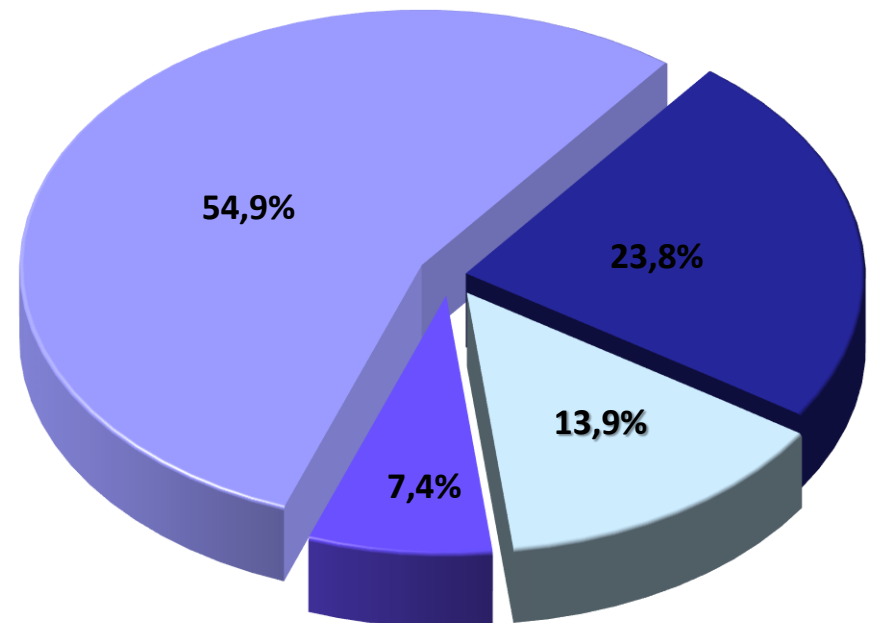
# Invazivni izolati bakterija u Srbiji – distribucija vrsta

Gram-negativne bakterije (1765)



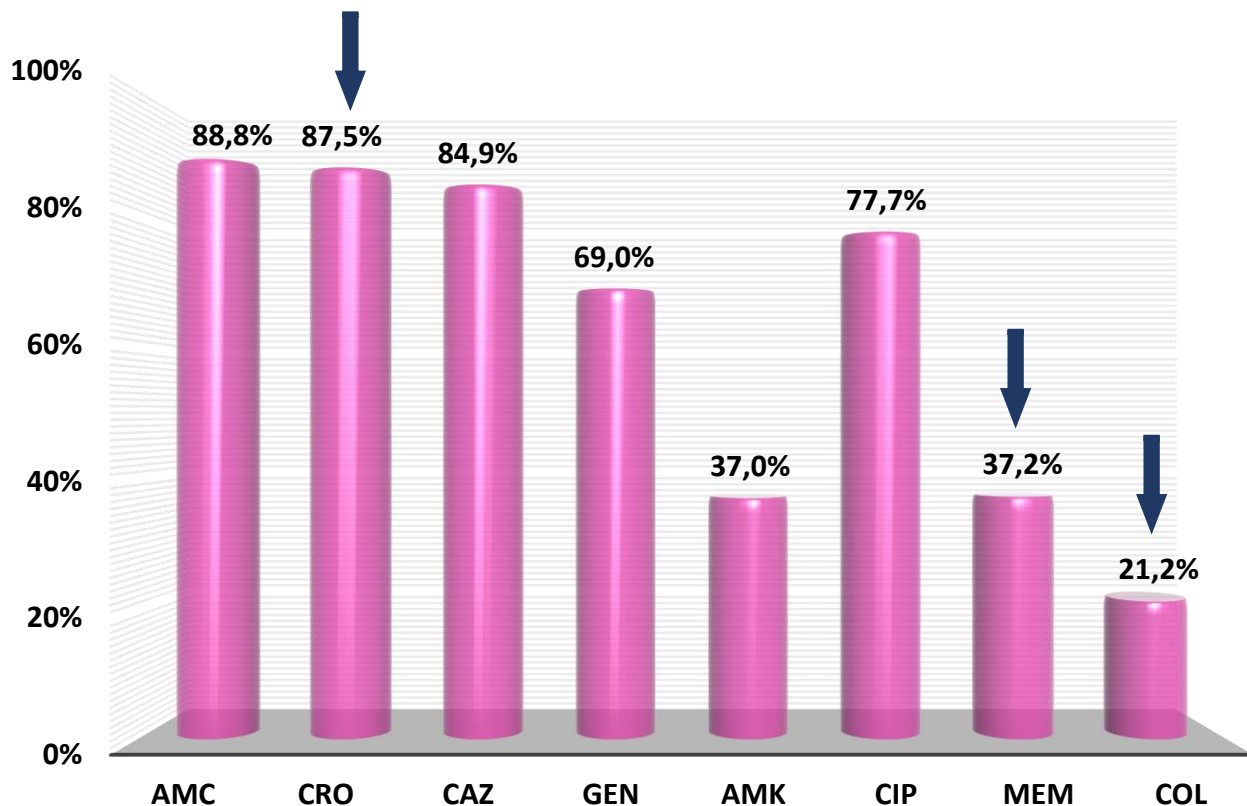
- Acinetobacter spp.
- E. coli
- Salmonella spp.
- K. pneumoniae
- P. aeruginosa

Gram-pozitivne bakterije (1144)



- S. aureus
- E. faecalis
- E. faecium
- S. pneumoniae

# *Klebsiella pneumoniae*: rezistencija na antimikrobne lekove u Srbiji, 2019. godina



AMC	Amoksisilin / klavulanska kiselina
CRO	Ceftriakson
CAZ	Ceftazidim
GEN	Gentamicin
AMK	Amikacin
CIP	Ciprofloksacin
MEM	Meropenem
COL	Kolistin

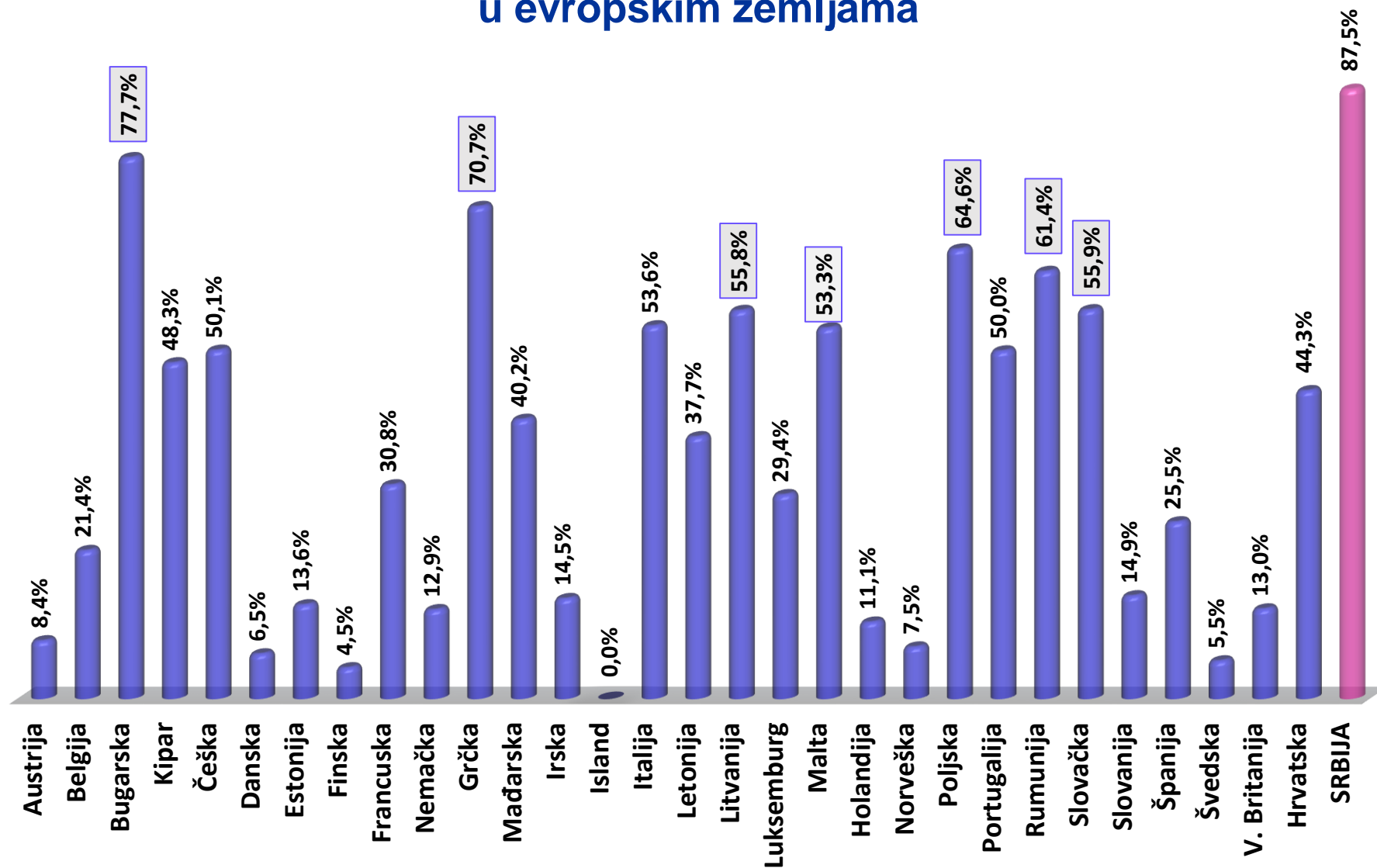
**Broj izolata: 513**

MEM R u 2016. godini 33,7%  
 MEM R u 2017. godini 41,0%  
 MEM R u 2018. godini 42,0%

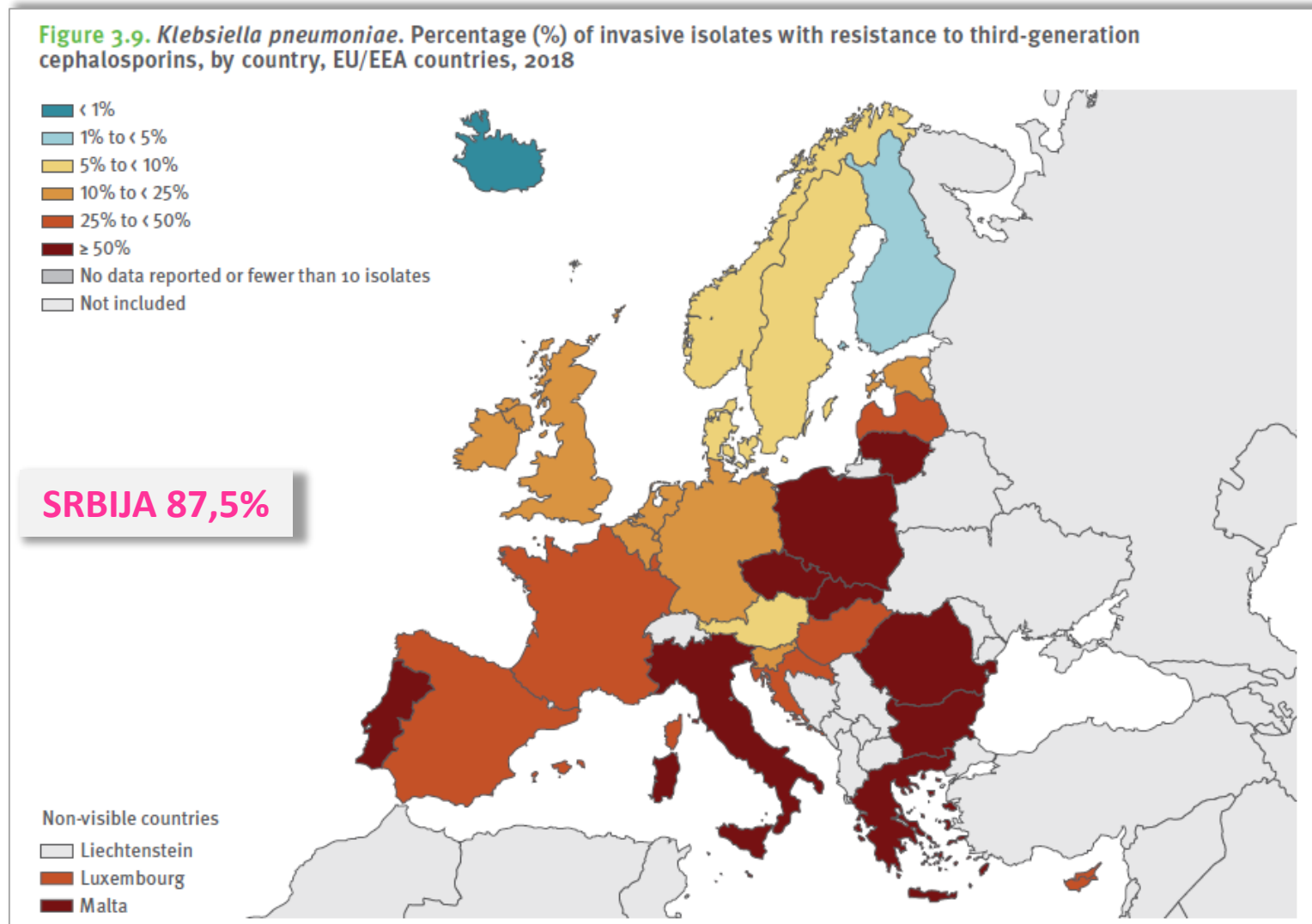
ESBL + 41,5%  
 MDR 65,0%

COL R u 2016. godini 24,3%  
 COL R u 2017. godini 22,8%  
 COL R u 2018. godini 26,3%

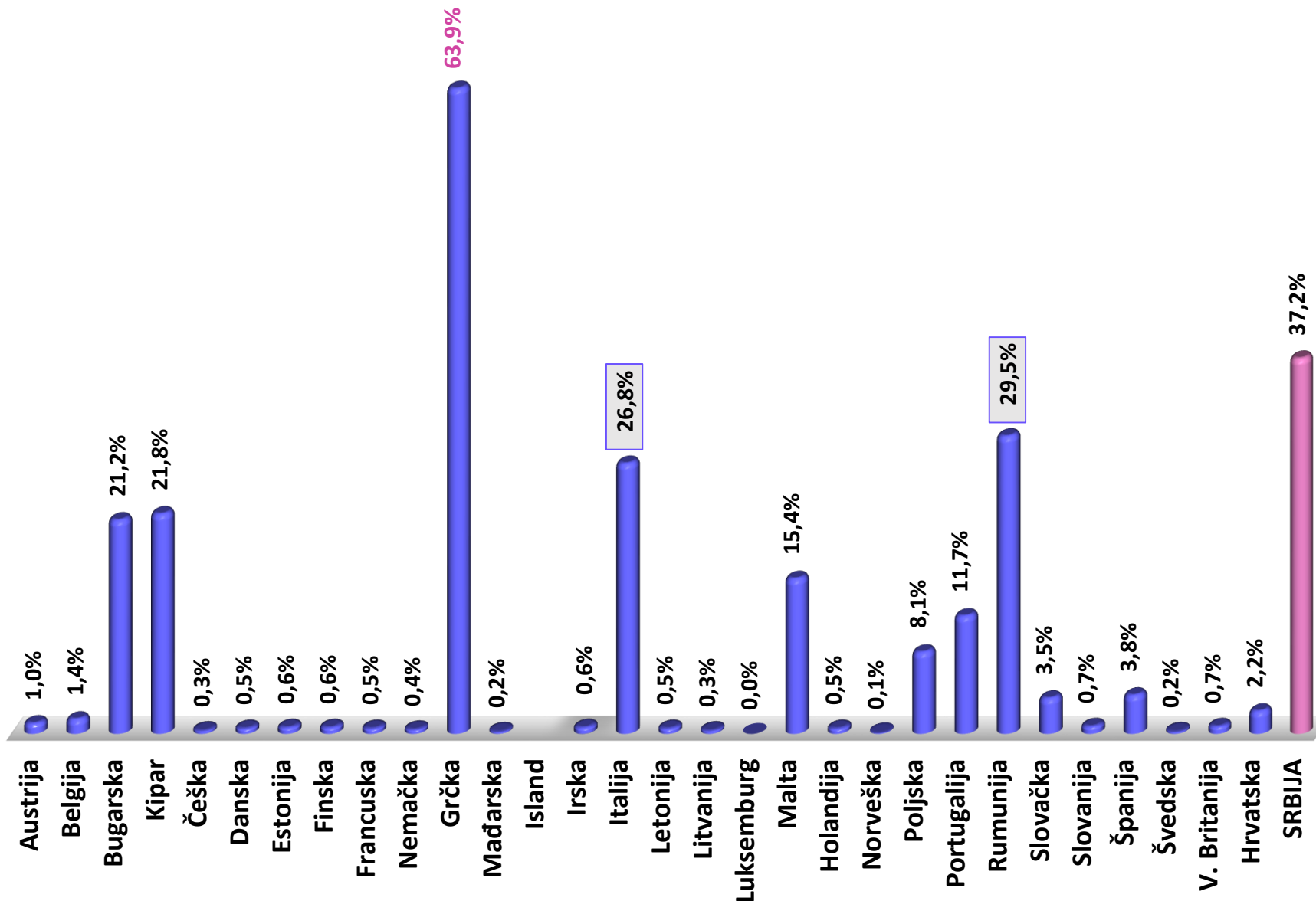
## Proporcija izolata *K. pneumoniae* rezistentnih na 3. gen. cefalosporina u evropskim zemljama



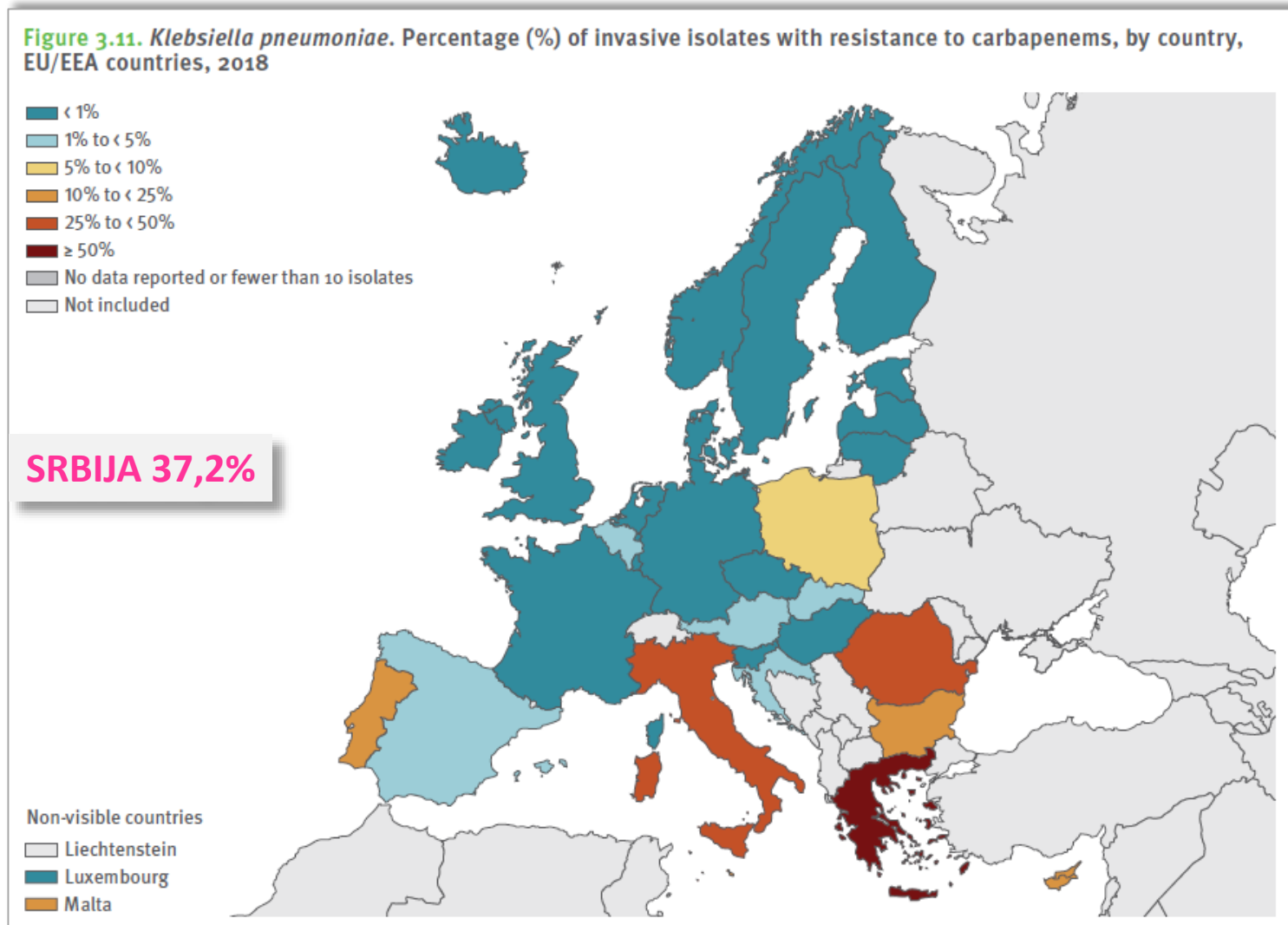
# *Klebsiella pneumoniae* - procenat invazivnih izolata rezistentnih na III gen. cefalosporina, po zemljama EU/EEA



# Proporcija karbapenem – rezistentnih izolata *K. pneumoniae* u evropskim zemljama

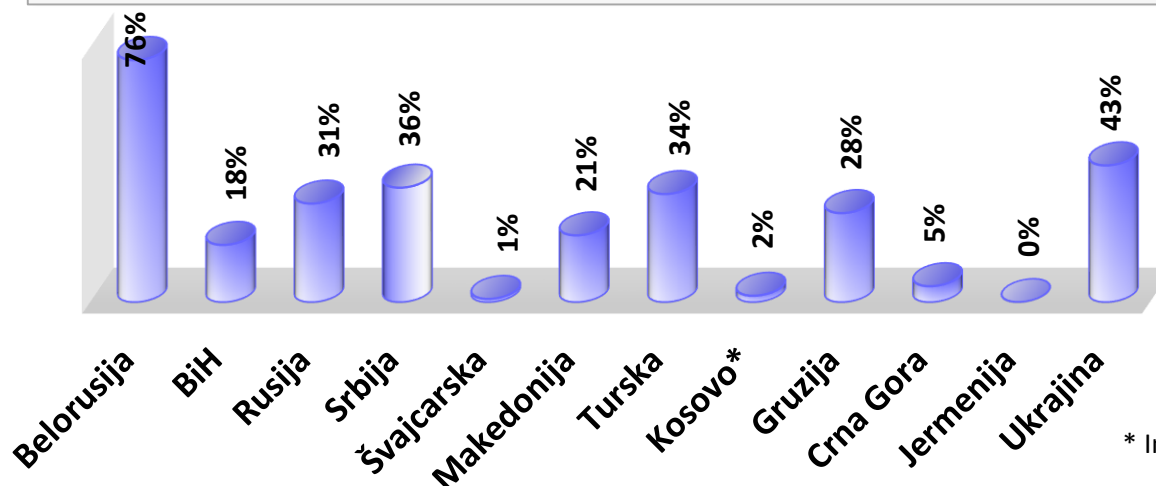
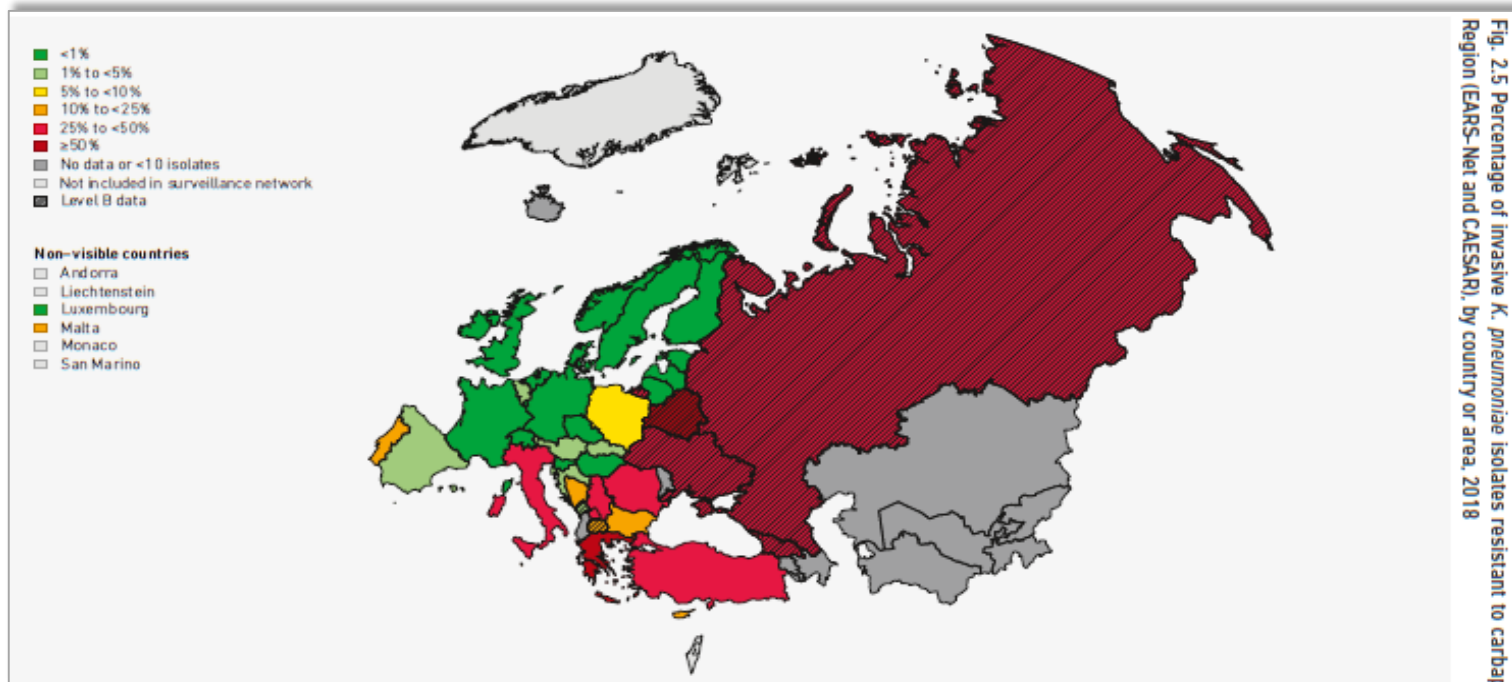


# *Klebsiella pneumoniae* - procenat invazivnih izolata rezistentnih na karbapeneme, po zemljama EU/EEA





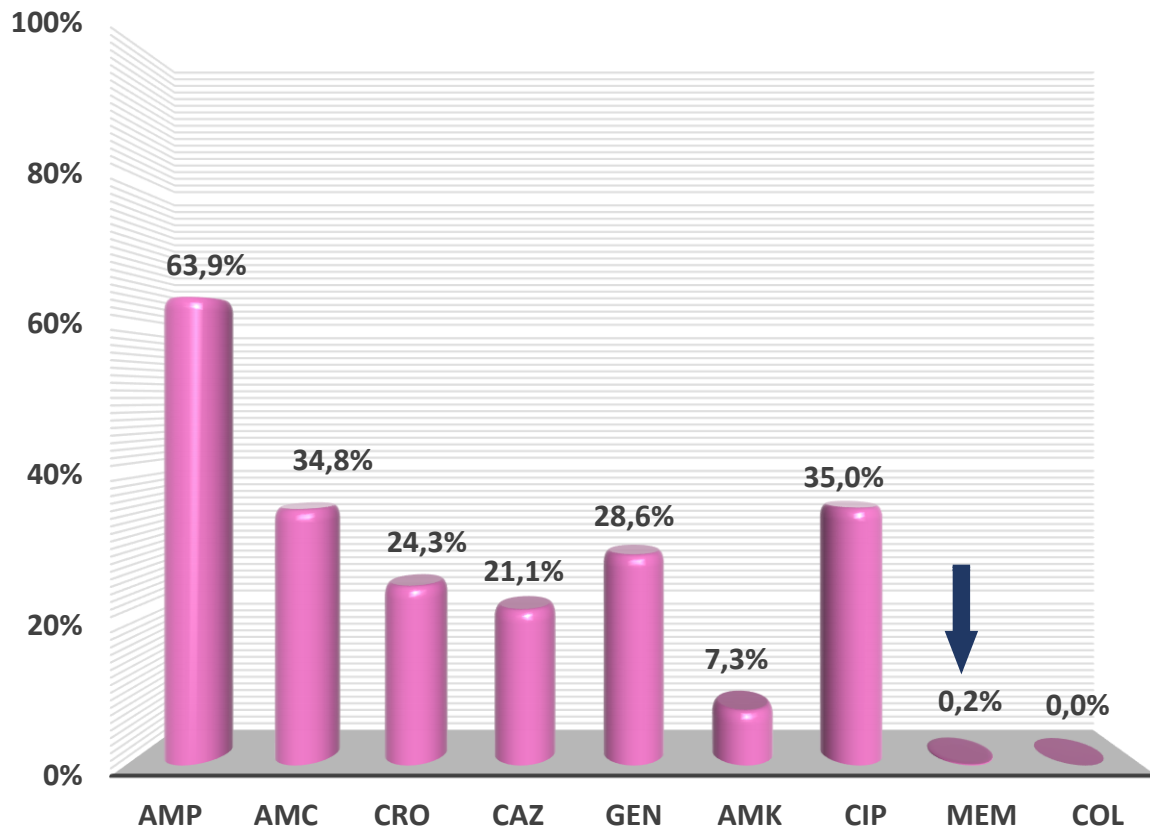
# *Klebsiella pneumoniae* – procenat izolata rezistentnih na karbapeneme u Evropskom regionu (EARS-Net i CAESAR)



Rezistencija na karbapeneme kod *K. pneumoniae* u Belorusiji, Rusiji, Turskoj, Gruziji, Ukrajini je > 25%.

\* In accordance with UNSC Resolution 1244 (1999)

# *Escherichia coli*: rezistencija na antimikrobne lekove u Srbiji, 2019. godina



AMP	Ampicilin
AMC	Amoksicilin / klavulanska kiselina
CRO	Ceftriakson
CAZ	Ceftazidim
GEN	Gentamicin
AMK	Amikacin
CIP	Ciprofloksacin
MEM	Meropenem

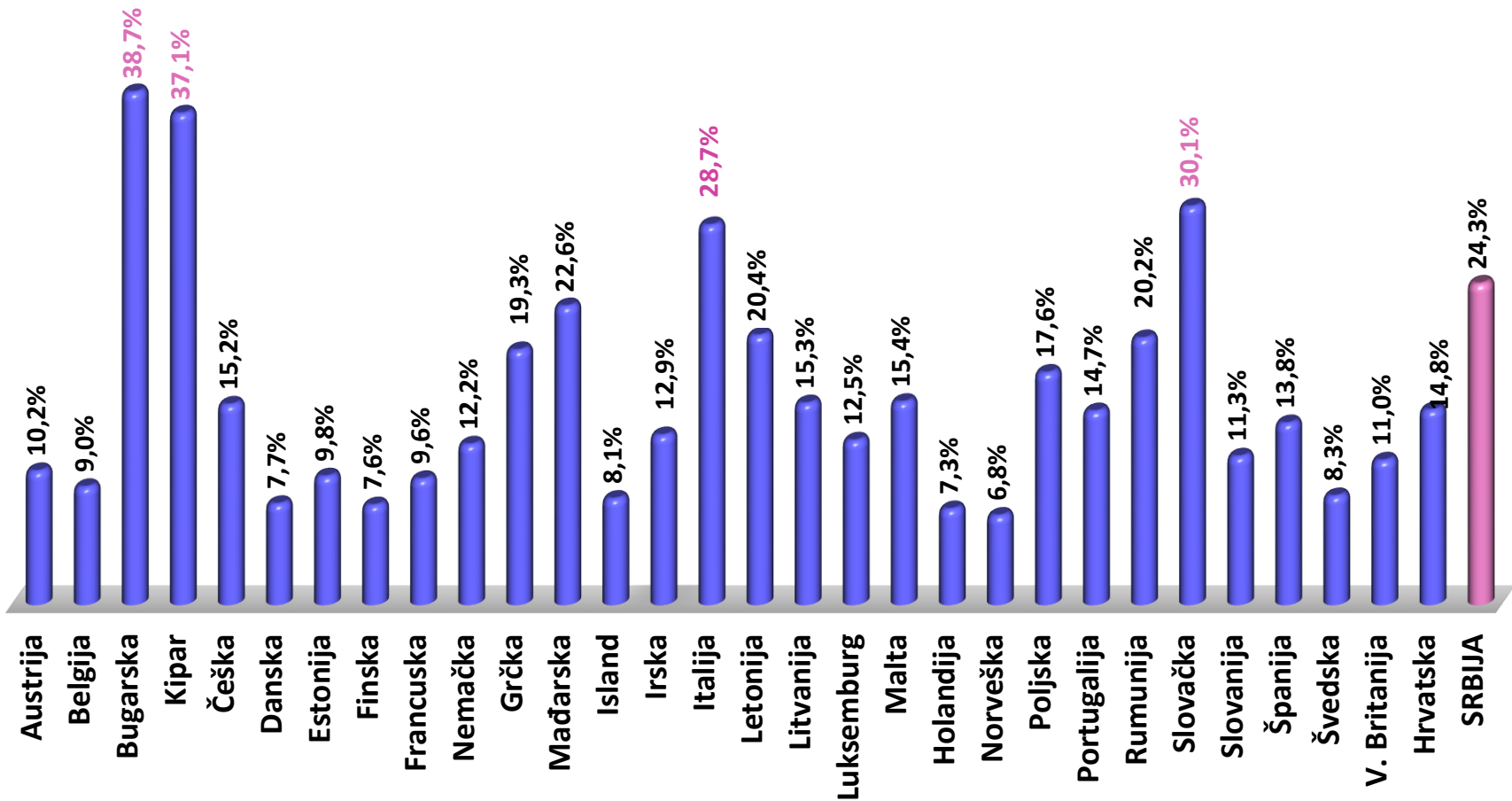
**Broj izolata: 510**

MEM R u 2016. godini 0,7%  
MEM R u 2017. godini 1,5%  
MEM R u 2018. godini 1,1%

ESBL + 21,1%  
MDR 13,0%

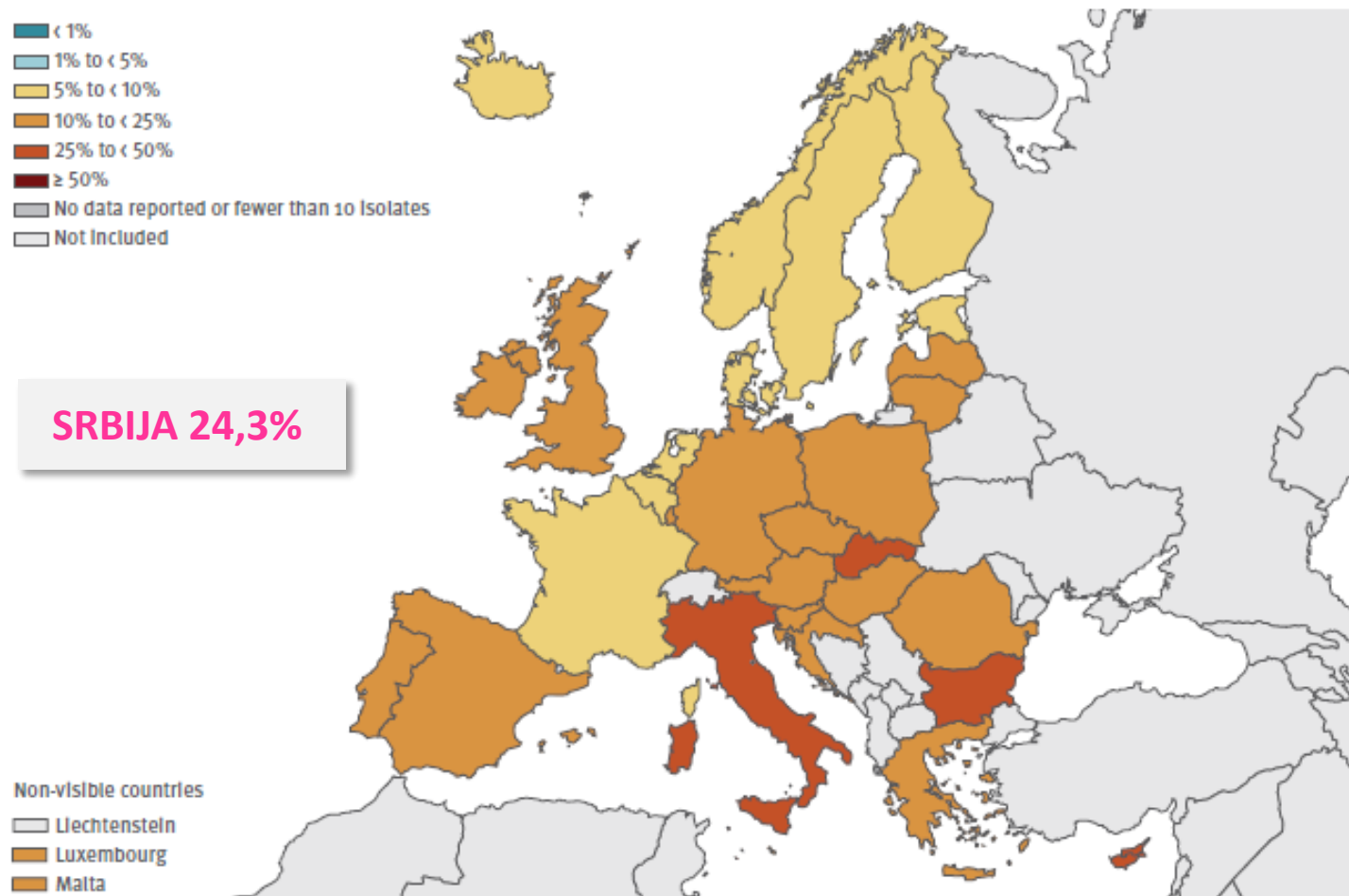
ESBL + 29,4% u 2016. godini  
ESBL + 26,7% u 2017. godini  
ESBL + 25,2% u 2018. godini

# Proporcija izolata *E. coli* rezistentnih na 3. gen. cefalosporina u evropskim zemljama



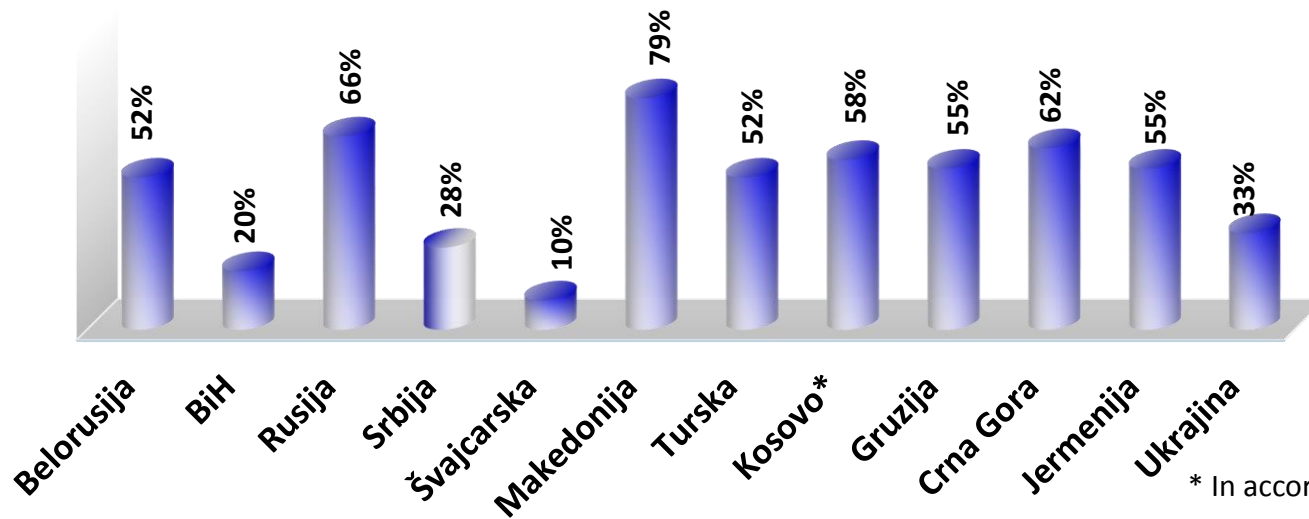
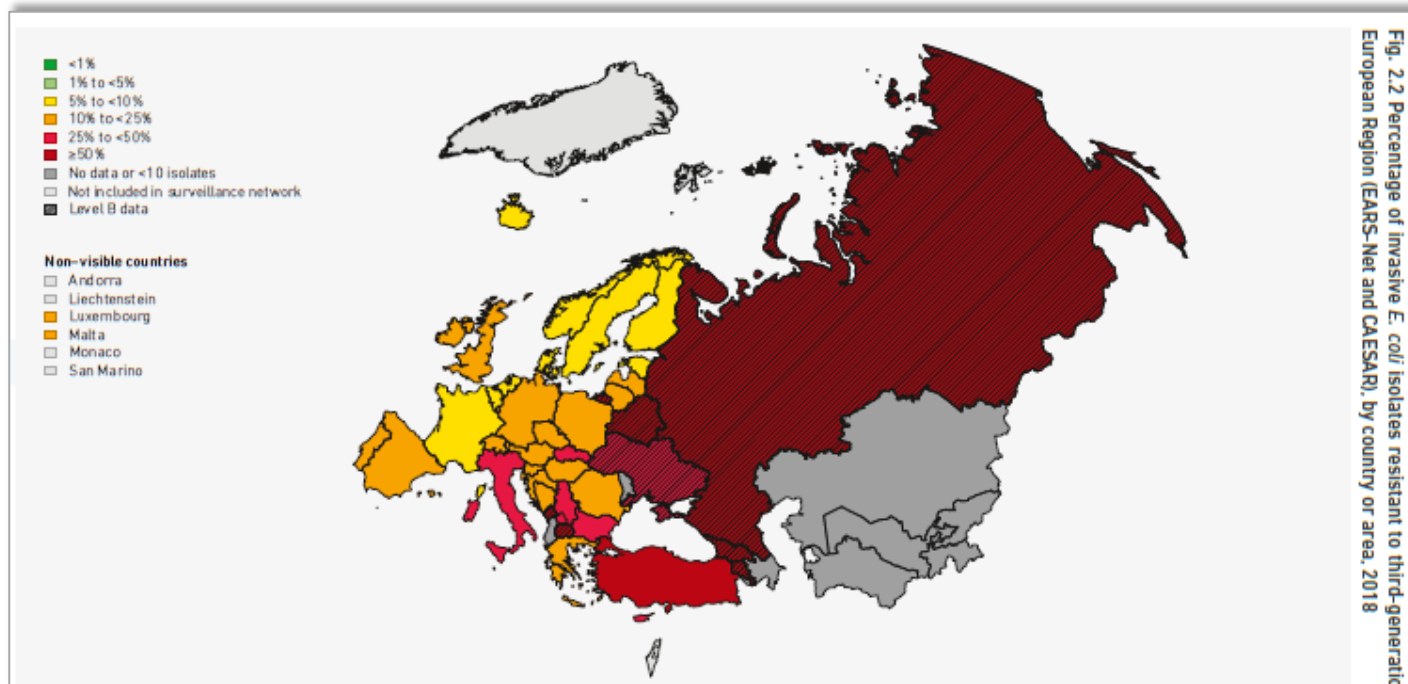
# *Escherichia coli* - procenat invazivnih izolata rezistentnih na III generaciju cefalosporina, po zemljama, EU/EEA

Figure 3.3. *Escherichia coli*. Percentage (%) of Invasive Isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2018



U ostalim zemljama % izolata *E. coli* rezistentnih na III gen. cefalosporina je znatno niži i ne prelazi 25%.

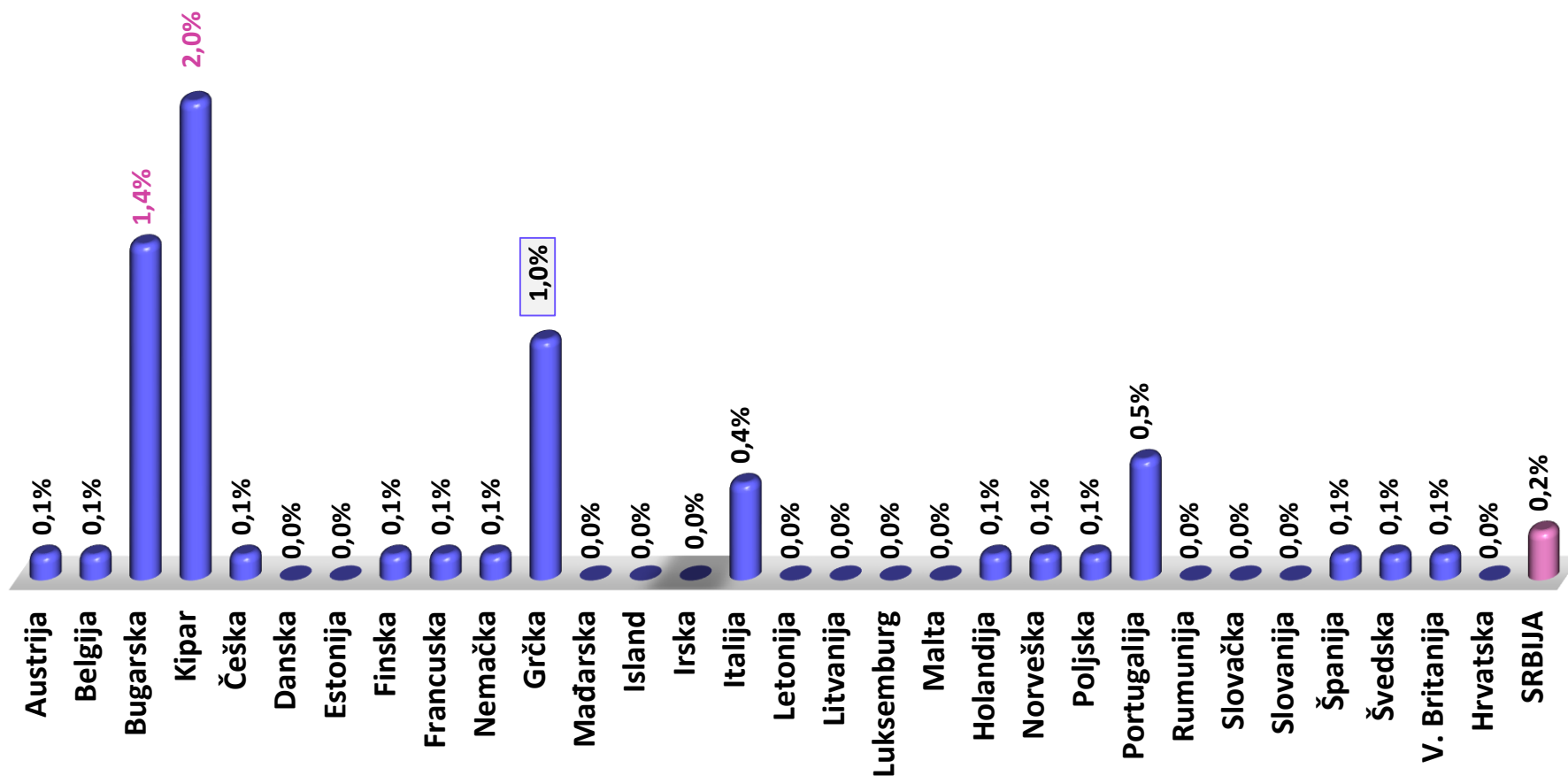
## E. coli - procenat izolata rezistentnih na 3. gen. cefalosporina u Evropskom regionu (EARS-Net i CAESAR)



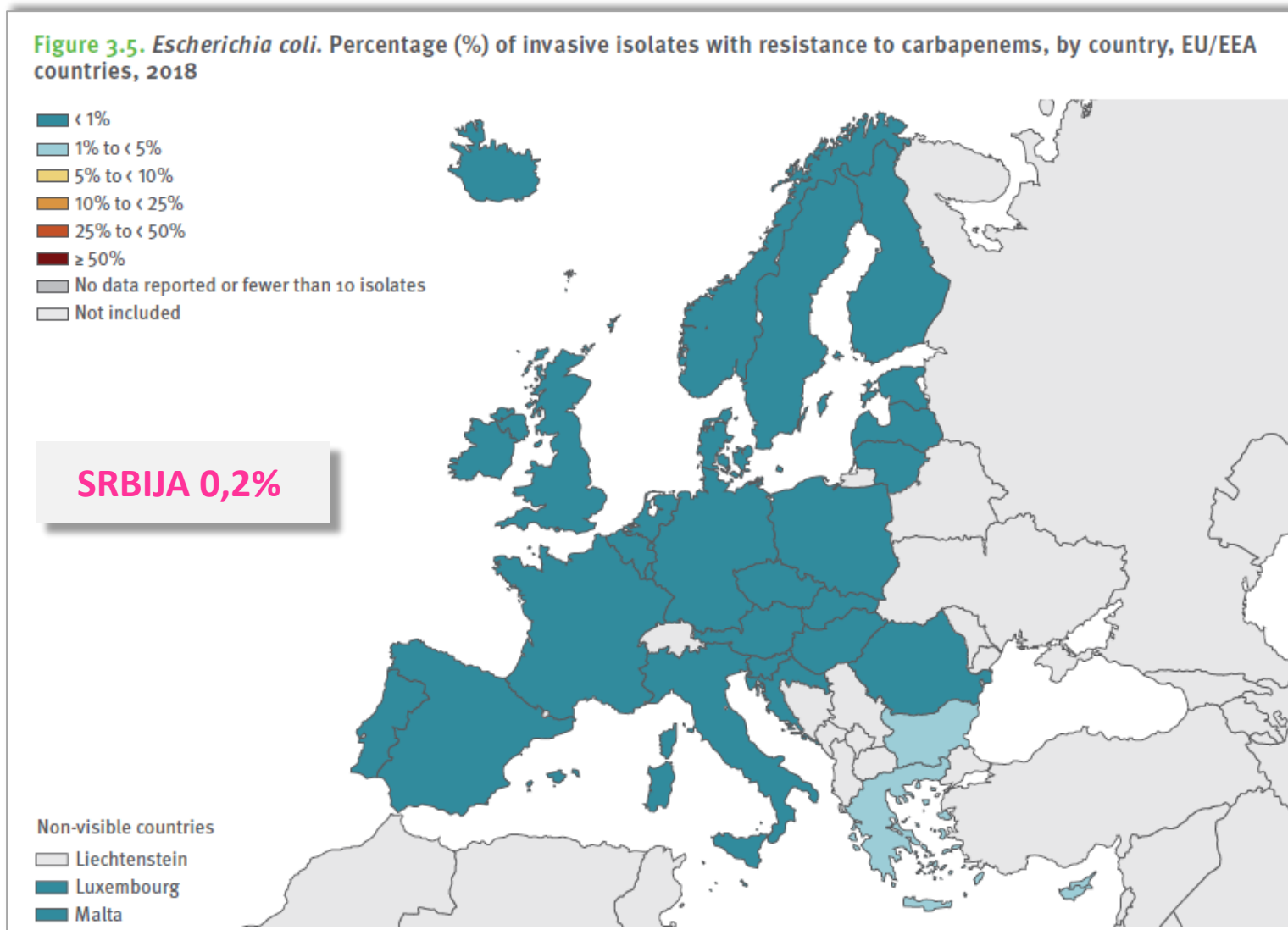
\* In accordance with UNSC Resolution 1244 (1999)

Među zemljama CAESAR mreže Belorusija, Rusija, Makedonija, Turska, Kosovo, Gruzija, Jermenija i Crna Gora beleže rezistenciju >50%, dok je u Srbiji rezistencija slična kao i u Bosni, dok je u Švajcarskoj 10%

# Proporcija karbapenem-rezistentnih izolata *E. coli* u evropskim zemljama



# *Escherichia coli* - procenat invazivnih izolata rezistentnih na karbapeneme, po zemljama, EU/EEA



## *E. coli* – procenat izolata rezistentnih na karbapeneme u Evropskom regionu (EARS-Net i CAESAR)

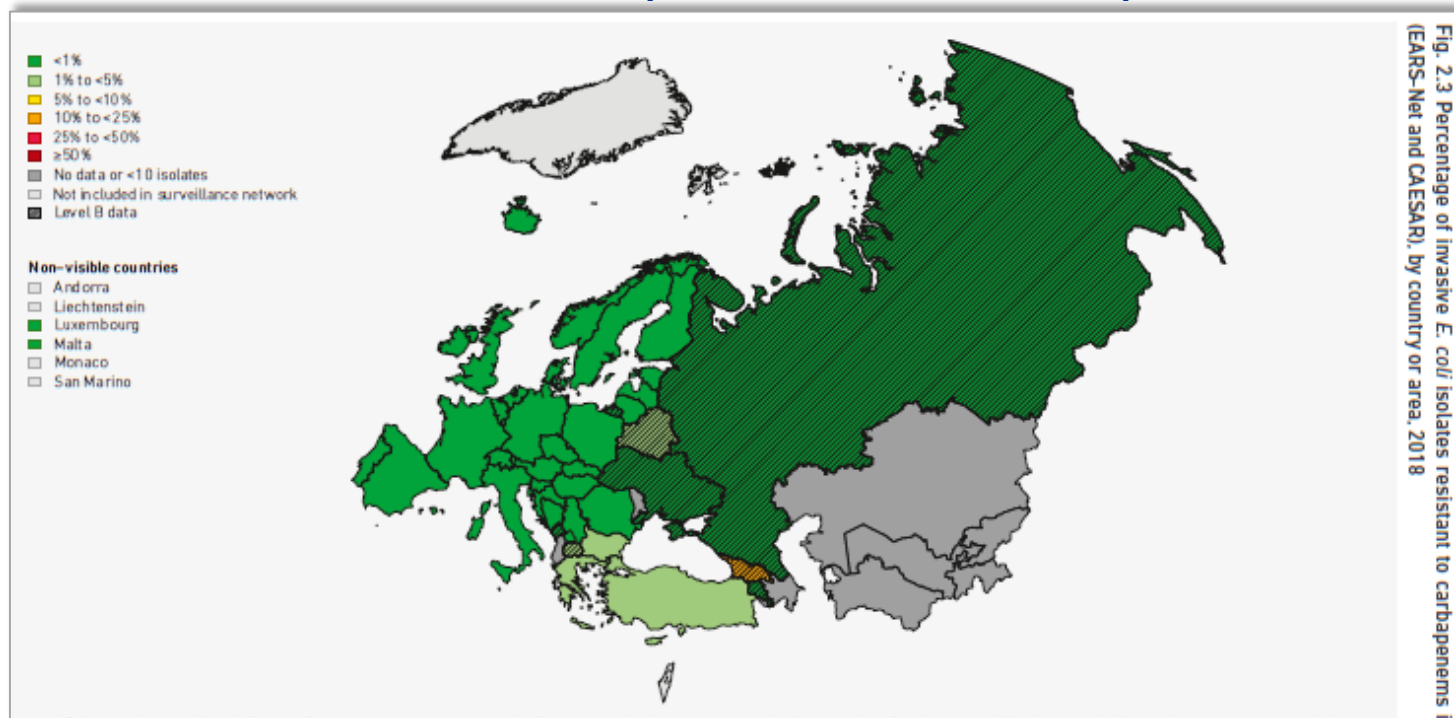
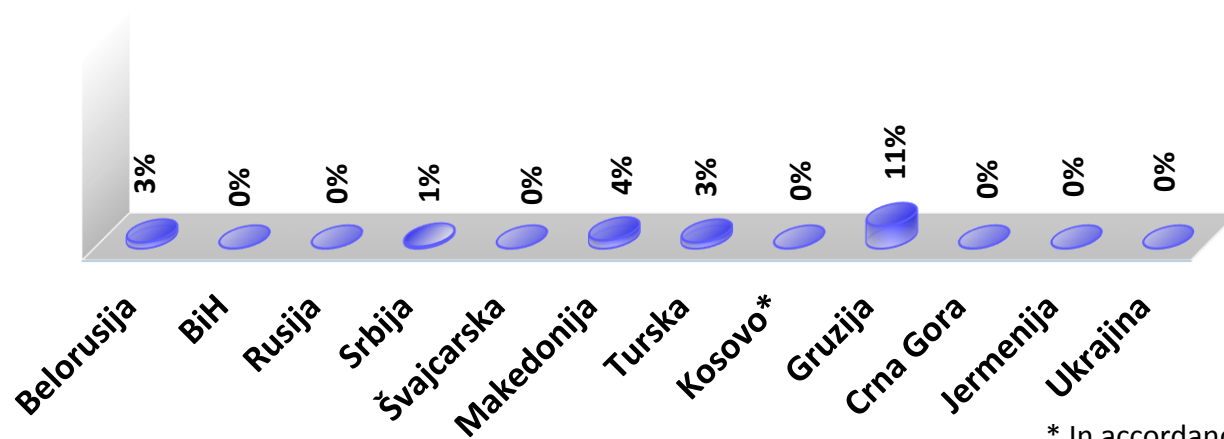


Fig. 2.3 Percentage of invasive *E. coli* isolates resistant to carbapenems in EARS-Net and CAESAR, by country or area, 2018

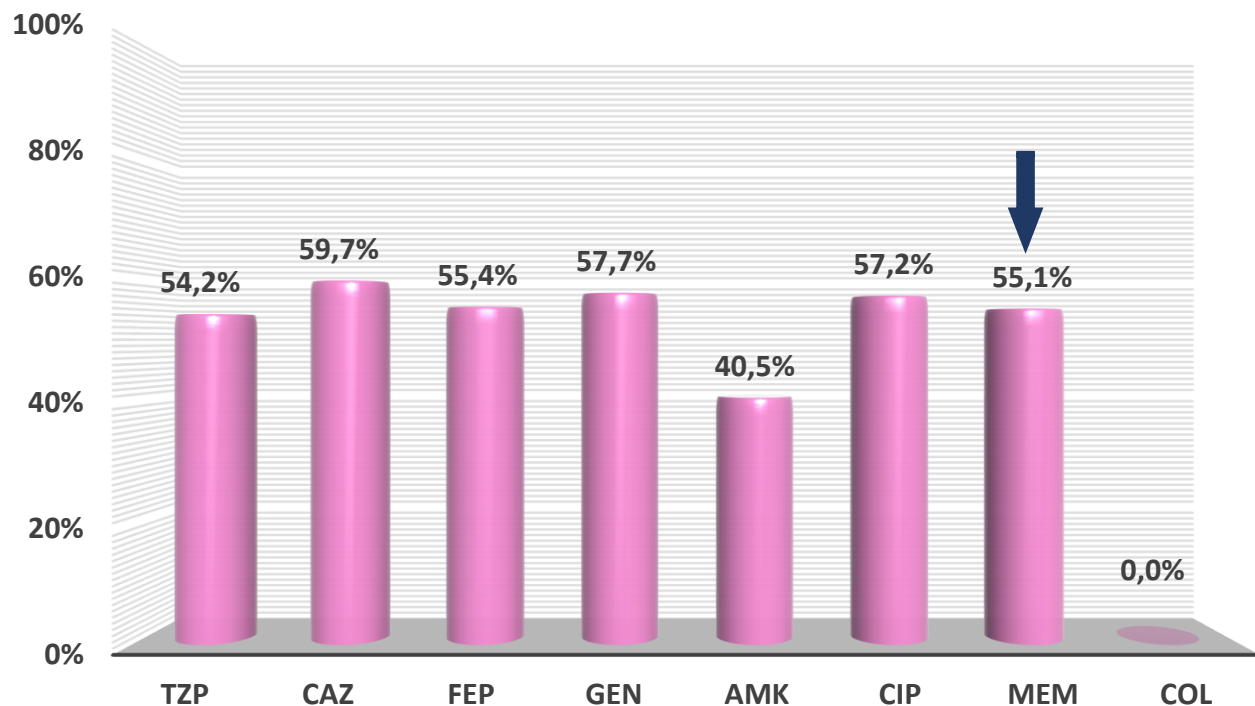
Među zemaljama CAESAR mreže zabeležena je rezistencija od 3% u Turskoj i Belorusiji, za razliku od Gruzije gde je zabeležena visoka rezistencija od čak 11%.



\* In accordance with UNSC Resolution 1244 (1999)



# *Pseudomonas aeruginosa*: rezistencija na antimikrobne lekove u Srbiji, 2019. godina



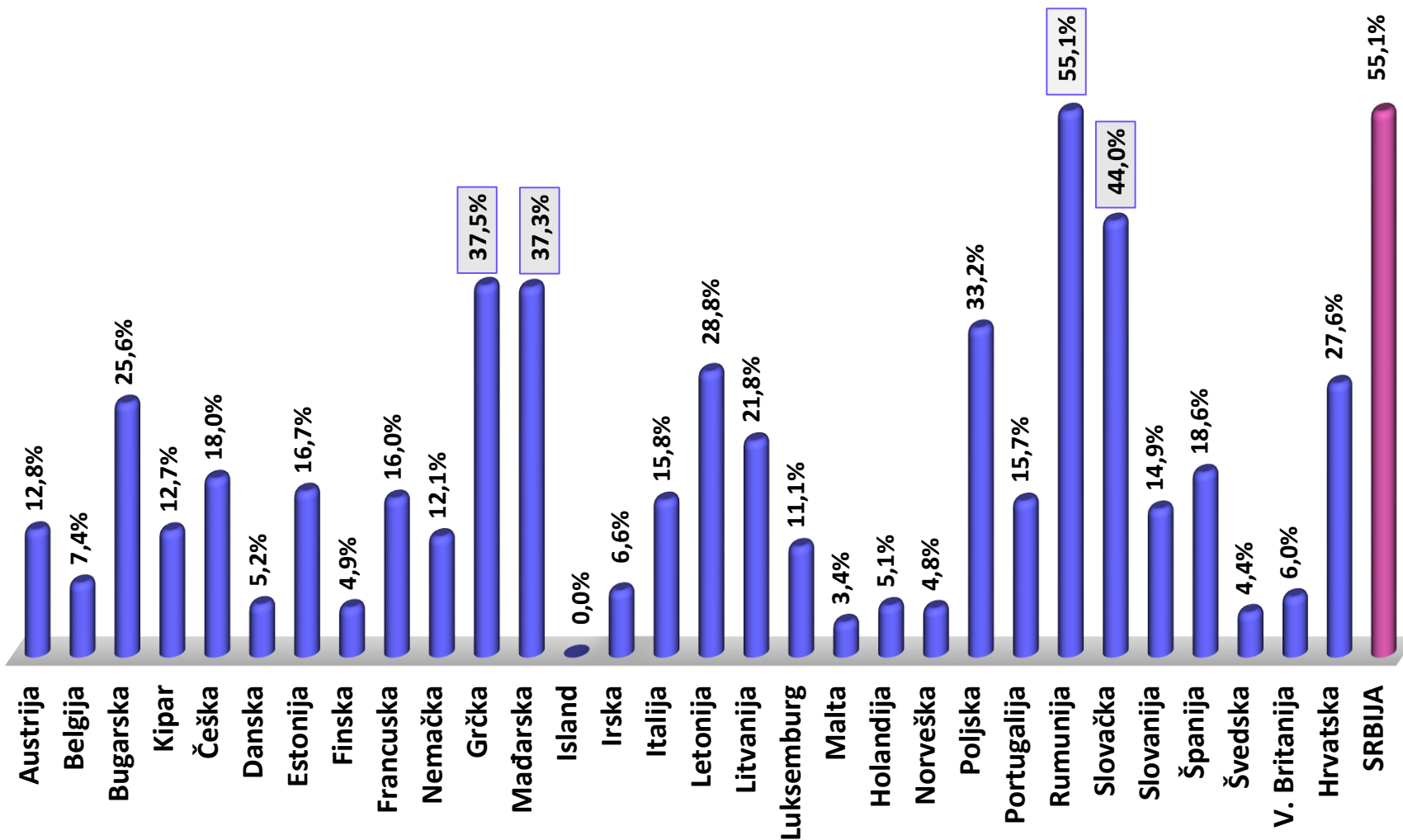
TZP	Piperacilin/ Tazobaktam
CAZ	Ceftazidim
FEP	Cefepim
GEN	Gentamicin
AMK	Amikacin
CIP	Ciprofloksacin
MEM	Meropenem

**Broj izolata: 196**

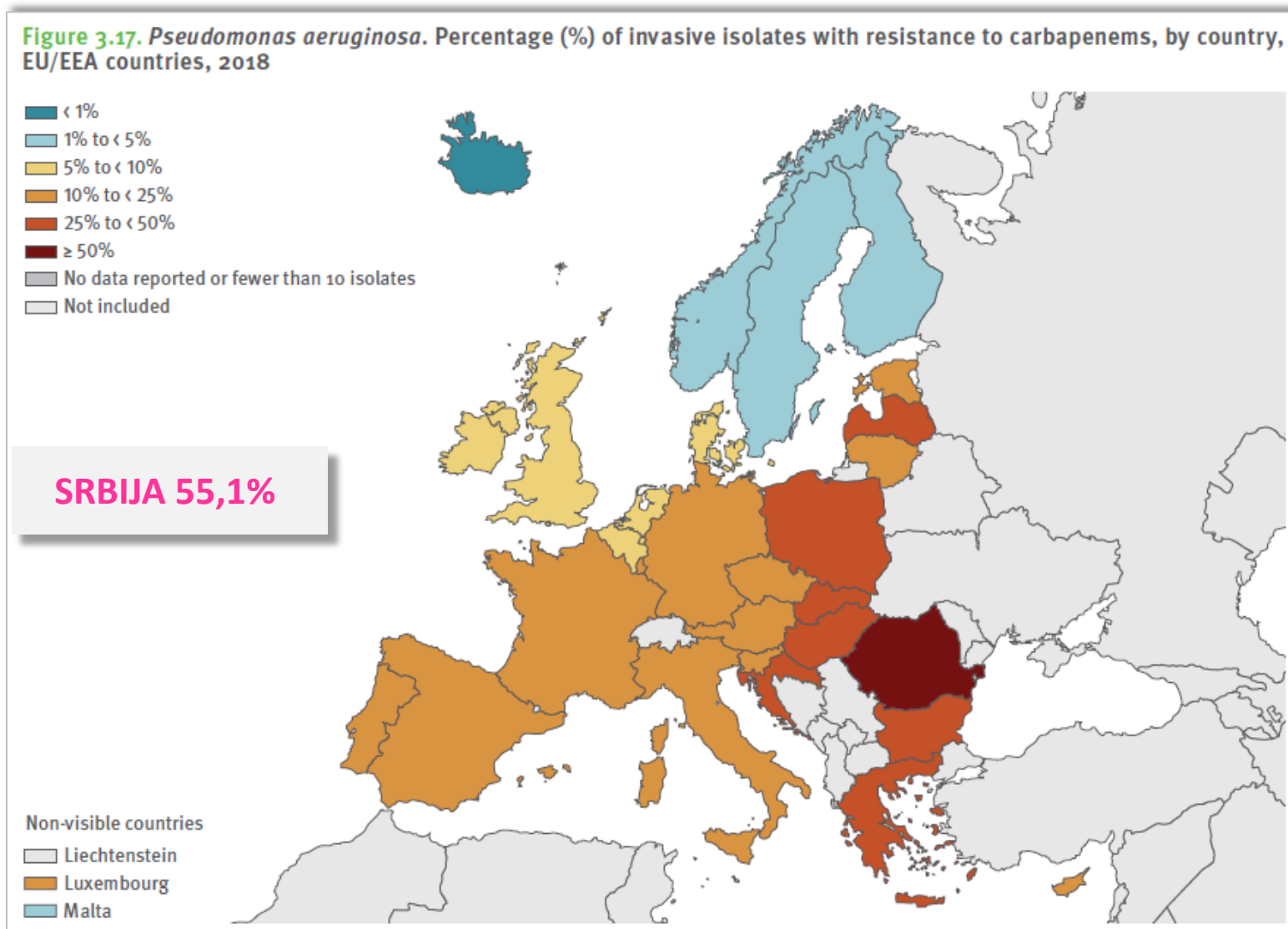
MEM R u 2016. godini 41,1%  
MEM R u 2017. godini 53,5%  
MEM R u 2018. godini 58,1%

**MDR 56,0%**

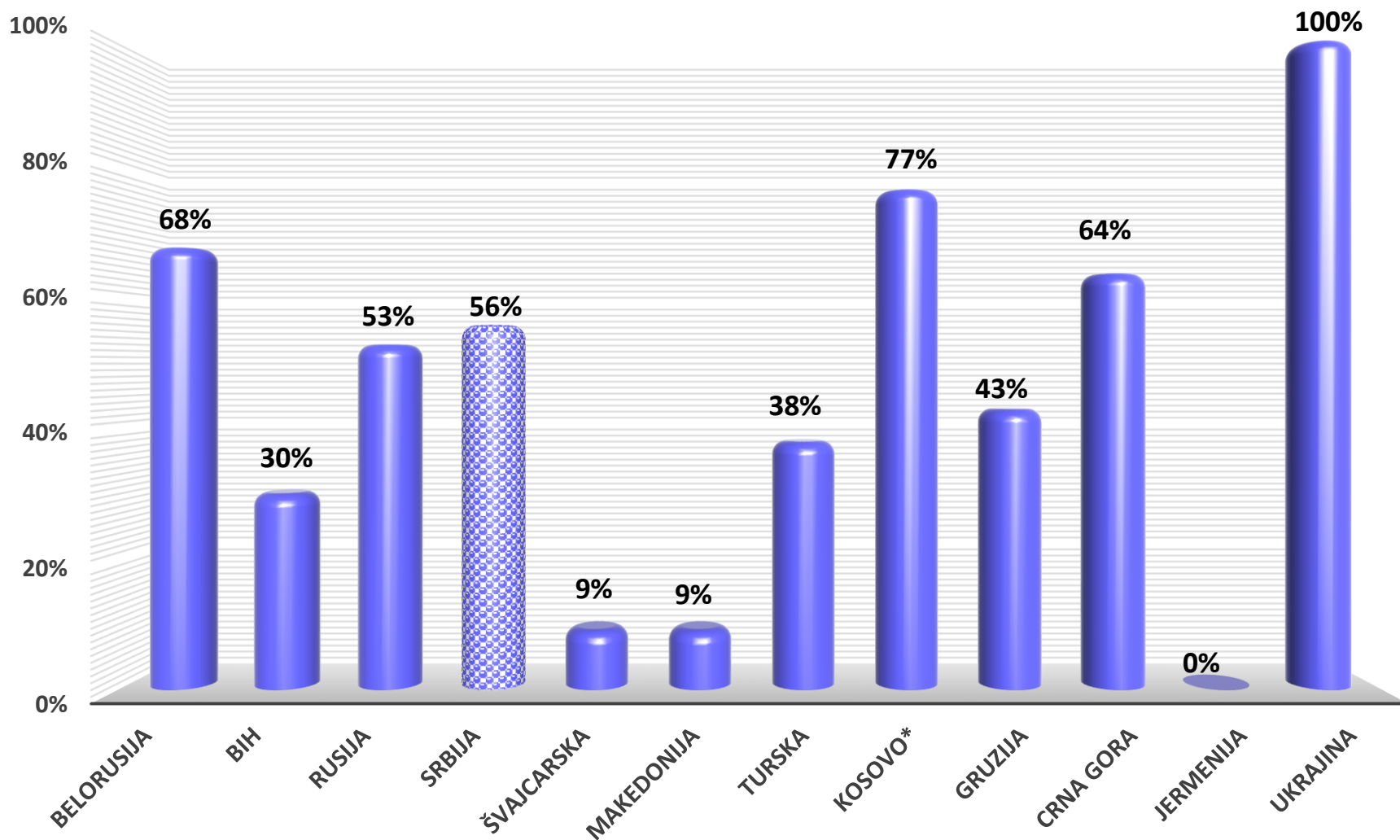
# Proporcija izolata *Pseudomonas aeruginosa* rezistentnih na karbapeneme u evropskim zemljama



# *Pseudomonas aeruginosa* - procenat invazivnih izolata rezistentnih na karbapeneme, po zemljama, EU/EEA

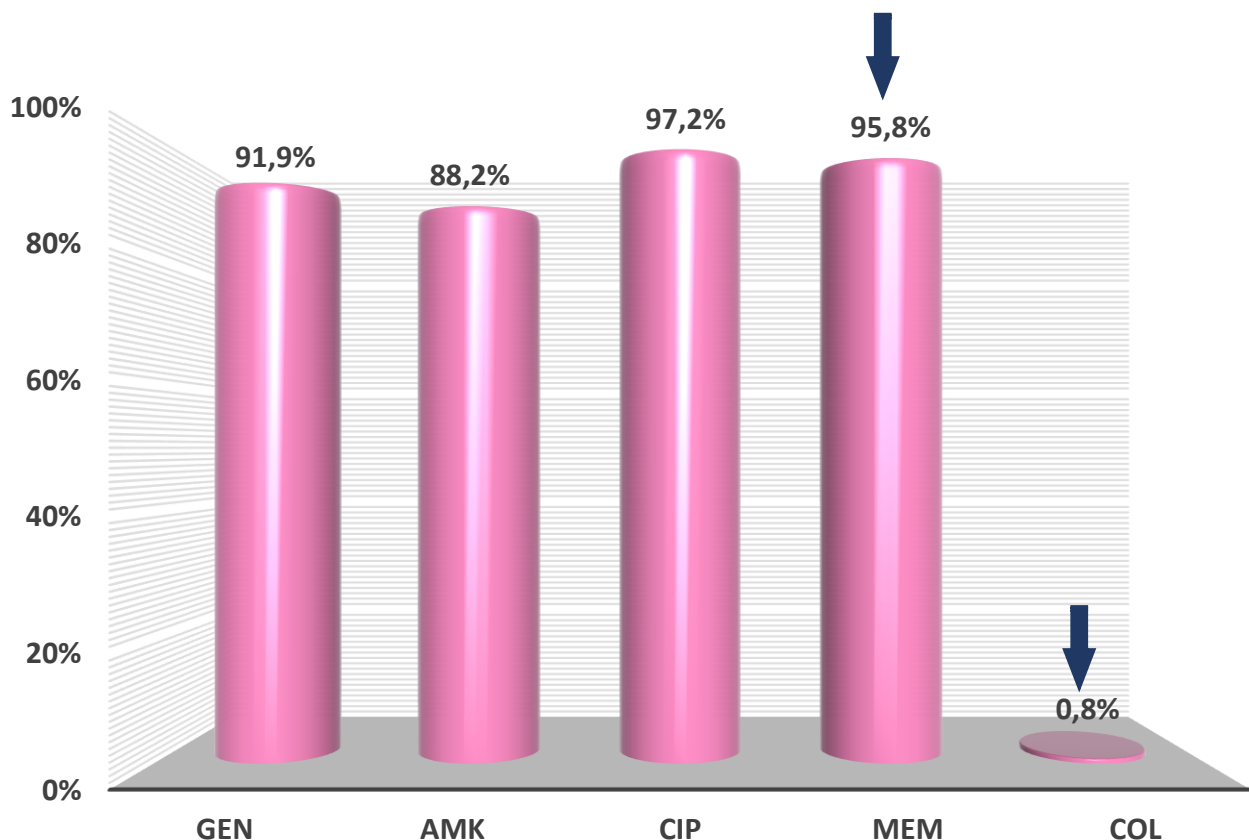


# Procenat izolata *Pseudomonas aeruginosa* rezistentnih na karbapeneme po zemljama CAESAR mreže



\* In accordance with UNSC Resolution 1244 (1999)

# Acinetobacter spp.: rezistencija na antimikrobne lekove u Srbiji, 2019. godina



TZP	Tazobaktam / piperacilin
GEN	Gentamicin
AMK	Amikacin
CIP	Ciprofloksacin
MEM	Meropenem
COL	Kolistin

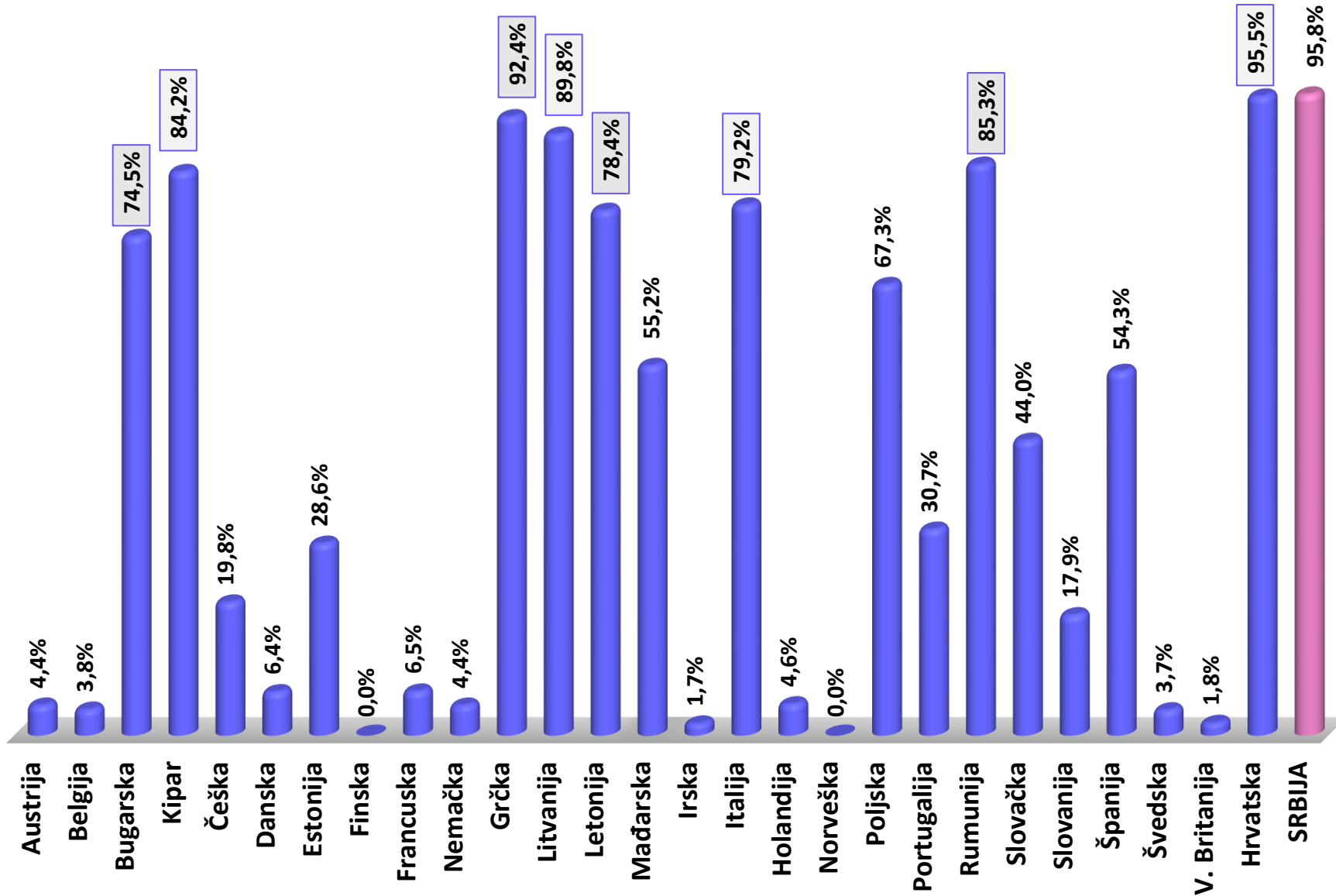
**Broj izolata: 532**

MEM R u 2016. godini 96,2%  
MEM R u 2017. godini 95,3%  
MEM R u 2018. godini 95,7%

MDR 90%

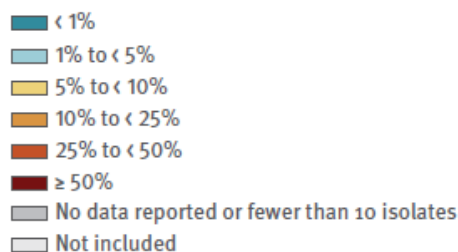
COL R u 2016. godini 0,7%  
COL R u 2017. godini 1,5%  
COL R u 2018. godini 0,9%

# Proporcija izolata *Acinetobacter* spp. rezistentnih na karbapeneme u evropskim zemljama



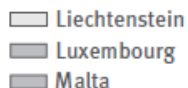
# Acinetobacter spp. - procenat invazivnih izolata rezistentnih na karbapeneme, po zemljama, EU/EEA

Figure 3.22. *Acinetobacter* spp. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2018



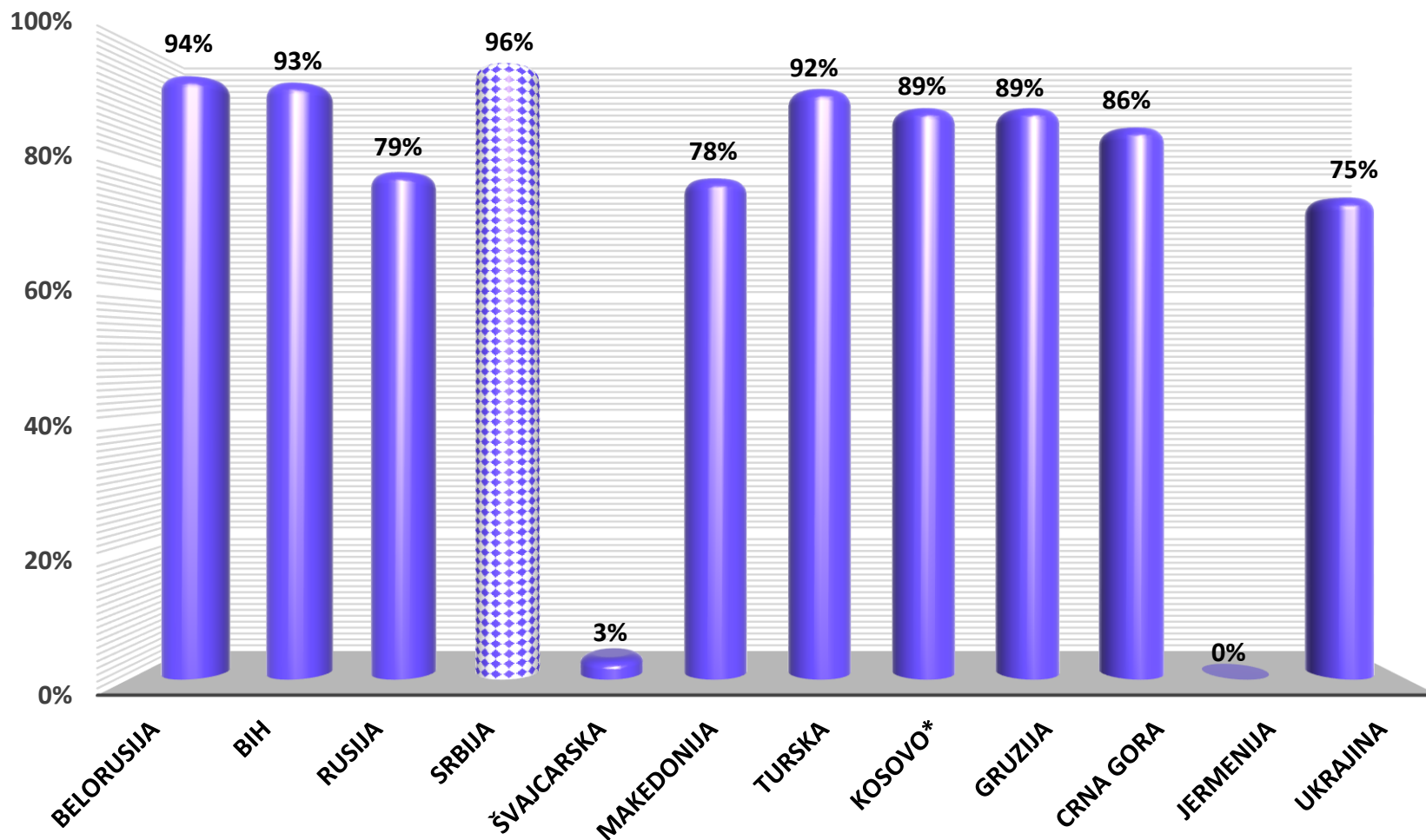
**SRBIJA 95,8%**

Non-visible countries



U Skandinavskim zemljama, V. Britaniji, Belgija, Nemačkoj, Austrija, Holandija procenat ovih izolata je manji od 5%, dok je u Danskoj, Francuskoj, Španiji, Češkoj od 5% do 25%.

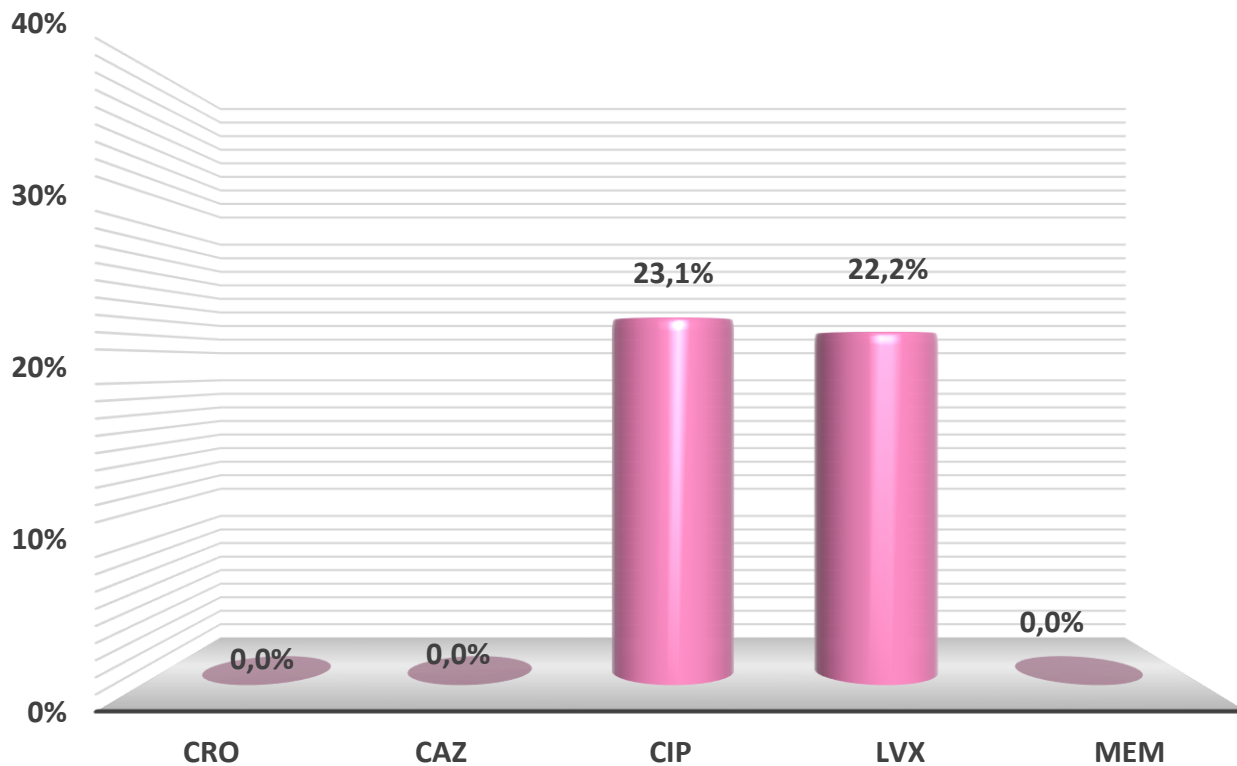
# Procenat izolata *Acinetobacter* spp. rezistentnih na karbapeneme po zemljama CAESAR mreže



\* In accordance with UNSC Resolution 1244 (1999)



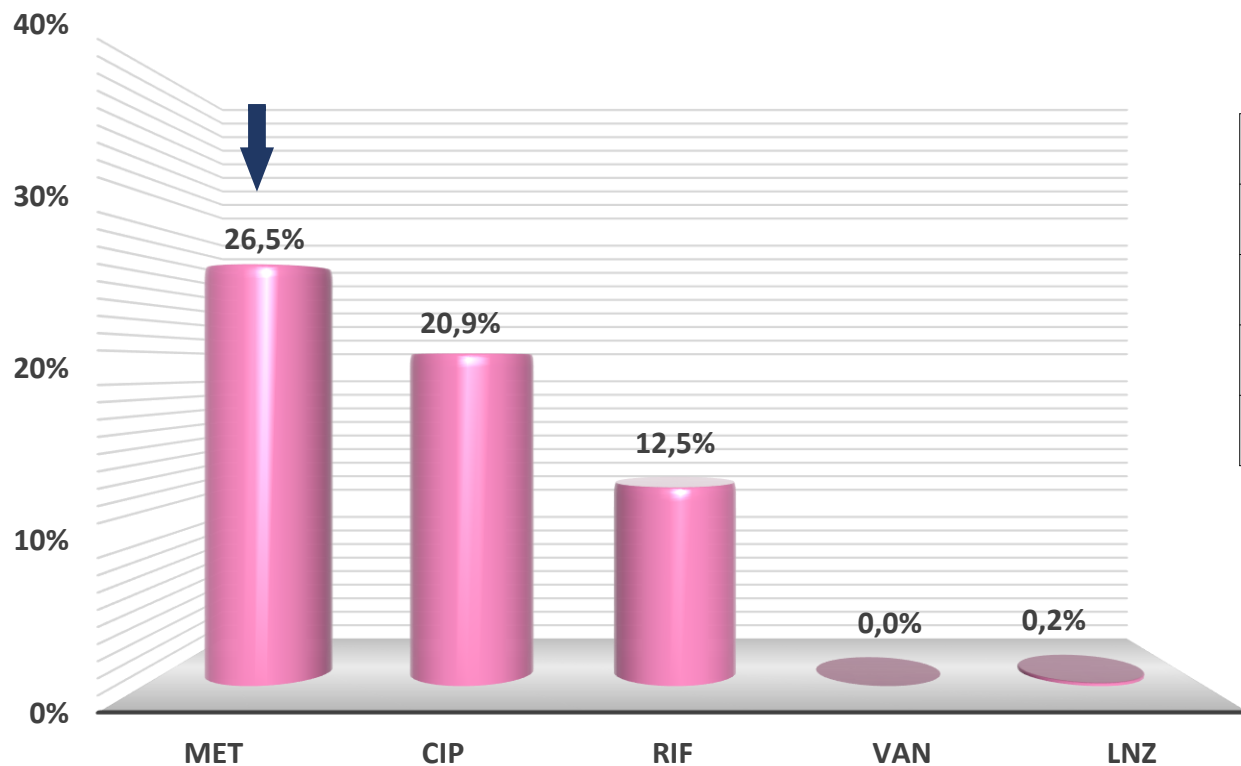
# Salmonella spp.: rezistencija na antimikrobne lekove u Srbiji, 2019. godina



CRO	Ceftriakson
CAZ	Ceftazidim
CIP	Ciprofloksacin
LVX	Levofloksacin
MEM	Meropenem

Broj izolata: 14

# *Staphylococcus aureus*: rezistencija na antimikrobne lekove u Srbiji, 2019. godina

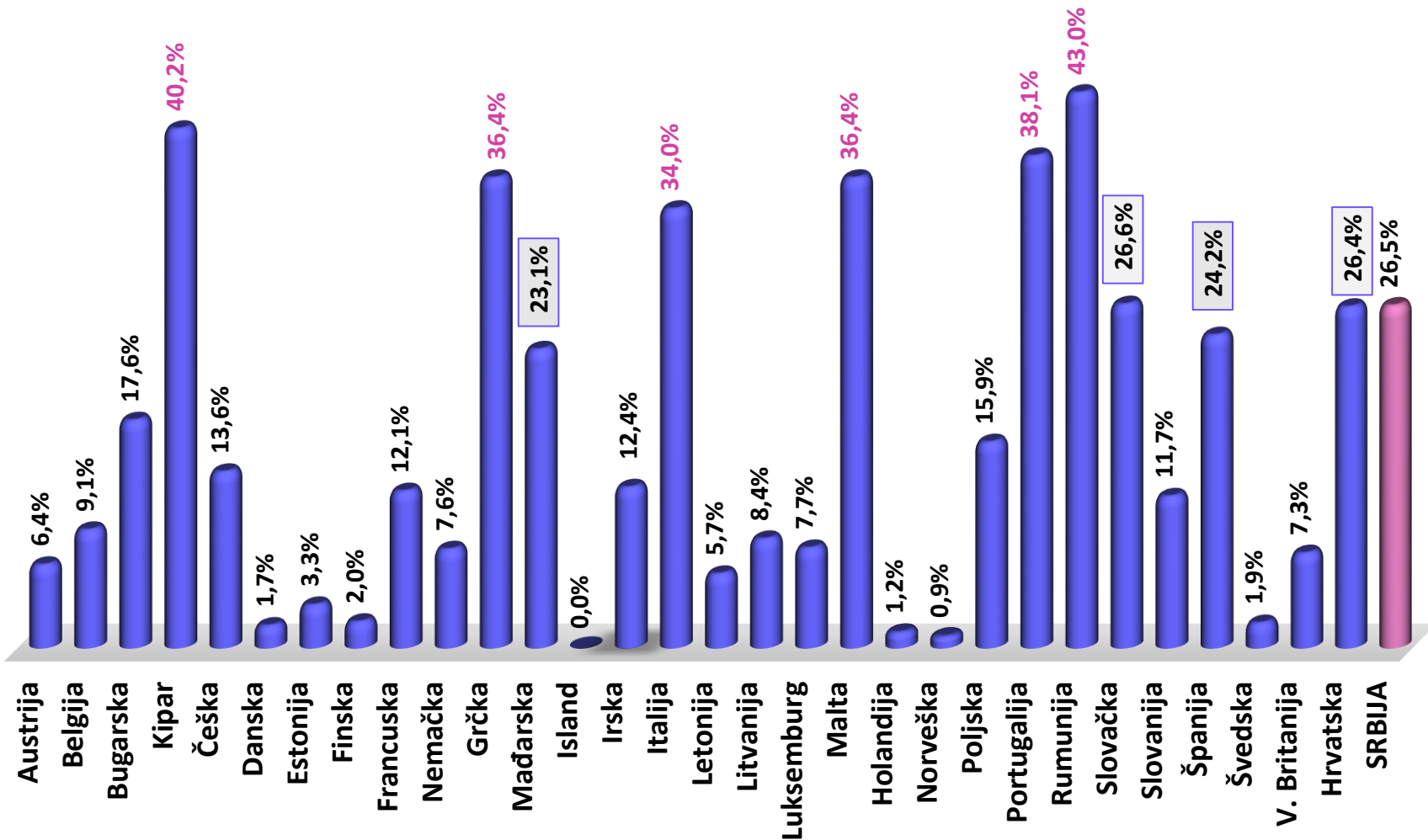


MET	Meticilin
CIP	Ciprofloksacin
RIF	Rifampicin
VAN	Vankomicin
LNZ	Linezolid

**Broj izolata: 628**

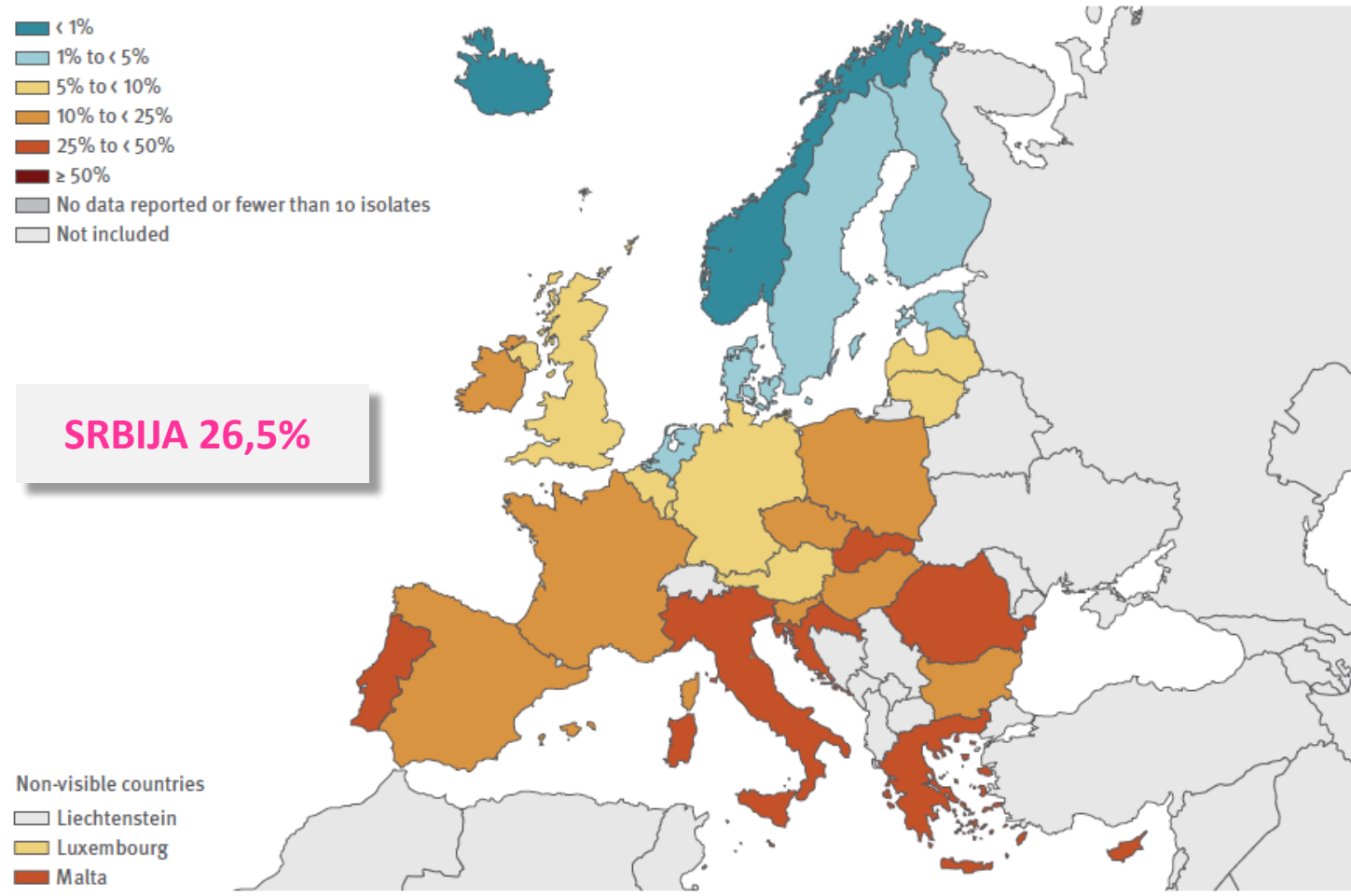
**MET R u 2016. godini 26,5%**  
**MET R u 2017. godini 26,1%**  
**MET R u 2018. godini 28,0%**

# Proporcija MRSA izolata u evropskim zemljama



# Staphylococcus aureus - procenat invazivnih izolata rezistentnih na meticilin, po zemljama, EU/EEA

Figure 3.25. *Staphylococcus aureus*. Percentage (%) of invasive isolates with resistance to meticillin (MRSA), by country, EU/EEA countries, 2018



U Skandinavskim zemljama, na Islandu procenat ovih izolata je manji od 5%, dok je u zemljama Centralne Evrope do 25%.

# MRSA – procenat izolata u Evropskom regionu (EARS-Net i CAESAR)

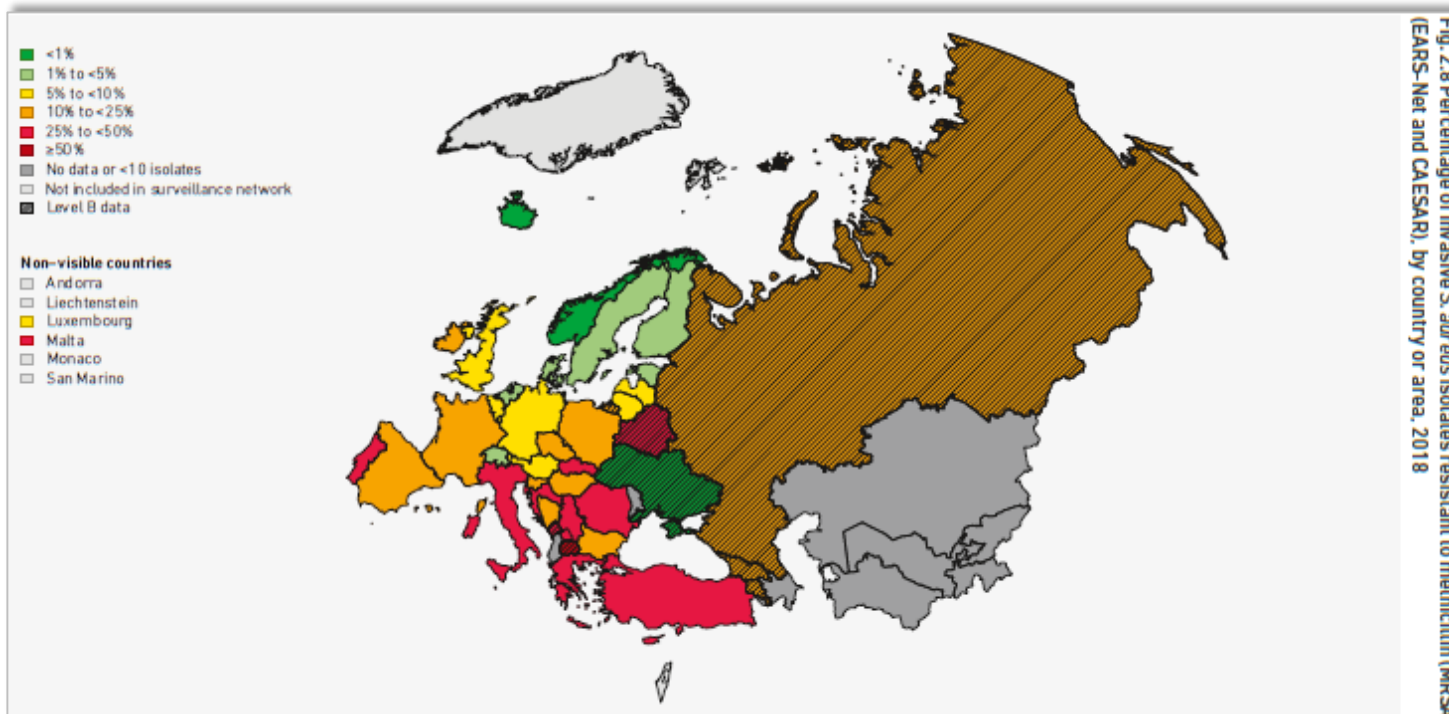
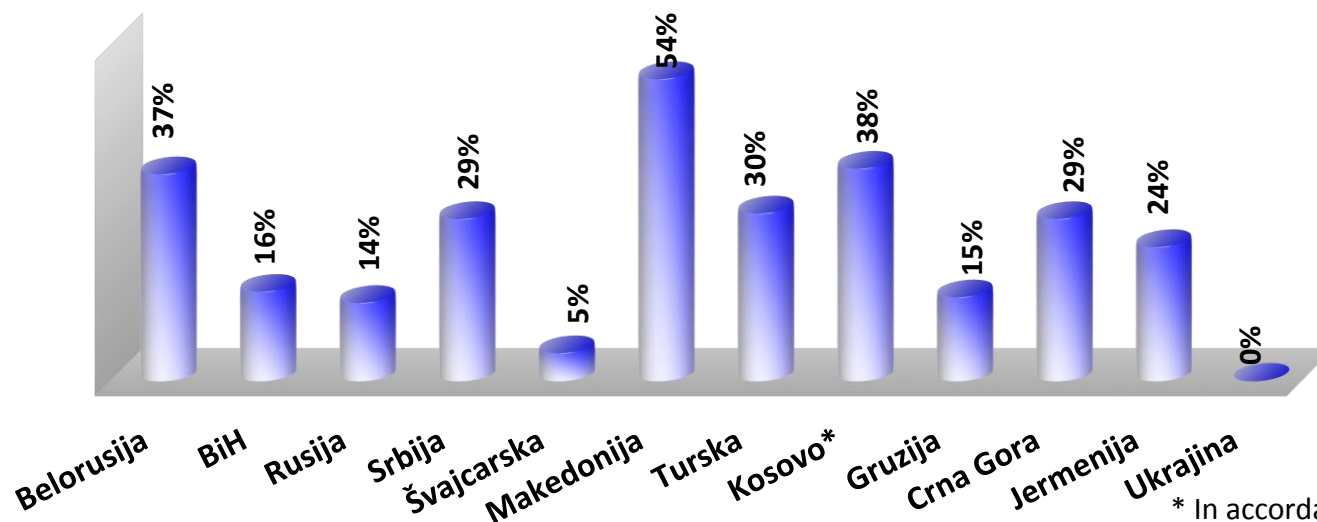


Fig. 2.8 Percentage of invasive *S. aureus* isolates resistant to methicillin (MRSA) (EARS-Net and CAESAR), by country or area, 2018

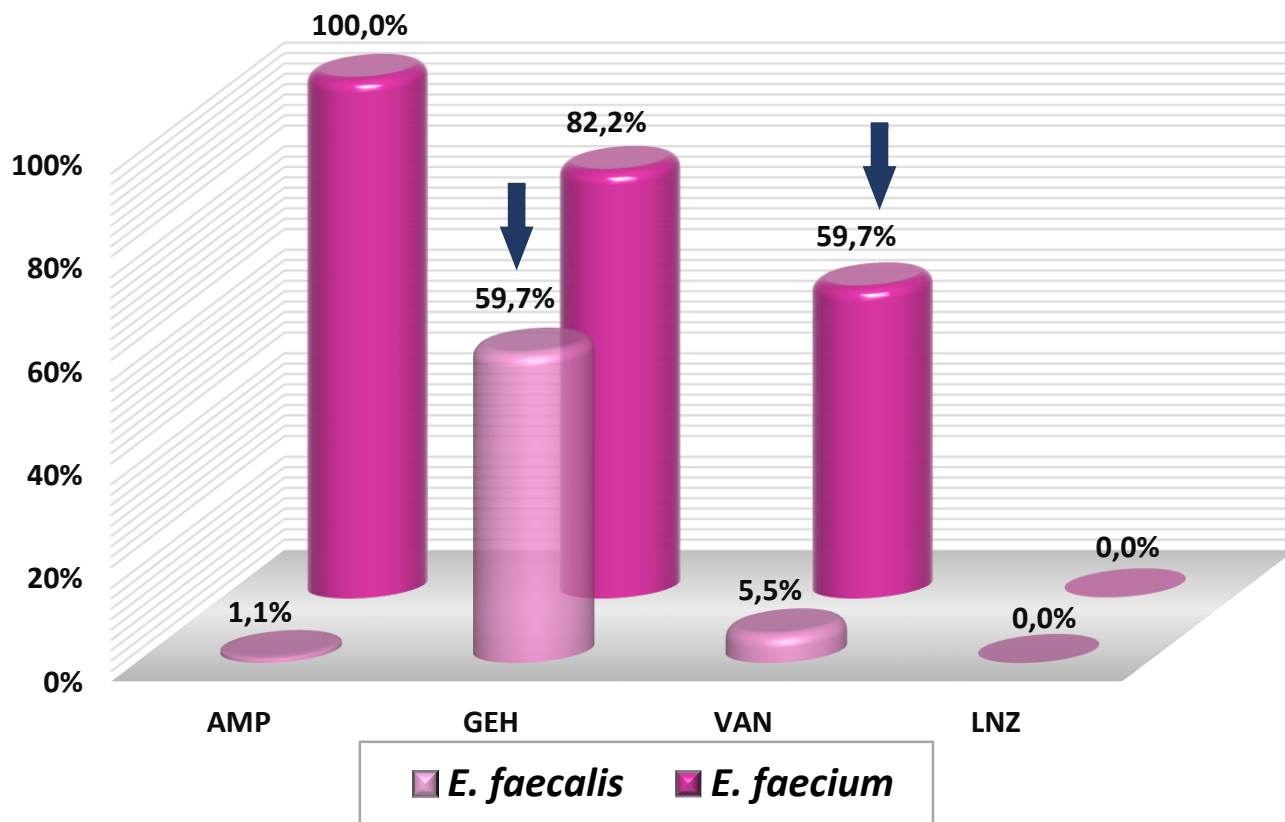
Među zemljama CAESAR mreže u Ukrajini i Švajcarskoj % MRSA izolata je nizak i ide do 5%, dok je u većini ostalih zemalja između 25-50%.

Izuzetak je Makedonija gde % MRSA izolata prelazi 50%.



\* In accordance with UNSC Resolution 1244 (1999)

# Uporedni prikaz procenta rezistentnih izolata *E. faecalis*/*E. faecium* (272/159 izolata), 2019. godina



AMP	Ampicilin
GEH	Gentamicin visoke doze
VAN	Vankomicin
TEC	Teikoplanin
LNZ	Linezolid

## *E. faecalis*

GEH R u 2016. godini: 63,7%

GEH R u 2017. godini: 70,9%

GEH R u 2018. godini: 64,5%

## *E. faecium*

VAN R u 2016. godini: 35,5%

VAN R u 2017. godini: 45,9%

VAN R u 2018. godini: 53,5%

# *Enterococcus faecalis* - procenat invazivnih izolata rezistentnih na aminoglikozide visokih doza, po zemljama, EU/EEA

Figure 3.26. *Enterococcus faecalis*. Percentage (%) of invasive isolates with high-level resistance to gentamicin, by country, EU/EEA countries, 2018

- < 1%
- 1% to < 5%
- 5% to < 10%
- 10% to < 25%
- 25% to < 50%
- ≥ 50%
- No data reported or fewer than 10 isolates
- Not included

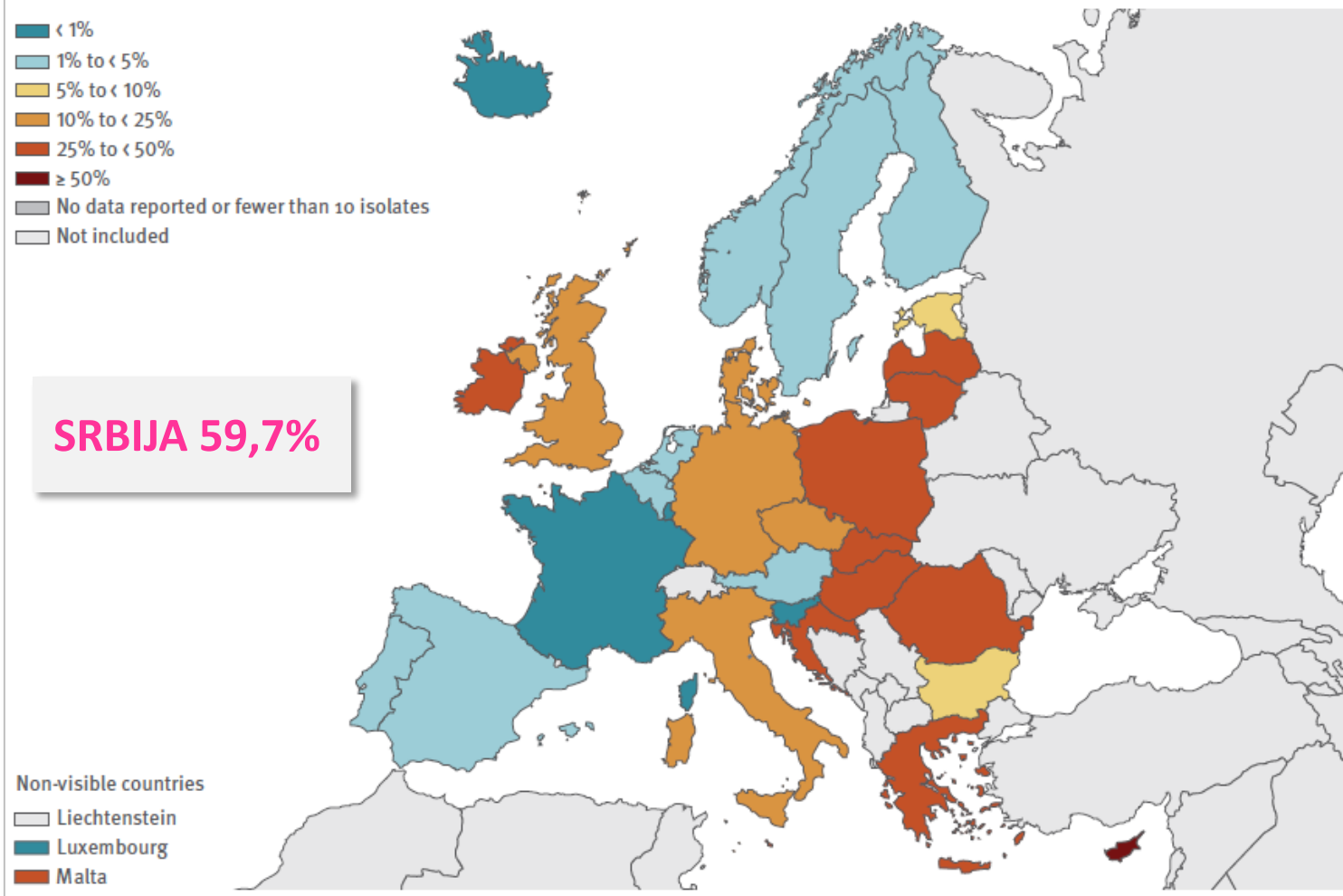
SRBIJA 59,7%

- Non-visible countries
- Liechtenstein
  - Luxembourg
  - Malta

U većini Evropskih zemljama rezistencija se kreće od 10% do 50%.

# Enterococcus faecium - procenat invazivnih izolata rezistentnih na vankomicin, po zemljama, EU/EEA

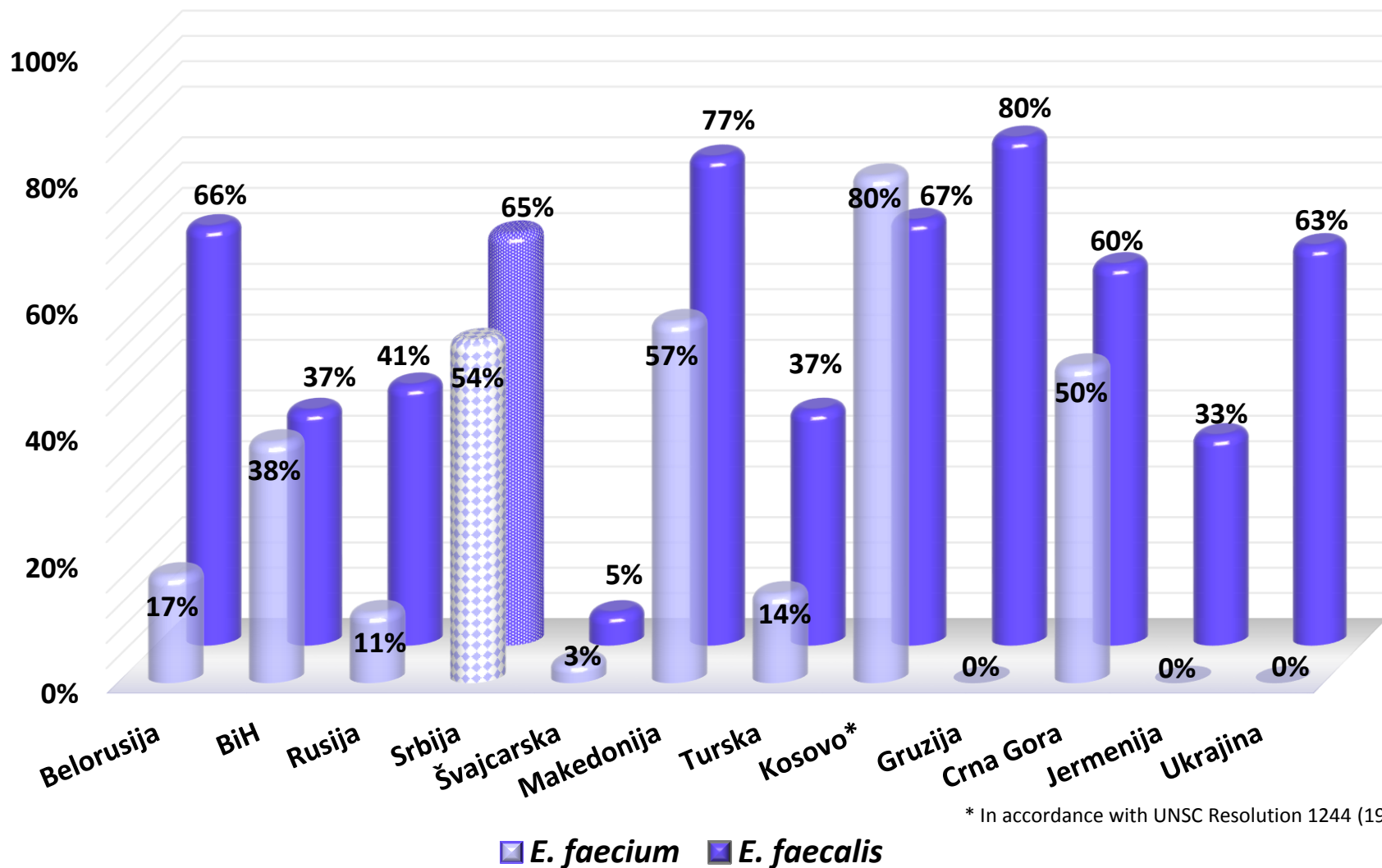
Figure 3.27. *Enterococcus faecium*. Percentage (%) of invasive isolates with resistance to vancomycin, by country, EU/EEA countries, 2018



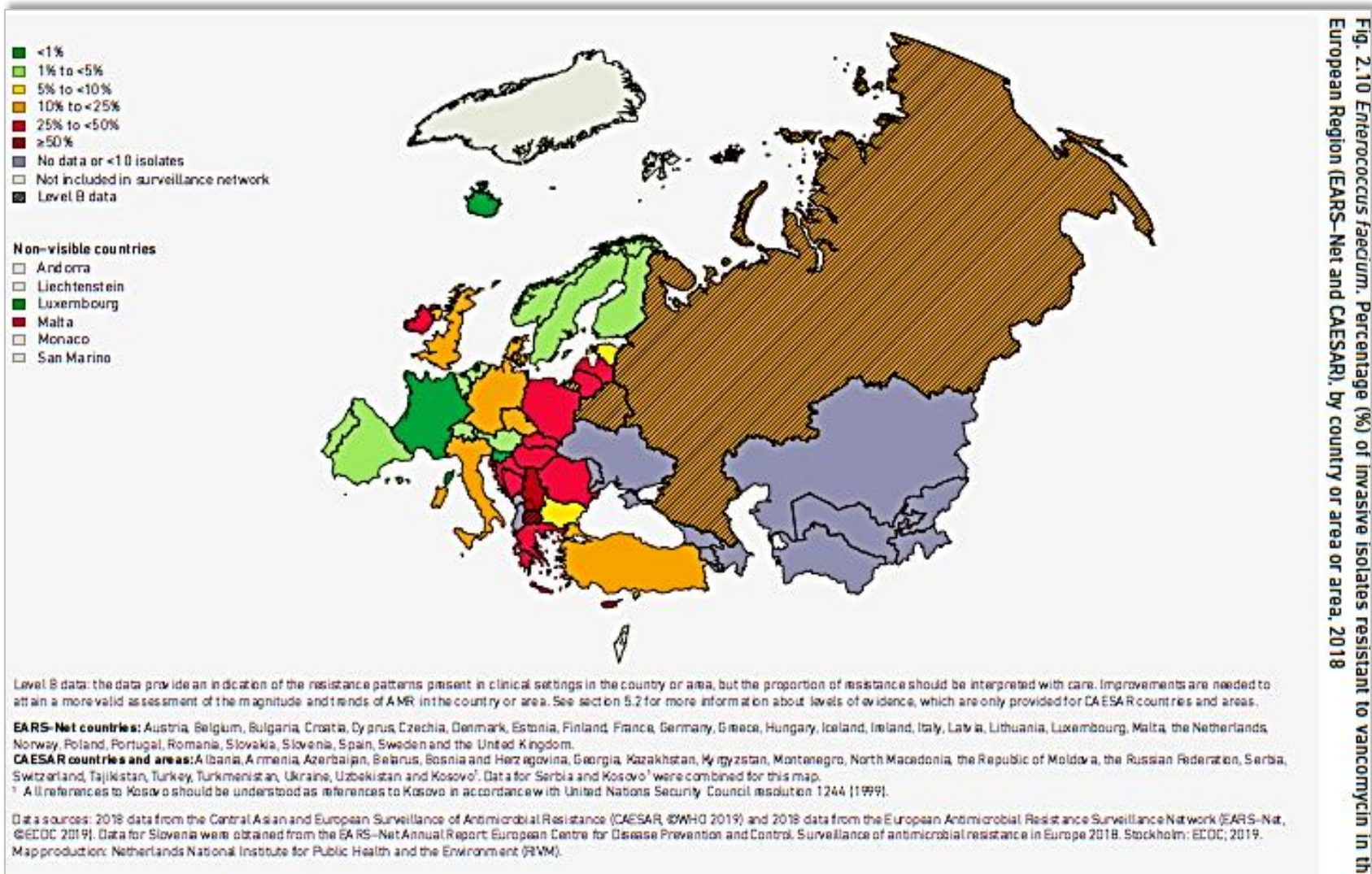
U Skandinavskim zemljama, Španiji, Francuskoj, Sloveniji rezistencija je <5%, dok u Poljskoj, Slovačkoj, Grčkoj, Rumuniji i u Irskoj ide i do 50%. Na Kipru rezistencija je preko 50%.



# *Enterococcus faecium/faecalis* - procenat izolata rezistentnih na vankomicin/aminoglikozide visokih doza po zemljama CAESAR mreže

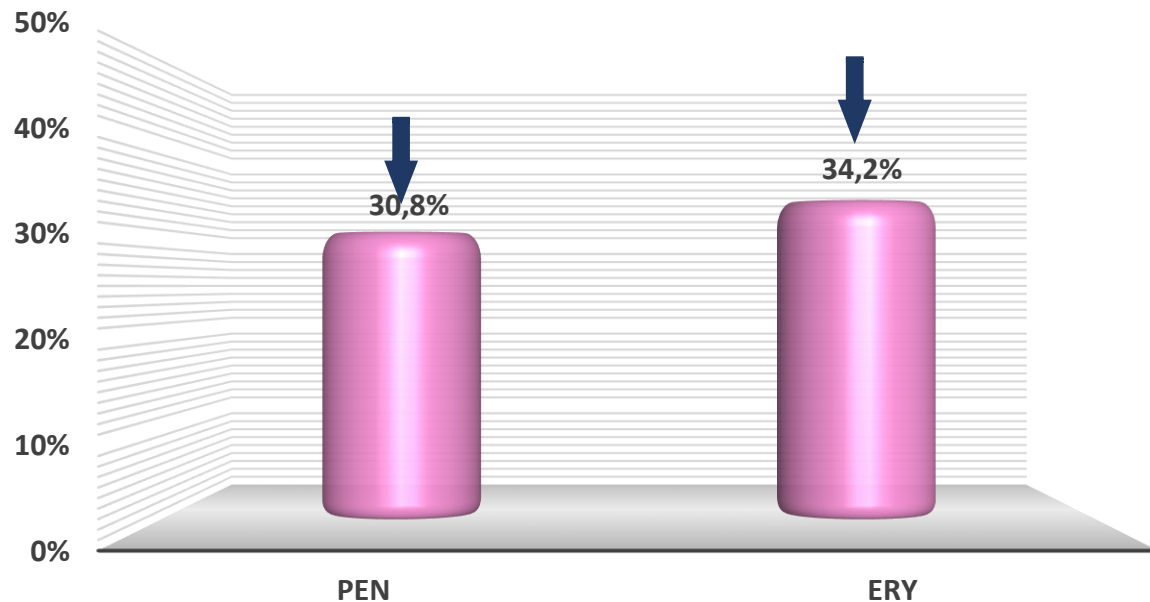


# Enterococcus faecium - procenat izolata rezistentnih na vankomicin u Evropskom regionu (EARS-Net i CAESAR)



\* In accordance with UNSC Resolution 1244 (1999)

# ***Streptococcus pneumoniae*: rezistencija na antimikrobne lekove u Srbiji, 2019. godina**



PEN	Penicilin
ERY	Eritromicin

**Broj izolata: 85**

**PEN: Granične vrednosti za meningitis (I+R)**

**PEN R u 2016. godini 25,4%**

**PEN R u 2017. godini 40,3%**

**PEN R u 2018. godini 32,9%**

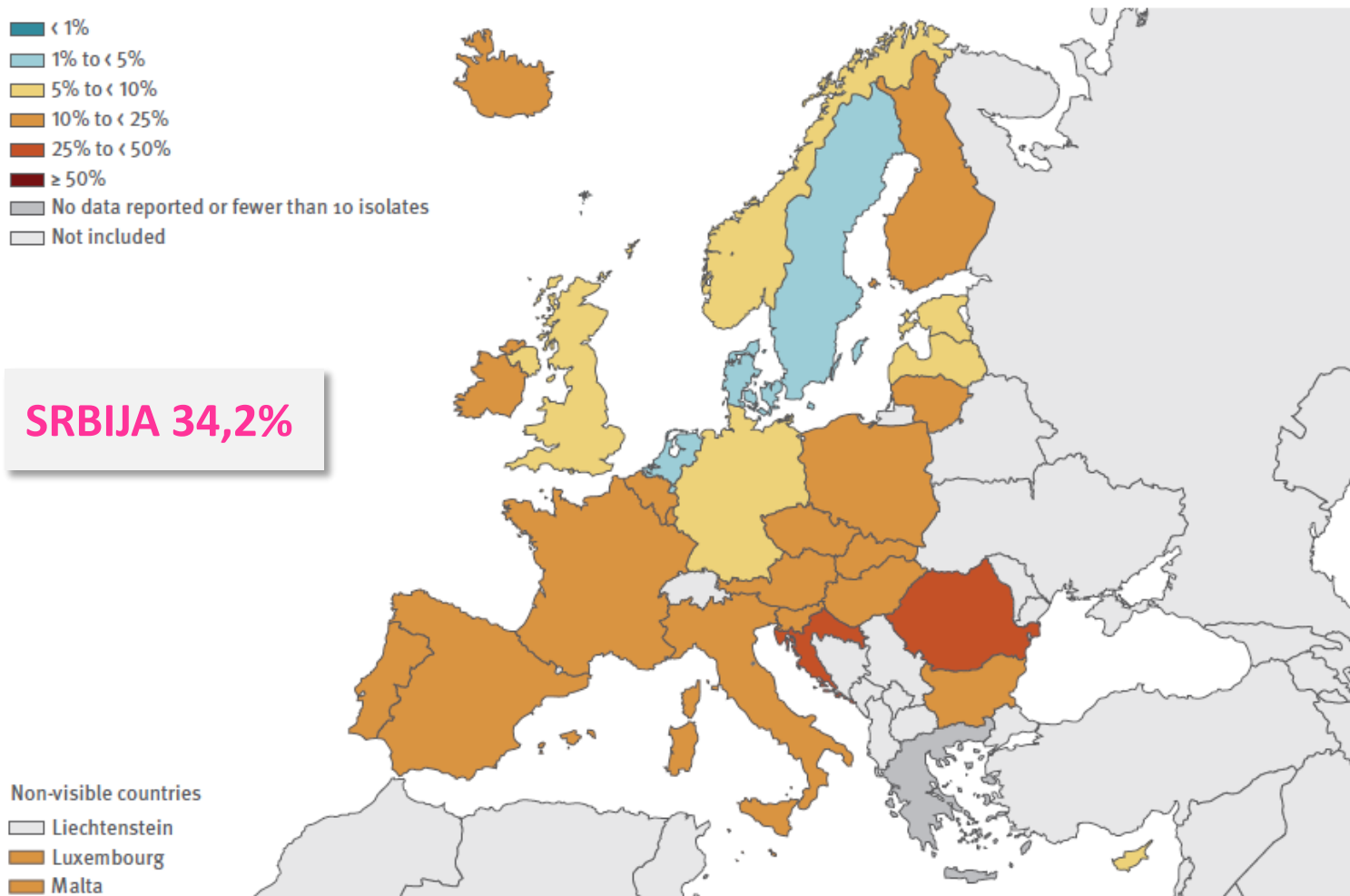
**ERY R u 2016. godini 31,0 %**

**ERY R u 2017. godini 26,6%**

**ERY R u 2018. godini 27,0%**

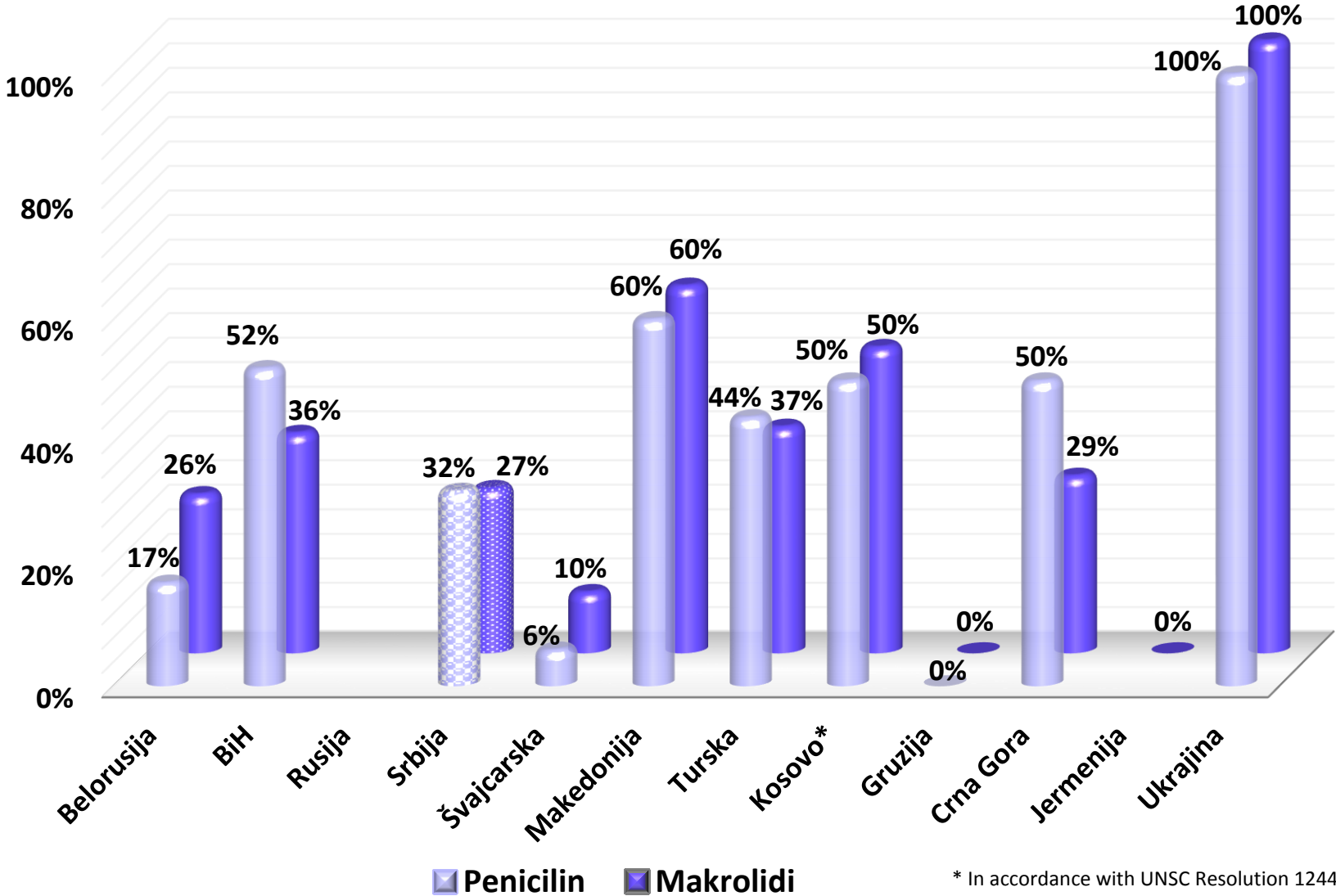
# *Streptococcus pneumoniae* - procenat invazivnih izolata rezistentnih na makrolide, po zemljama, EU/EEA

Figure 3.24. *Streptococcus pneumoniae*. Percentage (%) of invasive isolates resistant to macrolides, EU/EEA countries, 2018



U većini zemalja Evropske unije rezistencija je <25%, izuzev Hrvatske i Rumunije gde je od 25-50%.

# Streptococcus pneumoniae - procenat izolata rezistentnih na penicilin i makrolide po zemljama CAESAR mreže



\* In accordance with UNSC Resolution 1244 (1999)

# Streptococcus pneumoniae - procenat izolata rezistentnih na penicilin u Evropskom regionu (EARS-Net i CAESAR)

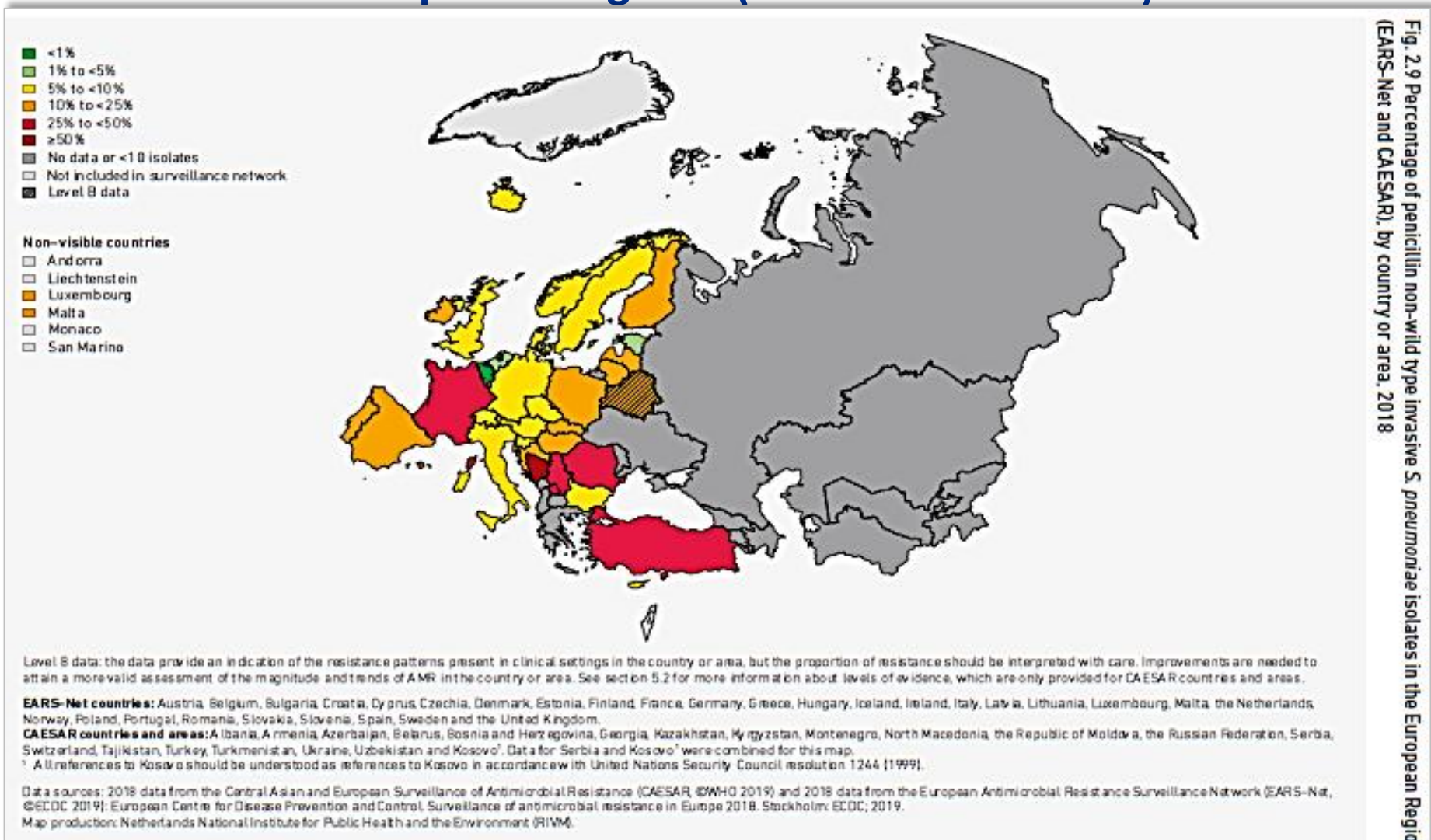


Fig. 2.9 Percentage of penicillin non-wild type invasive *S. pneumoniae* isolates in the European Region (EARS-Net and CAESAR), by country or area, 2018

\* In accordance with UNSC Resolution 1244 (1999)