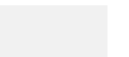




# *Antibioticorezistentă*

## *Relatia cauza efect*

- ***Dr. Andreea Capîlna***
- ***Medic primar Boli Infecțioase***
- ***Medic specialist Epidemiologie***



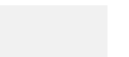


*Ce înseamnă  
„Rezistență  
bacteriană”?*

“That which does not kill us  
makes us stronger.”  
- Friedrich Nietzsche



***De ce ne e teamă de rezistența bacteriană?***





***Pentru că e doar vârful icebergului sau Calul troian***



# General Data

(it can always become personal)

## *Hospital Acquired Infections (HAIs)*

500,000 patients /day

5th cause of death, after heart disease,  
stroke, oncological conditions and car  
accidents

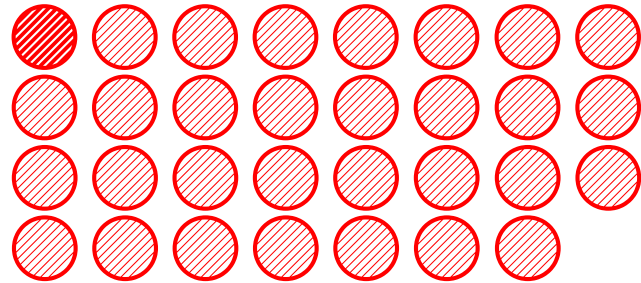
16,000,000 deaths / year



**16.000.000 deaths / year = 1 death / 3 minutes = 1 Boeing 737 crash / day**

# Perspective

**1 in 31 patients acquires a HCAI**

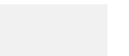


687.000 deaths in acute settings

USA - approx. 72,000 deaths / year

The equivalent of:

Toledo (Spain), St Gallen  
(Switzerland), Bourges (France),  
Burnley (UK)



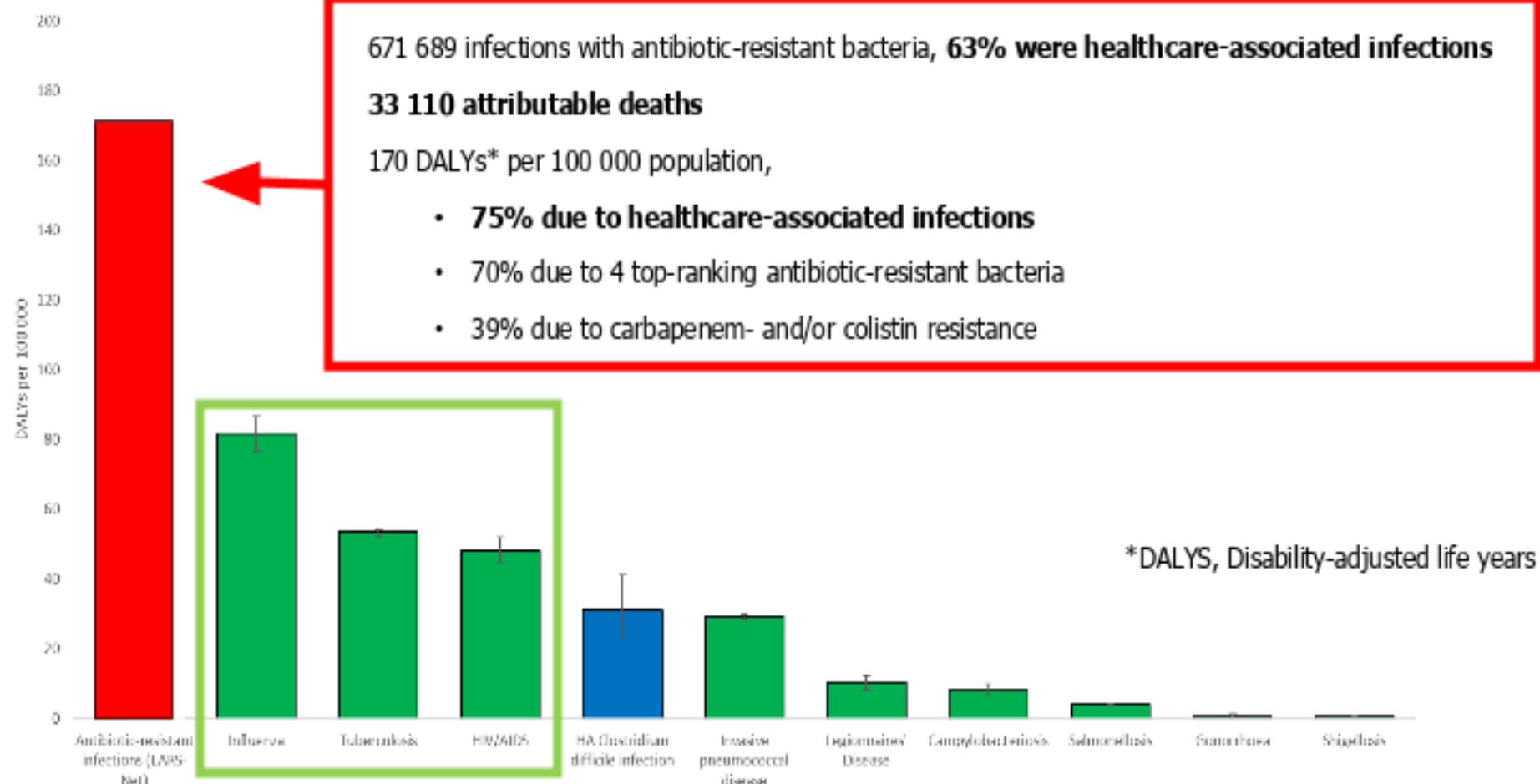




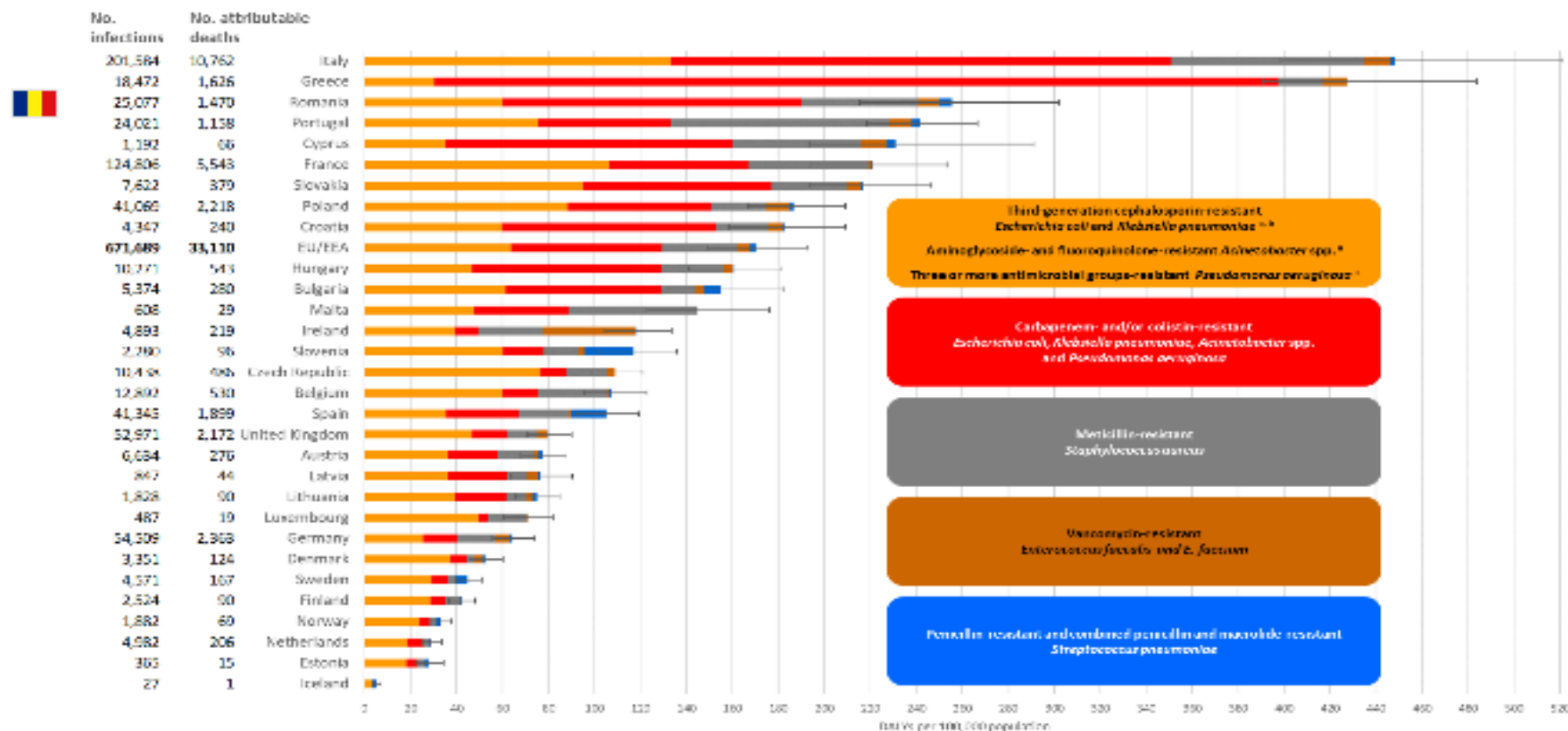
Use it smart

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## Burden of infections with antibiotic-resistant bacteria is comparable to burden of influenza, TB & HIV/AIDS combined

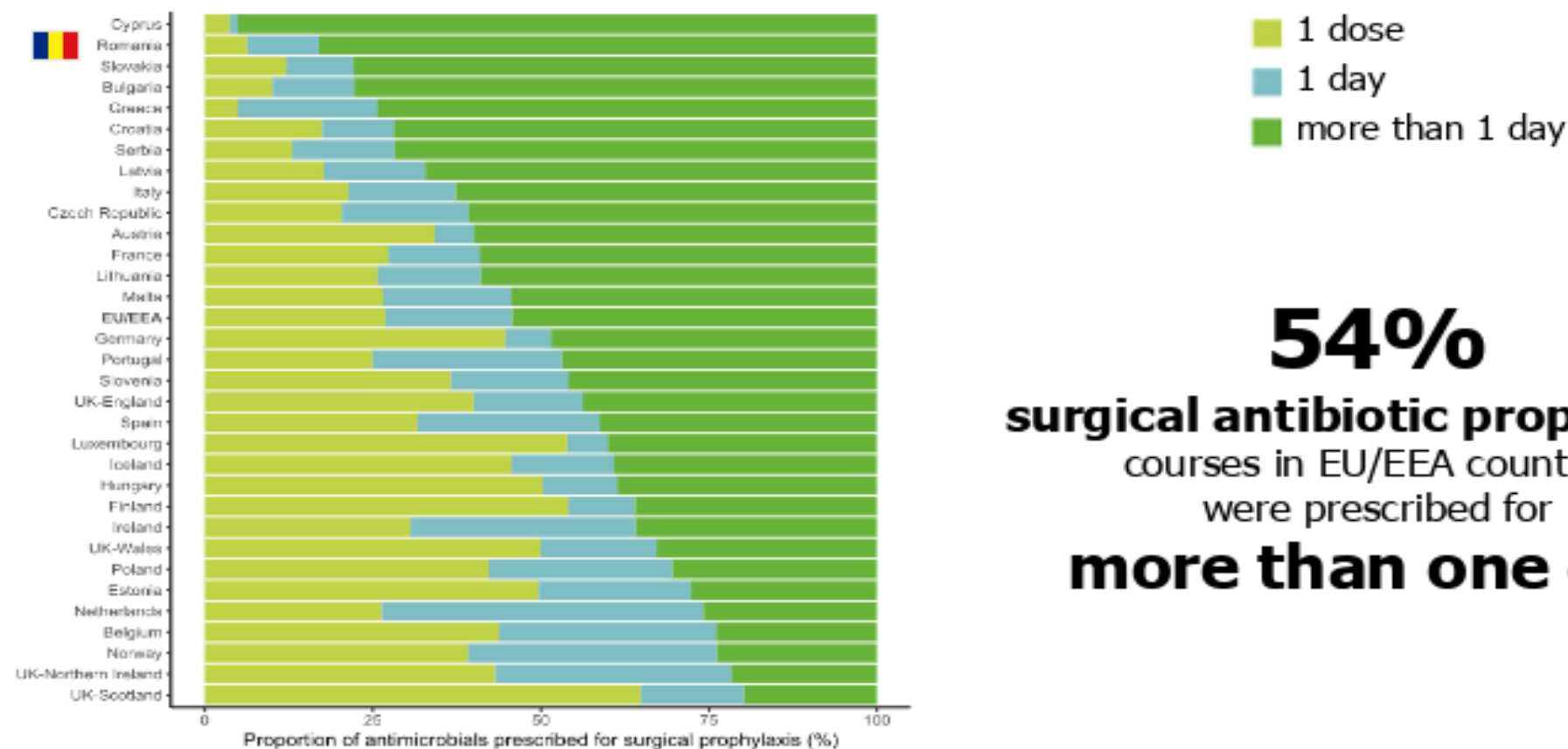


# Estimated burden of infections with antibiotic-resistant bacteria, age-group standardised, EU/EEA, 2015



Source: Cassini A, et al. Lancet Infectious Diseases. 5 November 2018.

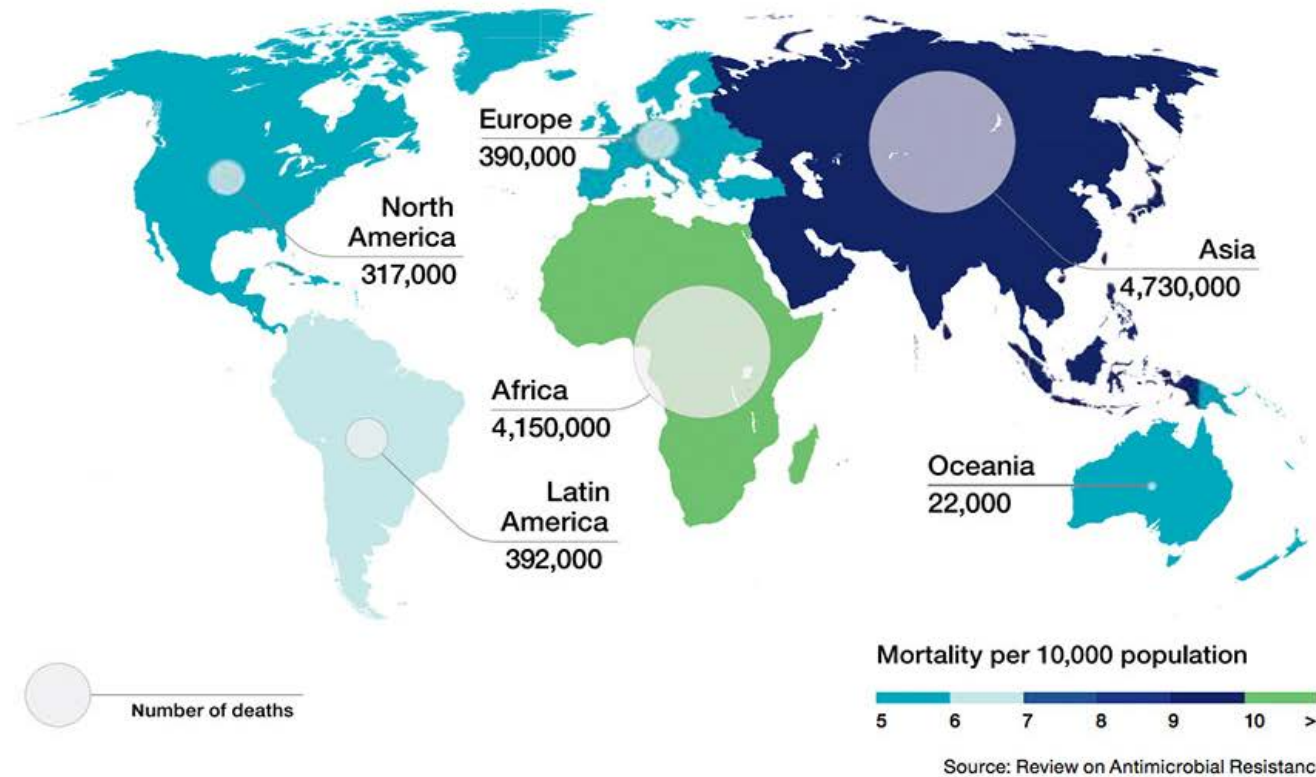
## Surgical antibiotic prophylaxis in acute care hospitals, by duration (single dose, one day, more than one day), EU/EEA countries and Serbia, 2016-2017



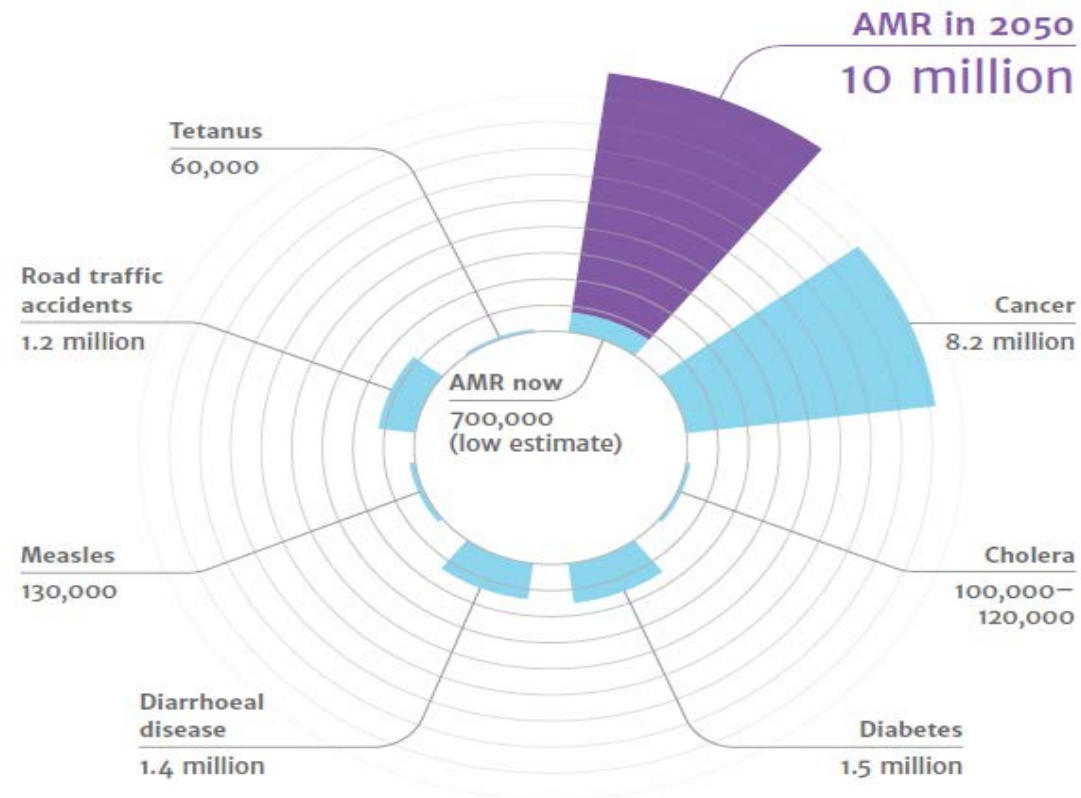
**54%**  
 surgical antibiotic prophylaxis  
 courses in EU/EEA countries  
 were prescribed for  
**more than one day**

Source: Plachouras D, et al. Eurosurveillance 15 November 2018.

# *Decese atribuite rezistenței microbiene anual, până în 2050*



# *Decese atribuite rezistenței microbiene anual, comparativ cu alte cauze majore de mortalitate*

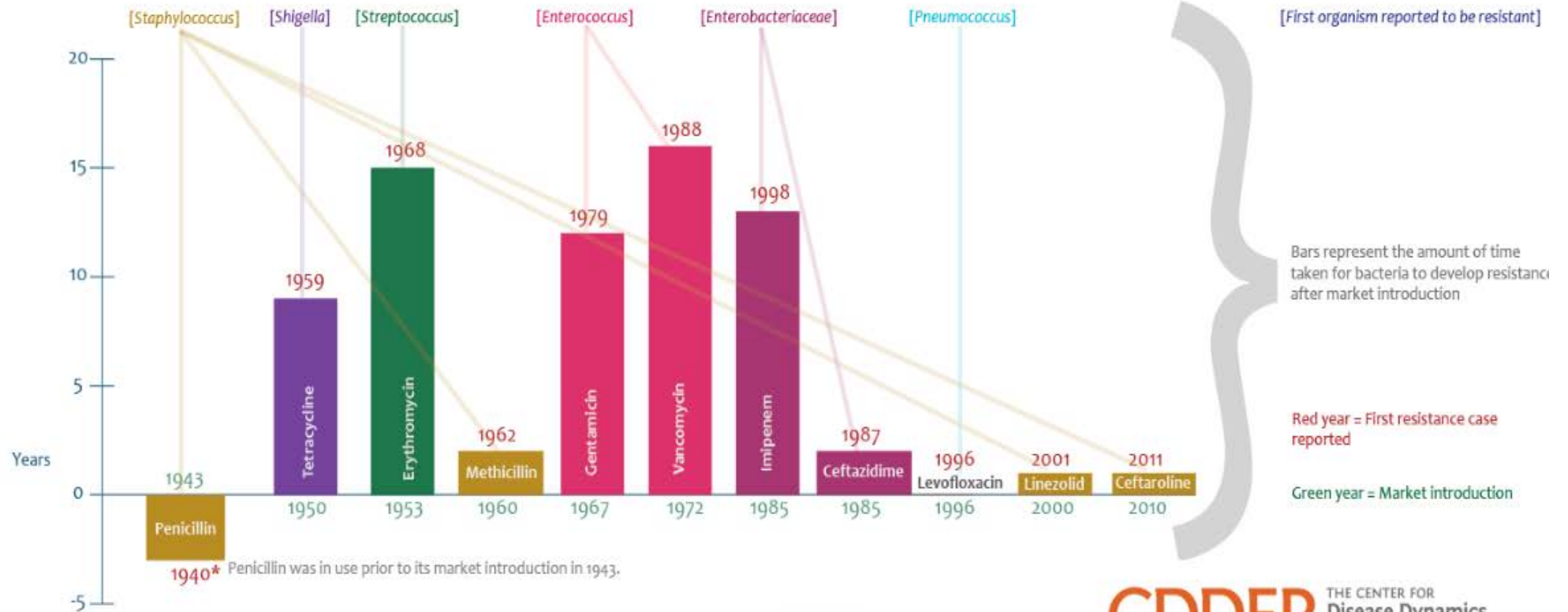


**Sources:**

Diabetes: [www.who.int/mediacentre/factsheets/fs312/en/](http://www.who.int/mediacentre/factsheets/fs312/en/) Cancer: [www.who.int/mediacentre/factsheets/fs297/en/](http://www.who.int/mediacentre/factsheets/fs297/en/)  
Cholera: [www.who.int/mediacentre/factsheets/fs107/en/](http://www.who.int/mediacentre/factsheets/fs107/en/) Diarrhoeal disease: [www.sciencedirect.com/science/article/pii/S0140673612617280](http://www.sciencedirect.com/science/article/pii/S0140673612617280)  
Measles: [www.sciencedirect.com/science/article/pii/S0140673612617280](http://www.sciencedirect.com/science/article/pii/S0140673612617280) Road traffic accidents: [www.who.int/mediacentre/factsheets/fs358/en/](http://www.who.int/mediacentre/factsheets/fs358/en/)  
Tetanus: [www.sciencedirect.com/science/article/pii/S0140673612617280](http://www.sciencedirect.com/science/article/pii/S0140673612617280)



# Istoria primelor cazuri de rezistența bacteriană



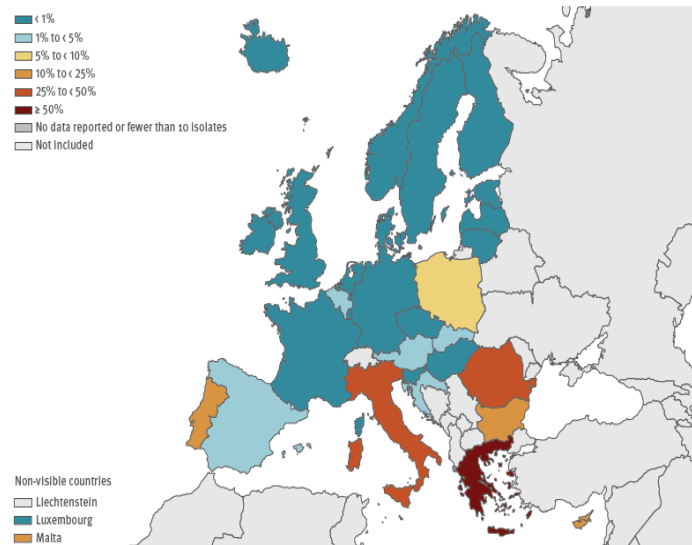
Data source: Antibiotic Resistance Threats in the United States, 2013.  
US Centers for Disease Control and Prevention (CDC).



# Date din Raportul de supraveghere a rezistenței bacteriene în Europa -2018

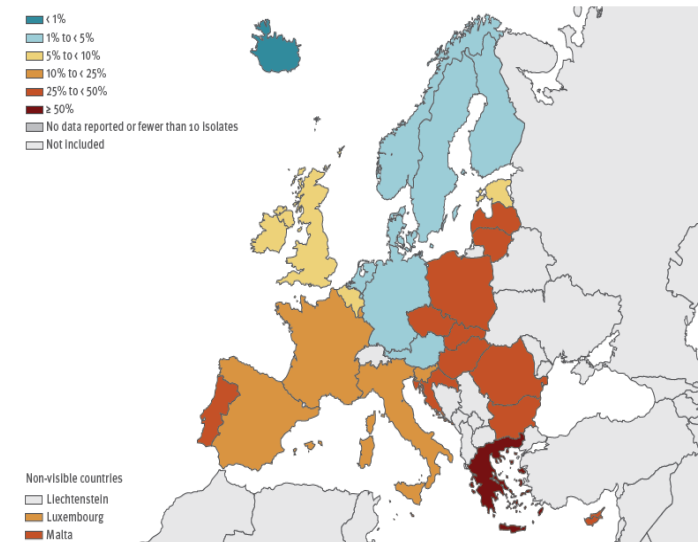
- **Klebsiella pneumoniae** – rezistentă la carbapeneme

Figure 3.11. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2018



- **Klebsiella pneumoniae** – MDR la FQ, CG3, aminoglicozide

Figure 3.12. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with combined resistance to fluoroquinolones, third-generation cephalosporins and aminoglycosides, by country, EU/EEA countries, 2018

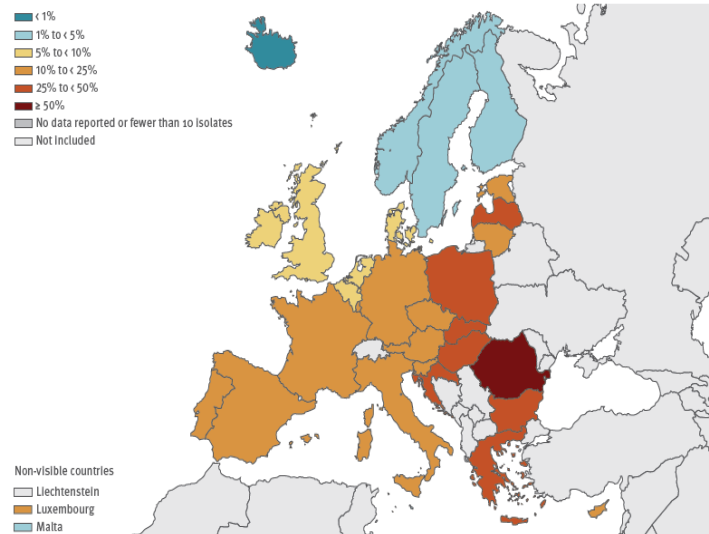




# Date din Raportul de supraveghere a rezistenței bacteriene în Europa -2018

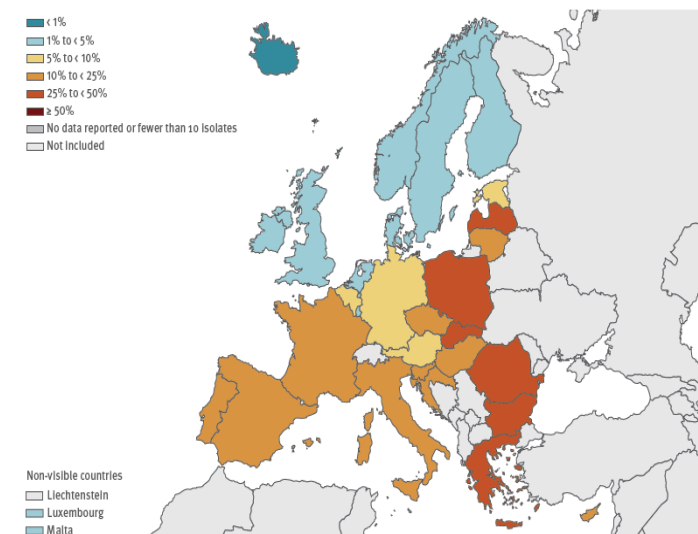
- **Pseudomonas aeruginosa** – rezistența la carbapeneme

Figure 3.17. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2018



- **Pseudomonas aeruginosa** – rezistență combinată la Pip/Taz, CTZ, FQ, AG și carbapeneme

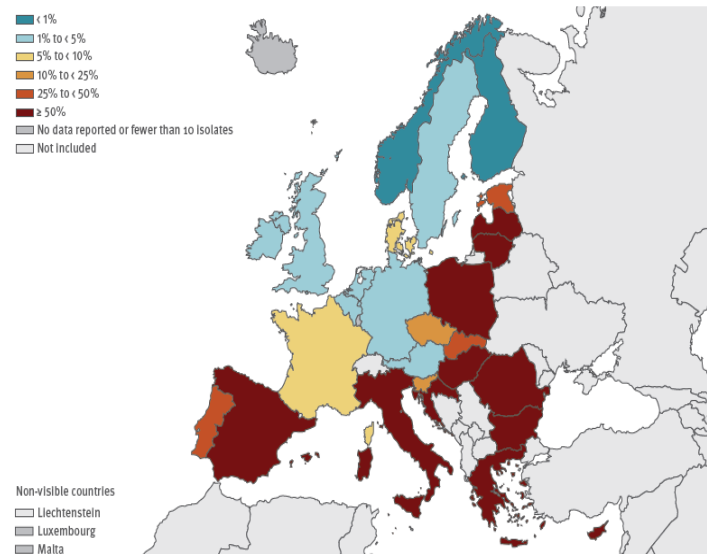
Figure 3.18. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with combined resistance (resistance to three or more antimicrobial groups among piperacillin + tazobactam, ceftazidime, fluoroquinolones, aminoglycosides and carbapenems), by country, EU/EEA countries, 2018



# Date din Raportul de supraveghere a rezistenței bacteriene în Europa -2018

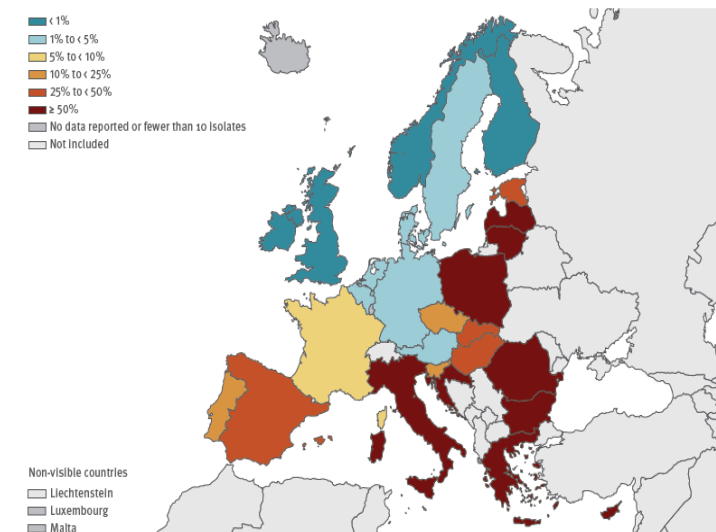
- **Acinetobacter spp**- rezistența la carbapeneme

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

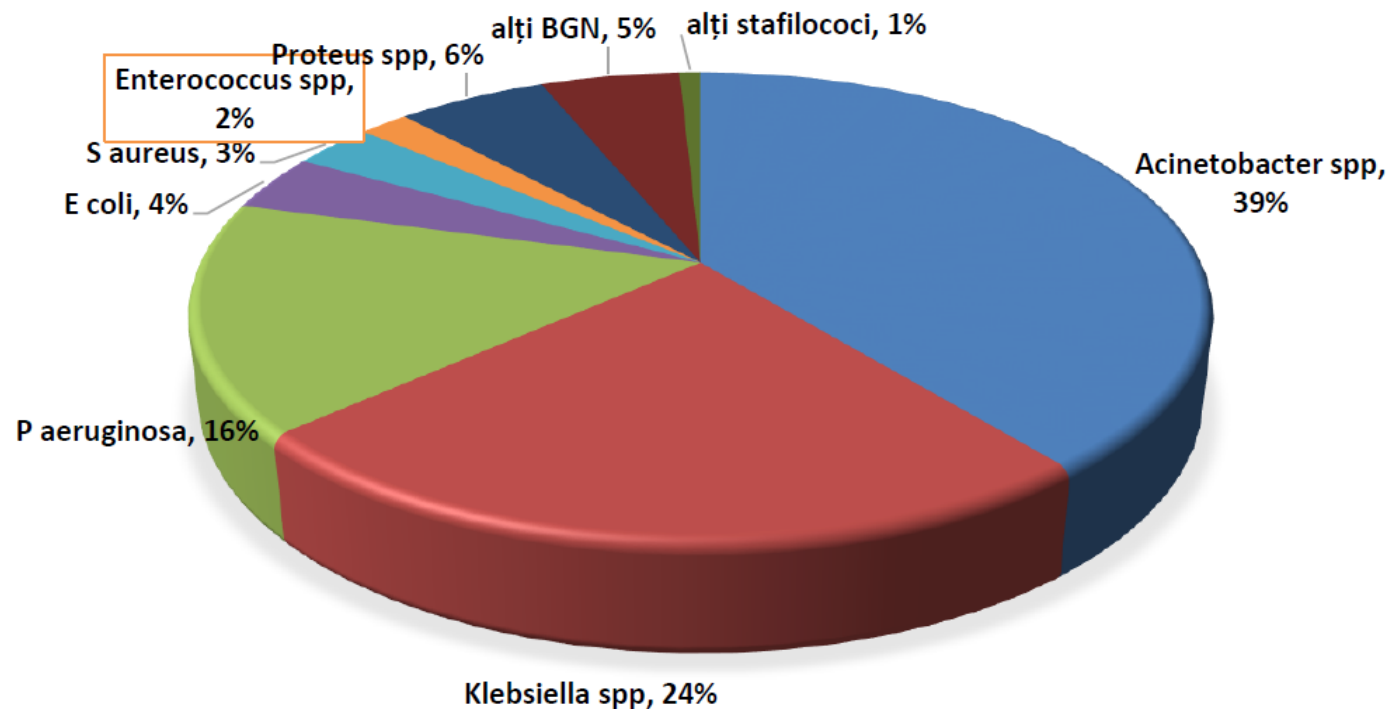


- **Acinetobacter spp**- rezistența cobinată la FQ, AG and carbapenems

Figure 3.23. *Acinetobacter* spp. Percentage (%) of invasive isolates with combined resistance to fluoroquinolones, aminoglycosides and carbapenems, by country, EU/EEA countries, 2018

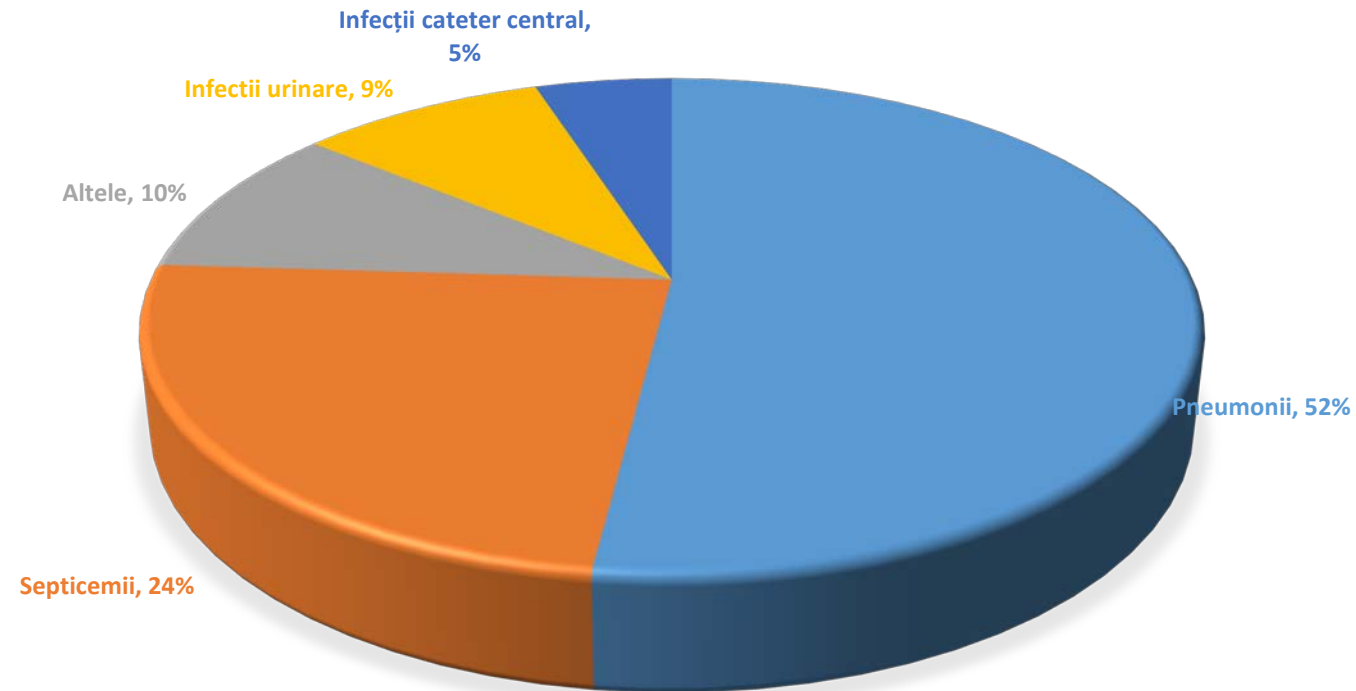


# Supravegherea Infecțiilor Asociate Asistenței Medicale (IAAM) 2018



17 spitale santinelă din România

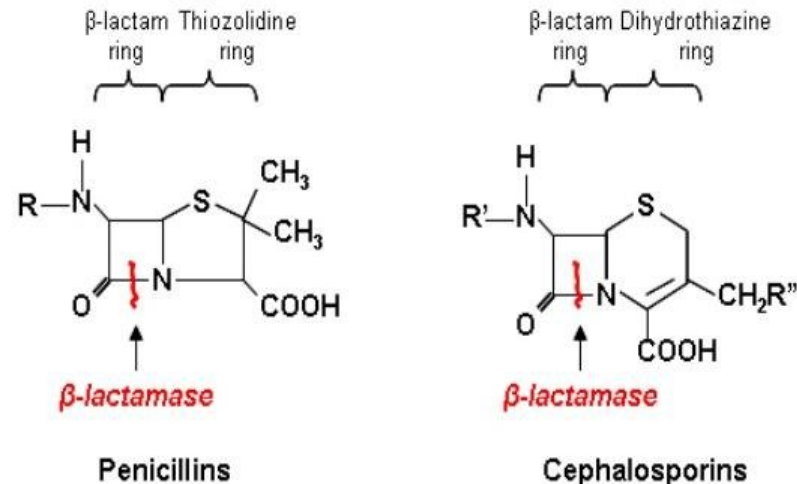
# Supravegherea Infecțiilor Asociate Asistenței Medicale (IAAM) 2018



# Mecanisme de rezistență bacteriană

- Inactivarea antibioticului**- producerea de enzime care distrug substanța activă ( $\beta$ -lactamaze, carbapenemaze)

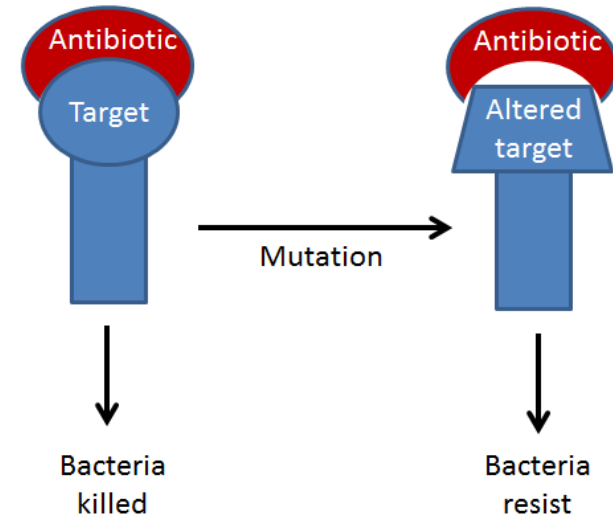
## $\beta$ -Lactam Antibiotics



# *Mecanisme de rezistență bacteriană*

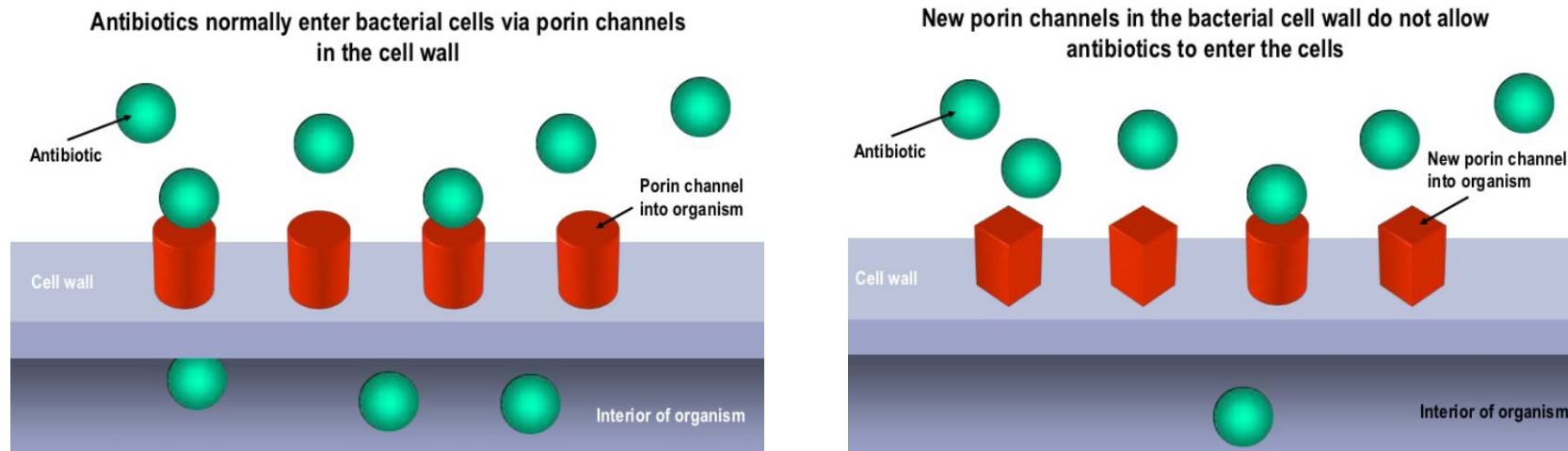
**2. Alterarea locului unde acționează antibioticul** (alterarea proteinelor specifice de pe subunitățile ribozomale bacteriene 30S sau 50S)

- Poate determina rezistență bacteriană la macrolide, tetraciclină, clindamicină



# *Mecanisme de rezistență bacteriană*

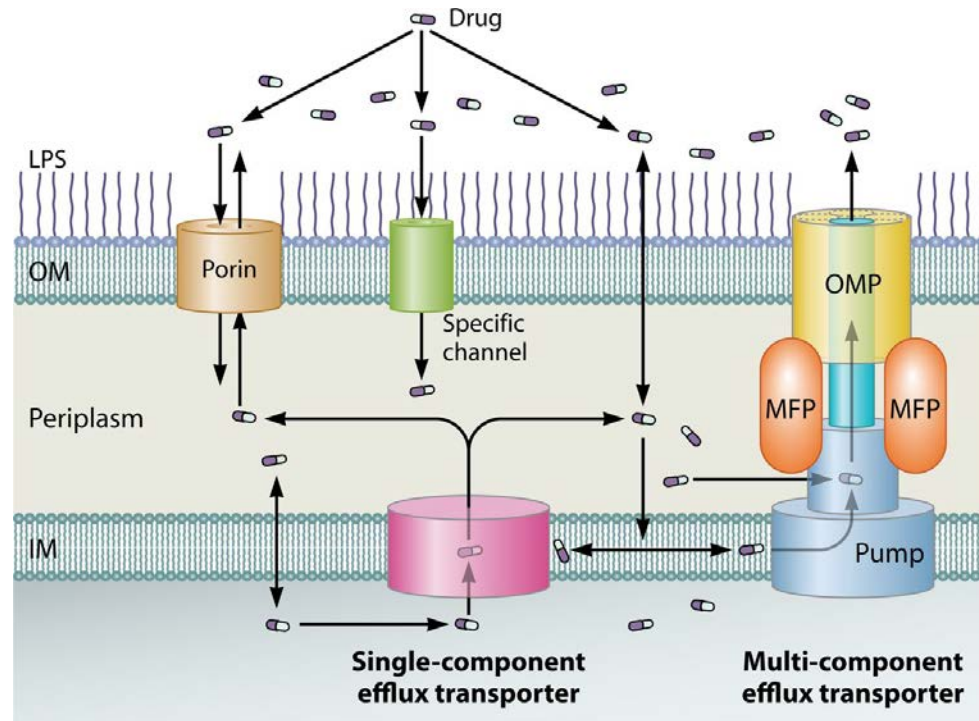
## 3. Modificarea permeabilității și a transportului membranelor pentru antibioticul respectiv (tetracicline, meticilină, cloramfenicol)



An overview of the antimicrobial resistance mechanisms of bacteria, Wanda C Reygaert\* Department of Biomedical Sciences, Oakland University William Beaumont School of Medicine, Rochester, MI, USA, June 2018

# *Mecanisme de rezistență bacteriană*

## 4. **Pompa de eflux** (mecanism major de rezistență la tetracicline)



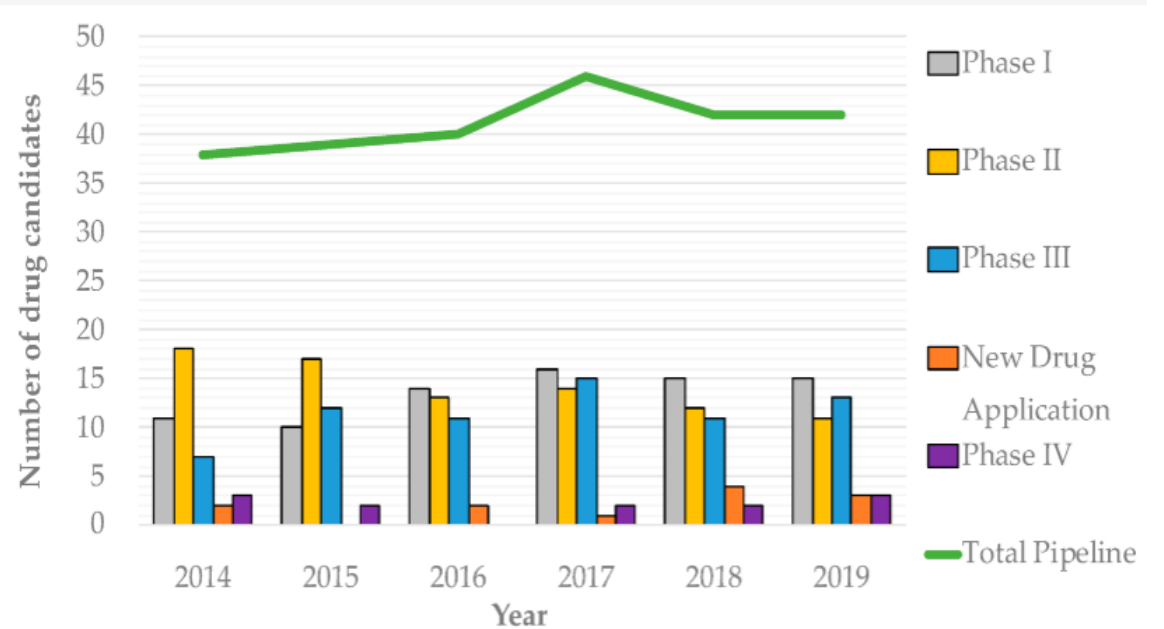


# Vistieria e săracă

## The Antibiotic Pipeline is Dry....



**Figure 1.** Evolution of the total antibiotic pipeline and the antibiotic pipeline by stage of development, which includes: Clinical Trials ranging from Phase I, to evaluate safety; Phase II, to access effectiveness and safety; Phase III, to gather statistically significant data on safety, effectiveness and benefits-versus-risk; submission of a New Drug Application, for marketing approval; and lastly, Phase IV for post-marketing surveillance.



# OMS, 2014

**“WHO’s first global report on antibiotic resistance reveals serious, worldwide threat to public health”**

**Date microbiologice provenite din 114 tari**

**Urmata de initiative ONU, CDC, ECDC**



# Antibiotic Resistance

- *“the silent tsunami facing modern medicine”*

2015

- anul în care **rezistența bacteriană** la antibiotice a devenit o **problemă globală** abordată în cadrul Summit-ului G7 al liderilor mondiali
- lansarea Antibiotic Awareness Week



Leaders' Declaration  
G7 Summit  
7-8 June 2015



## Obiectivele Summit-ului G7 (iunie 2015):

- Stimularea inovației
- Intensificarea dialogului cu:
  - industriile farmaceutice, de biotehnologie și alimentare
  - WHO, OIE-World Organisation for Animal Health, FAO-Food and Agriculture Organization of the United Nations
- Cumularea eforturilor naționale de combatere a rezistenței bacteriene
- Promovarea utilizării judicioase a antibioticelor

*Morbiditate  
Mortalitate*

<https://www.cdc.gov/drugresistance/biggest-threats.html>

*Impactul infecțiilor cu  
germeni rezistenți asupra  
sistemului de sănătate*

*Internări prelungite în spital*

*Vizite ulterioare de urmărire la  
medic*

*Alternative terapeutice  
costisitoare*

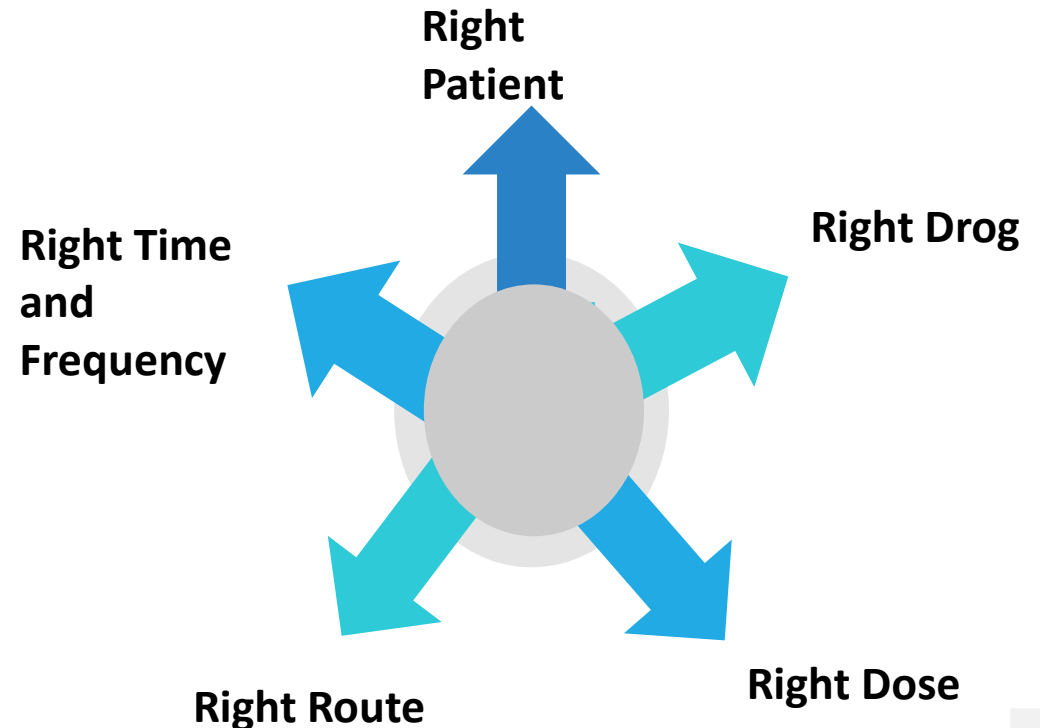
# *Cum păstrăm eficiența antibioticelor?*

## *...prin strategii de limitare a rezistenței bacteriene*

*Dezvoltarea de  
noi antibiotice*



*Utilizarea judicioasă a antibioticelor  
existente*





• ***Ce vom culege după anul de  
pandemie COVID-19 în  
România, ținând cont de abuzul  
de:***

- ***Azitromicină***
- ***Carbapeneme***
- ***Fluorochinolone***
- ***Cefalosporine po/iv ?!...***



*Muțumesc!*

