ARS TOSCANA
agenzia regionale di sanità

Oltre l'epidemia da SARS-CoV-2: l'impatto su vita e lavoro ed i patogeni da monitorare nel prossimo futuro

WEBINAR ECM **Crediti ECM: 4**

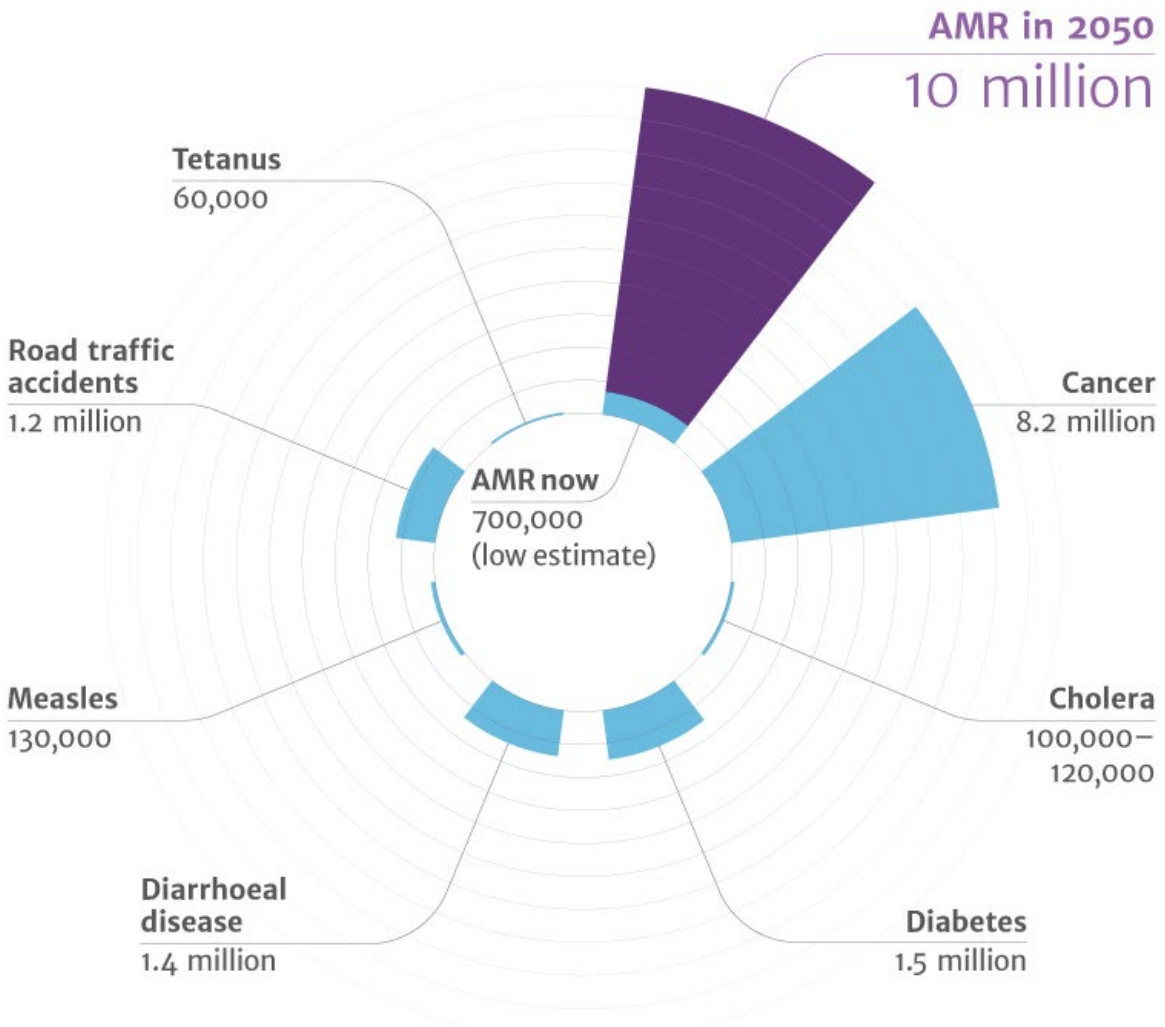
**26 ottobre 2023 ore 9.30-14.00**

# L'andamento dell'antibiotico-resistenza in Toscana nel 2022 (Rete SMART)

*Silvia LM Forni*
ARS Toscana

antibiotico-resistenza: sconfiggiamola insieme!

# L’AMR è la più grande minaccia alla salute globale e alla medicina moderna




**Sources:**
Diabetes: www.whi.int/mediacentre/factsheets/fs312/en/ Cancer: www.whi.int/mediacentre/factsheets/fs297/en/
Cholera: www.whi.int/mediacentre/factsheets/fs107/en/ Diarrhoeal disease: www.sciencedirect.com/science/article/pii/S0140673612617280
Measles: www.sciencedirect.com/science/article/pii/S0140673612617280 Road traffic accidents: www.whi.int/mediacentre/factsheets/fs358/en/
Tetanus: www.sciencedirect.com/science/article/pii/S0140673612617280

https://amr-review.org/

Review on Antimicrobial Resistance

ARS TOSCANA agenzia regionale di sanità

THE LANCET
Volume 399, Issue 10325, 12–18 February 2022, Pages 629-655

Articles

# Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

*Antimicrobial Resistance Collaborators**

**Summary**

**Background** Antimicrobial resistance (AMR) poses a major threat to human health around the world. Previous publications have estimated the effect of AMR on incidence, deaths, hospital length of stay, and health-care costs for specific pathogen–drug combinations in select locations. To our knowledge, this study presents the most comprehensive estimates of AMR burden to date.

*Lancet* 2022; 399: 629–55
Published Online
January 20, 2022
https://doi.org/10.1016/
S0140-6736(21)02724-0

## Associated deaths

*Most inclusive estimate of AMR burden*

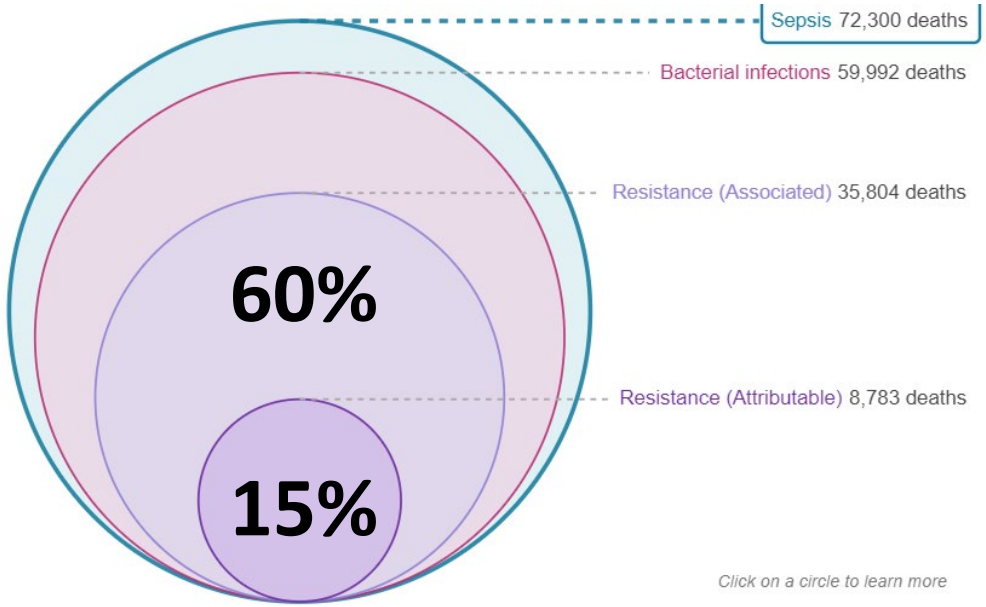
> Associated deaths measures people with a drug-resistant infection that contributed to their death. The infection was implicated in their death, but resistance may or may not have been a factor.

## Attributable deaths

*Most conservative estimate of AMR burden*

> Attributable deaths measures people who would not have died of infection if it was treatable (i.e., if there was no AMR) for whom resistance can be said to have caused their death.

**Italia 119 decessi per 100K**

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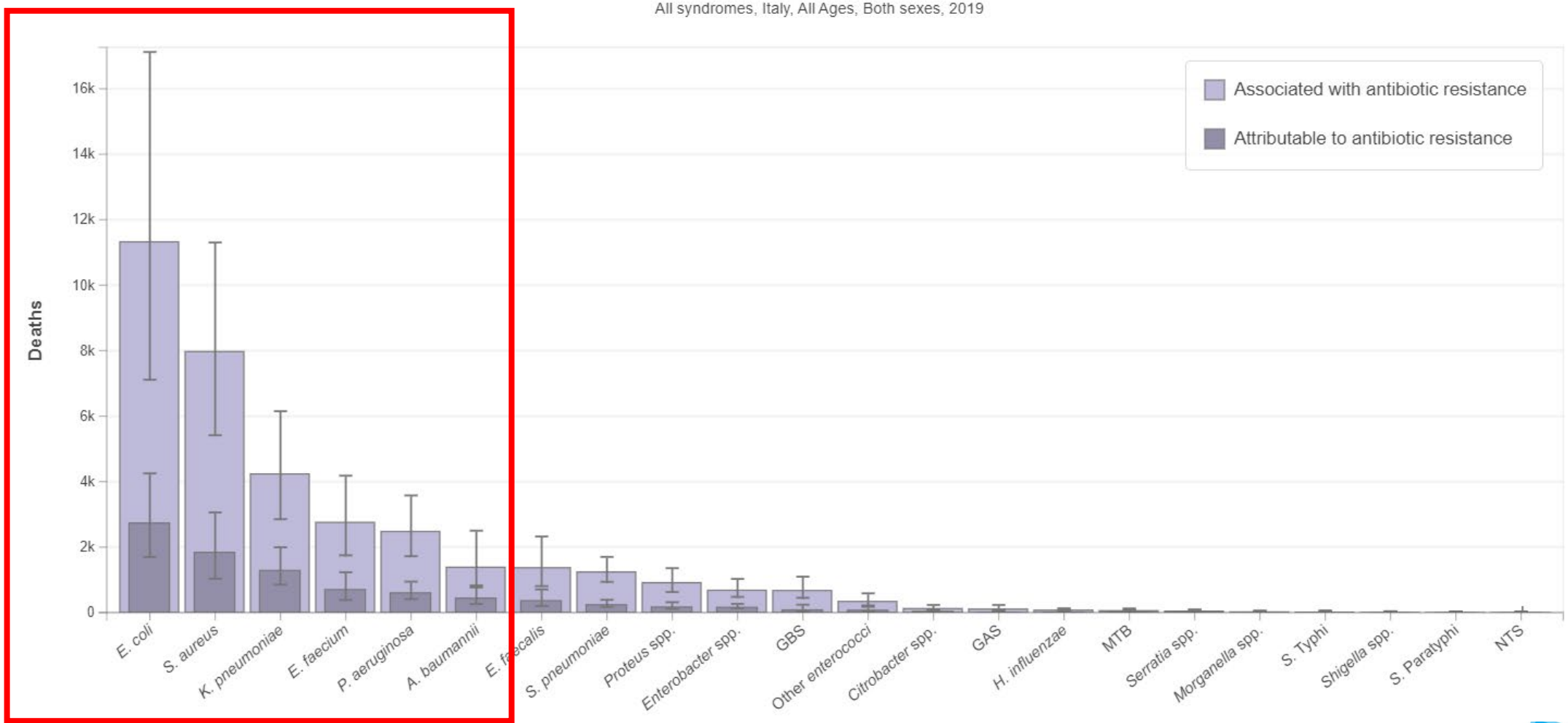
Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

Antimicrobial Resistance Collaborators*

**Deaths both associated with and attributable to bacterial antimicrobial resistance by pathogen**

All syndromes, Italy, All Ages, Both sexes, 2019

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**Box 6: WHO priority pathogens list for R&D of new antibiotics**

On 27th February 2017, the WHO published a catalogue of 12 families of bacteria that should be priorities for R&D efforts, in addition to TB. The list was drawn up in a bid to guide and promote R&D and highlights in particular the threat of gram-negative bacteria that are resistant to multiple antibiotics.

Priority 1: CRITICAL

- *Acinetobacter baumannii*, carbapenem-resistant
- *Pseudomonas aeruginosa*, carbapenem-resistant
- *Enterobacteriaceae*, carbapenem-resistant, ESBL-producing

Priority 2: HIGH

- *Enterococcus faecium*, vancomycin-resistant
- *Staphylococcus aureus*, methicillin-resistant, vancomycin-intermediate and resistant
- *Helicobacter pylori*, clarithromycin-resistant
- *Campylobacter* spp., fluoroquinolone-resistant
- *Salmonellae*, fluoroquinolone-resistant
- *Neisseria gonorrhoeae*, cephalosporin-resistant, fluoroquinolone-resistant

Priority 3: MEDIUM

- *Streptococcus pneumoniae*, penicillin-non-susceptible
- *Haemophilus influenzae*, ampicillin-resistant
- *Shigella* spp., fluoroquinolone-resistant

The objective of the WHO prioritization exercise was to identify previously unrecognised health threats due to increasing antibiotic resistance.

Batteriemie **multidrug resistant (MDR)** - resistenti contemporaneamente a vari antibiotici:

- causano infezioni difficili da trattare; vi sono poche o nessuna opzione di trattamento.
- facilita la diffusione della resistenza agli antibiotici.
- complica gli sforzi per ridurre la resistenza.

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Ministero della Salute

PER UN USO CONSAPEVOLE
ANTIBIOTICI EFFICACI

# Piano Nazionale di Contrasto all'Antibiotico-Resistenza (PNCAR) 2022-2025

## Piano Nazionale di Contrasto all'Antibiotico-Resistenza PNCAR 2022-2025

Appendice: funghi, virus e parassiti

**SORVEGLIANZA E MONITORAGGIO**
- ABR
- ICA
- Uso antibiotici
- Monitoraggio ambientale

**PREVENZIONE DELLE INFEZIONI**
- ICA
- Malattie infettive e zoonosi

**BUON USO ANTIBIOTICI**
- Ambito umano
- Ambito veterinario
- Corretta gestione e smaltimento

Governance

Formazione

Informazione, comunicazione e trasparenza

Ricerca, innovazione e bioetica

Cooperazione nazionale e internazionale

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# La sorveglianza dell'antibiotico resistenza

**European Antimicrobial Resistance Surveillance Network (EARS-Net)**

**AR-ISS:**
**sorveglianza nazionale dell'Antibiotico-Resistenza**

**La rete Sorveglianza Microbiologica e dell'Antibiotico-Resistenza Toscana**

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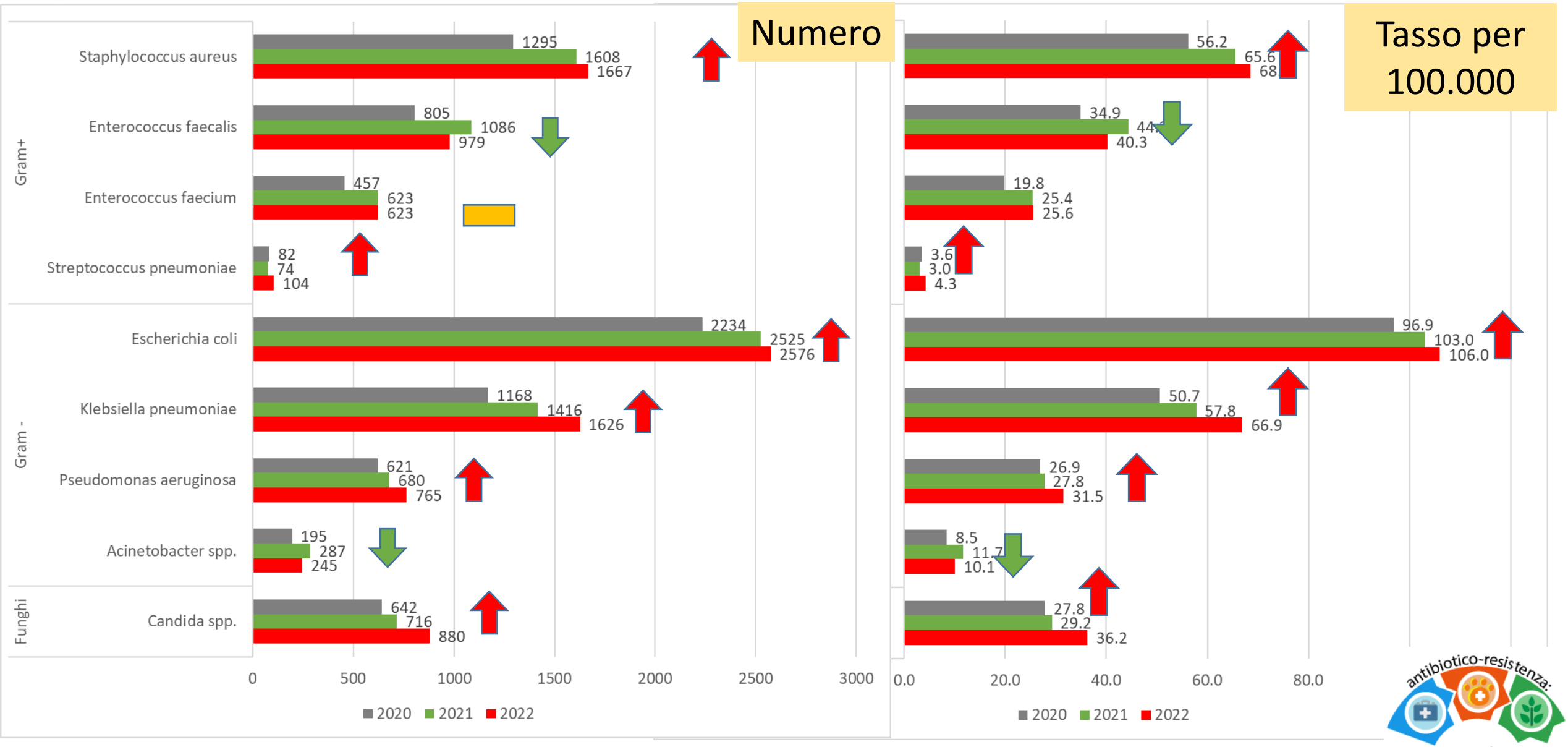
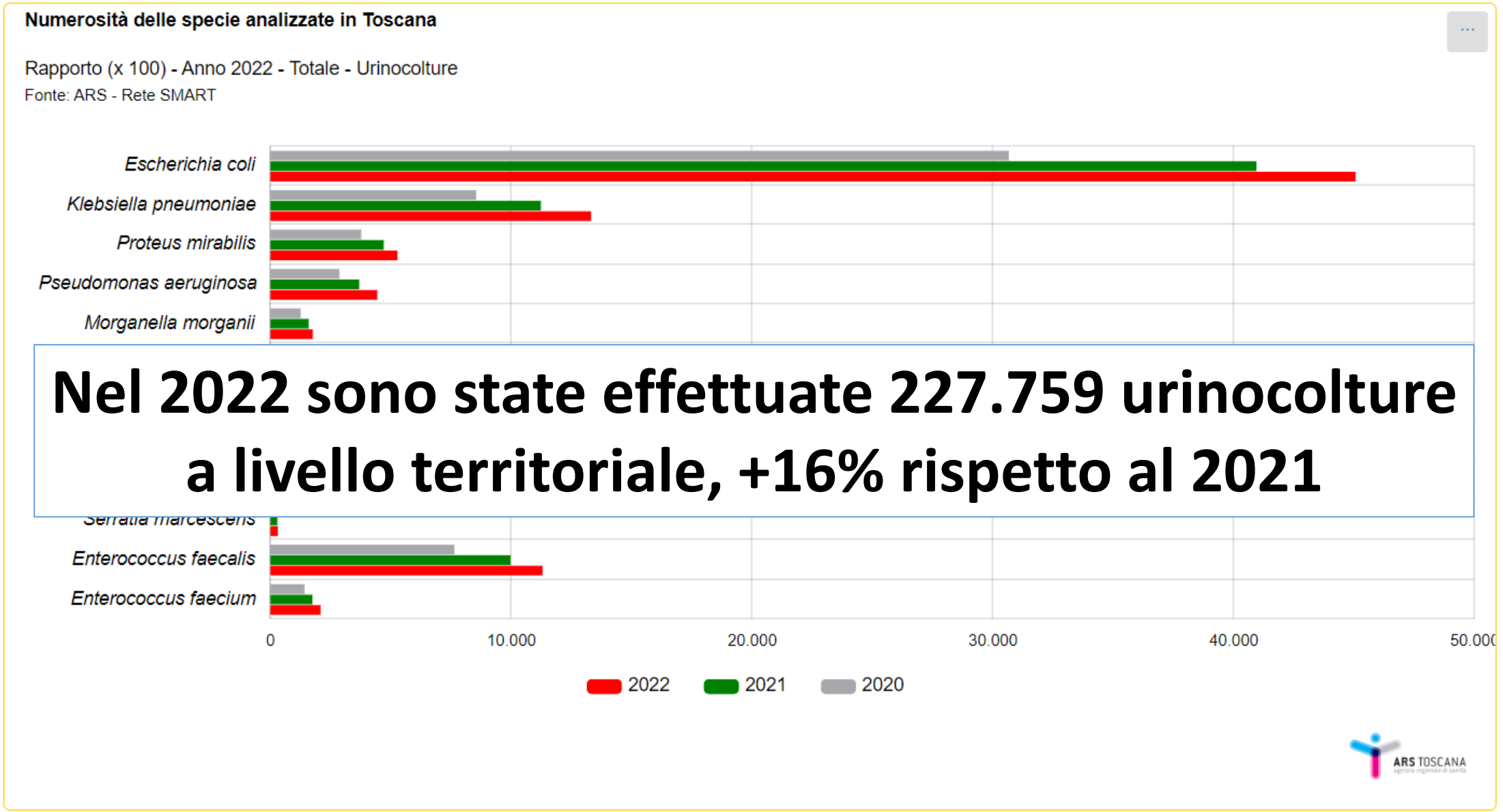
# Isolati da sangue non ripetuti, Toscana, 2020-2022




antibiotico-resistenza: sconfiggiamola insieme!

# Isolati da urine non ripetuti, Toscana, 2020-2022

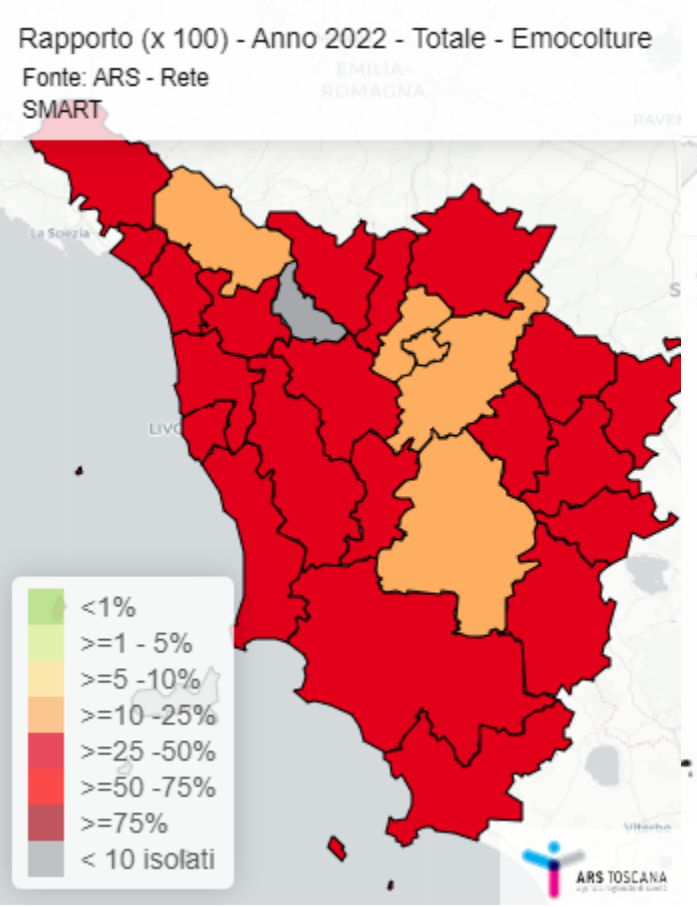


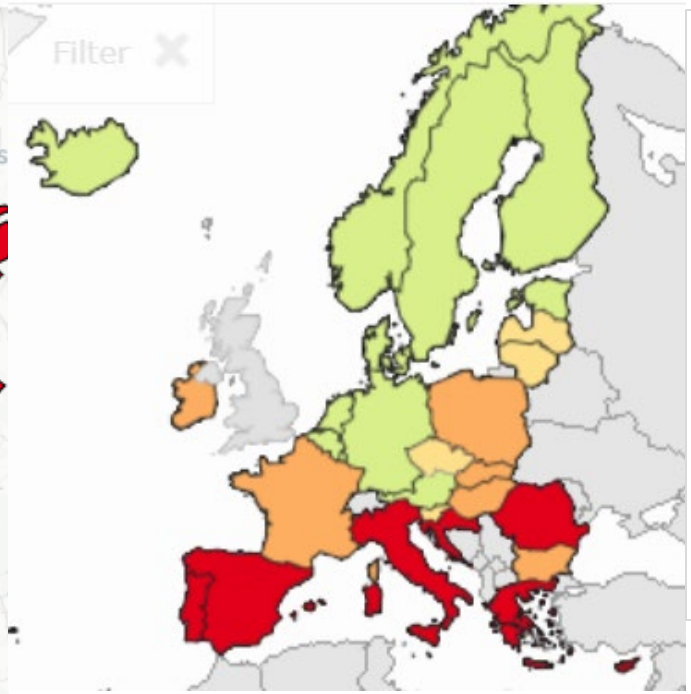

**Nel 2022 sono state effettuate 227.759 urinocolture a livello territoriale, +16% rispetto al 2021**

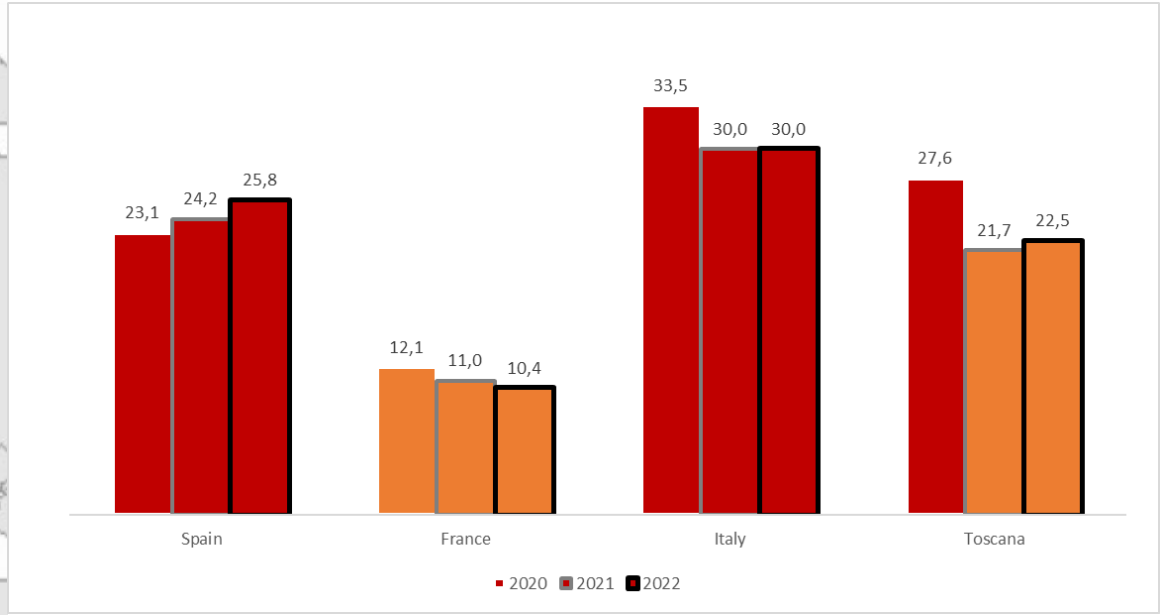
sconfiggiamola insieme!

# *Staphylococcus aureus*, meticillino-resistente (MRSA)

(1667 isolati di *S.aureus* da sangue non ripetuti, Toscana, 2022)



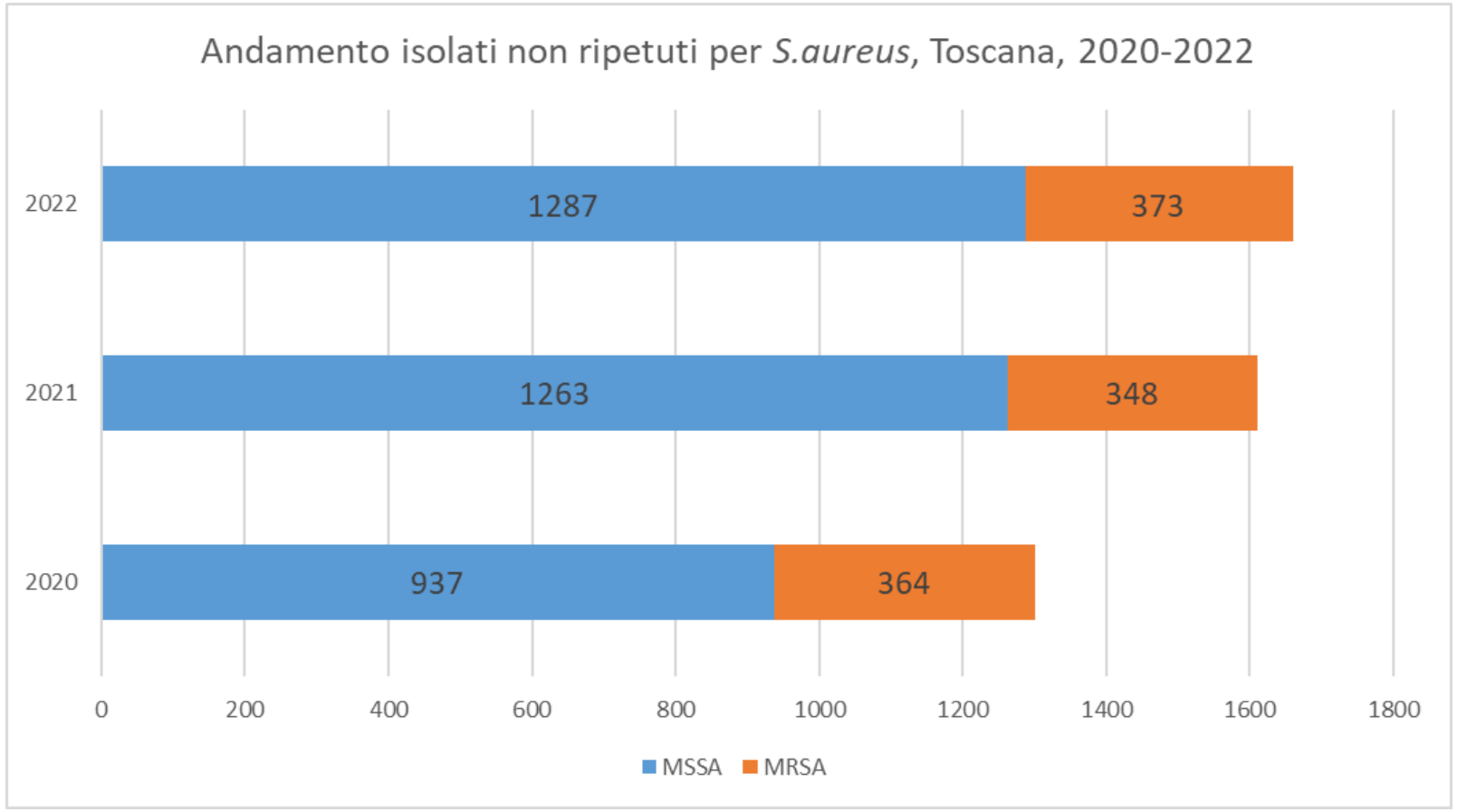




antibiotico-resistenza: sconfiggiamola insieme!

# *Staphylococcus aureus*, meticillino-resistente (MRSA)

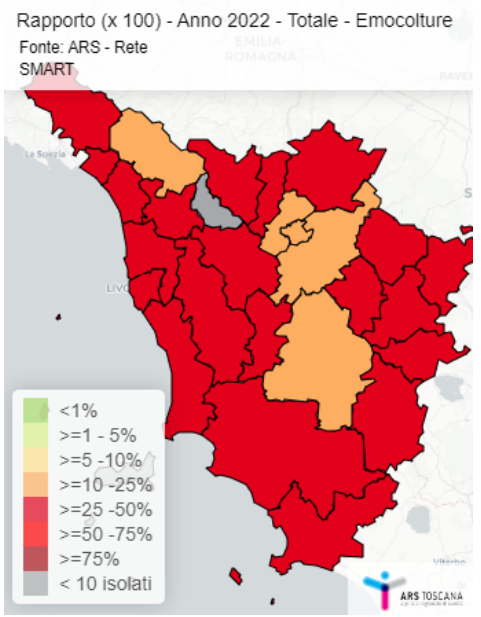
La riduzione «apparente» della prevalenza di MRSA tra il 2020 e il 2021 è principalmente dovuta all'aumento degli isolati MSSA

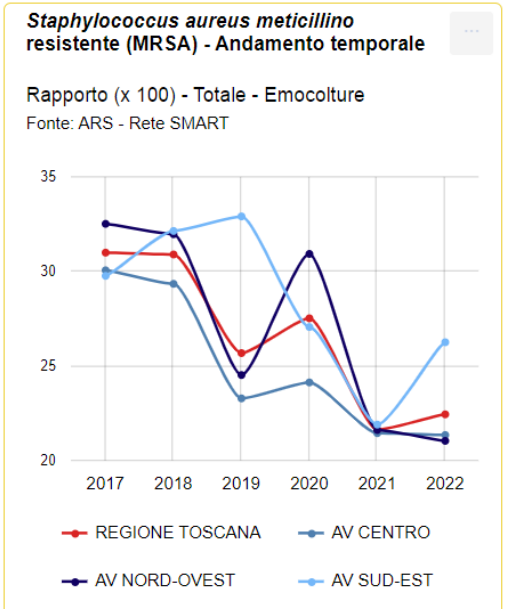



| Luogo di isolamento | MSSA | MRSA |
|---|---|---|
| | | |
| H | 65.8% | 65.1% |
| PS | 26.2% | 24.7% |
| RSA/Hospice | 0.8% | 1.6% |
| Altro, non noto | 7.2% | 8.6% |

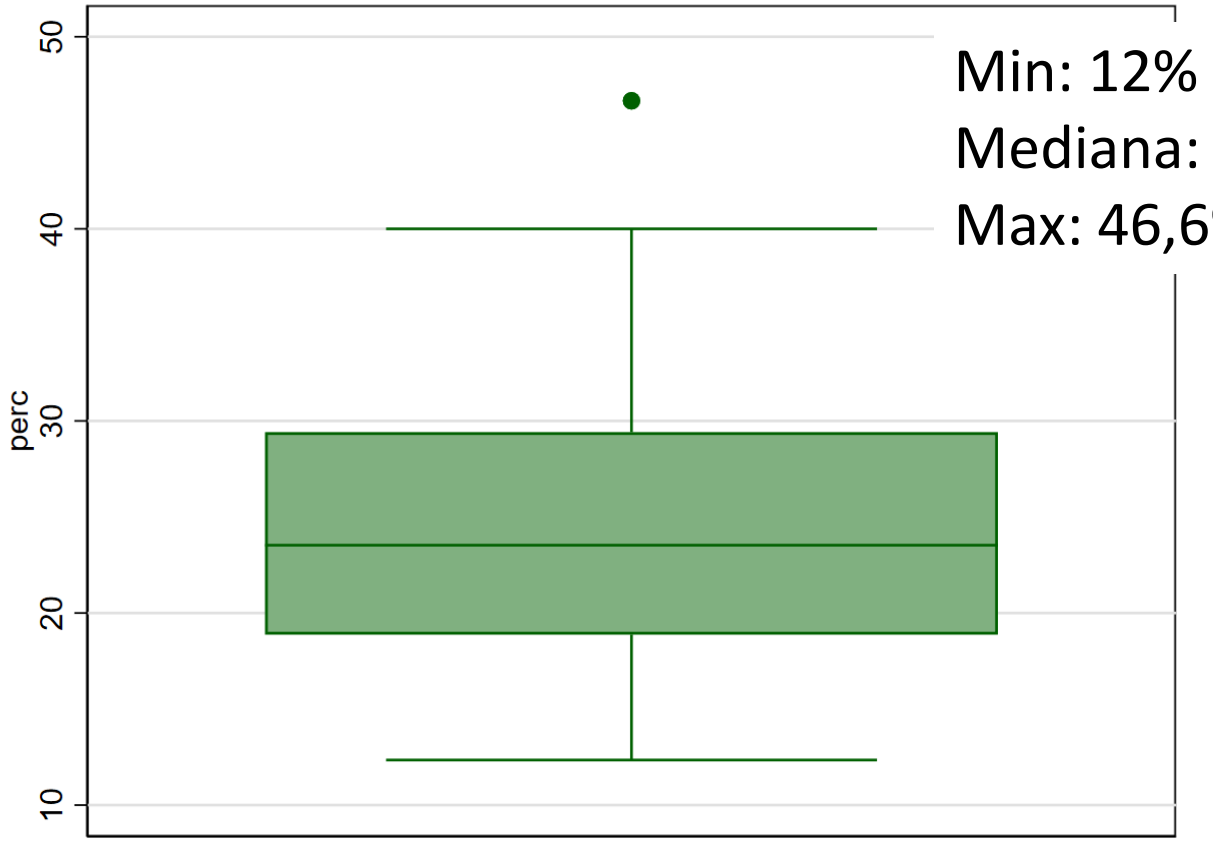
antibiotico-resistenza: sconfiggiamola insieme!

# *Staphylococcus aureus*, meticillino-resistente (MRSA)




Prevalenza MRSA per ospedale, Toscana,2022 (30 H con oltre 10 isolati)

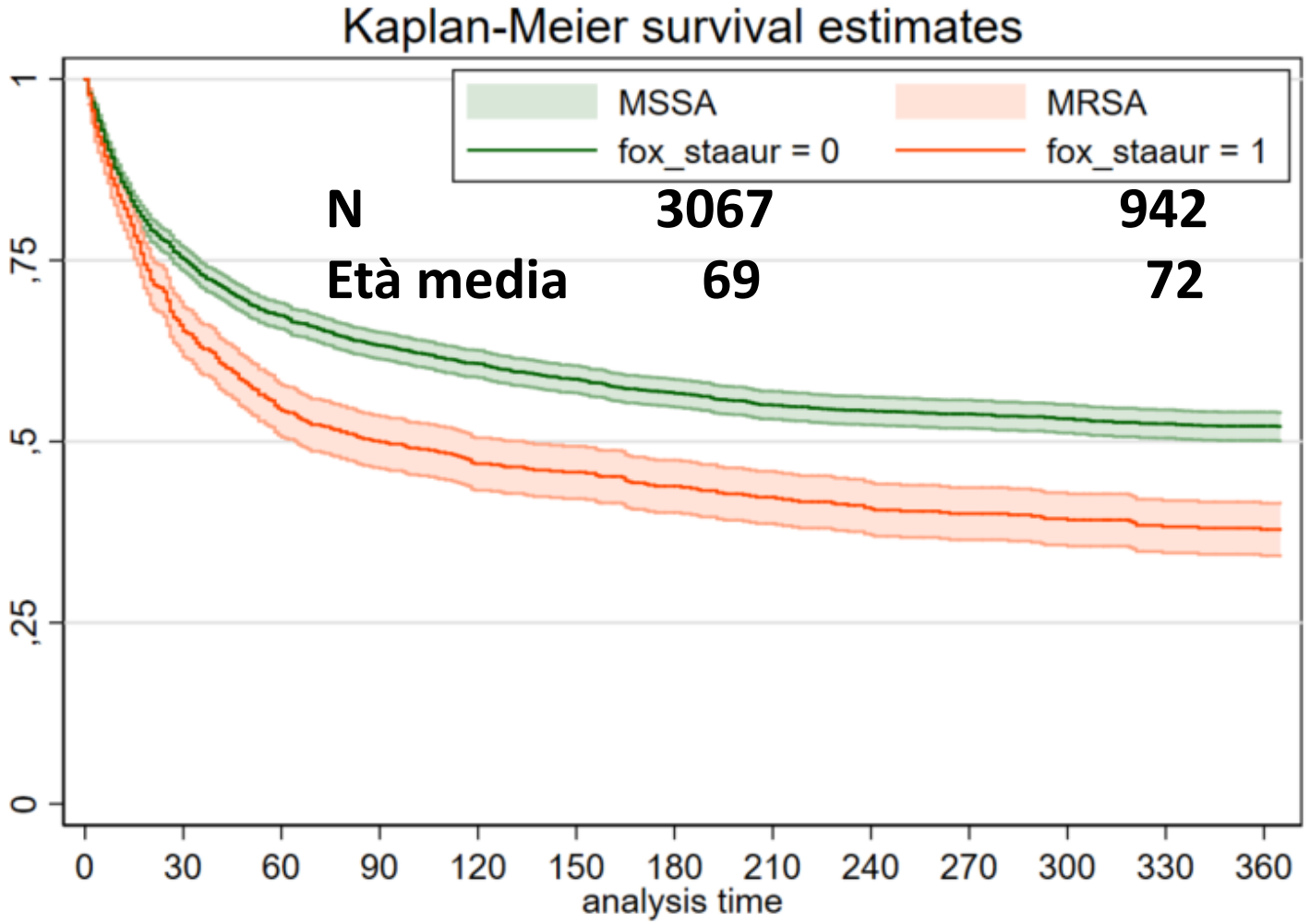



Median Odds Ratio (MOR) 1,18

Passando da un ospedale a minor prevalenza di MRSA ad uno a maggior prevalenza, il rischio di MRSA aumenta del 18%

antibiotico-resistenza: sconfiggiamola insieme!

# *Staphylococcus aureus,* meticillino-resistente (MRSA) – sopravvivenza a 1 anno Toscana 2020-2022




**MICROBE**
Measuring Infectious Causes and Resistance Outcomes for Burden Estimation

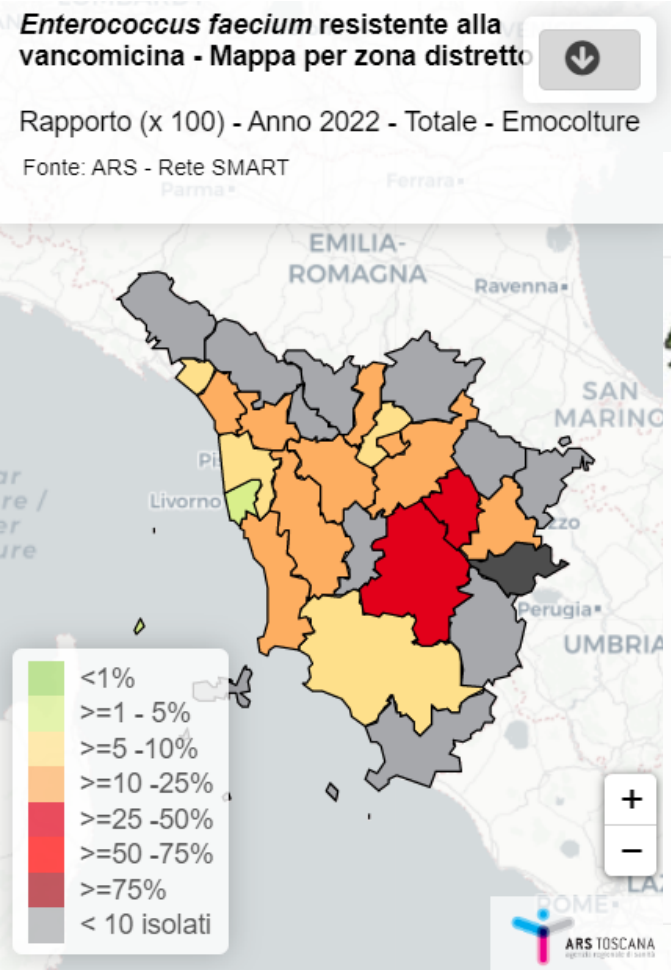
The drug-bug combination with the greatest **attributable** fatal burden was

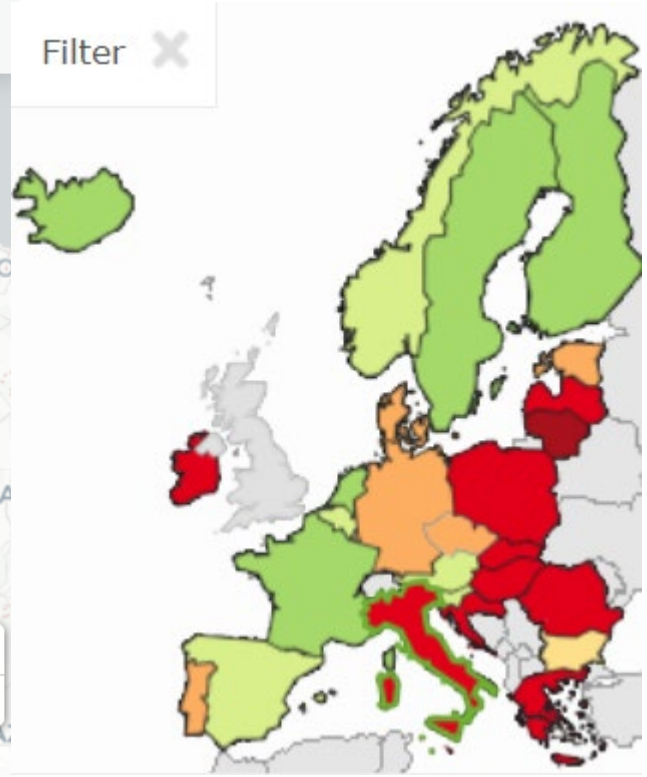
**Methicillin-resistant *S. aureus***

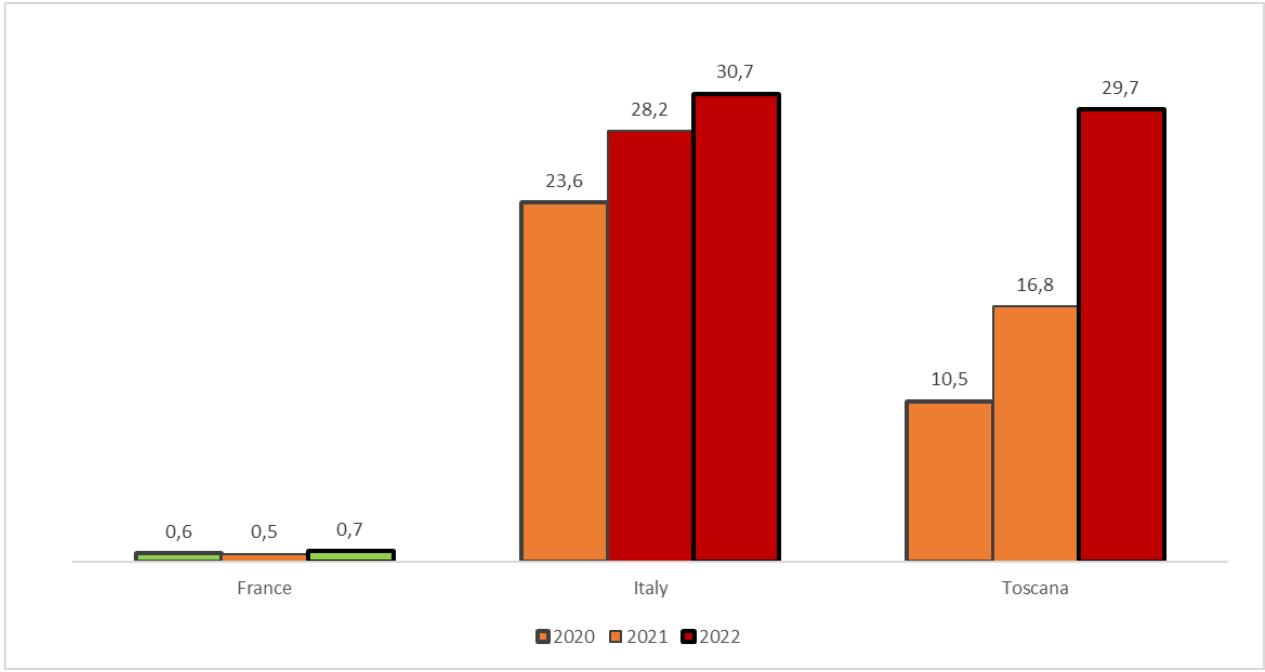
Explore more pathogen-drug combinations

# *Enterococcus faecium*, resistente alla vancomicina (VRE)

(623 isolati di *E.faecium* da sangue non ripetuti, 2022)



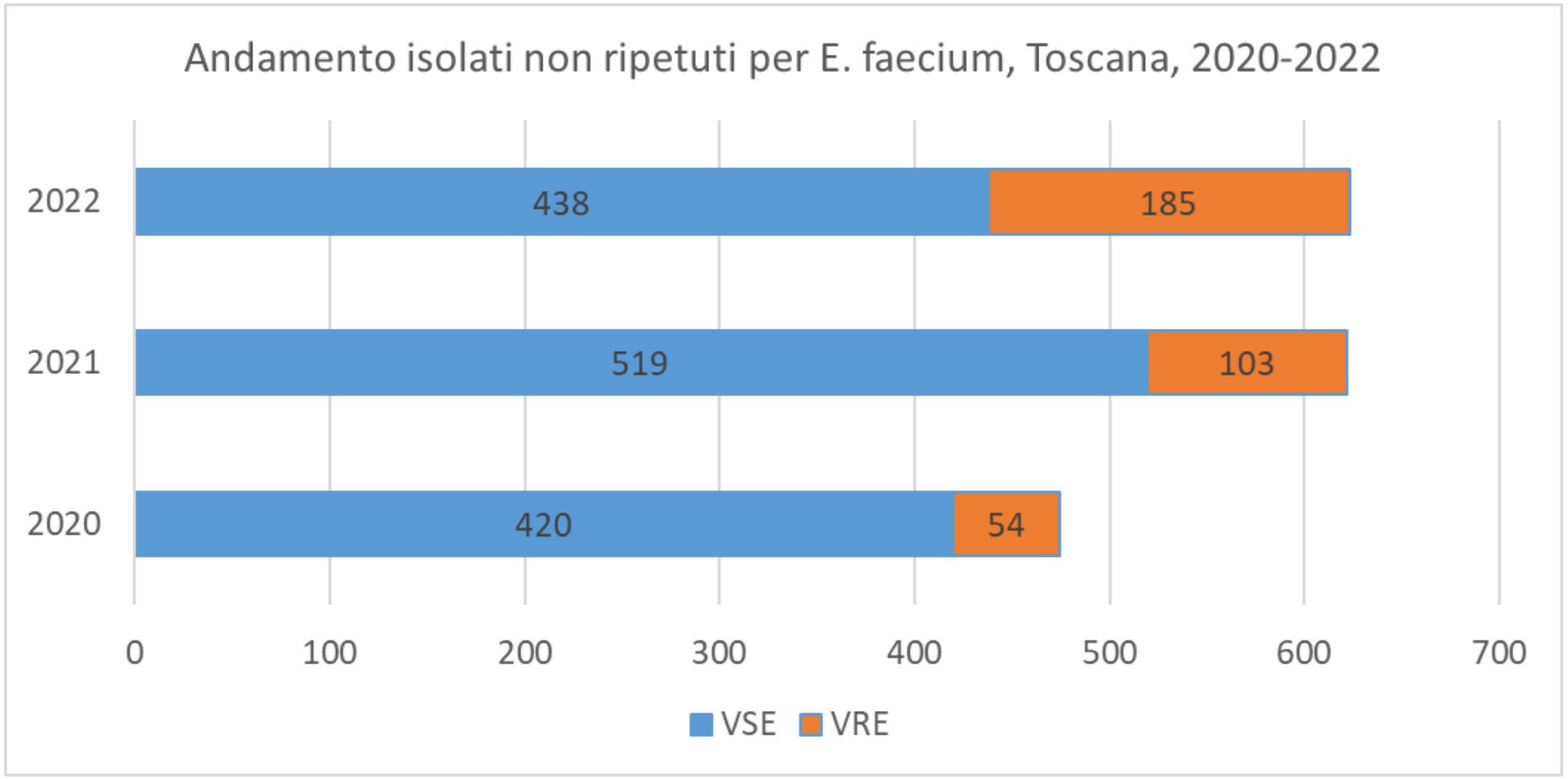



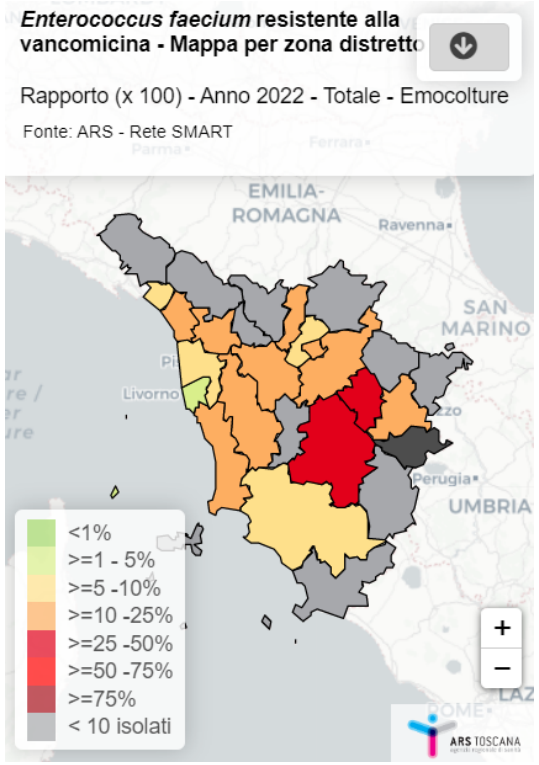

antibiotico-resistenza: sconfiggiamola insieme!

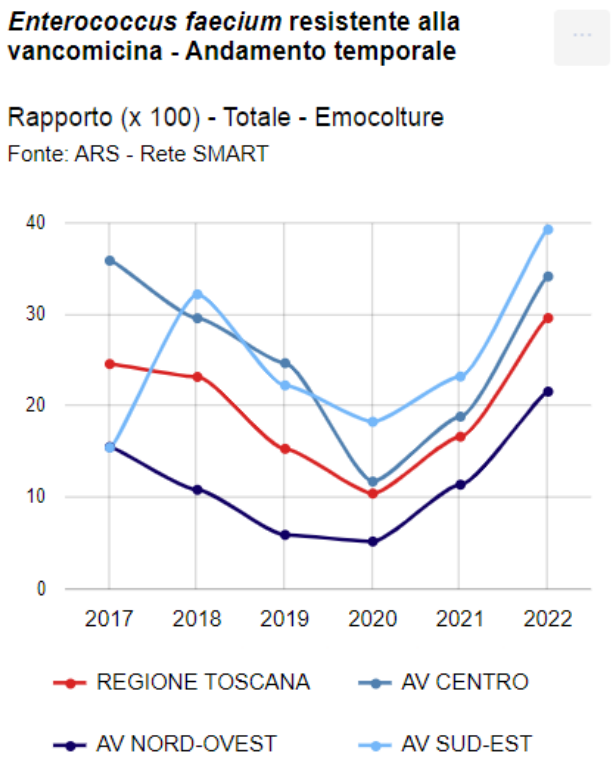
# *Enterococcus faecium*, resistente alla vancomicina (VRE)

Il numero di *E. faecium* isolati in Toscana nel 2022 non è aumentato, cresce il numero di VRE

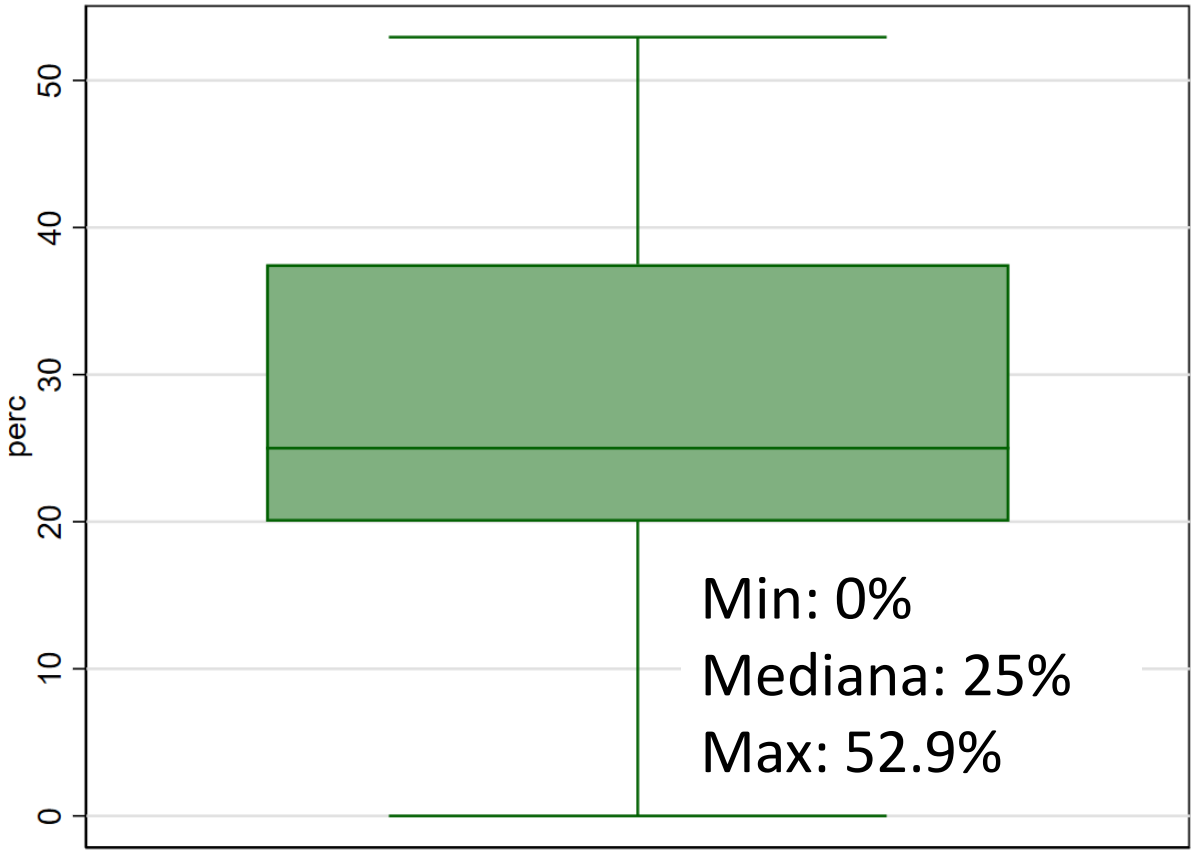


# *Enterococcus faecium*, resistente alla vancomicina (VRE)




Prevalenza VRE per ospedale,
Toscana, 2022 (15 H con 10 + isolati)

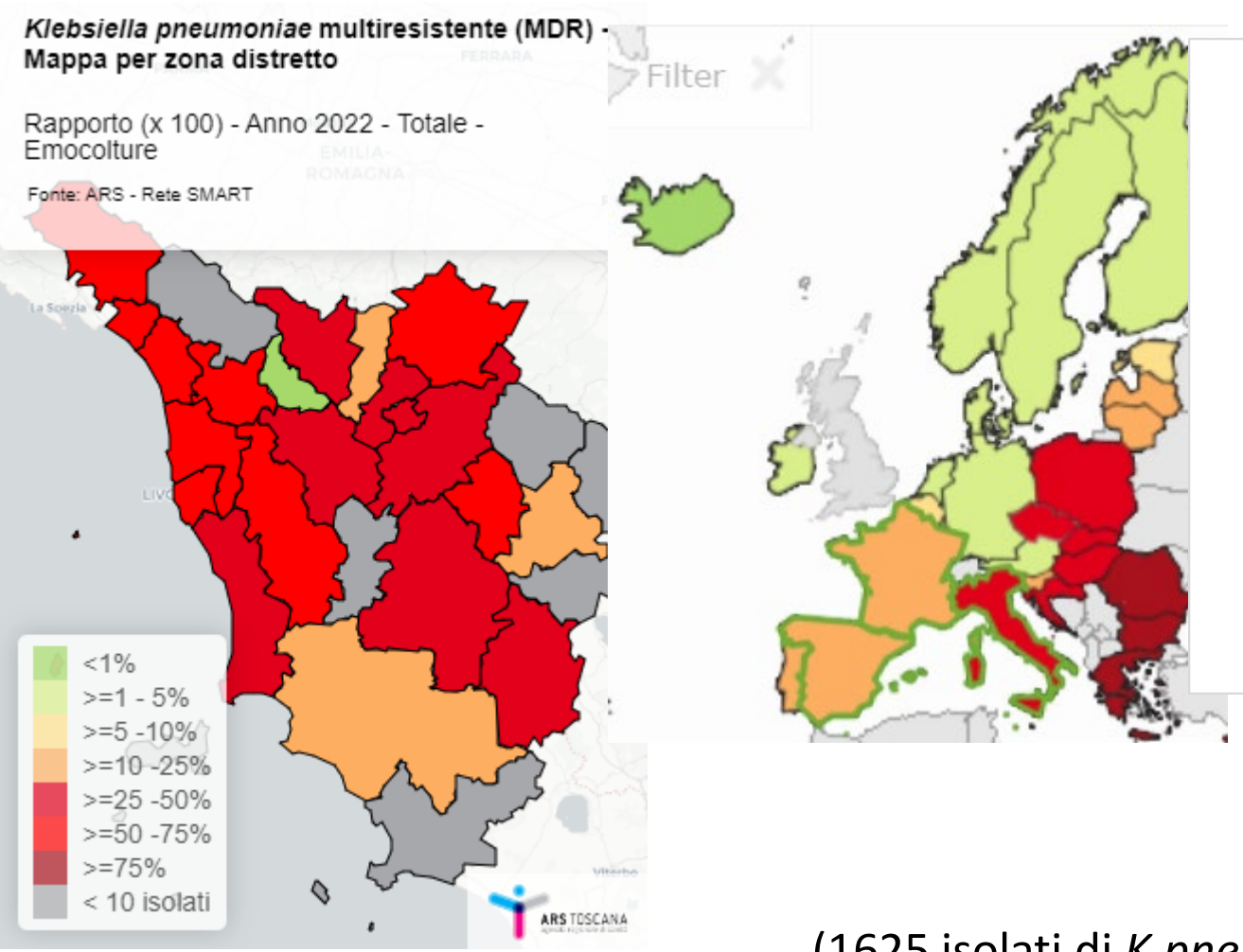



Median Odds Ratio (MOR) 1,31

Passando da un ospedale a minor prevalenza di VRE ad uno a maggior prevalenza, il rischio di VRE aumenta del 31%

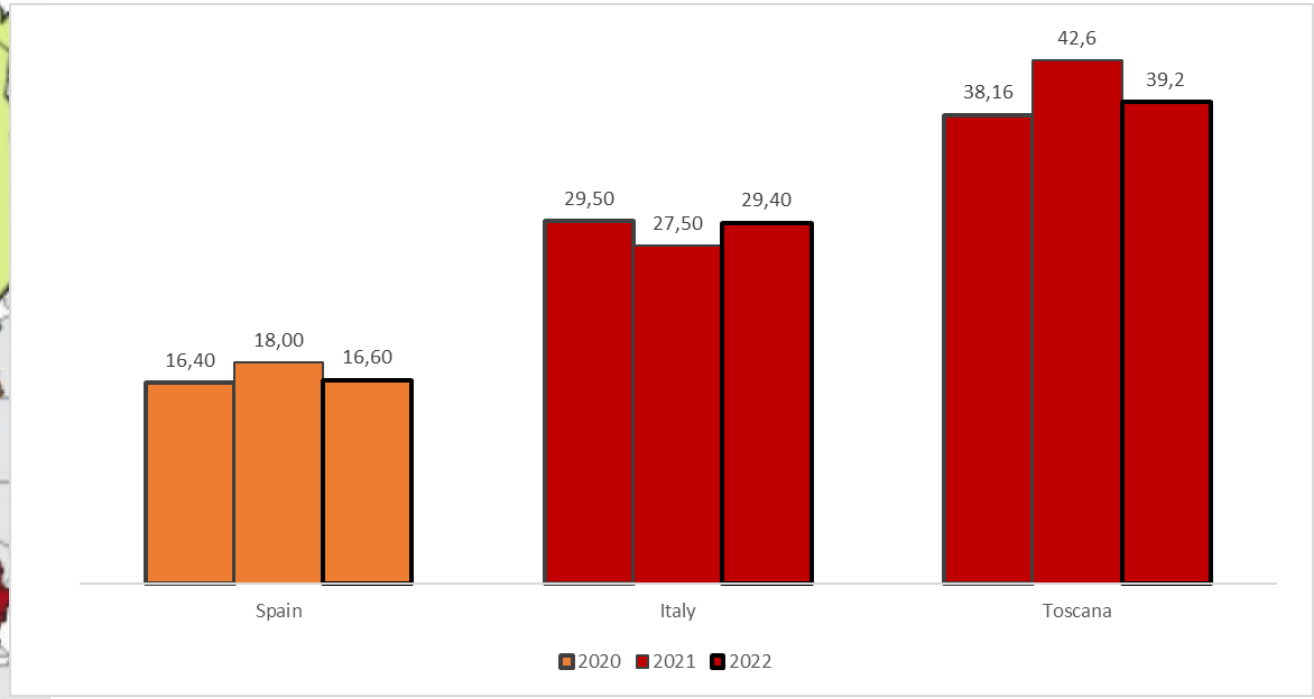
antibiotico-resistenza: sconfiggiamola insieme!

# *Klebsiella pneumoniae*, multiresistente (cefalosporina di III generazione, fluorochinoloni e aminoglicosidi)





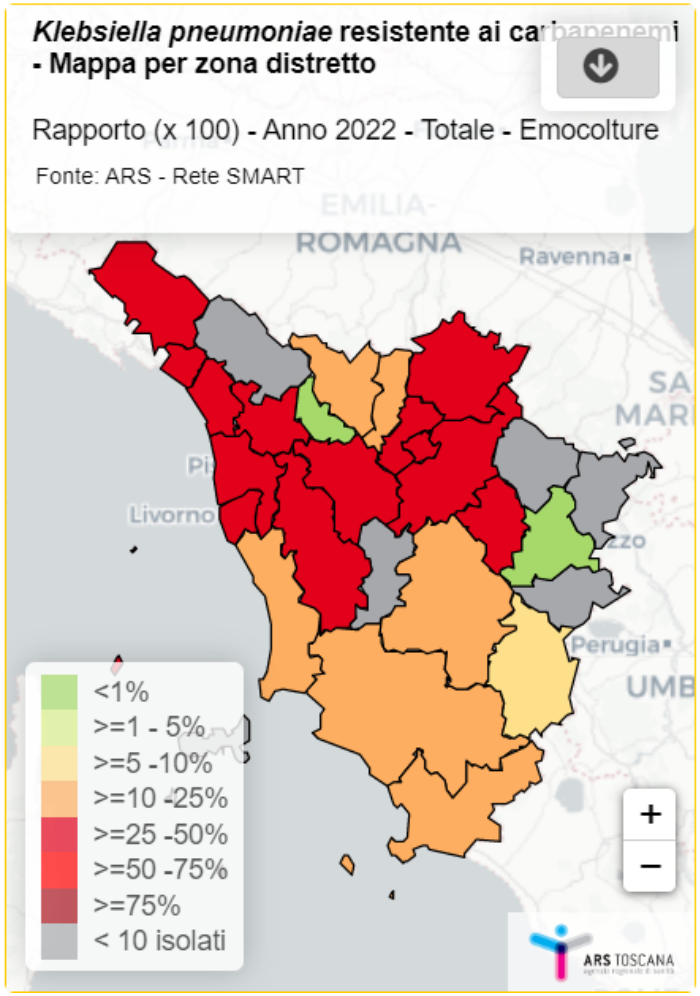


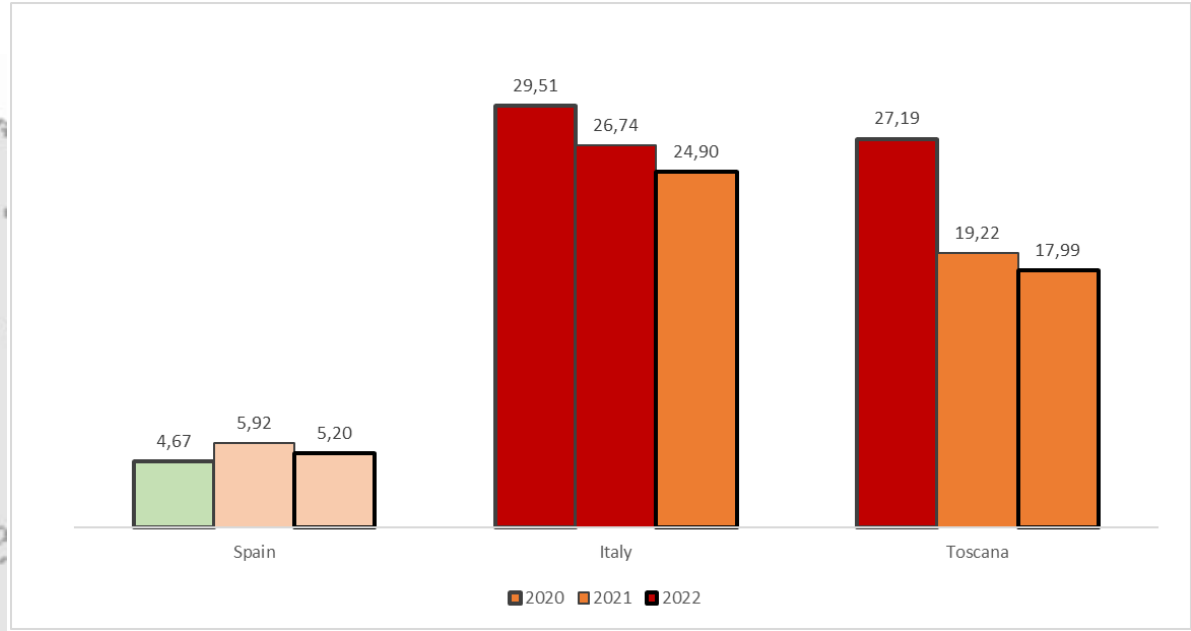



(1625 isolati di *K.pneumoniae* da sangue non ripetuti, 2022)

# *Klebsiella pneumoniae*, resistente ai carbapenemi

(1625 isolati di *K.pneumoniae* da sangue non ripetuti, 2022)

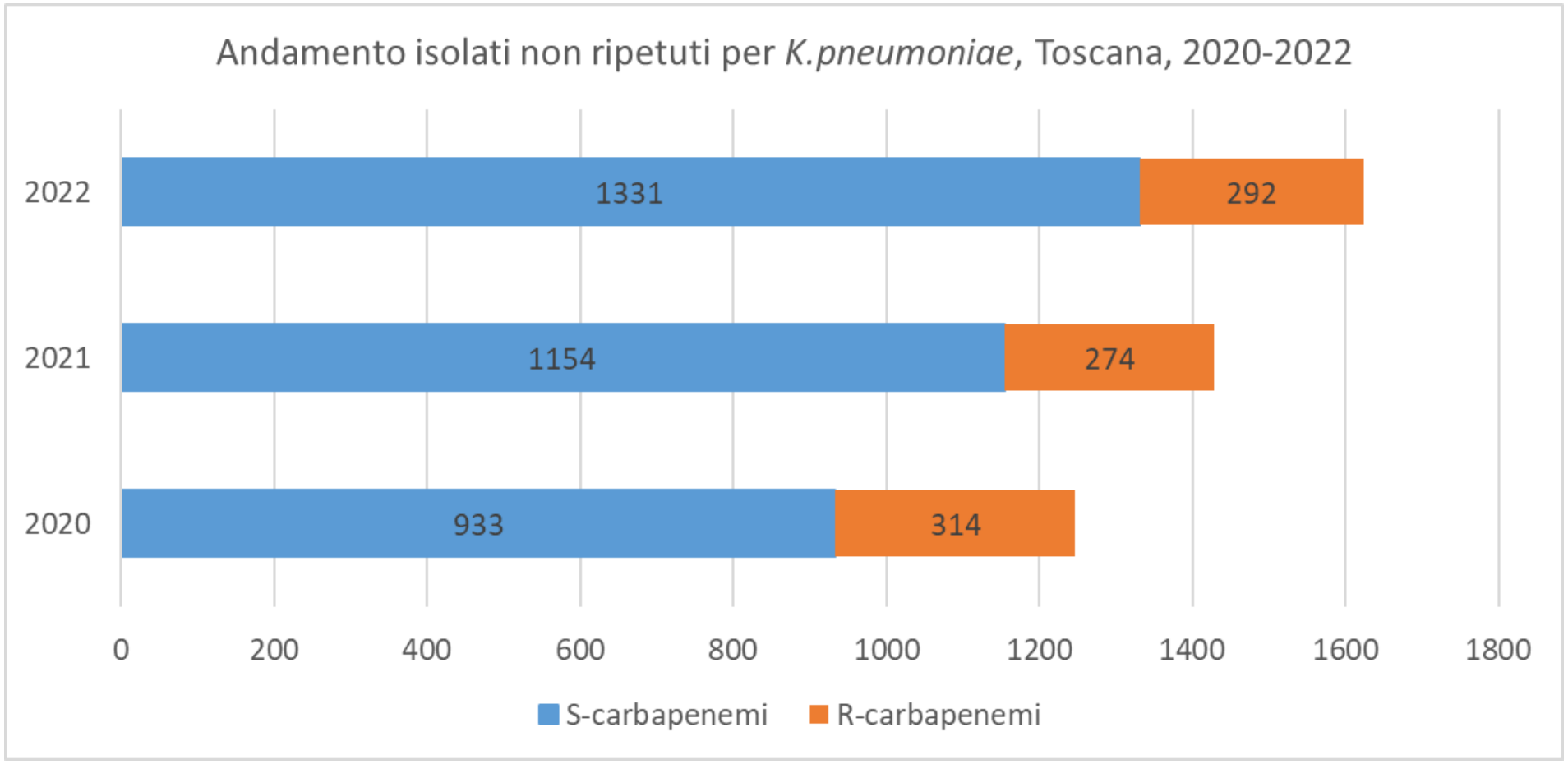



antibiotico-resistenza: sconfiggiamola insieme!

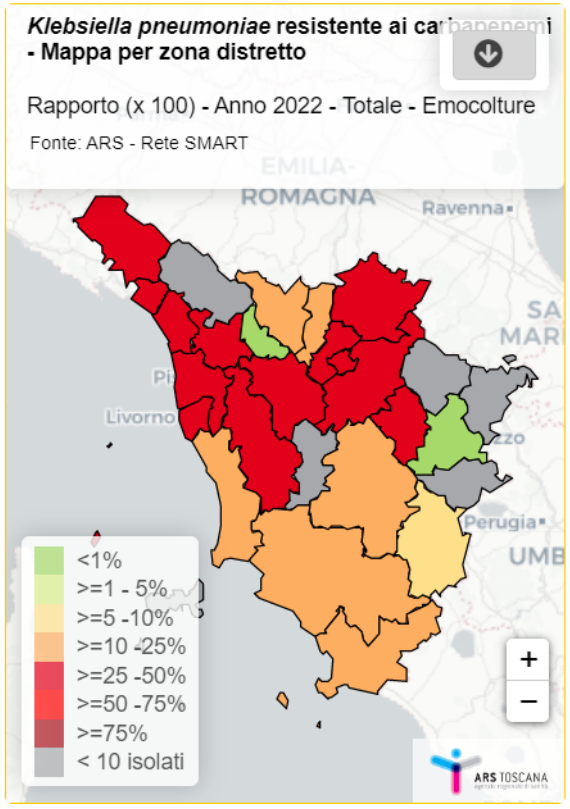
# *Klebsiella pneumoniae*, resistente ai carbapenemi

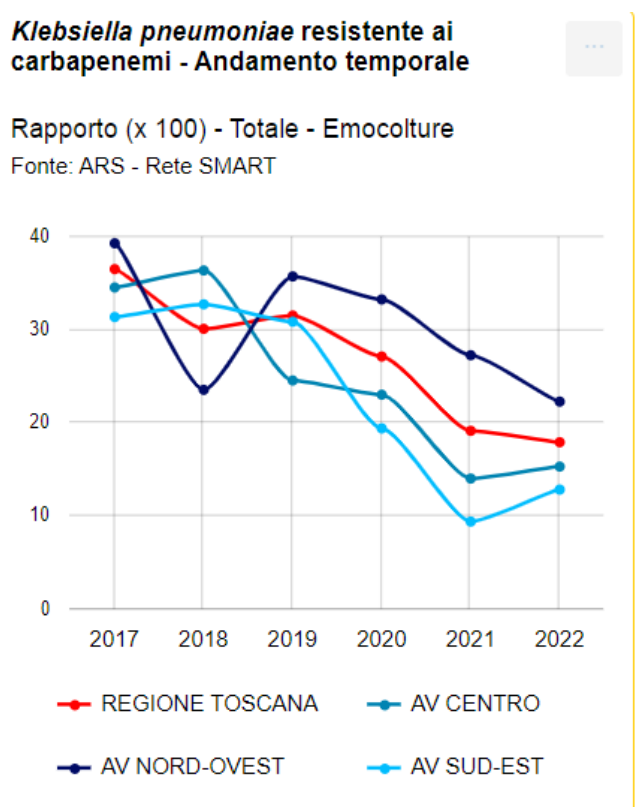
Il numero di *K. pneumoniae* isolate in Toscana nel 2022 è aumentato, in particolare i S-carbapenemi



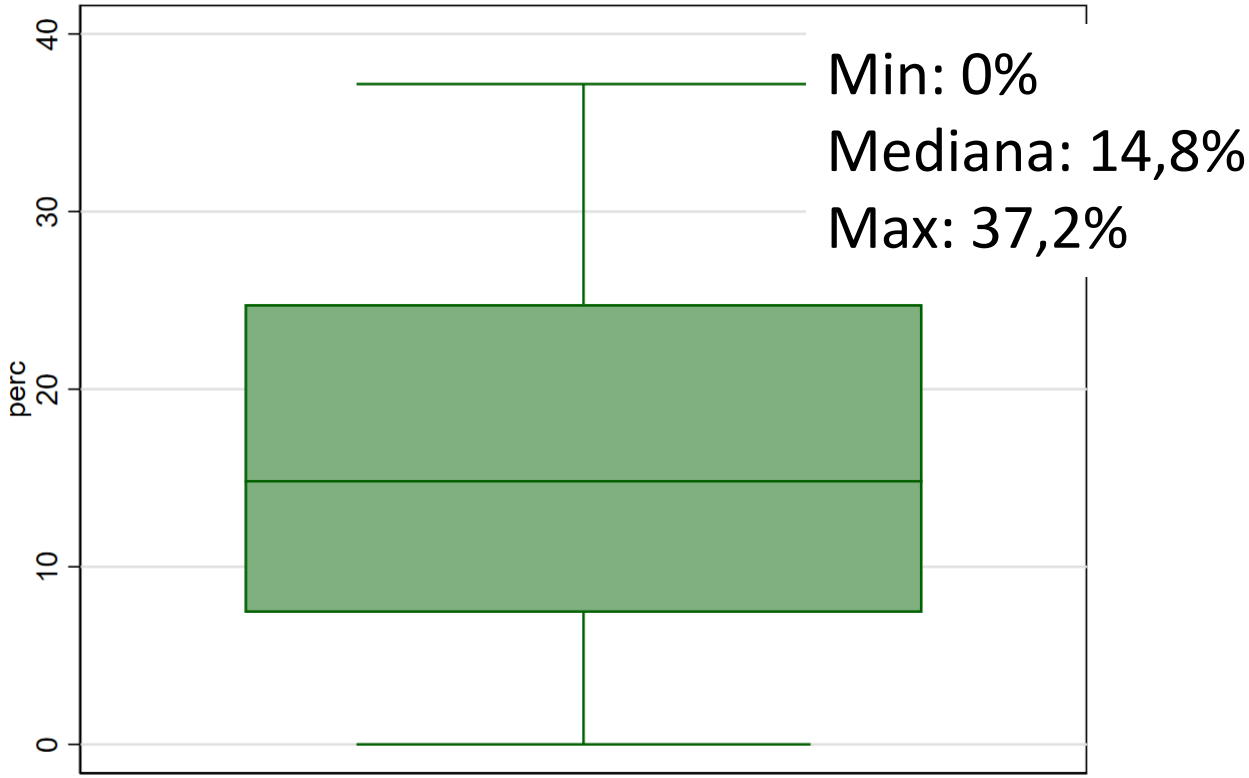

antibiotico-resistenza: sconfiggiamola insieme!

# *Klebsiella pneumoniae*, resistente ai carbapenemi




Prevalenza *K. pneumoniae* per ospedale, Toscana 2022 (25 H con 10 + isolati)



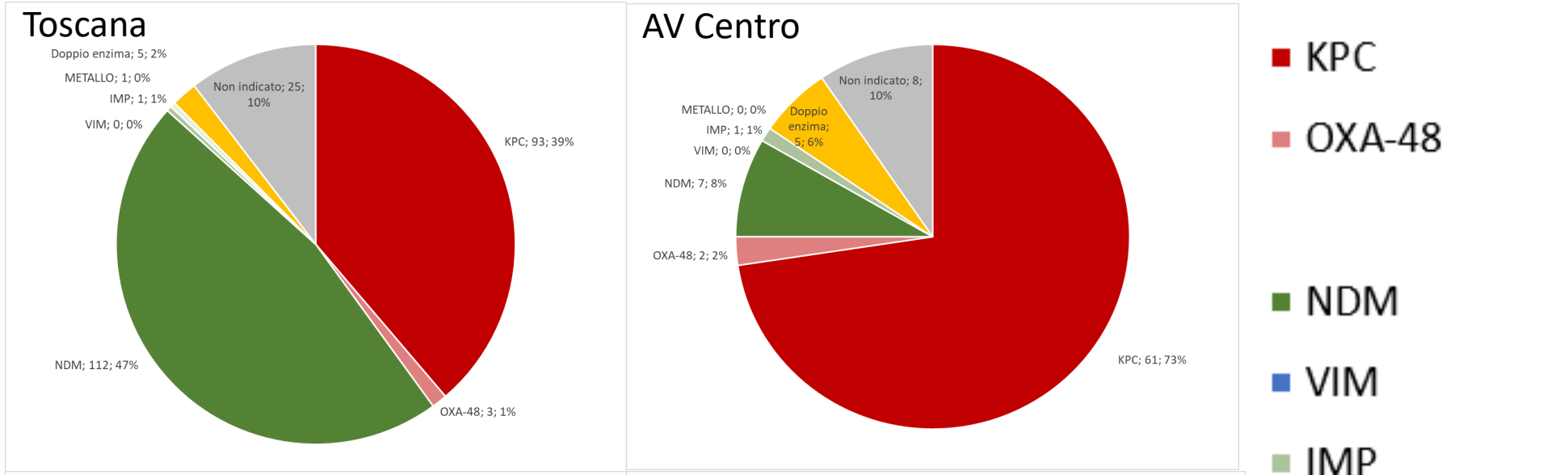

Median Odds Ratio (MOR) 2,59

Passando da un ospedale a minor prevalenza di K.pneumoniae resistenti a carbapenemi ad uno a maggior prevalenza, il rischio è più che doppio

antibiotico-resistenza: sconfiggiamola insieme!

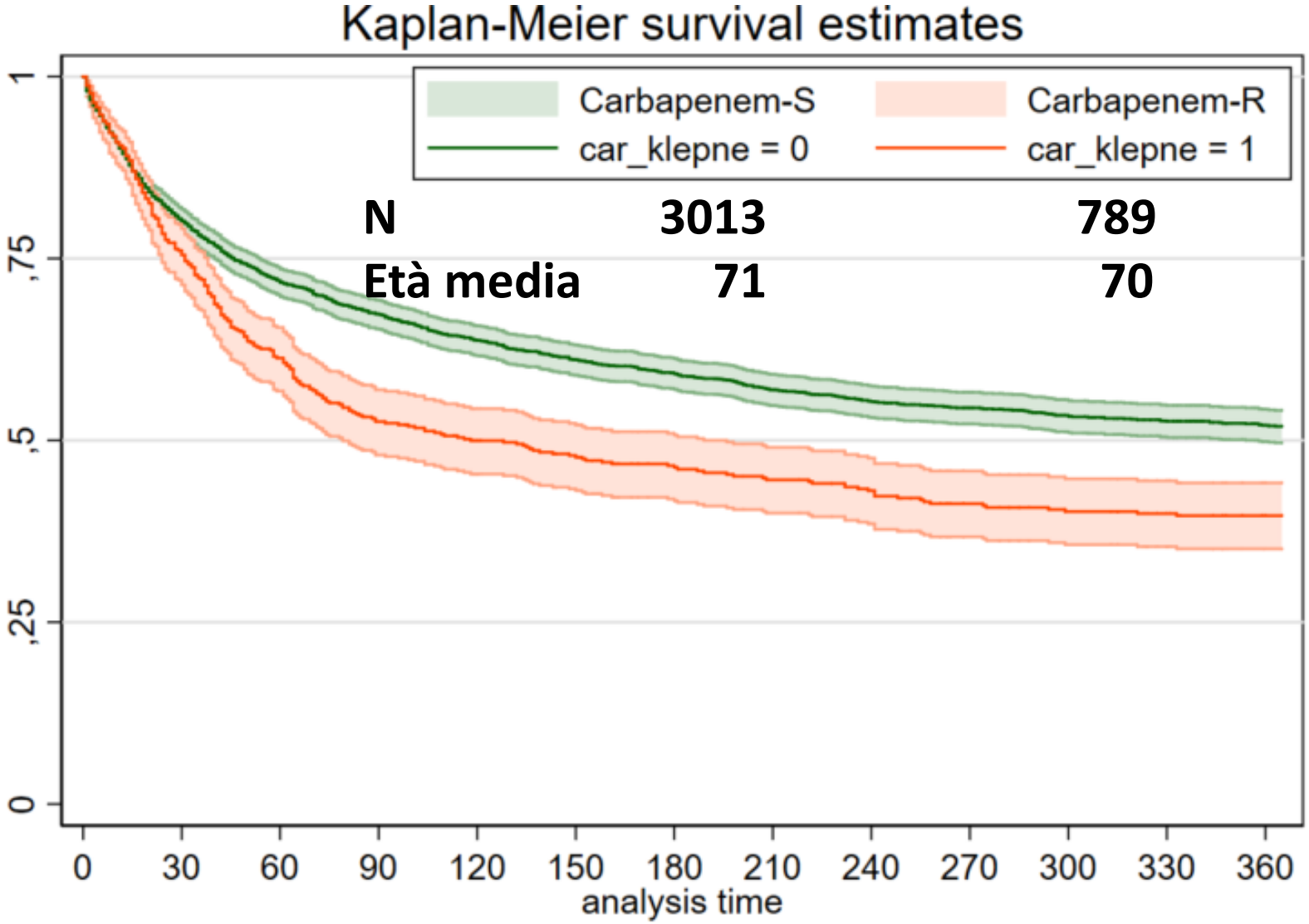
# *Klebsiella pneumoniae*, resistente ai carbapenemi

## Enzimi responsabili (fonte: Sorveglianza CRE)




antibiotico-resistenza: sconfiggiamola insieme!

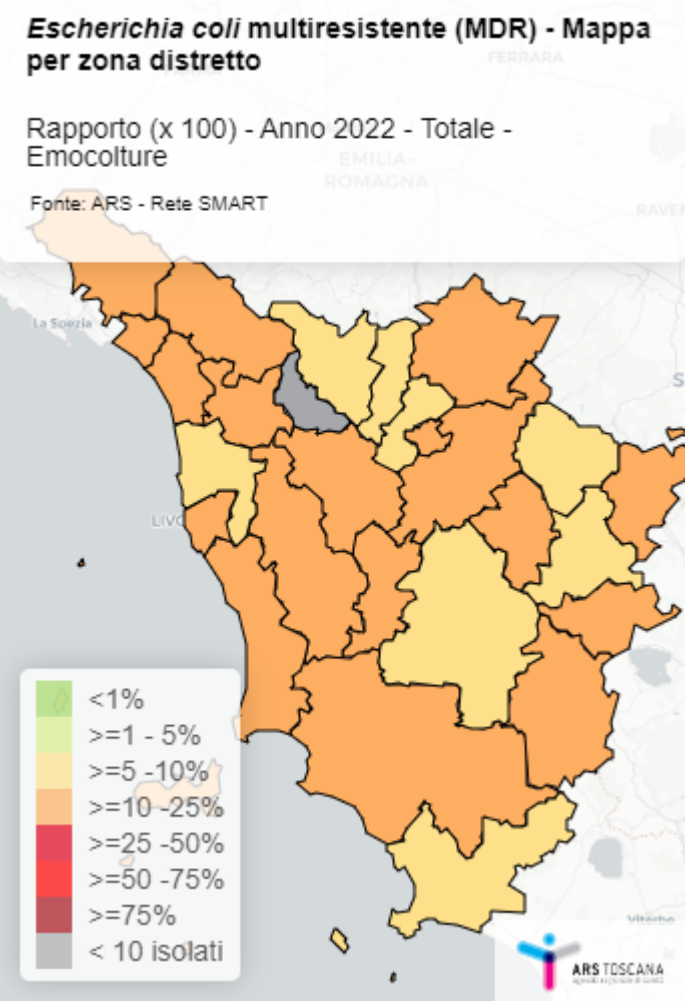
# *Klebsiella pneumoniae*, resistente ai carbapenemi – sopravvivenza a 1 anno Toscana 2020-2022

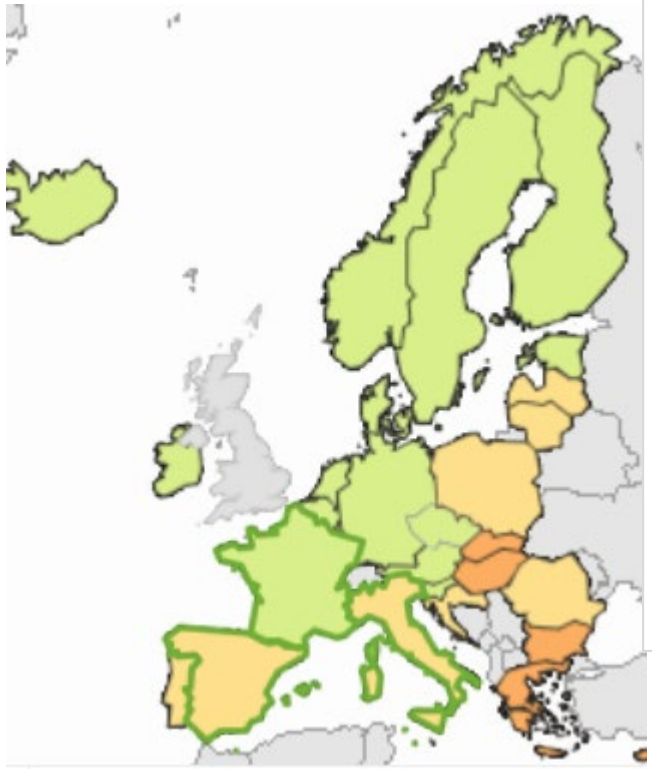


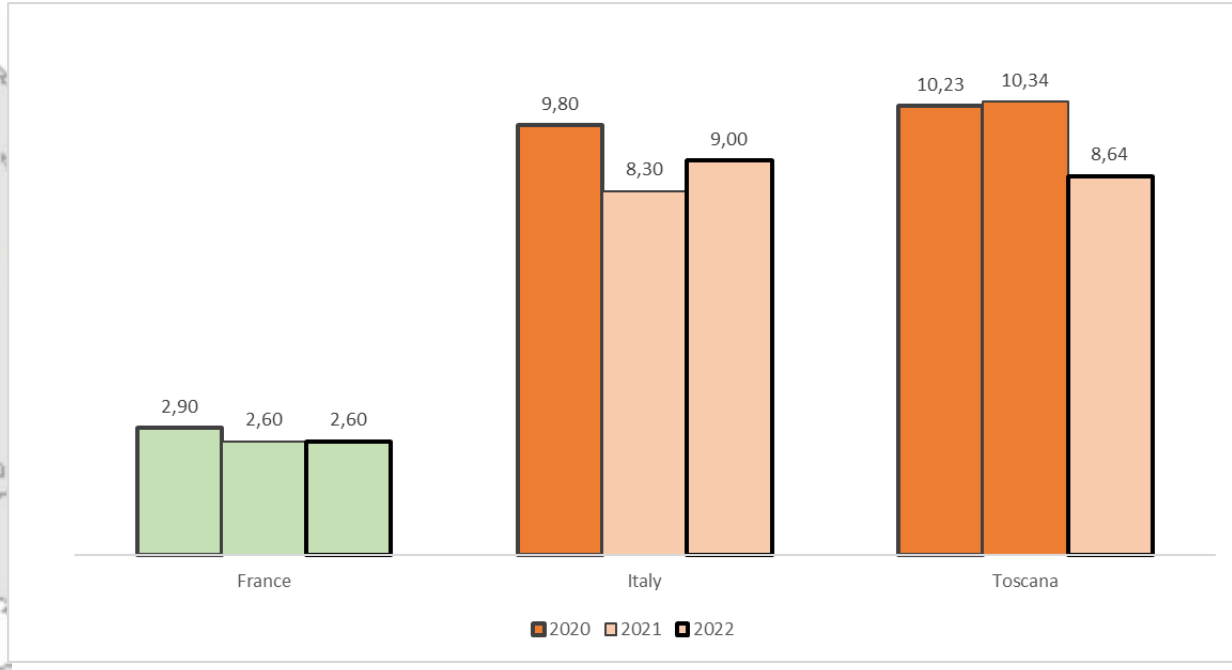
# Escherichia coli, resistente ai multiresistente

## (cefalosporina di III generazione, fluorochinoloni e aminoglicosidi)

(2575 isolati di *E.coli* da sangue non ripetuti, 2022)



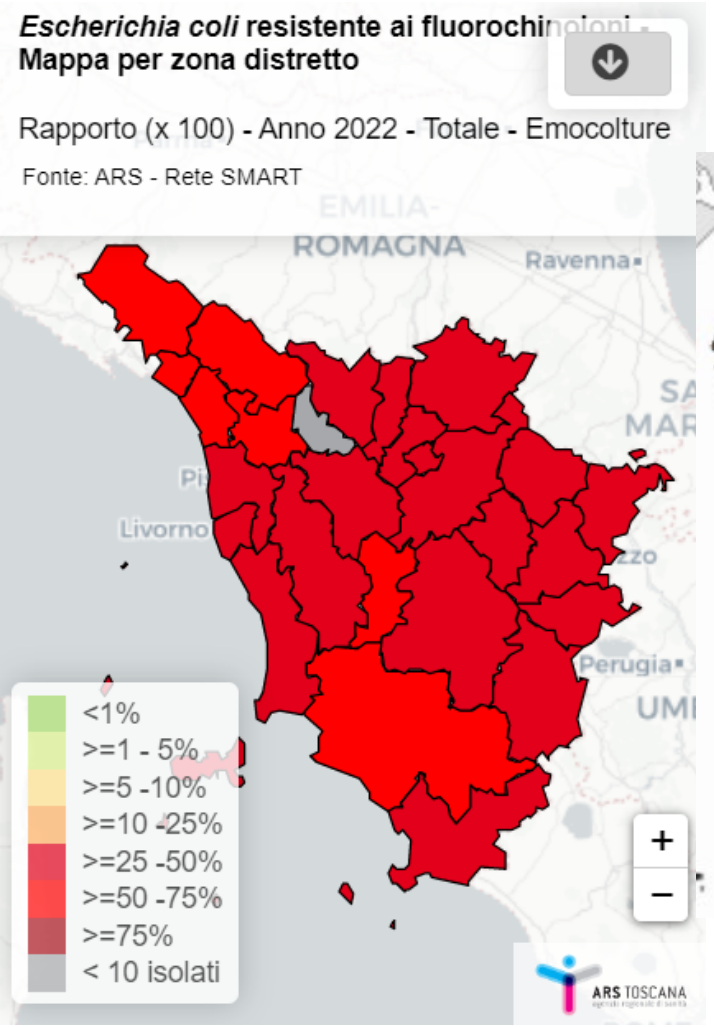



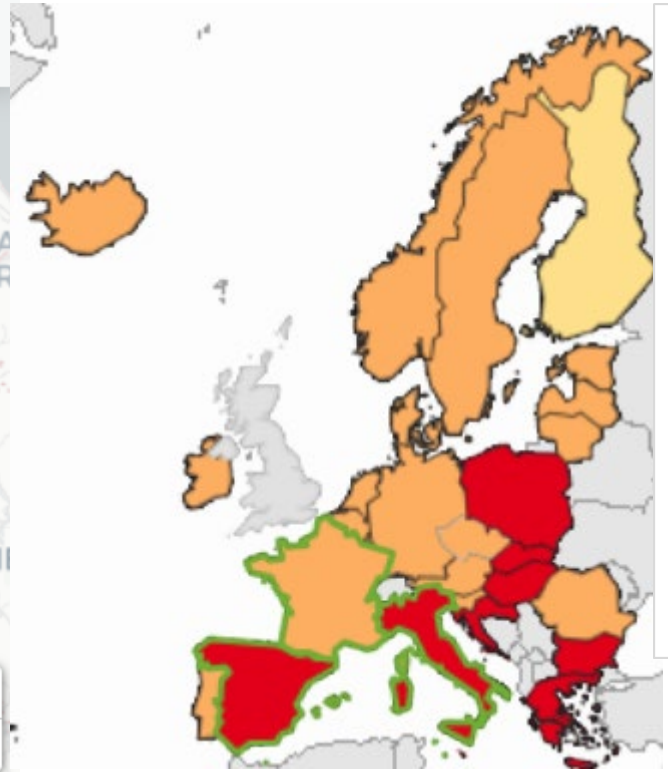


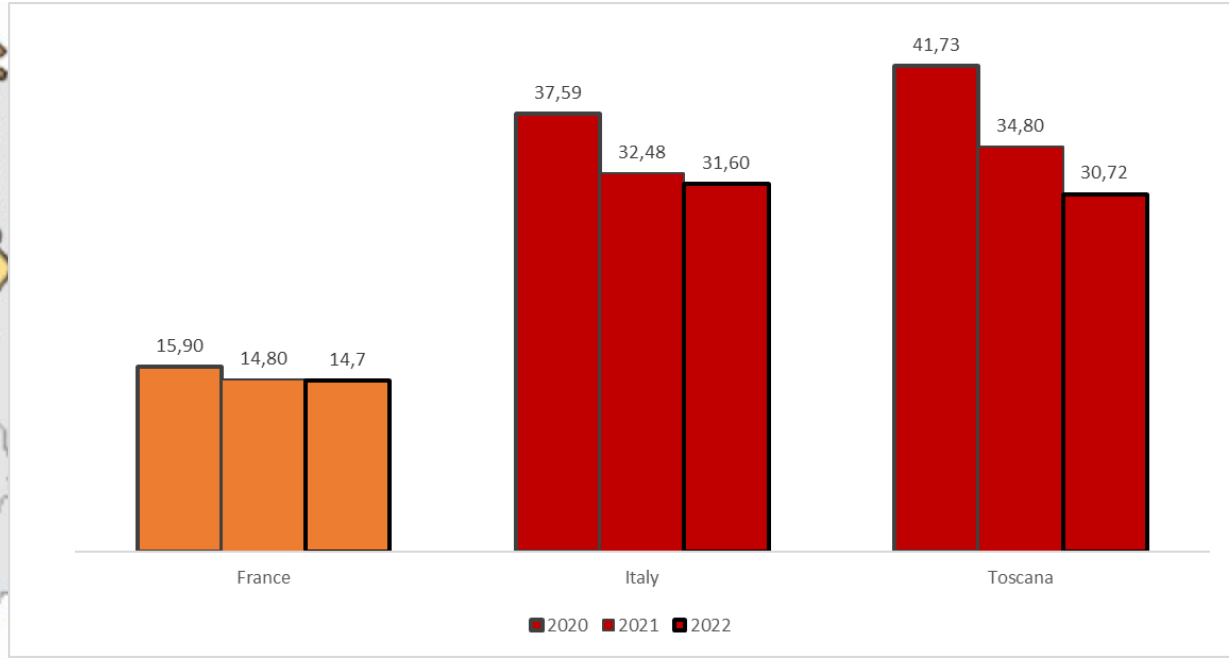

antibiotico-resistenza: sconfiggiamola insieme!

# *Escherichia coli,* resistente ai fluorichinoloni

(2575 isolati di *E.coli* da sangue non ripetuti, 2022)



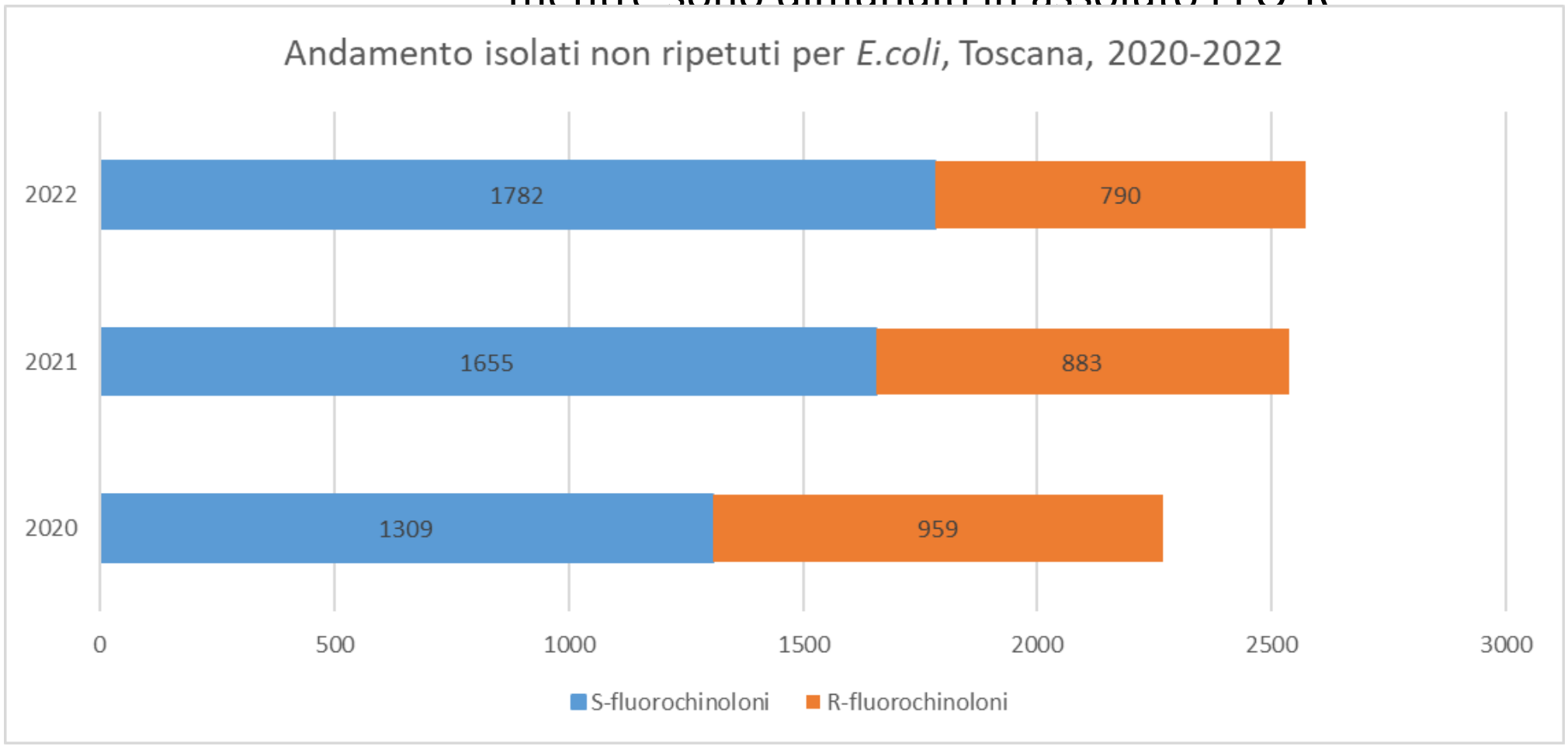





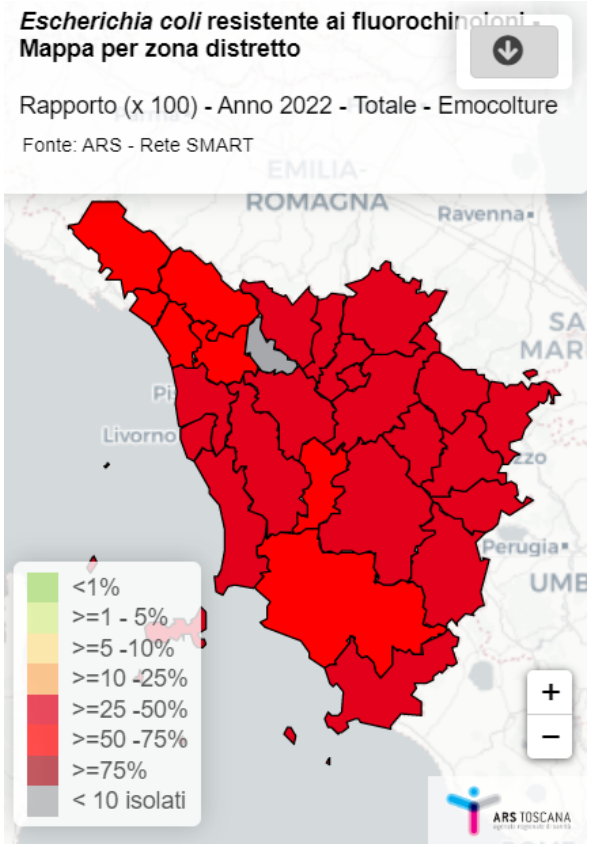

antibiotico-resistenza: sconfiggiamola insieme!

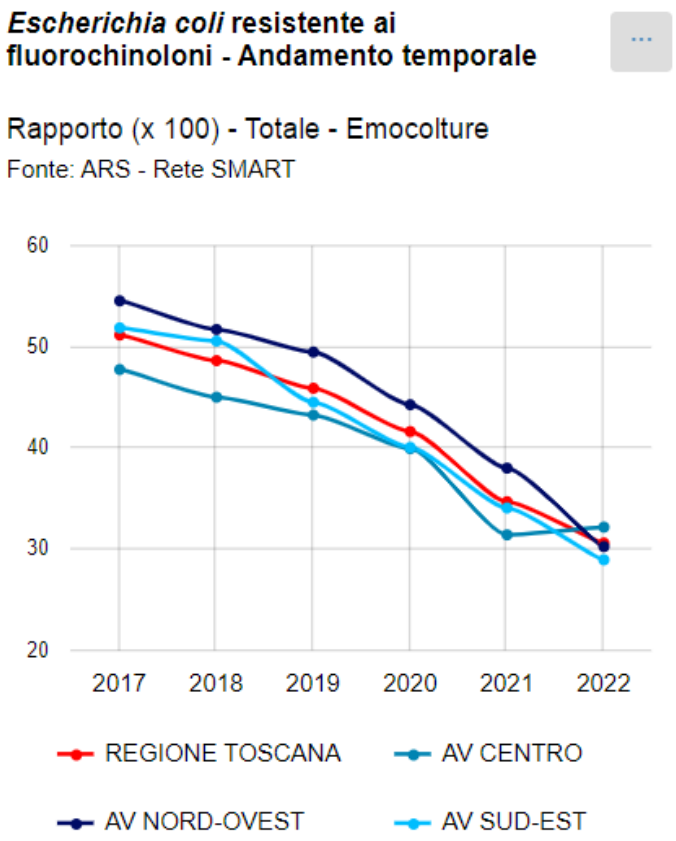
# *Escherichia coli,* resistente ai fluorichinoloni

Il numero di *E.coli* isolati in Toscana nel 2022 è aumentato, in particolare i S-fluorochinoloni, mentre sono dimunuiti in assoluto i FQ-R

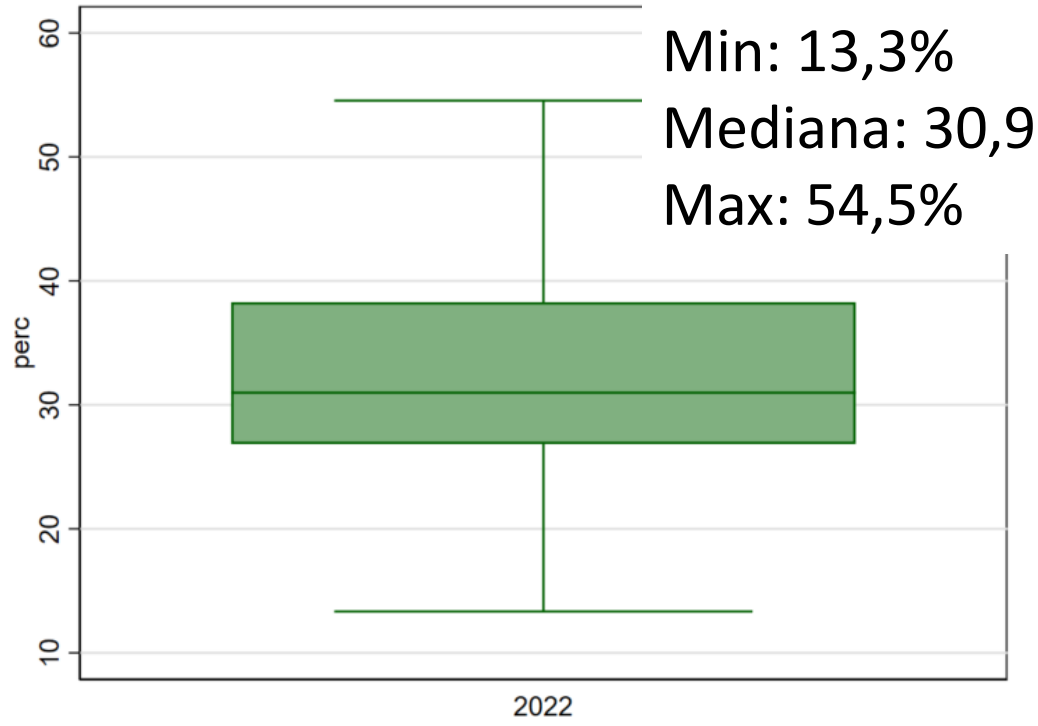


# *Escherichia coli*, resistente ai fluorichinoloni




Prevalenza *E.coli* fluorochinoloni R per ospedale, Toscana, 2020-2022 (32 H con 10 + isolati)



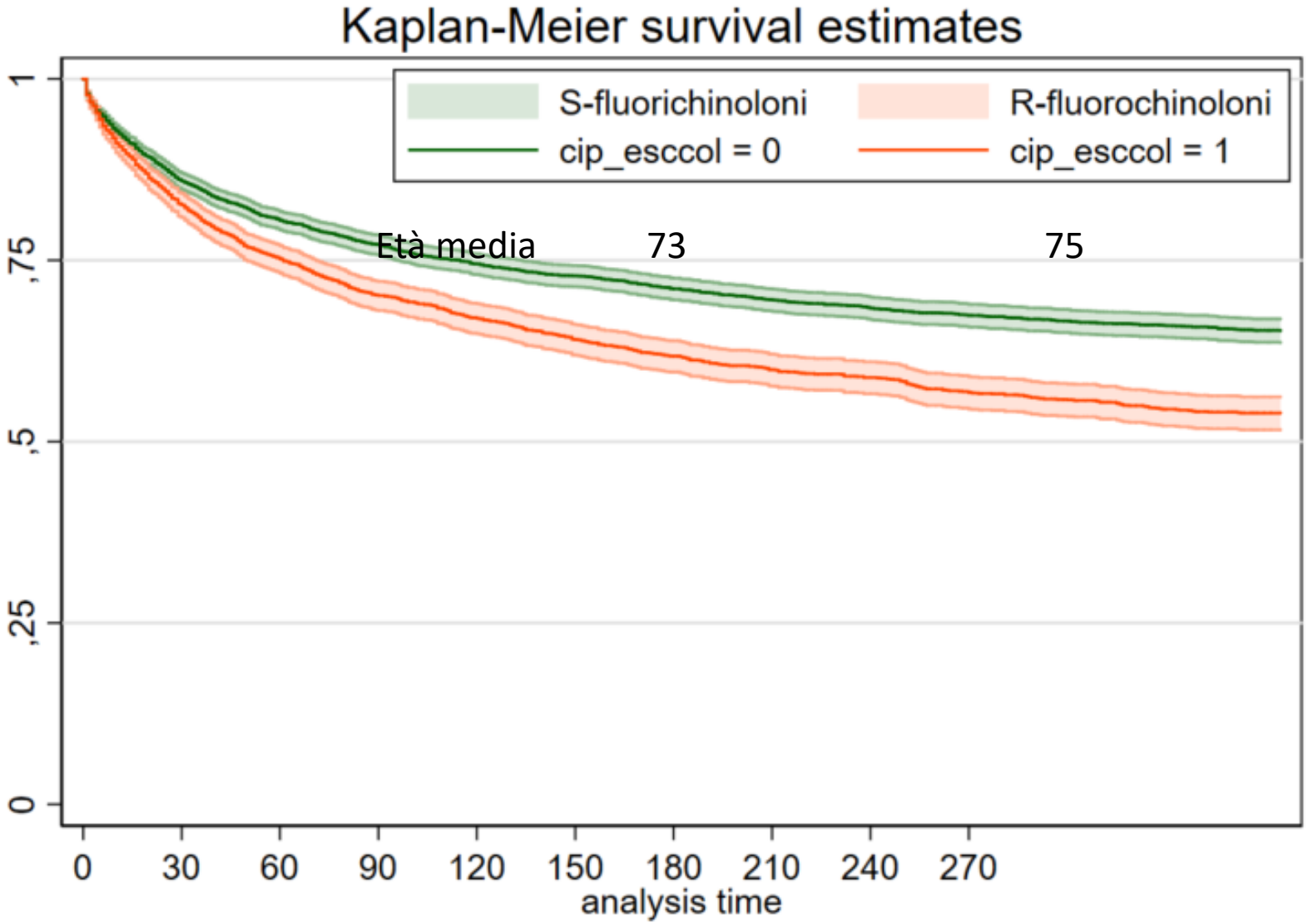

Min: 13,3%
Mediana: 30,9%
Max: 54,5%

Median Odds Ratio (MOR) 1,12 (non sign)

Passando da un ospedale a minor prevalenza di *E.coli* resistenti a fluorochinoloni ad uno a maggior prevalenza, il rischio cresce in modo non significativo

antibiotico-resistenza: sconfiggiamola insieme!

# *Escherichia coli,* resistente ai fluorichinoloni – sopravvivenza a 1 anno Toscana 2020-2022



ARS TOSCANA
agenzia regionale di sanità

# grazie per l'attenzione

antibiotico-resistenza:
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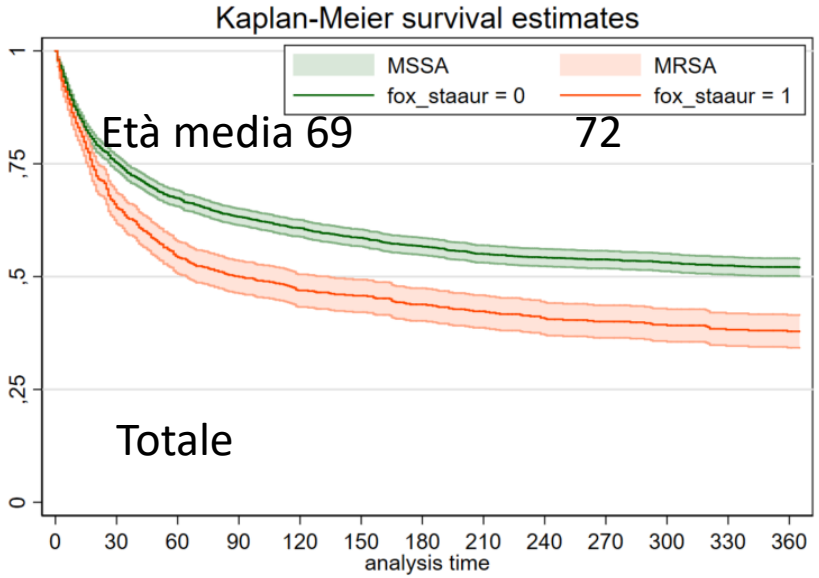
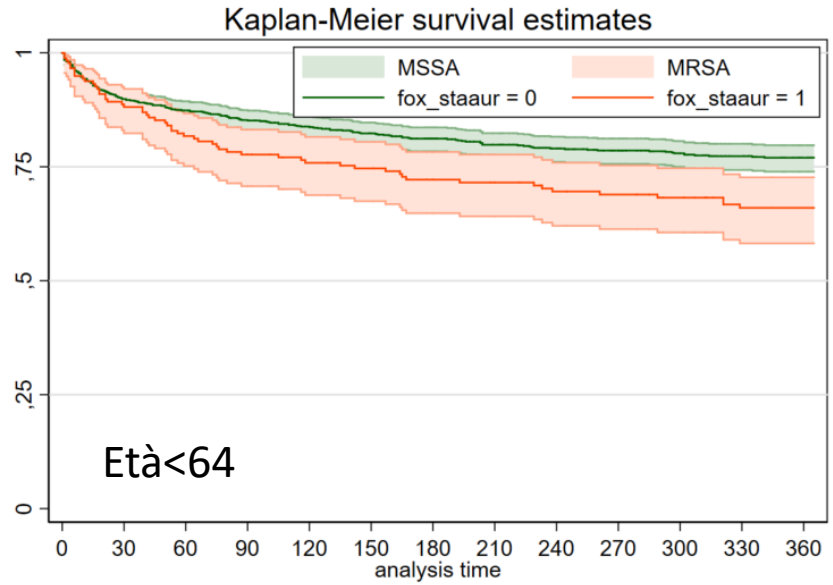
# Profili di resistenza, Toscana, 2017-2022

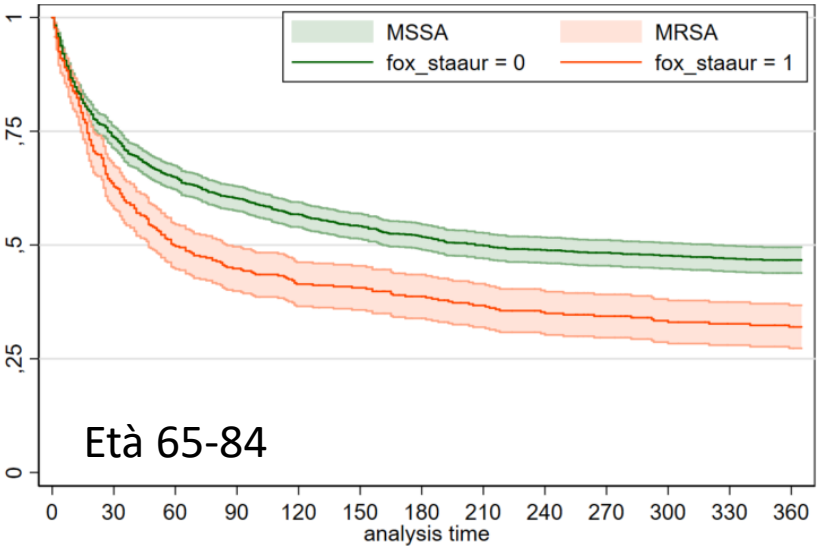
| Profili di Resistenza | 2022 | 2021 | 2020 | 2019 | 2018 | 2017 | Andamento 17-22 |
|---|---|---|---|---|---|---|---|
| | Toscana | | | | | | |
| Acinetobacter spp. - carbapenemi | 65.7% | 72.0% | 65.8% | 63.9% | 76.9% | 78.0% | ↓ |
| E. coli - multiresistente | 8.6% | 10,3% | 10.2% | 13.2% | 15.6% | 17.2% | ↓ |
| E. coli - fluorchinoloni | 30.7% | 34,8% | 41.7% | 45.8% | 48.0% | 51.0% | ↓ |
| E. coli – cefalosporine III gen. | 21.0% | 21.5% | 28.3% | 32.8% | 37.0% | 39.0% | ↓ |
| K. pneumoniae - multiresistente | 39.4% | 42.7% | 38.2% | 40.1% | 33.0% | 38.9% | ↓ |
| K. pneumoniae - fluorochinoloni | 57.0% | 57.1% | 58.1% | 63.1% | 61.9% | 65.4% | ↓ |
| K. pneumoniae – cefalosporine III gen. | 61.4% | 58.9% | 58.7% | 64.2% | 61.5% | 63.9% | ↓ |
| K. pneumoniae - carbapenemi | 18.0% | 19.2% | 27.2% | 33.0% | 29.1% | 35.5% | ↓ |
| P. aeruginosa - multiresistente | 9.4% | 10.0% | 7.3% | 8.6% | 12.5% | 17.5% | ↓ |
| P. aeruginosa - carbapenemi | 14.0% | 13.1% | 6.0% | 5.7% | 8.7% | 14.7% | – |
| S. aureus - MRSA | 22.5% | 21.6% | 27.5% | 26.0% | 30.8% | 30.8% | ↓ |
| E. faecium - Vancomicina | 29.7% | 16.7% | 10.5% | 15.7% | 23.1% | 24.5% | ↑ |

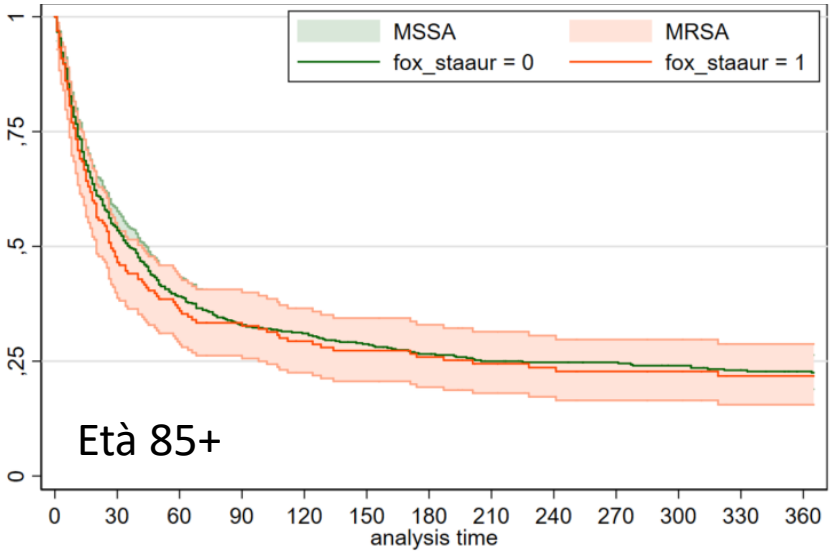
antibiotico-resistenza: sconfiggiamola insieme!

# *Staphylococcus aureus* meticillino-resistente (MRSA), 2020-2022




| Classe di età | MSSA | MRSA |
|---|---|---|
| | | |
| <64 | 36% | 27% |
| 65-84 | 46% | 52% |
| 85+ | 18% | 21% |

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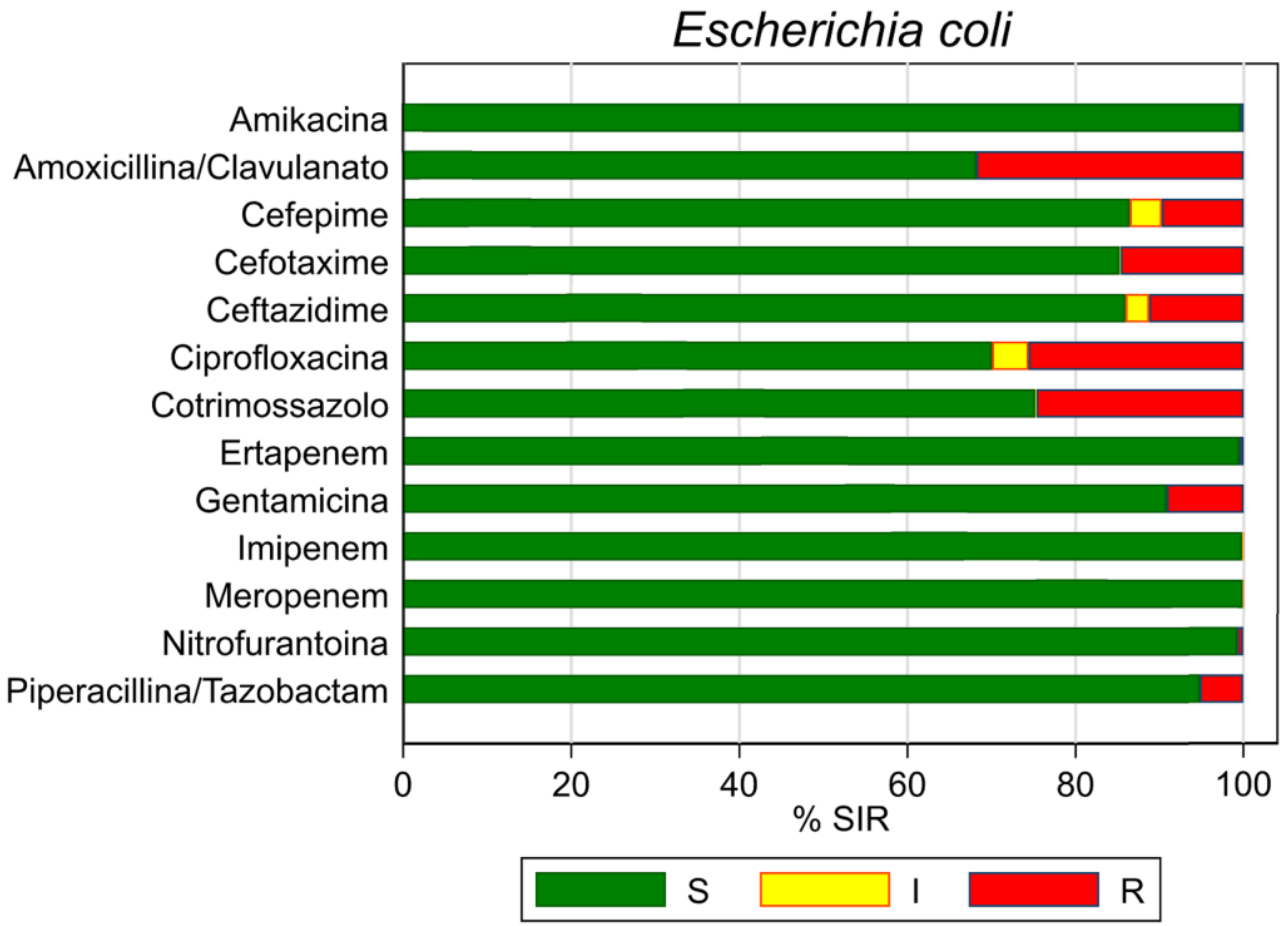
## Urinocolture




R-ciprofloxacina:

2021: 29,4% (44.840)
2022: 25,6% (44.913)