SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERO-UNIVERSITARIA
POLICLINICO UMBERTO I

SAPIENZA
UNIVERSITÀ DI ROMA

Le infezioni correlate all'assitenza sanitaria

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AOU Policlinico Umberto I

Evoluzione del concetto di infezione ospedaliera

- Pazienti
- Operatori
- Visitatori
- Ospiti

- Degenza ordinaria
- Ricovero diurno
- Assistenza ambulatoriale
- Assistenza domiciliare
- Degenze protette (RSA, lungodegenti, hospice, ecc.)

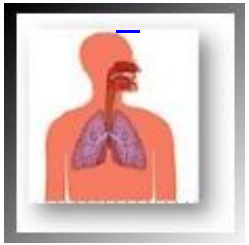
Infezioni correlate all'assistenza sanitaria (HAI)

Jarvis WR

SITO DI INFEZIONE

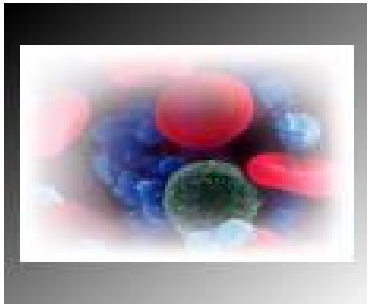
INFEZIONI DELLE VIE URINARIE

INFEZIONI DELLE FERITE CHIRURGICHE



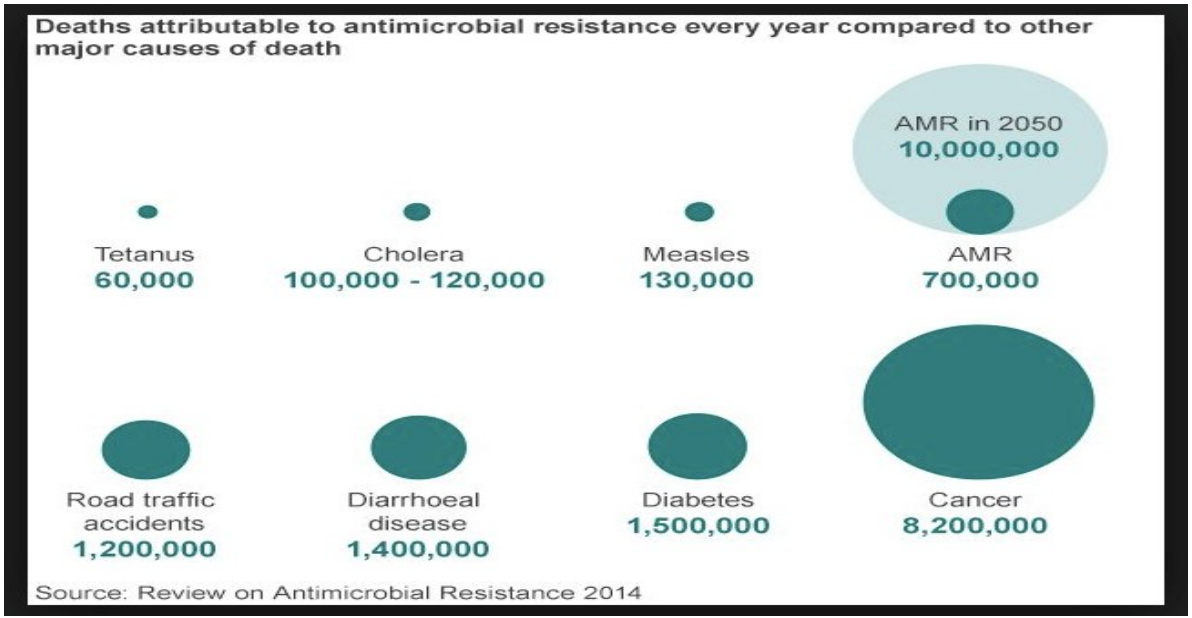
INFEZIONI DELL'APPARATO RESPIRATORIO

INFEZIONI SISTEMICHE (BATTERIEMIE)



Antimicrobial resistance (AMR) «The hidden pandemic»

Superbugs to kill 'more than cancer' by 2050



Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis

*Alessandro Cassini, Liselotte Diaz Högberg, Diamantis Plachouras, Annalisa Quattrocchi, Ana Hoxha, Gunnar Skov Simonsen, Mélanie Colomb-Cotinat, Mirjam E Kretzschmar, Brecht Devleesschauwer, Michele Cecchini, Driss Ait Ouakrim, Tiago Cravo Oliveira, Marc J Struelens, Carl Suetens, Dominique L Monnet, and the Burden of AMR Collaborative Group**

Summary

Background Infections due to antibiotic-resistant bacteria are threatening modern health care. However, estimating their incidence, complications, and attributable mortality is challenging. We aimed to estimate the burden of infections caused by antibiotic-resistant bacteria of public health concern in countries of the EU and European Economic Area (EEA) in 2015, measured in number of cases, attributable deaths, and disability-adjusted life-years (DALYs).

Lancet Infect Dis 2018

Published Online
November 5, 2018
http://dx.doi.org/10.1016/S1473-3099(18)30605-4

671.000 casi di infezioni da germi resistenti
il peso di queste infezioni sia paragonabile a quello di influenza, tubercolosi e HIV / AIDS messi insieme

33.000 decessi

874.000 condizioni di disabilità

.

il 75% del carico di malattia è dovuto a infezioni associate all'assistenza sanitaria (HAI)

In Italia un terzo di tutti i decessi (10.000 casi)

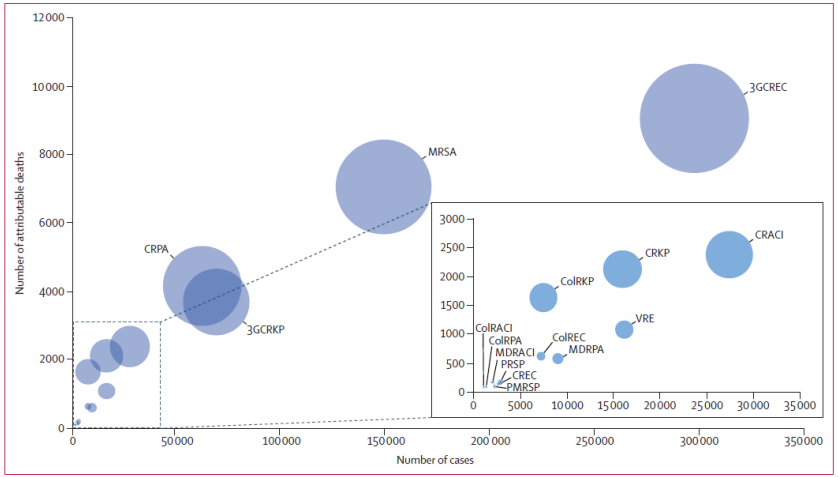
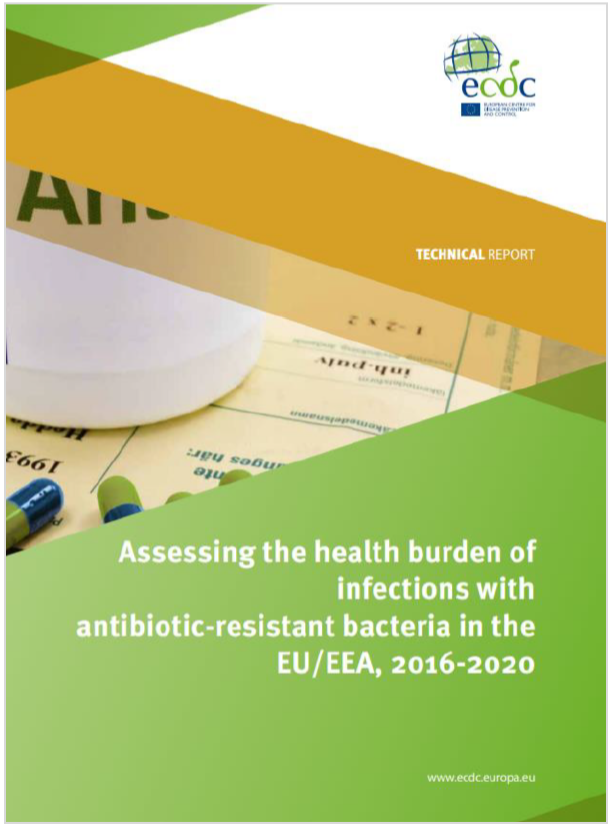


Figure 1: **Infections with antibiotic-resistant bacteria, EU and European Economic Area, 2015**
Diameter of bubbles represents the number of disability-adjusted life-years. ColRACI=colistin-resistant *Acinetobacter* spp. CRACI=carbapenem-resistant *Acinetobacter* spp. MDRACI=multidrug-resistant *Acinetobacter* spp. VRE=vancomycin-resistant *Enterococcus faecalis* and *Enterococcus faecium*. ColREC=colistin-resistant *Escherichia coli*. CREC=carbapenem-resistant *E coli*. 3GCREC=third-generation cephalosporin-resistant *E coli*. ColRKP=colistin-resistant *Klebsiella pneumoniae*. CRKP=carbapenem-resistant *K pneumoniae*. 3GCRKP=third-generation cephalosporin-resistant *K pneumoniae*. ColRPA=colistin-resistant *Pseudomonas aeruginosa*. CRPA=carbapenem-resistant *P aeruginosa*. MDRPA=multidrug-resistant *P aeruginosa*. MRSA=meticillin-resistant *Staphylococcus aureus*. PRSP=penicillin-resistant *Streptococcus pneumoniae*. PMRSP=penicillin-resistant and macrolide-resistant *S pneumoniae*.

Health burden of infections with antibiotic-resistant bacteria by country, EU/EEA, 2016-2020



- In 2020 in the EU/EEA:
  - More than **800,000 infections** with antibiotic-resistant bacteria
  - More than **35,000 attributable deaths**
  - More than **1 million disability-adjusted life years (DALYs) lost**
  - More than **70% linked to healthcare-associated infections**
- This burden:
  - Remains comparable to that of influenza, tuberculosis and HIV/AIDS combined
  - Increased between 2016 and 2020, although there was a small decrease in 2020 compared to 2019
  - Varies greatly between EU/EEA countries

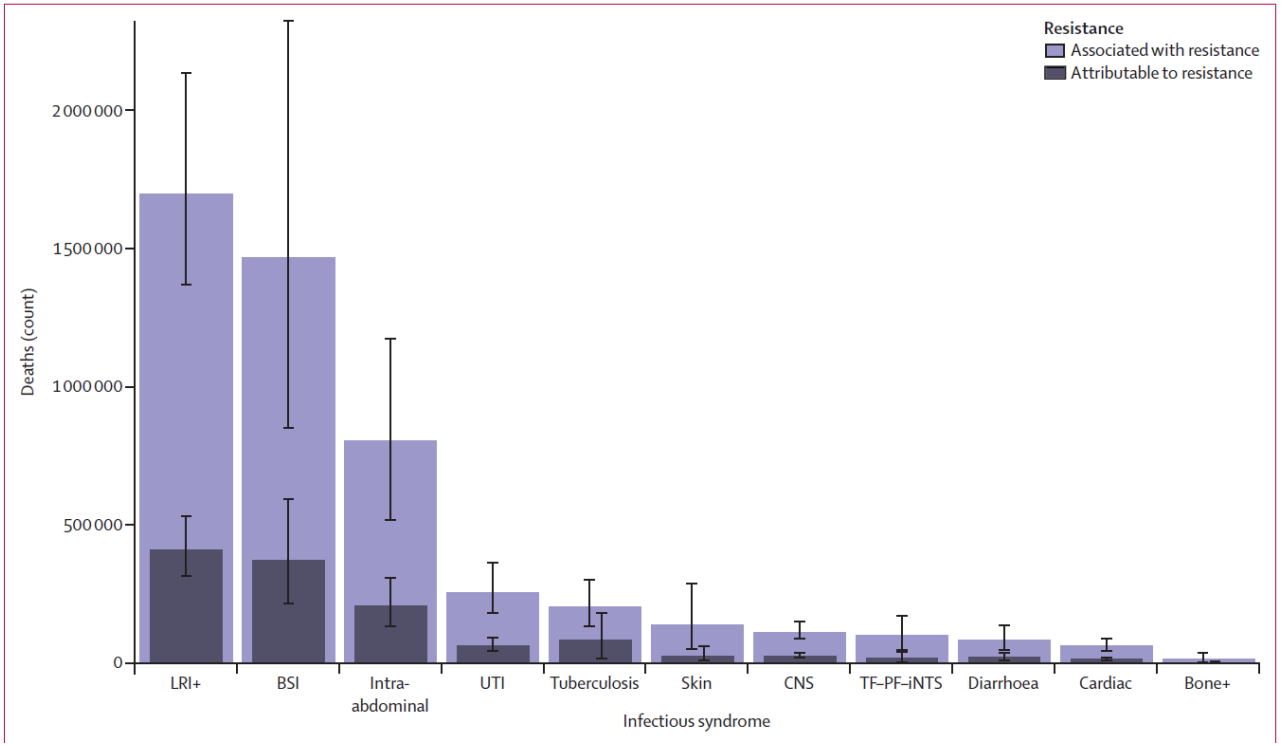
Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

*Antimicrobial Resistance Collaborators**

- 4,9 M morti associate
- 1,27 M morti attribuibili
- 1,5 M per infezioni delle basse vie respiratorie
- Patogeni (per numero di morti):
  1. *Escherichia coli*
  2. *Staphylococcus aureus*
  3. *Klebsiella pneumoniae*
  4. *Streptococcus pneumoniae*
  5. *Acinetobacter baumannii*
  6. *Pseudomonas aeruginosa*

Lancet 2023

Global deaths (counts) attributable to and associated with bacterial antimicrobial resistance by infectious syndrome, 2019



Antimicrobial Resistance Collaborators. *Lancet* 2022; **399**: 629–55

COVID-19 e AMR

Antimicrobial resistance in the age of COVID-19

Action is needed to prevent COVID-19 from casting a long shadow over antimicrobial resistance.

How covid-19 is accelerating the threat of antimicrobial resistance

Healthcare responses to the novel coronavirus may be hastening another long looming public health threat, writes **Jeremy Hsu**

J Antimicrob Chemother
doi:10.1093/jac/dkac194

Journal of Antimicrobial Chemotherapy

COVID-19 and the potential long-term impact on antimicrobial resistance

Timothy M. Rawson[1–3], Luke S. P. Moore[1,3,4], Enrique Castro-Sanchez[1], Esmita Charani[1,5], Frances Davies[1,3], Giovanni Satta[1,3], Matthew J. Ellington[5] and Alison H. Holmes[1–3]*

EDITORIAL

Will coronavirus disease (COVID-19) have an impact on antimicrobial resistance?

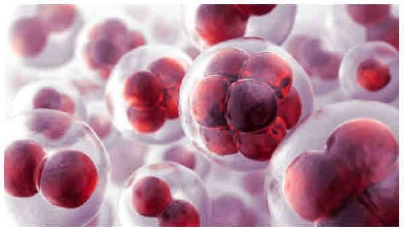
Dominique L Monnet[1], Stephan Harbarth[2]

COMMENTARY Open Access

Lessons learned from COVID-19 for the post-antibiotic future

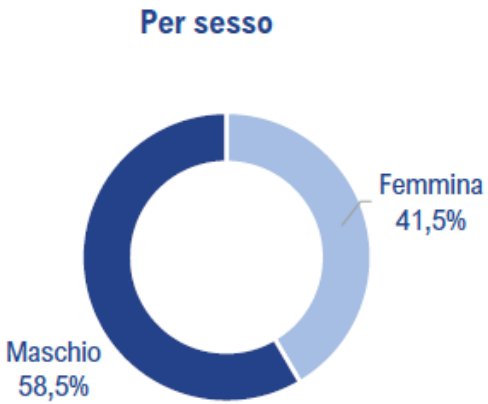
Lindsay A. Wilson[1], Susan Rogers Van Katwyk[1], Patrick Fafard[1,2], A. M. Viens[1,3] and Steven J. Hoffman[1,4,5,6]*

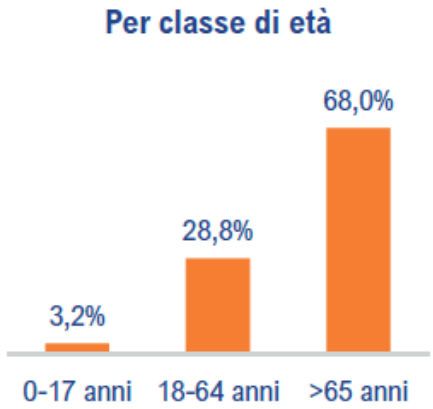
1. Whilst the pandemic has focused society on the threat of emerging infections, certain infection control measures may have to be relaxed and probably severe compromised;
2. The overcrowding associated with overloading of health-care systems and the depletion of structural and human resources has also jeopardized the correct application of antimicrobial stewardship (AS) models.

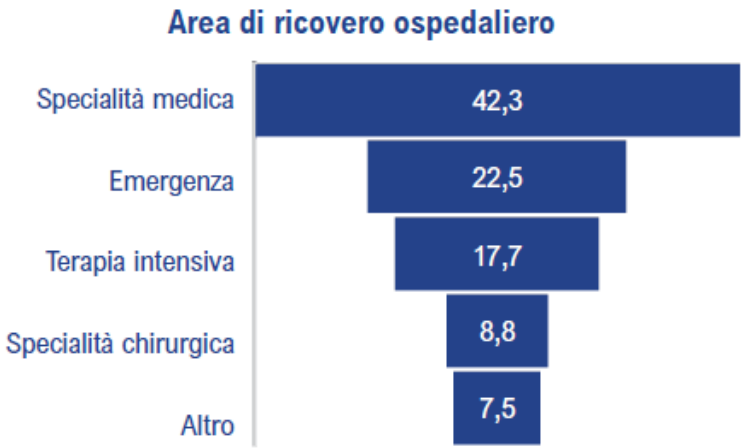


Nature Microbiology | VOL 5 | June 2020 | 779 www.nature.com/naturemicrobiology
BMJ 2020;369:m1983 doi: 10.1136/bmj.m1983 (Published 18 May 2020)
Euro Surveill. 2020;25(45):pii=2001886. https://doi.org/10.2807/1560-7917.ES.2020.25.45.2001886
Globalization and Health (2020) 16:94

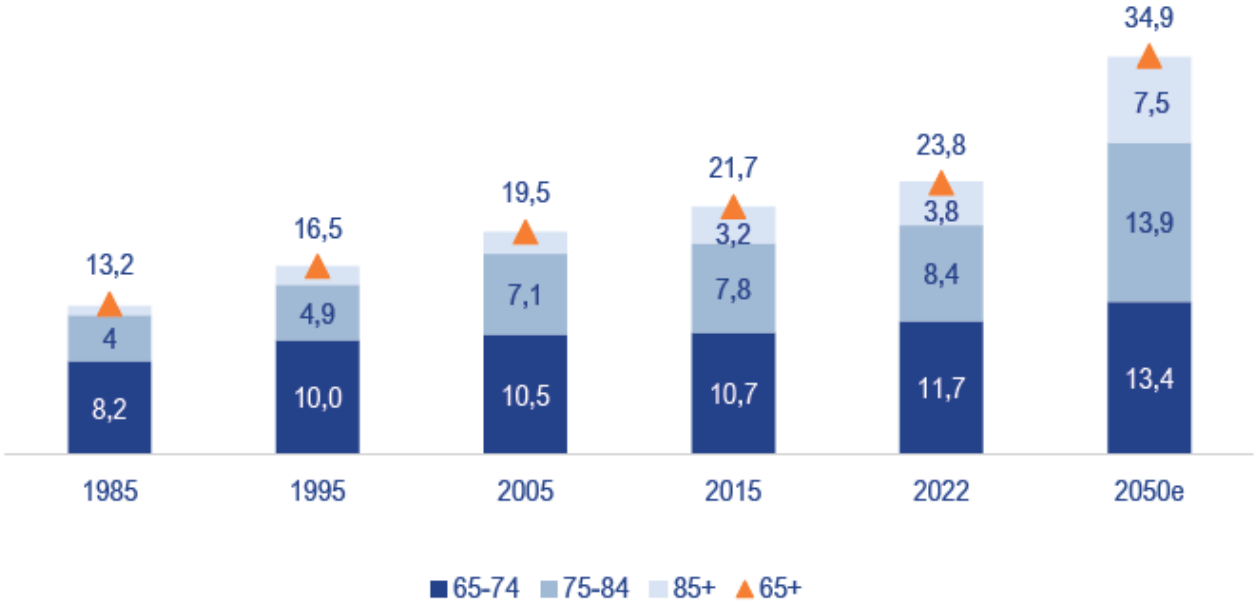
Ricoveri ospedalieri 2020







Progressivo invecchiamento della popolazione in Italia



for ***Enterococcus faecium***

for ***Staphylococcus aureus***

for ***Klebsiella pneumoniae***

for ***Acinetobacter baumannii***

for ***Pseudomonas aeruginosa***

for ***Enterobacter* species**

WHO PRIORITY PATHOGENS LIST FOR R&D OF NEW ANTIBIOTICS

Priority 1: CRITICAL#

Acinetobacter baumannii, carbapenem-resistant

Pseudomonas aeruginosa, carbapenem-resistant

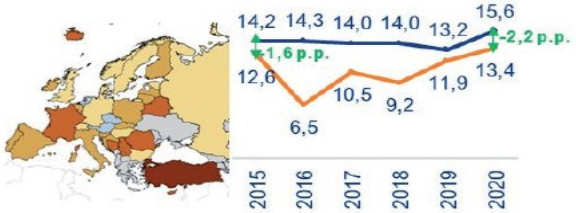
Enterobacteriaceae*, carbapenem-resistant, 3rd generation cephalosporin-resistant

Enterobacteriaceae include: *Klebsiella pneumonia*, *Escherichia coli*, *Enterobacter* spp., *Serratia* spp., *Proteus* spp., and *Providencia* spp, *Morganella* spp.

Escherichia coli resistente alle cefalosporine di 3ª generazione

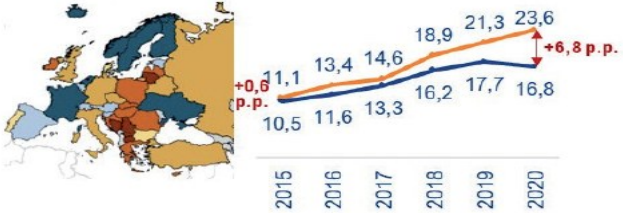
Klebsiella pneumoniae resistente ai carbapenemici

Streptococco pneumonie resistente alla penicillina



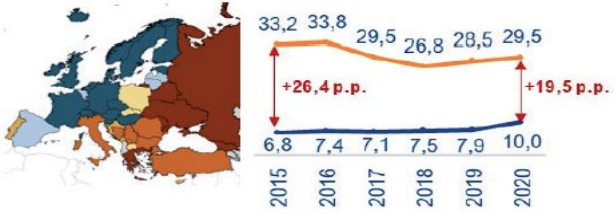
Pseudomonas aeruginosa resistente ai carbapenemi

Enterococcus faecium resistente alla vancomicina



Acinetobacter resistente ai carbapenemi

Staphylococcus aureus resistente alla meticillina

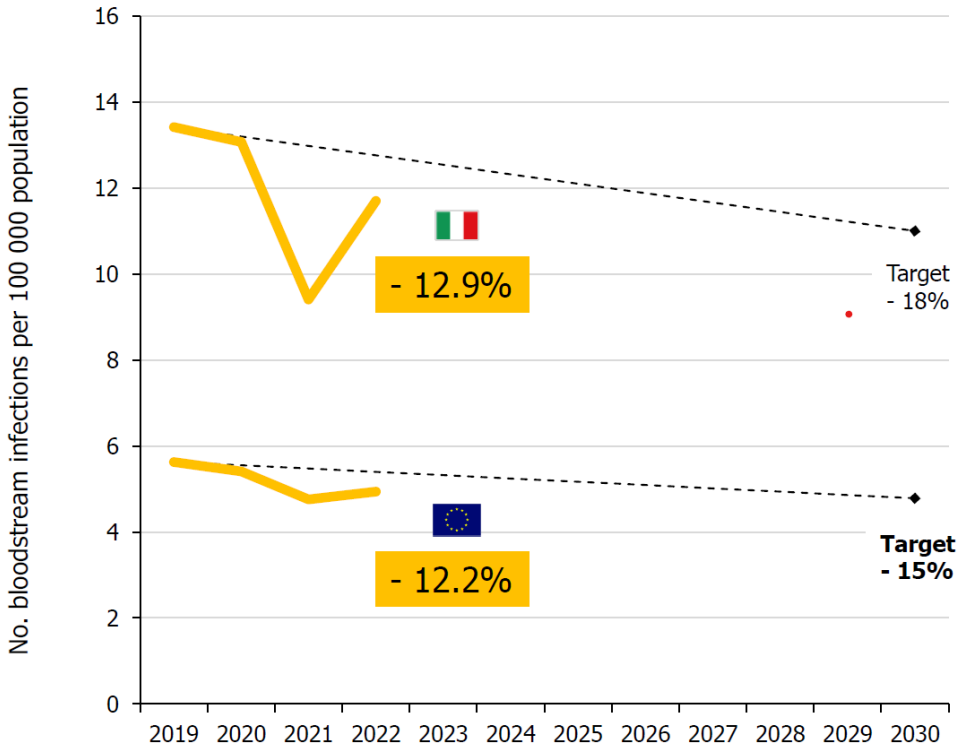


Percentuale di resistenza

- <1%
- 1%-5%
- 5%-10%
- 10%-25%
- 25%-50%
- ≥50%

Italia UE/SEE Gap rispetto alla media europea

Estimated incidence* of bloodstream infections with meticillin-resistant *Staphylococcus aureus* (MRSA)†, EU and EU/EEA countries, 2019-2022



Change 2019–2022

Target achieved	Progress	Regress

Austria	- 30.4 %	Italy	- 12.9 %
Belgium	- 51.5 %	Latvia	+ 14.8 %
Bulgaria	- 40.3 %	Liechtenstein	N/A‡
Croatia	+ 99.4 %	Lithuania	+ 27.3 %
Cyprus	+ 113 %	Luxembourg	- 18.7 %
Czechia	- 29.7 %	Malta	+ 15.8 %
Denmark	- 25.9 %	Netherlands	+ 31.7 %
Estonia	- 18.6 %	Norway	+ 15.5 %
Finland	+ 7.8 %	Poland	- 8.2 %
France	- 47.0 %	Portugal	- 22.6 %
Germany	- 35.1 %	Romania	+ 48.0 %
Greece	+ 8.2 %	Slovakia	- 31.8 %
Hungary	+ 19.7 %	Slovenia	+ 12.9 %
Iceland	- 45.8 %	Spain	+ 9.7 %
Ireland	- 14.5 %	Sweden	+ 17.8 %

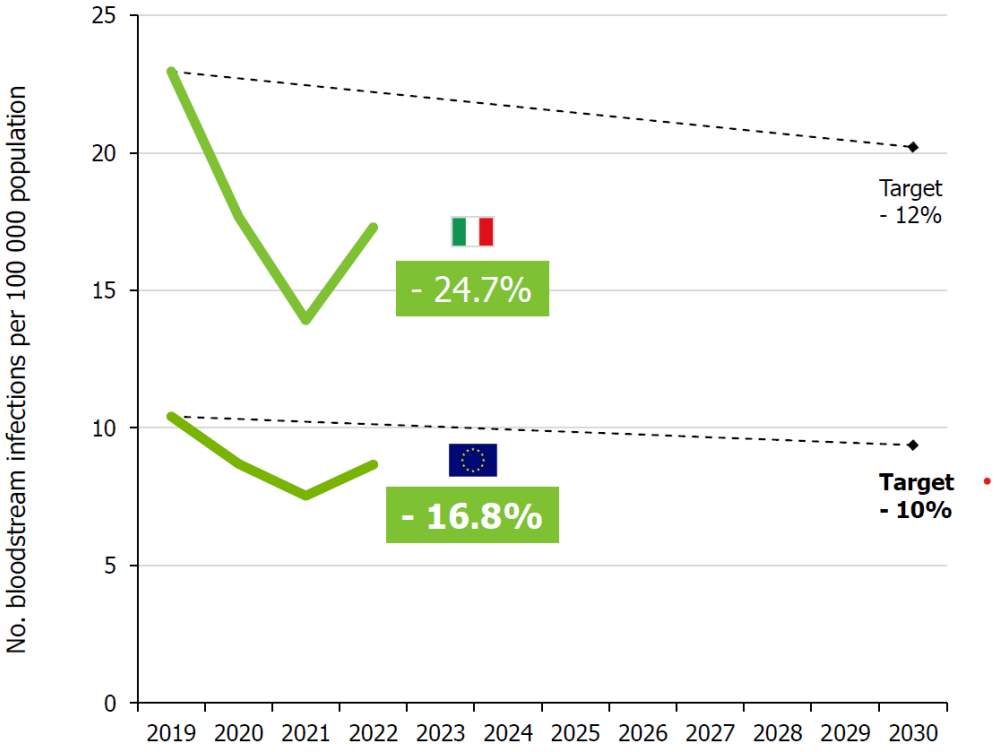
* Incidence was estimated using the EARS-Net data reported to EpiPulse. Each de-duplicated isolate from a blood sample (>99% data) or cerebrospinal fluid sample (<1% data) was considered a proxy for a bloodstream infection.

† MRSA is based on antimicrobial susceptibility testing (AST) results for cefoxitin or, if unavailable, oxacillin. AST results reported for cloxacillin, dicloxacillin, flucloxacillin or meticillin are accepted as a marker for oxacillin resistance if oxacillin is not reported. If no phenotypic results are available, data from molecular confirmation tests (detection of *mecA* gene PCR or a positive PBP2A-agglutination test) are accepted as a marker for MRSA.

‡ N/A, not applicable: Liechtenstein only reported data in 2022.

Source: EARS-Net, ECDC, 2023.

Estimated incidence* of bloodstream infections with third-generation cephalosporin-resistant *Escherichia coli*, EU and EU/EEA countries, 2019-2022



Change 2019–2022

Target achieved	Progress	Regress

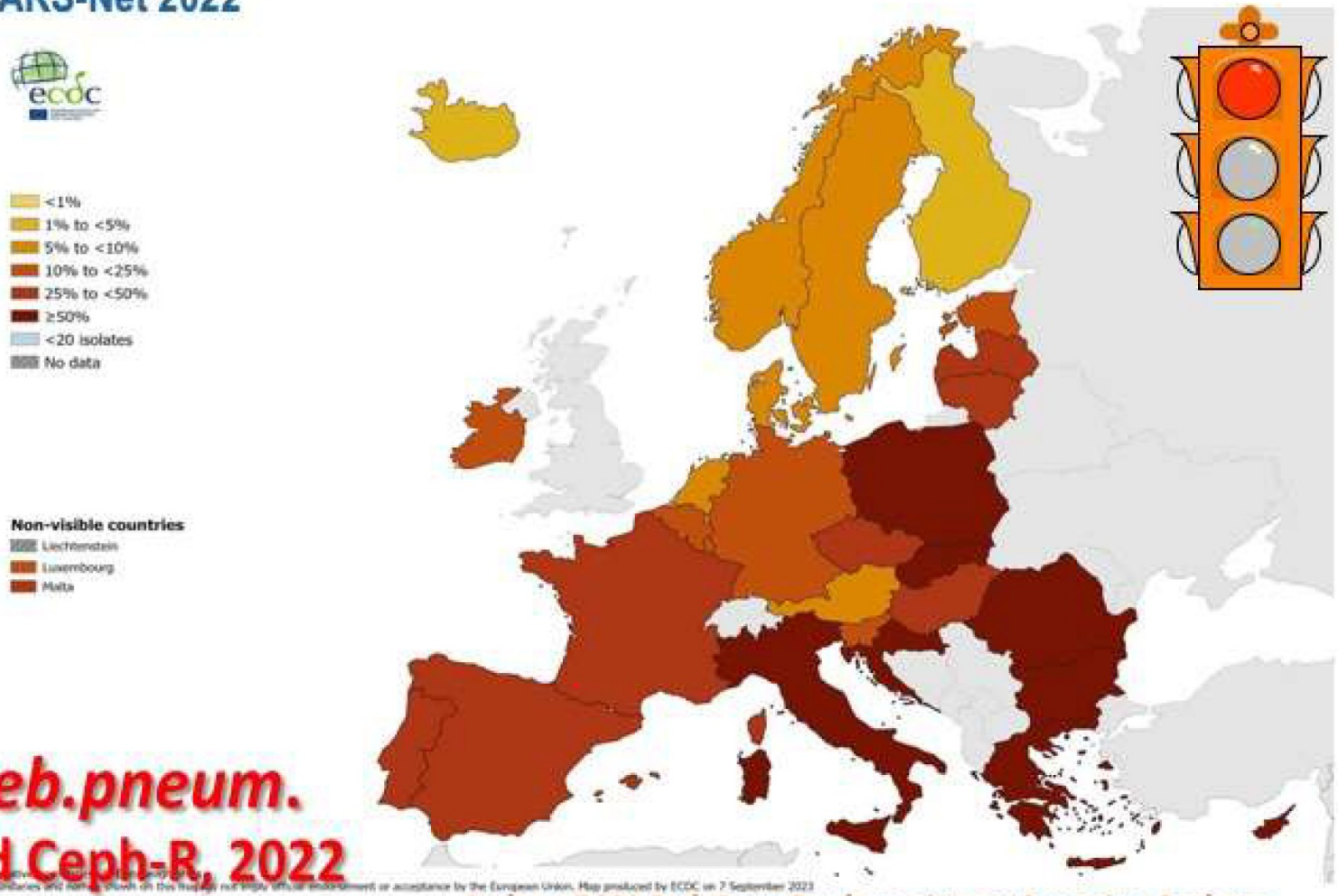
Austria	- 26.5 %	Italy	- 24.7 %
Belgium	- 38.9 %	Latvia	+ 14.1 %
Bulgaria	- 27.7 %	Liechtenstein	N/A†
Croatia	- 7.1 %	Lithuania	+ 28.1 %
Cyprus	+ 73.6 %	Luxembourg	- 24.1 %
Czechia	- 4.7 %	Malta	- 39.6 %
Denmark	- 9.1 %	Netherlands	- 5.4 %
Estonia	+ 11.8 %	Norway	- 15.0 %
Finland	- 28.0 %	Poland	- 6.1 %
France	- 53.4 %	Portugal	- 24.8 %
Germany	- 17.2 %	Romania	+ 70.3 %
Greece	+ 54.7 %	Slovakia	- 6.4 %
Hungary	+ 17.5 %	Slovenia	- 3.1 %
Iceland	+ 21.2 %	Spain	+ 29.5 %
Ireland	- 25.3 %	Sweden	- 7.7 %

* Incidence was estimated using the EARS-Net data reported to EpiPulse. Each de-duplicated isolate from a blood sample (>99% data) or cerebrospinal fluid sample (<1% data) was considered a proxy for a bloodstream infection.

† N/A, not applicable. Liechtenstein only reported data in 2022.

Source: EARS-Net, ECDC, 2023.

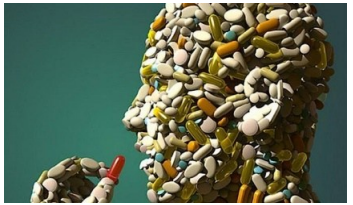
EARS-Net 2022



Kleb.pneum.
3rd Ceph-R, 2022

Italy: >50% 3rd Gen-Ceph-resistant invasive isolates

Perché la resistenza agli antibiotici ci preoccupa?

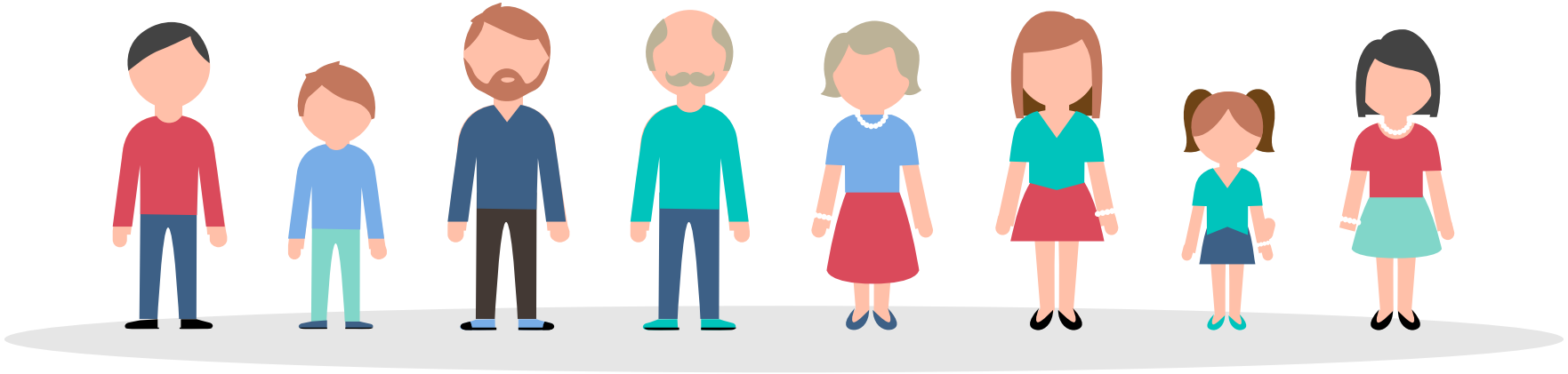


- **Ridotta efficacia terapeutica degli antibiotici disponibili**
- **Prolungamento della degenza**
- **Aumento dei costi dell'assistenza (es. personale dedicato, maggior uso di farmaci e test clinici, …)**
- **Aumento dei costi per la società (es. giornate di malattia, visite mediche, ...)**
- **Aumento delle complicanze delle infezioni in soggetti immunodepressi/neonati**
- **Talvolta, disabilità a lungo termine**
- **Aumento letalità**
- **Calo degli investimenti privati e mancanza di innovazione per sviluppo di nuove terapie**
- **Impatto anche nei settori veterinario, alimentare e ambientale**

Gli antibiotici sono dei farmaci necessari per il <u>trattamento di tante infezioni;</u>
pertanto dobbiamo
ridurre **la possibilità che i microorganismi sviluppino resistenza agli antibiotici <u>per potere curare le infezioni</u>**

Cosa possiamo fare?

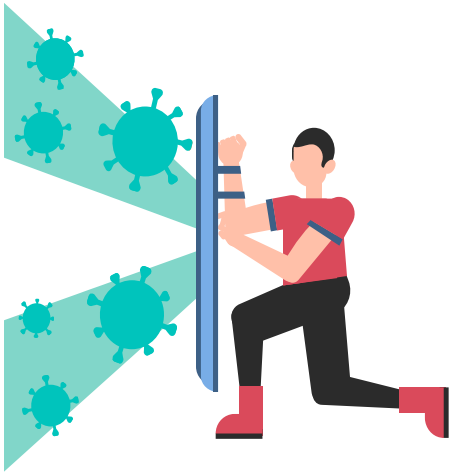
Alcune facili azioni da ricordare!



Nell’ambiente ospedaliero...

Lavaggio delle mani

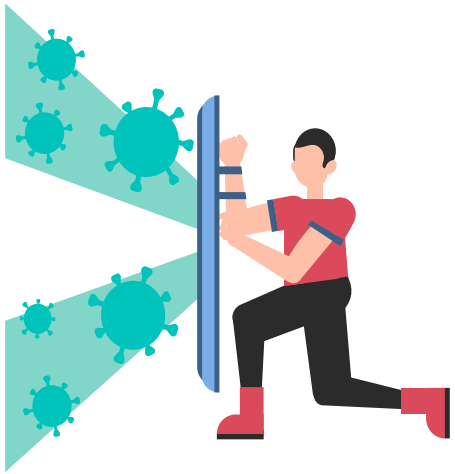
Lavarsi le mani o utilizzare disinfettanti prima e dopo il contatto con altri pazienti e il personale sanitario



Nell'ambiente ospedaliero...

Lavaggio delle mani

Lavarsi le mani o utilizzare disinfettanti prima e dopo il contatto con altri pazienti e il personale sanitario



Screening

Eseguire ricerche per identificare i portatori (colonizzati) di microorganismi resistenti agli antibiotici

Controllo ICA

Le infezioni correlate all'assistenza sono spesso causate da microorganismi resistenti agli infettivi

Diagnostica rapida

Avere una rapida identificazione dei microorganismi e dello spettro di resistenza agli antiinfettivi permette al clinico una maggiore appropriatezza

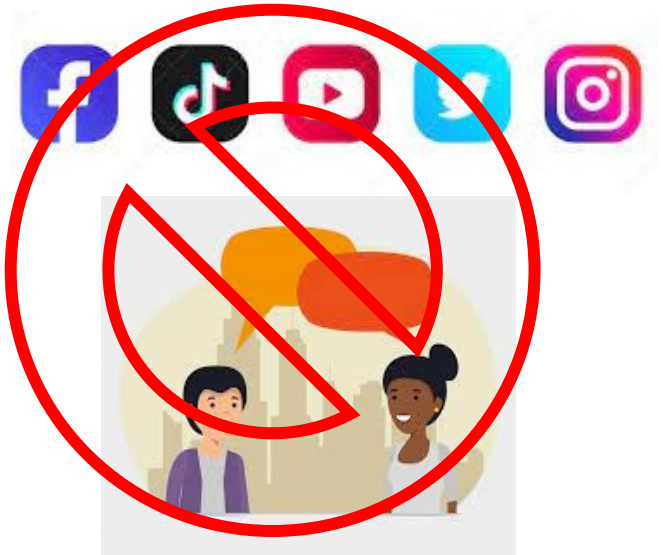
Uso appropriato nuovi antibiotici

Disponibilità nuove molecole che in molti casi sono salvavita se utilizzate in maniera appropriata

Conoscere è importante

1

Le informazioni sui social media e l'esperienza personale non sono sempre fonti affidabili, chiedi al Medico e consulta I siti ufficiali come quelli del Ministero della Salute, dell'Istituto Superiore di Sanità o dell'Agenzia Italiana del Farmaco (AIFA)



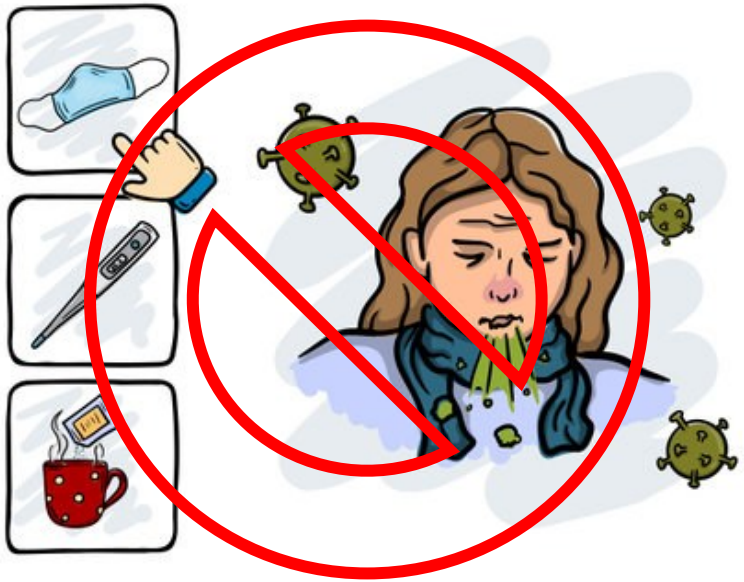
Ministero della Salute

https://www.salute.gov.it/portale/antibioticoresistenza

2

Gli antibiotici sono antiinfettivi attivi solo sui batteri

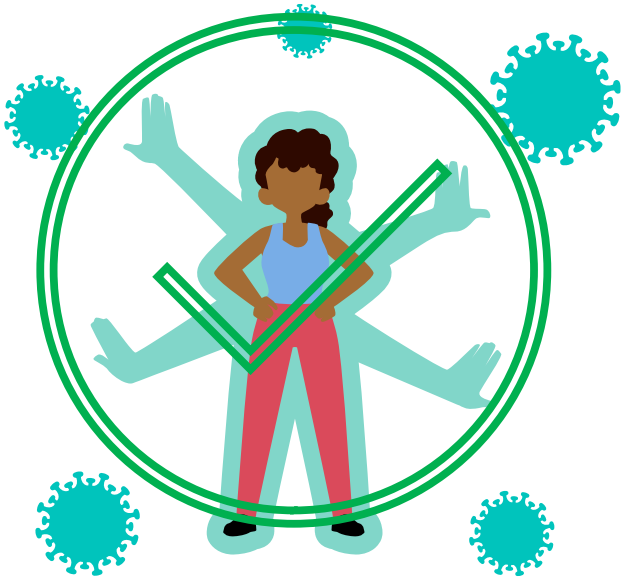
Non utilizzare antibiotici per infezioni virali (ad esempio l'influenza stagionale)



3

La terapia antibiotica non è sempre necessaria

Il sistema immunitario ha la capacità di eliminare i microorganismi in caso di infezione; non utilizzare antinfettivi per il trattamento del raffreddore o del mal di gola



4

Non tutti gli antibiotici sono uguali

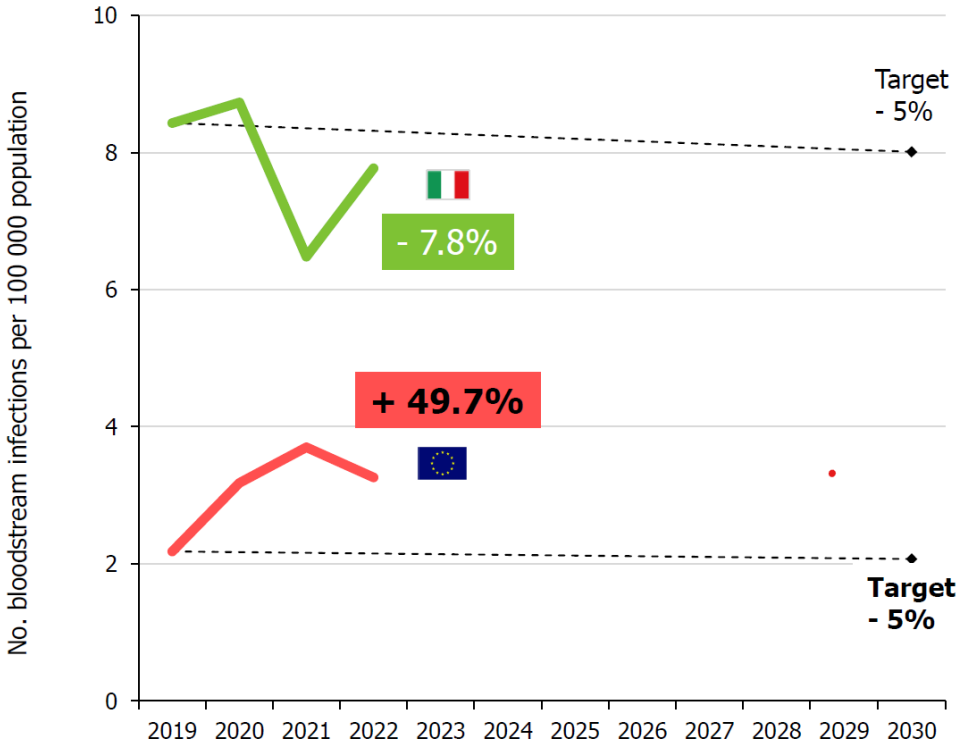
Gli antibiotici sono specifici per determinati microorganismi e agiscono in maniera diversa, non utilizzare antibiotici conservati in casa senza il consulto medico

5

La durata della terapia antibiotica è specifica per ogni infezione

Anche se i sintomi di una infezione sono risolti, non interrompere la terapia antibiotica prima di quando consigliato dal medico

Estimated incidence* of bloodstream infections with carbapenem-resistant *Klebsiella pneumoniae*, EU average and EU/EEA countries, 2019-2022



Change 2019–2022

Target achieved	Progress	Regress

Austria	- 32.2 %	Italy	- 7.8 %
Belgium	- 8.5 %	Latvia	N/A†
Bulgaria	+ 74.9 %	Liechtenstein	N/A†
Croatia	+ 111 %	Lithuania	- 80.1 %
Cyprus	+ 278 %	Luxembourg	+ 92.2 %
Czechia	+ 156 %	Malta	- 43.2 %
Denmark	+ 48.3 %	Netherlands	+ 85.9 %
Estonia	N/A†	Norway	- 1.8 %
Finland	- 100 %	Poland	+ 140 %
France	- 42.5 %	Portugal	+ 2.7 %
Germany	+ 20.7 %	Romania	+ 269 %
Greece	+ 38.0 %	Slovakia	+ 257 %
Hungary	+ 530 %	Slovenia	+ 591 %
Iceland	N/A†	Spain	+ 42.6 %
Ireland	- 40.0 %	Sweden	+ 71.6 %

* Incidence was estimated using the EARS-Net data reported to EpiPulse. Each de-duplicated isolate from a blood sample (>99% data) or cerebrospinal fluid sample (<1% data) was considered a proxy for a bloodstream infection.

† N/A, not applicable
Estonia: incidence increased from 0 in 2019 to 0.23 cases per 100 000 pop. in 2022;
Iceland: incidence was 0 in 2020-2022;
Latvia: incidence increased from 0 in 2019 to 0.47 cases per 100 000 pop. in 2022;
Liechtenstein: only reported data in 2022.

Source: EARS-Net, ECDC, 2023.

Rapid risk assessment: Emergence of hypervirulent *Klebsiella pneumoniae* (hvKp) ST23 carrying carbapenemase genes in EU/EEA countries, first update (14 February 2024)


RAPID RISK ASSESSMENT

Emergence of hypervirulent *Klebsiella pneumoniae* ST23 carrying carbapenemase genes in EU/EEA countries, first update

14 February 2024

Summary

Since the last ECDC rapid risk assessment in 2021, the number of European Union/European Economic Area (EU/EEA) countries reporting cases of hypervirulent *Klebsiella pneumoniae* (hvKp) sequence type (ST) 23 has increased from four to 10 countries, and the number of isolates submitted for analysis by these countries has increased from 12 to 143 isolates. Furthermore, there is now evidence of sustained spread of the globally dominant hvKp ST23-K1 lineage carrying carbapenemase genes between healthcare facilities in Ireland over a period of five years, despite enhanced control efforts. Clusters of hvKp ST23-K1 isolates signifying potential within-country transmission were also detected in France, Latvia, and Lithuania; however, these have so far not been confirmed as being most likely due to within-country transmission with epidemiological data. Similar spread in and between healthcare facilities may already occur in other EU/EEA countries with less established surveillance.

The emergence of *K. pneumoniae* isolates with combined hypervirulence and resistance to last-line antibiotics such as carbapenems is of concern as, in contrast to 'classic' *K. pneumoniae* strains, hvKp strains can cause severe infections in healthy individuals, often complicated by dissemination to various body sites. Previously, hvKp strains were primarily found in Asia, were mainly community-acquired, and were only rarely resistant to antibiotics. However, recent reports point to increasing geographic distribution, healthcare association and multidrug resistance. With the convergence of virulence and antimicrobial resistance in hvKp strains, there is a possibility of potentially untreatable infections in previously healthy adults. An even higher morbidity and mortality must be expected if carbapenem-resistant hvKp strains spread in healthcare settings and affect a vulnerable patient population. Sustained transmission of hvKp ST23 carrying carbapenemase genes between healthcare facilities in an EU/EEA country has been confirmed. The probability of further spread and establishment of hvKp carrying carbapenemase genes in healthcare settings in EU/EEA countries with consequent significant impact on morbidity and mortality is therefore currently considered to be high.

It is important to detect hvKp early and prevent further dissemination in healthcare settings in EU/EEA countries to avoid further establishment of hvKp carrying carbapenemase genes as a healthcare-associated pathogen. Options for response include alerts to clinicians and clinical microbiology laboratories, the establishment of sufficient laboratory capacity to detect hvKp isolates including whole-genome sequencing, the submission of all suspected hvKp isolates with or without additional antimicrobial resistance to national reference laboratories, and enhanced infection prevention and control measures in healthcare facilities. Prospective data collection on hvKp isolates, including epidemiological and clinical data on cases of infection, carriage and associated risk factors, would improve the understanding of national spread and transmission routes and determine the need for further surveillance and control measures. For further details, please refer to the 'Options for response' section below.

Suggested citation: European Centre for Disease Prevention and Control. Emergence of hypervirulent *Klebsiella pneumoniae* ST23 carrying carbapenemase genes in EU/EEA countries, first update, 14 February 2024. ECDC: Stockholm; 2024.

ISBN 978-92-9498-691-7 doi: 10.2900/993022 Catalogue number: TQ-02-24-218-EN-N

- Update of previous rapid risk assessment (17 March 2021) based on urgent inquiry (EPIS platform) from Ireland
- Increasing number of countries reporting hvKp ST23:
  2021: 4; by 14 February 2024: 10 countries
- Increasing number of cases of hvKp ST23 reported to ECDC:
  2021: 12; by 14 February 2024: 143 cases/isolates
- 89 (45.9%) of 194 hvKp ST23 isolates from the EU/EEA (reported to ECDC or from public databases) carried a carbapenemase gene
- Ireland: evidence of sustained spread of the globally dominant hvKp ST23-K1 lineage carrying carbapenemase genes between healthcare facilities (65 cases)
- Small clusters of hvKp ST23-K1 in three other countries, with carbapenemase genes (France , Lithuania) or without (Latvia), but not confirmed with epidemiological data.

https://www.ecdc.europa.eu/sites/default/files/documents/RRA-20240129-48%20FINAL.pdf

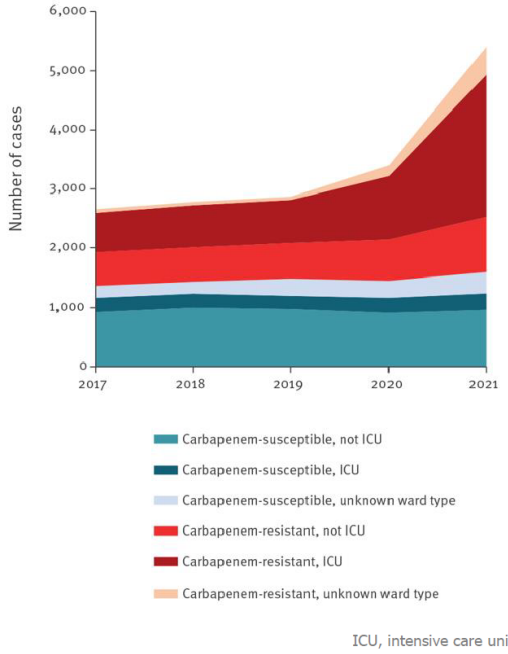
Le infezioni da *P. aeruginosa*
DTR

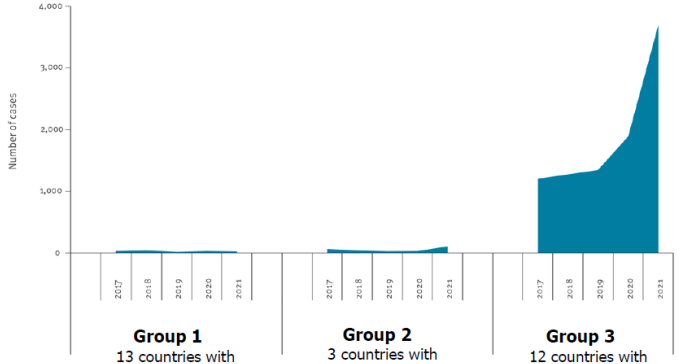
Fig. 16 ***Pseudomonas aeruginosa*. Percentage of invasive isolates with resistance to carbapenems (imipenem/meropenem), by country, EU/EEA, 2021**

- < 1%
- 1% to < 5%
- 5% to < 10%
- 10% to < 25%
- 25% to < 50%
- ≥ 50%
- < 20 isolates
- No data

Non-visible countries
- Liechtenstein
- Luxembourg
- Malta

Acinetobacter species bloodstream infections, by carbapenem susceptibility testing result, type of patient ward, and country group, EU/EEA*, 2017–2021





Group 1
13 countries with <10% carbapenem resistance in 2018-2019

Austria
Belgium
Denmark
Estonia
Finland
Germany
Iceland
Ireland
Luxembourg
Malta
Netherlands
Norway
Sweden

Group 2
3 countries with 10% to <50% carbapenem resistance in 2018-2019

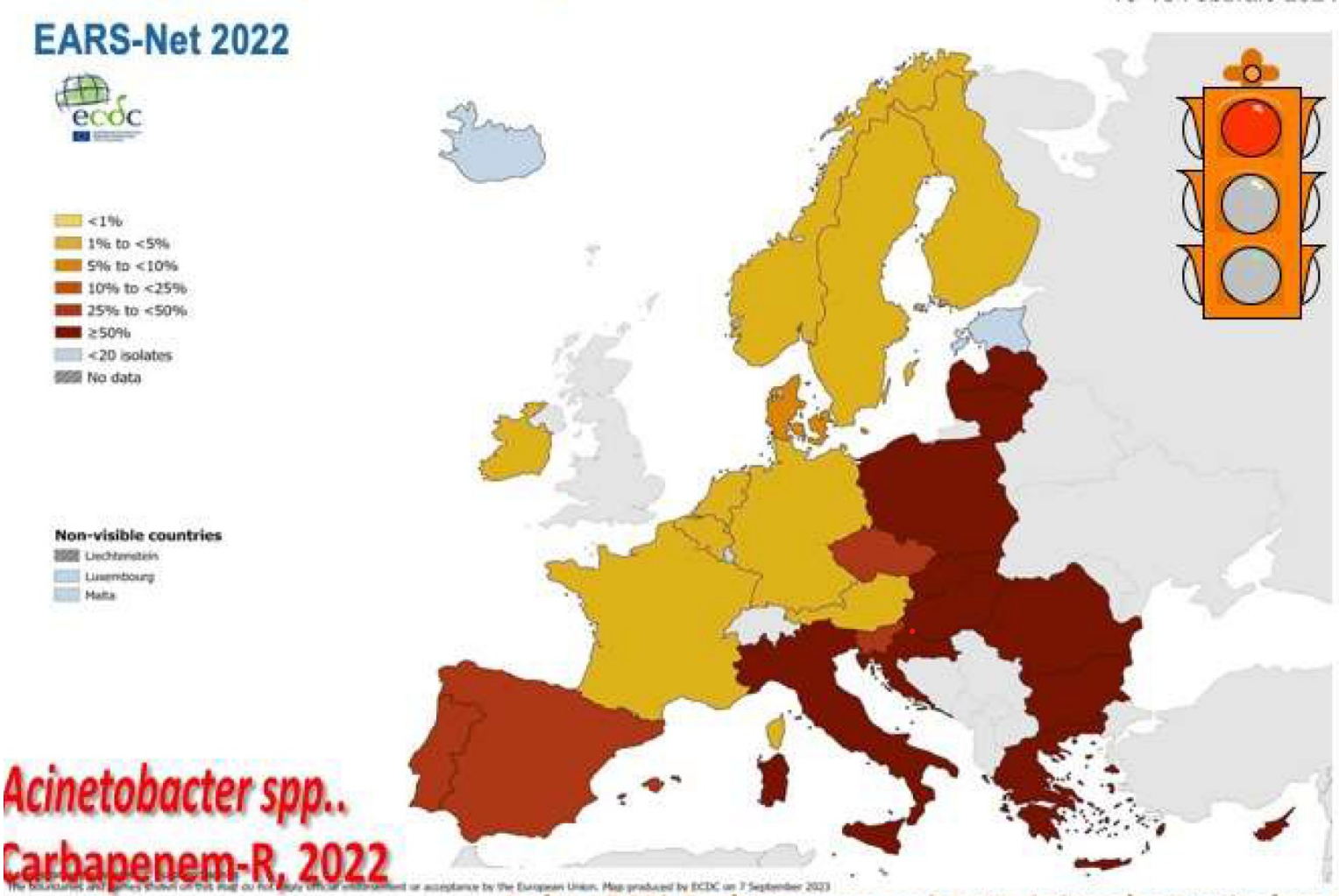
Czechia
Portugal
Slovenia

Group 3
12 countries with ≥50% carbapenem resistance in 2018-2019

Bulgaria
Croatia
Cyprus
Greece
Hungary
Italy
Latvia
Lithuania
Poland
Romania
Slovakia
Spain

*From laboratories that continuously reported data to the European Antimicrobial Resistance Surveillance Network (EARS-Net)

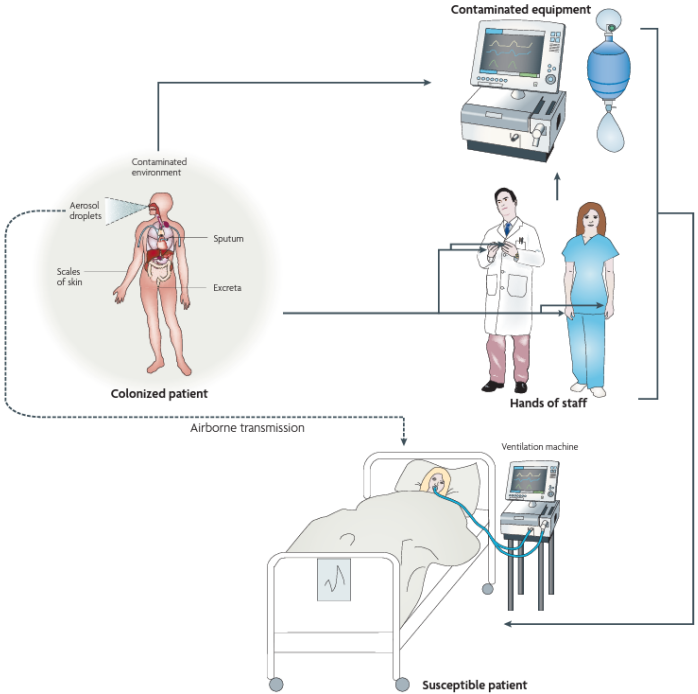
Adapted from: Kinross P, et al. Eurosurveillance (17 November 2022).



Italy: >50% Carbapenem-resistant Acineobacter isolates

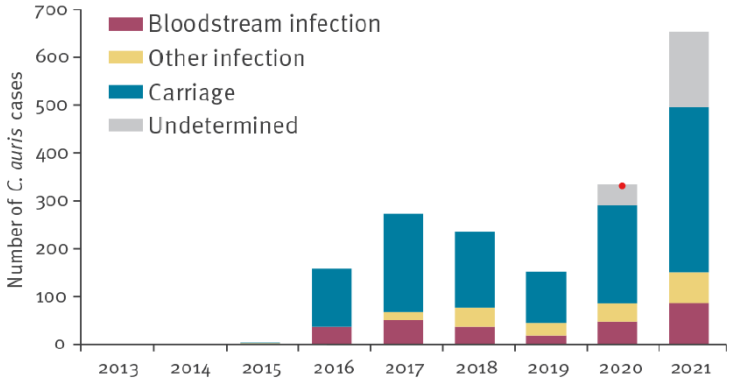
A. baumannii colonization

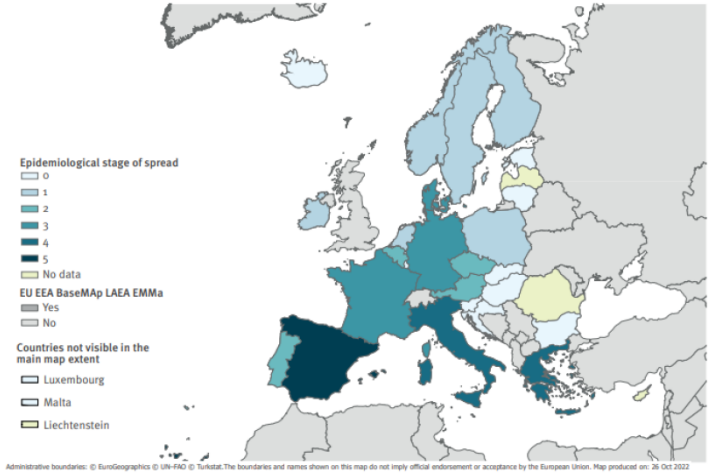
- **Prolonged colonization (range 8-42 months)** may contribute to the endemicity of MDR *A. baumannii* after an outbreak in up to 20% of patients



Cogliati Dezza et al. JAC Antimicrob Resist. 2023 Aug 10;5(4)

Reported cases of *Candida auris* infection or carriage, EU/EEA*, 2013–2021 (n = 1,812)





* Data reported by the United Kingdom until 2019 were excluded to ensure comparability over time by including the same set of countries. For this reason, the absolute case numbers differ from the number of cases reported for 2013–2019 in previous reports

Epidemiological stages of spread

Stage 0: No cases of *C. auris* infection or colonisation have been detected.

Stage 1: Only imported cases of *C. auris* have been detected.
Stage 2: Only sporadic cases of *C. auris* that were locally acquired or of unknown origin have been detected.
Stage 3: Sporadic outbreaks of *C. auris* have occurred without or with only limited inter-facility spread.

Stage 4: Multiple outbreaks of *C. auris* with verified or plausible inter-facility spread have occurred.
Stage 5: *C. auris* is endemic in parts of the country (regional spread).

Source: Kohlenberg A, et al. Eurosurveillance (17 November 2022).

Five Tools to tackle the Problem of Hospital Infections in Italy

1. Training of Infection Control Professionals
2. Surveillance of HAI, ABx, AMR
3. Interventions: Active Screening, Decolonization, Contact Precautions
4. Hand Hygiene – simple and effective
5. Antibiotic Stewardship

3.1 Active Screening for MRSA

➡ Decolonisation

Efficacy

Harbarth S et al. Chemother 1999
Hudson IRB J Hosp Infect 1994
Kluytmans J et al. J Hosp Infect 1998
Parras F et al. Antimicrob Agents Chemother 1995
Vasquez JE et al. Infect Control Hosp Epidemiol 2000
Walsh TJ Antimicrob Agents Chemother 1993
Buehlmann et al. ICHE 2008

Screening of Patients: systematic vs. selective

Girou E et al. Infect Control Hosp Epidemiol 2000
Karchmer TB et al. J Hosp Infect 2002
Huang SS et al. NEJM 2013

3.2 Contact Precautions for MDRO

	3. Generation-Cephalosporin-R (CRE) „**RGN**“	FQ + 3.Generation-Cephalosporin-R (FQ-CRE) „**MDR GN**“	Carbapenem-R (Carb-CRE) „**XDR GN**“ + **MRSA**
Risik patients[1] + Risik areas[2]	Barrier precautions 	Contact isolation  	**Contact isolation (always)** 
Regular ward	Standard hygiene	Barrier precautions	**Contact isolation (always)** 
Outpatient facility	Standard hygiene	Standard hygiene	Barrier precautions

Wearing gloves does not prevent cross-contamination!

4. Improving Hand Hygiene

Hand contact = Most common mode of germ transmission

- Spread of antimicrobial resistance
- Healthcare-asociated (= nosocomial) Infections

Ruolo delle mani nelle infezioni ospedaliere

La mano **prende**

- dalla cute
- dalle ferite infette
- dal pus
- dalle secrezioni

del paziente

- dal viso
- dal corpo
- dalle mani
- dai vestiti

del personale sanitario

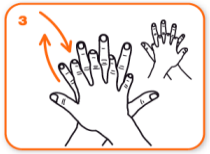
La mano **infetta**
- pazienti
- operatori sanitari

La mano **contamina**
- attrezzature sanitarie
- ambienti

Durata dell'intera procedura: **20-30 secondi**

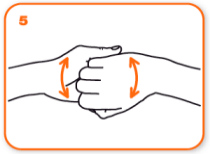
Versare nel palmo della mano una quantità di soluzione sufficiente per coprire tutta la superficie delle mani.

frizionare le mani palmo contro palmo



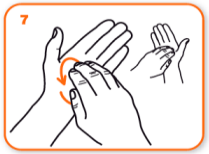
il palmo destro sopra il dorso sinistro intrecciando le dita tra loro e viceversa

palmo contro palmo intrecciando le dita tra loro

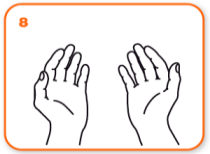


dorso delle dita contro il palmo opposto tenendo le dita strette tra loro

frizione rotazionale del pollice sinistro stretto nel palmo destro e viceversa



frizione rotazionale, in avanti ed indietro con le dita della mano destra strette tra loro nel palmo sinistro e viceversa



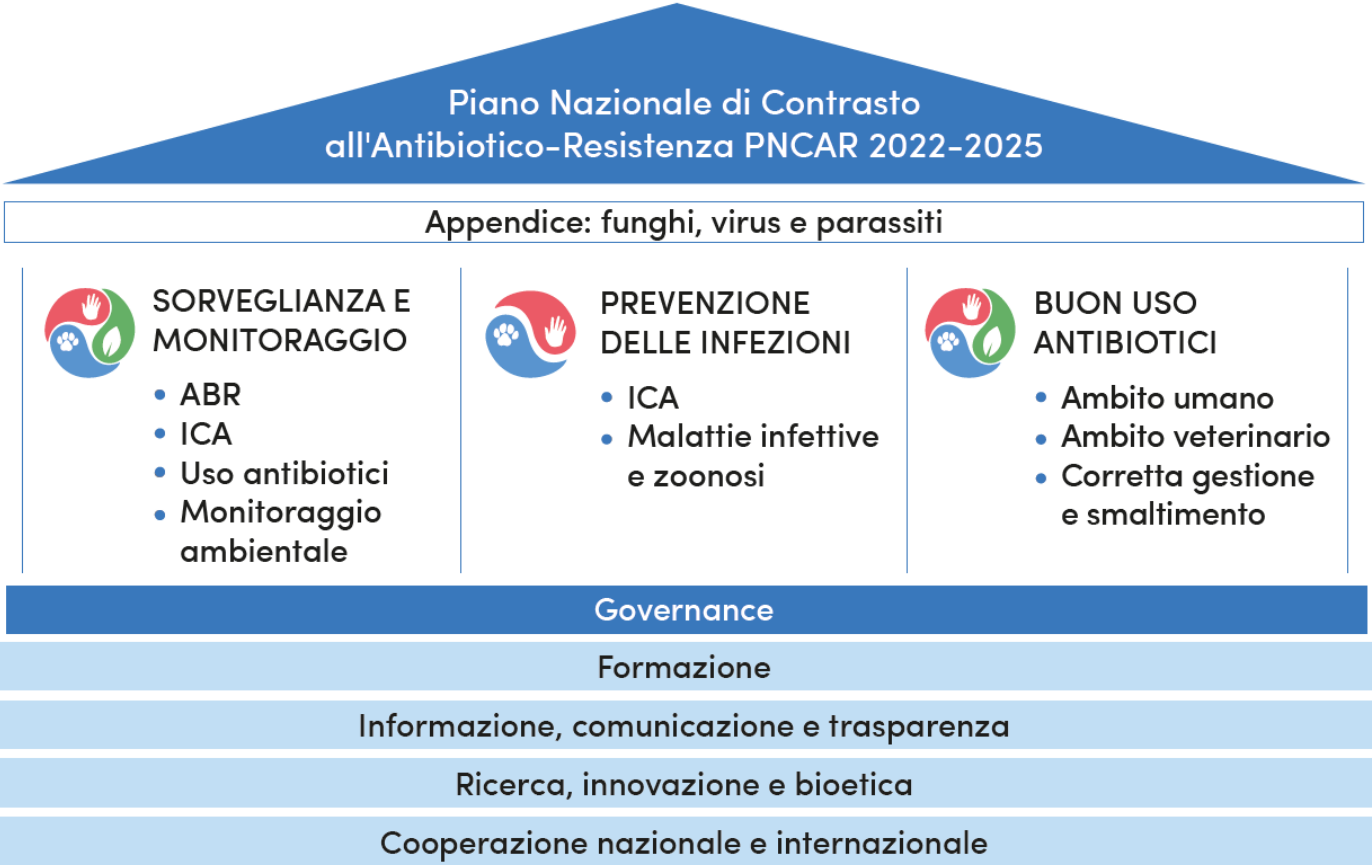
...una volta asciutte, le tue mani sono sicure.

Ministero della Salute

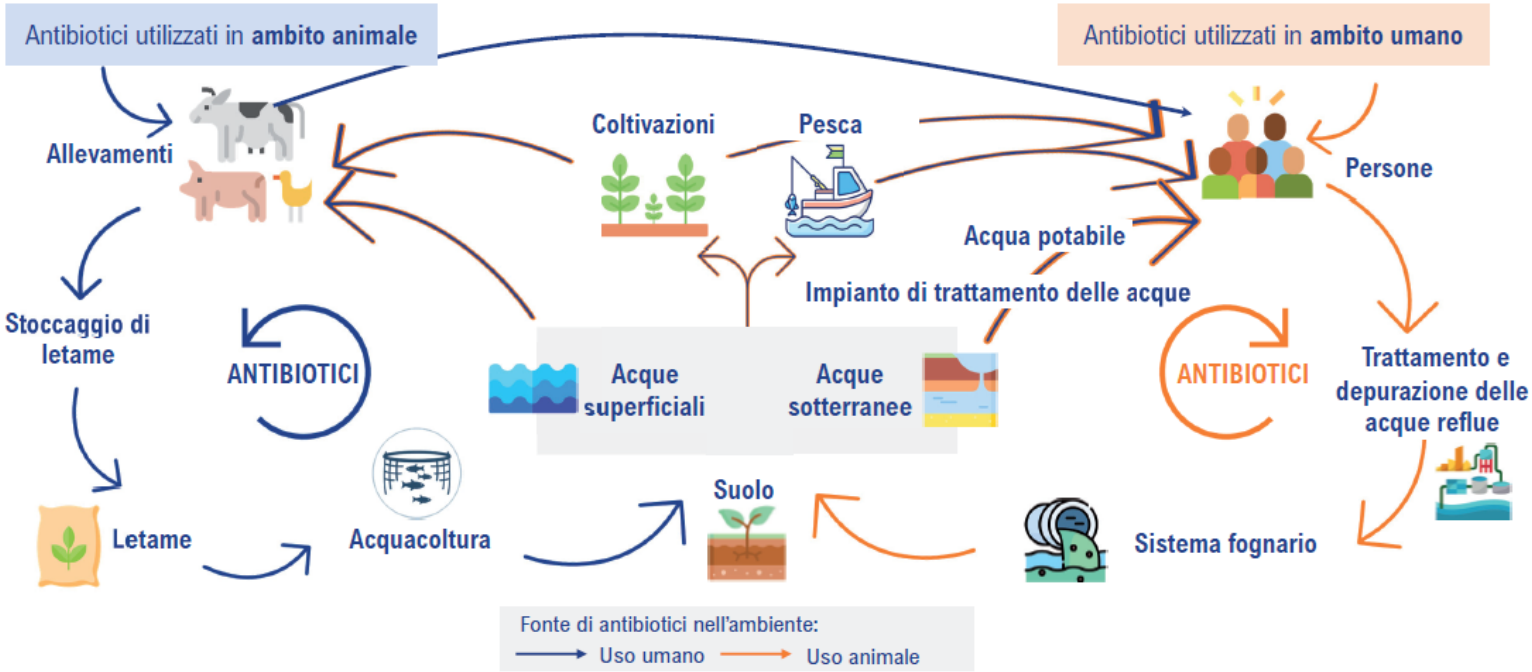
PER UN USO CONSAPEVOLE
ANTIBIOTICI EFFICACI

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

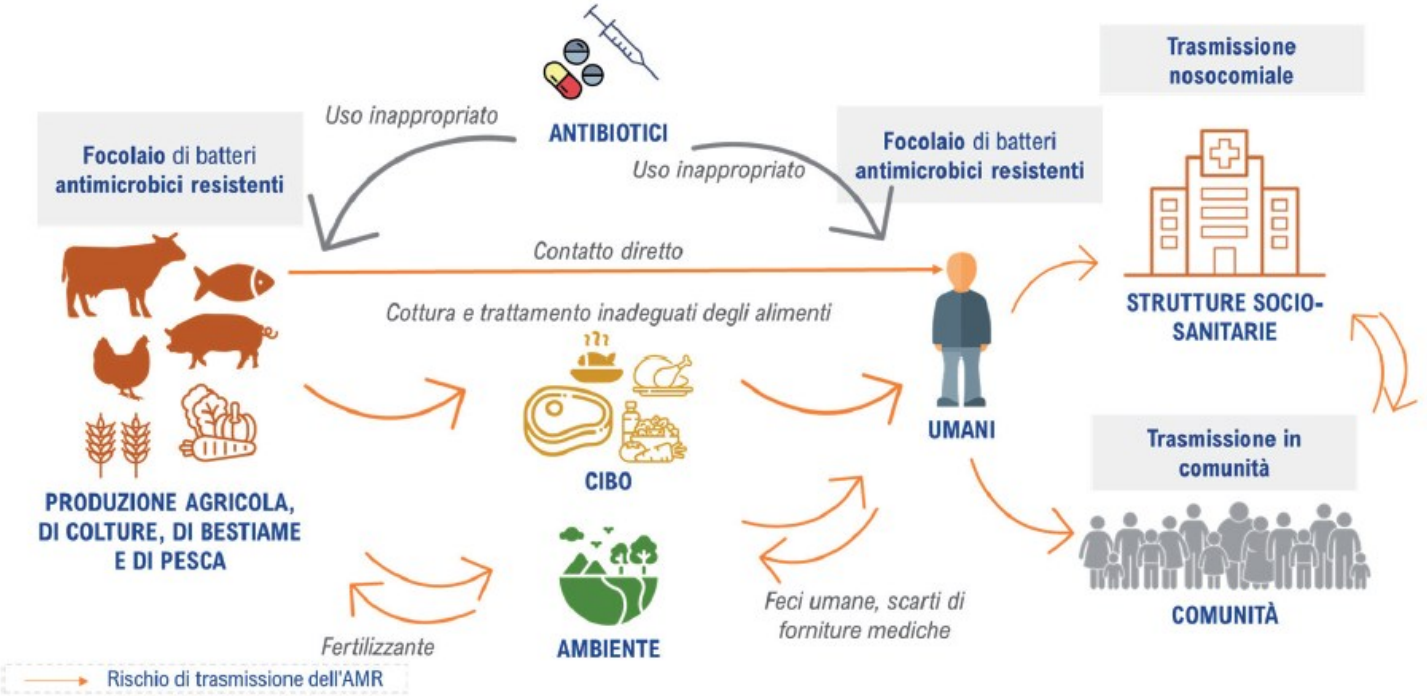
Struttura


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

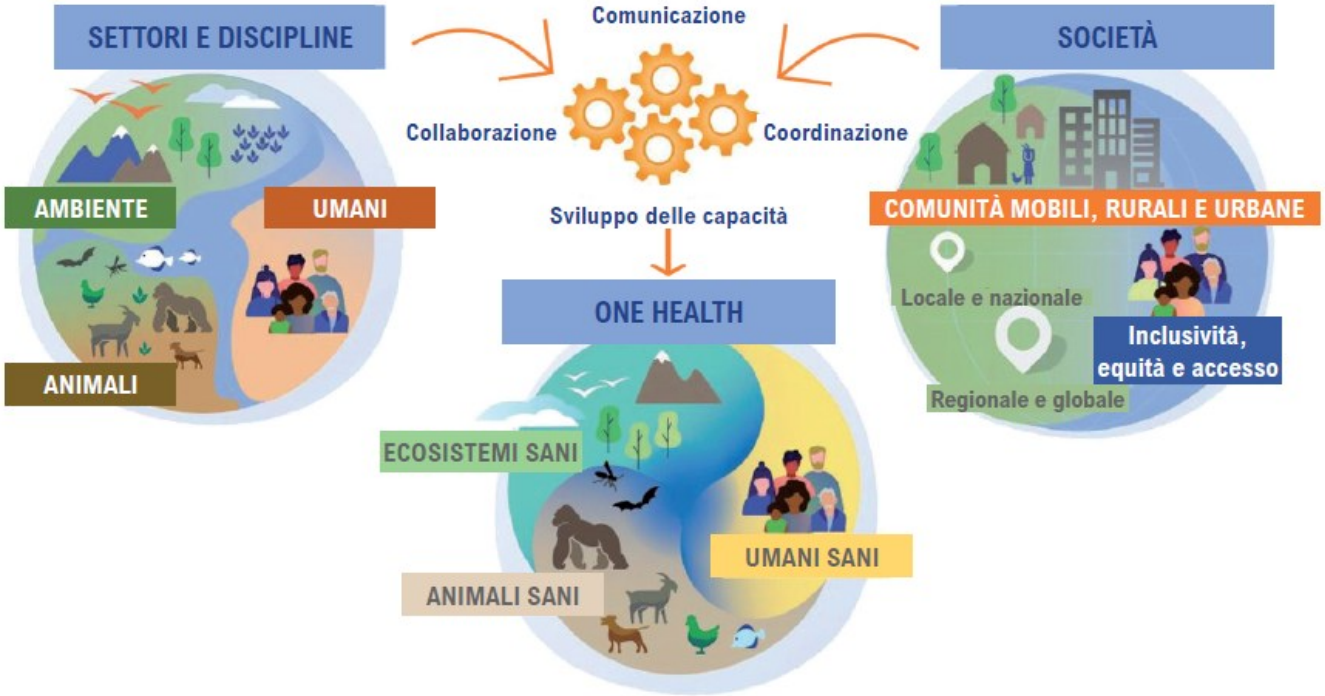
Consumo di antibiotici nell'ambiente



Sorveglianza AMR in una logica One-Health



Approccio One-Health

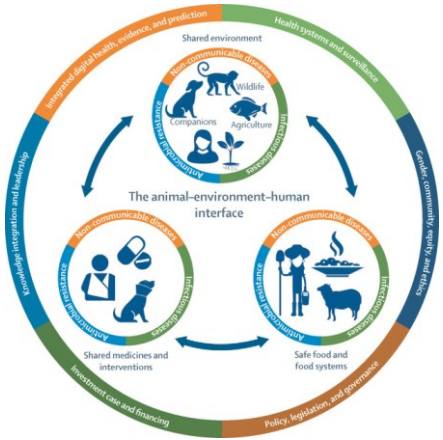


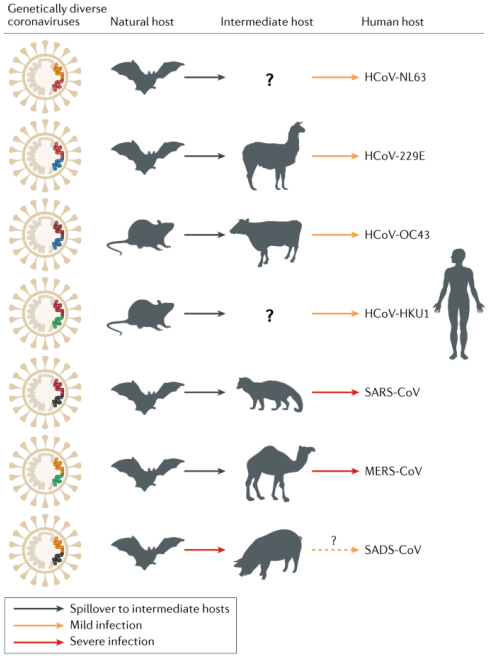
One Health

L’approccio One Health considera la salute dell’uomo, degli animali e dell’ambiente come strettamente interdipendenti, spostando così la visione tipicamente antropocentrica della Salute Pubblica in una visione, finalmente, integrata.

FATTORI che rendono necessario l’approccio One Health

- Crescita esponenziale della popolazione
- Globalizzazione epidemiologica
- Adattamento dei patogeni
- Sicurezza alimentare
- Cambiamento climatico
- Antibiotico-resistenze



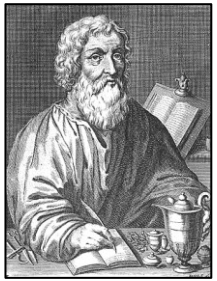


La pandemia da COVID-19 è stata l'ennesimo esempio della necessità dell'approccio One Health.
È ormai noto come diverse malattie infettive emergenti da fonti animali siano state innescate da cambiamenti ambientali (es. HIV).

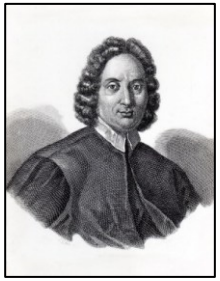
Altro ambito in cui è fondamentale la filosofia One Health è l'AMR, la pandemia silente.
A causa dell'uso, spesso improprio, di questi farmaci si sono selezionati e diffusi nell'ambiente patogeni multi-resistenti che minacciano sia il settore umano che quello animale.

One health nella storia

Il benessere dell'uomo è strettamente connesso a quello della terra che abita. Questo concetto ha delle radici profonde nella storia…

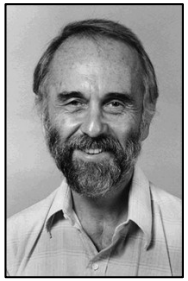


IPPOCRATE
(460-377 a.C)
Primo cenno del concetto One Health nel suo *Dell'aria, delle acque e dei luoghi* in cui sottolinea il nesso tra salute pubblica e ambiente sano



LANCISI
(1654-1720)
Epidemiologo, medico e veterinario, scrisse del ruolo rilevante dell'ambiente nella trasmissione di malattie a uomini ed animali

VIRCHOW
(1821-1902)
Padre della patologia comparata, coniò il termine zoonosi e scrisse: *«Non esiste linea di demarcazione tra medicina umana e quella animale, né dovrebbe esserci»*



SCHWABE
(1927-2006)
Veterinario e parassitologo, inventore della Medicina Unica, sostenitore dell'approccio unificato nella gestione delle zoonosi

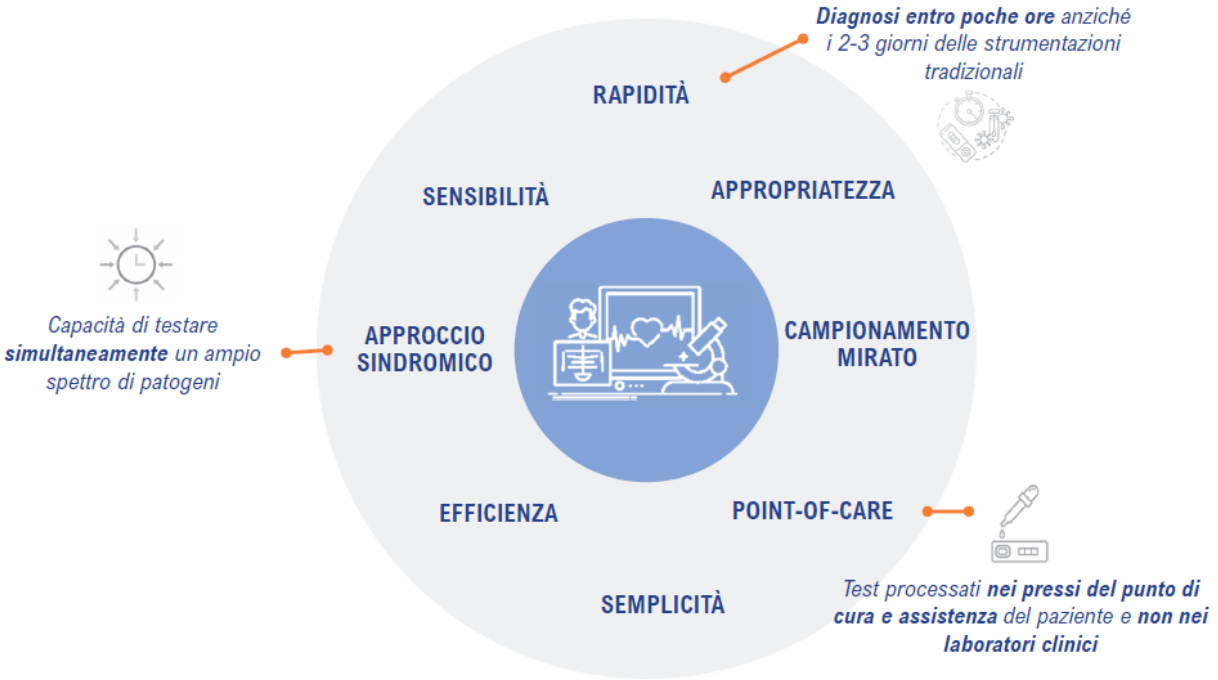
MANTOVANI
(1926-2012)
Medico veterinario, maestro non solo della medicina veterinaria ma della Medicina Unica per la difesa della salute umana, animale e ambientale.
Artefice del concetto *One World, One Health*

L'Italia è l'unico Paese dove la Veterinaria non è collocata all'interno del Ministero dell'Agricoltura, ma del Ministero della Salute.

One HEALTH

HUMANS, ECOSISTEMS AND ANIMALS, LIVING TOGETHER HARMONIOUSLY

Integrazione tra stewardship diagnostica e stewardship antimicrobica



RUOLO DELLA PREVENZIONE VACCINALE COME STRUMENTO DI CONTRASTO ALLA RESISTENZA ANTIMICROBICA

RUOLO DELLA PREVENZIONE VACCINALE COME STRUMENTO DI CONTRASTO ALLA RESISTENZA ANTIMICROBICA

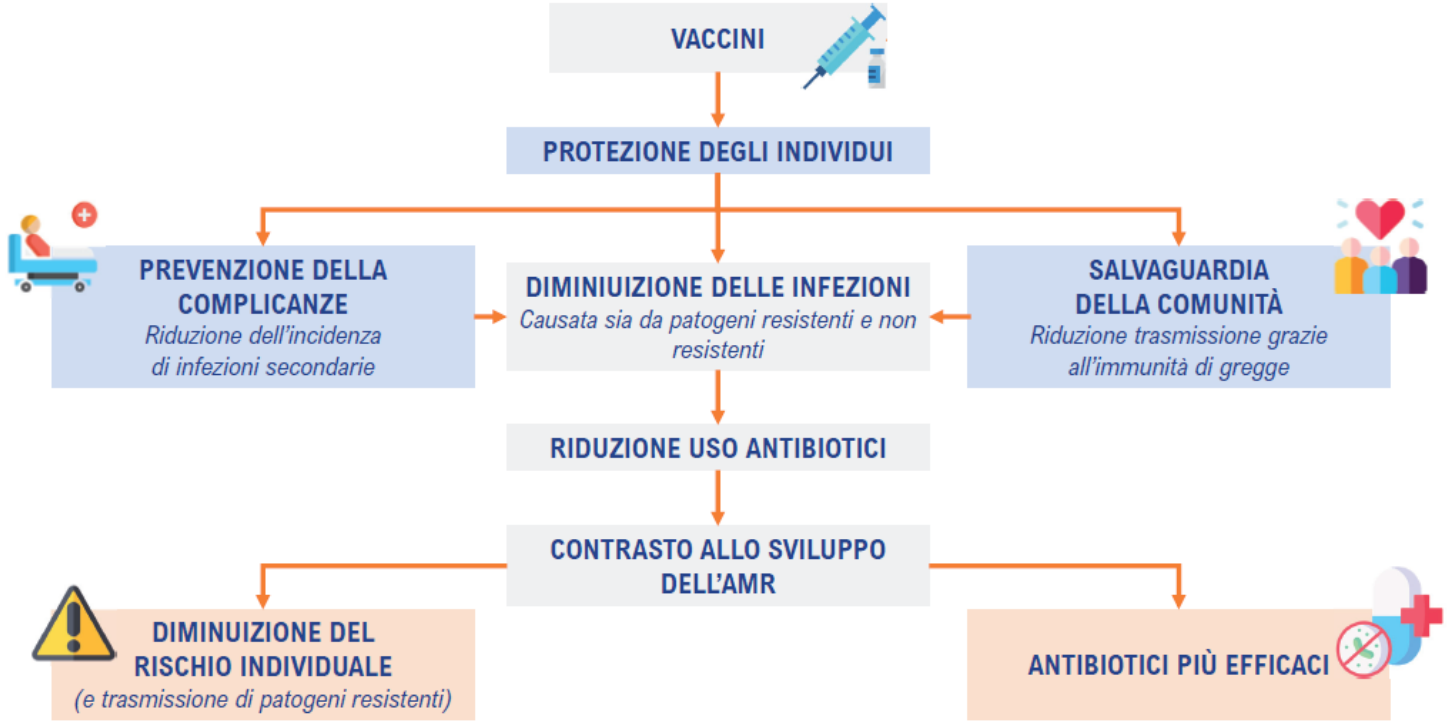
a) proteggendo direttamente l'individuo vaccinato che non contrarrà l’infezione batterica e quindi non dovrà usare l’antibiotico;

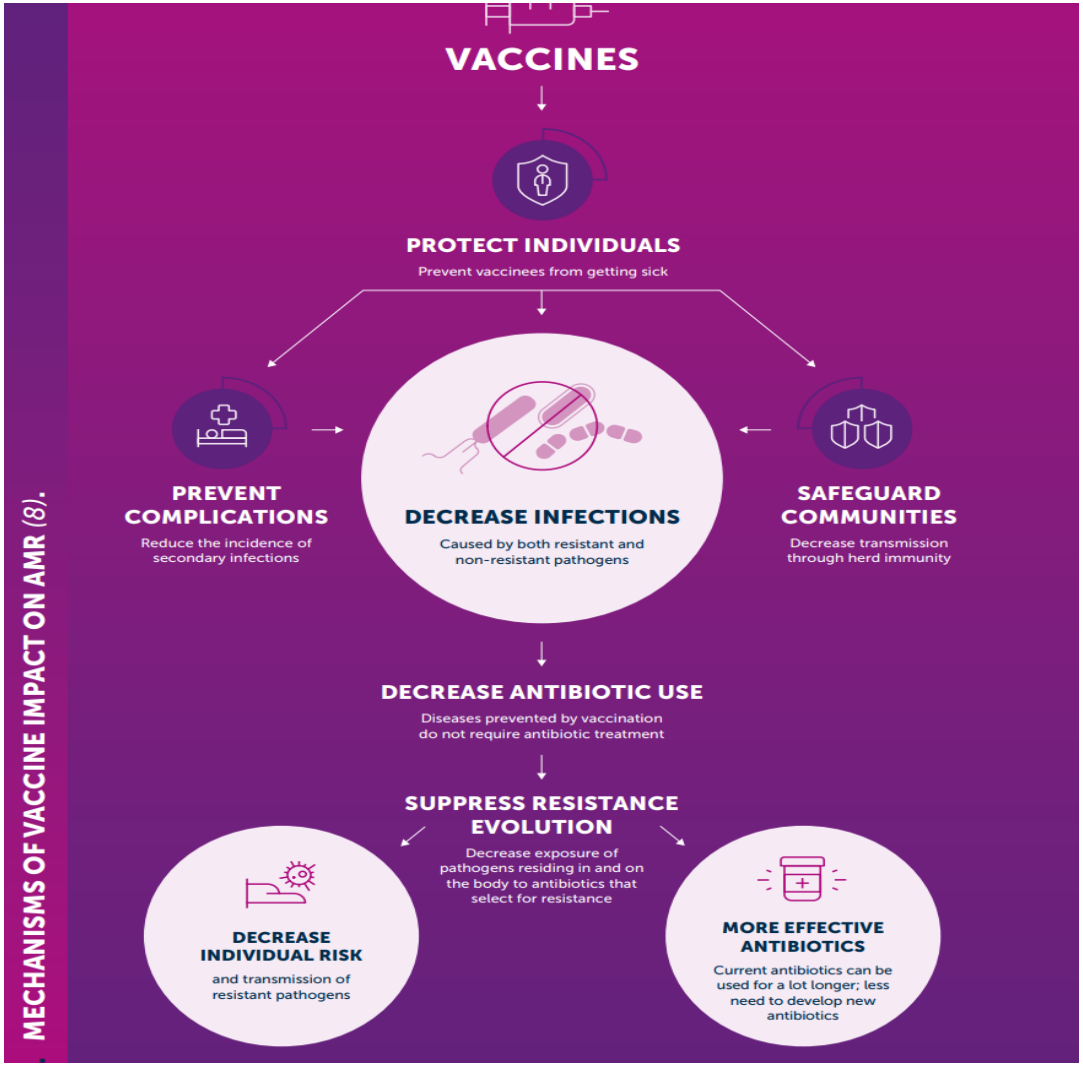
b) riducendo le infezioni virali, si limitano le eventuali infezioni batteriche secondarie associate, e anche l’uso non appropriato degli antimicrobici;

c) diminuendo la possibilità che la malattia si trasmetta nella popolazione non vaccinata, si riduce la probabilità di trasmissione del patogeno

d) proteggendo anche il microbioma dall'alterazione indotta dagli antibiotici ad ampio spettro e quindi dallo sviluppo di specie batteriche resistenti determinato dall'acquisizione di geni di resistenza da altri organismi presenti nel microbioma stesso

Il contributo dei vaccini al contrasto dell'AMR




VACCINES
PROTECT INDIVIDUALS
Prevent vaccinees from getting sick
PREVENT COMPLICATIONS
Reduce the incidence of secondary infections
DECREASE INFECTIONS
Caused by both resistant and non-resistant pathogens
SAFEGUARD COMMUNITIES
Decrease transmission through herd immunity
DECREASE ANTIBIOTIC USE
Diseases prevented by vaccination do not require antibiotic treatment
SUPPRESS RESISTANCE EVOLUTION
Decrease exposure of pathogens residing in and on the body to antibiotics that select for resistance
DECREASE INDIVIDUAL RISK
and transmission of resistant pathogens
MORE EFFECTIVE ANTIBIOTICS
Current antibiotics can be used for a lot longer; less need to develop new antibiotics
MECHANISMS OF VACCINE IMPACT ON AMR (8).

Box 1. **Access, Watch and Reserve antibiotics definitions**

- **Access** antibiotics are antibiotics with a narrow spectrum of activity, generally with less side-effects, a lower potential for the selection of antimicrobial resistance and of lower cost. They are recommended for the empiric treatment of most common infections and should be widely available.
- **Watch** antibiotics generally have a higher potential for the selection of antimicrobial resistance and are more commonly used in sicker patients in the hospital facility setting. Their use should be carefully monitored to avoid overuse.
- **Reserve** antibiotics are last-resort antibiotics that should only be used to treat severe infections caused by multidrug-resistant pathogens.

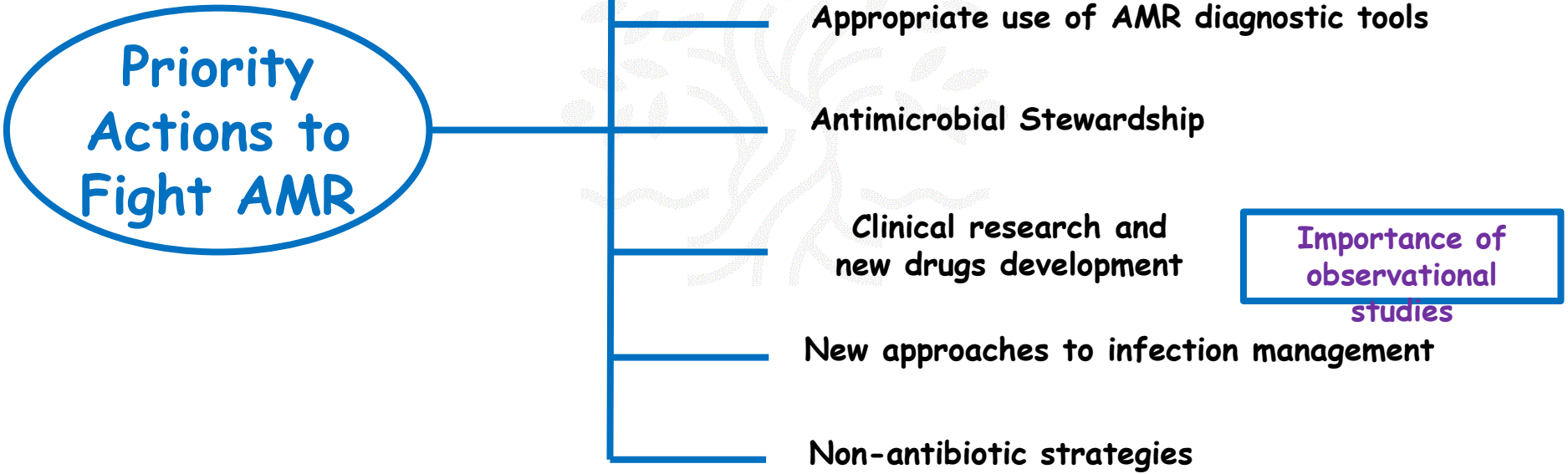
L'Infection Prevention and Control come punto di partenza

L'Antimicrobial Stewardship come strategia irrinunciabile

Il contasto all'antimicrobico resistenza come punto di arrivo

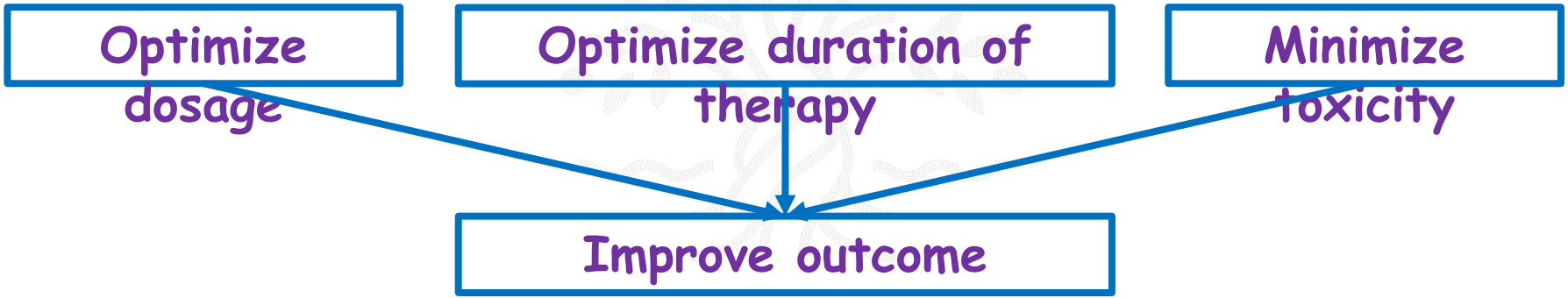
FIGHTING ANTIMICROBIAL RESISTANCE IN CLINICAL SETTING

Claudio M. Mastroianni
Department of Public Health and Infectious Diseases
Sapienza University of Rome


Priority Actions to Fight AMR
Vaccinations
protect people
prevent complications
decrease infections
decrease antibiotic use
Infection control
Appropriate use of AMR diagnostic tools
Antimicrobial Stewardship
Clinical research and new drugs development
Importance of observational studies
New approaches to infection management
Non-antibiotic strategies

Antimicrobial Stewardship (AMS)

A coherent set of actions which promote using antimicrobials responsibly



Implementation and real-life application of AMS projects

Golden rules to treat correctly patients and prevent MDR infections

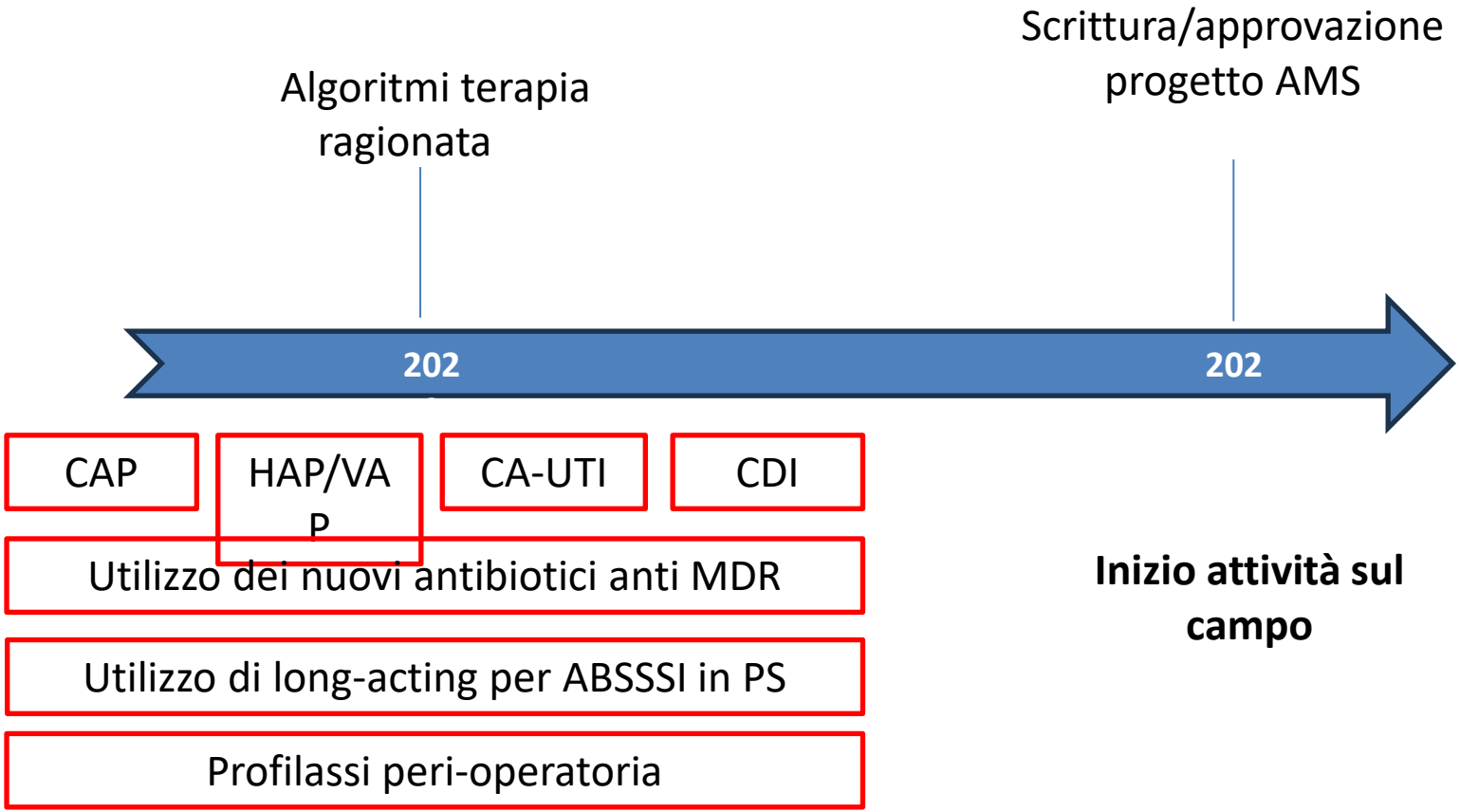
- Prescribing antibiotics only when necessary, not be impulsive
- Selection of antimicrobials using a risk-based approach (ie, clinical severity)
- Be aware of local epidemiology and diagnostic tools
- Avoid useless combinations and redundant prescriptions
- Consider PK/PD features
- Early re-evaluation of antibiotic prescriptions to optimize treatment
- Avoid not necessary long duration therapy
- Right place in therapy of any new and old drugs

Antimicrobial-stewardship presso il Policlinico Umberto I: il progetto aziendale

Claudio Mastroianni, Alessandra Oliva

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERO-UNIVERSITARIA
POLICLINICO UMBERTO I
SAPIENZA
UNIVERSITÀ DI ROMA

AMS e la realtà del Policlinico Umberto I



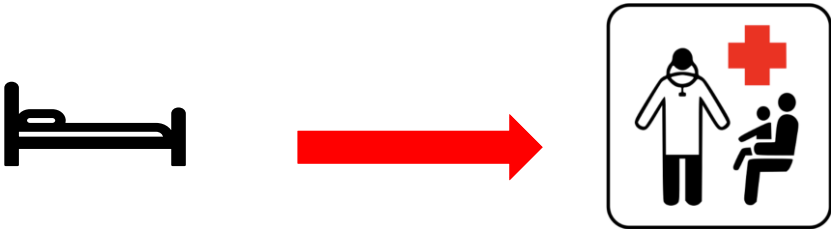
Il progetto AMS: organizzazione

Un team di Infettivologi dedicato effettua le consulenze specialistiche presso i reparti selezionati medici e chirurgici rappresentativi delle **diverse intensità di cura**

Attività di consulenza ordinaria nei reparti *target*

Terapia Intensiva **Terapia Sub-Intensiva** **Degenza ordinaria**

Attività ambulatoriale di presa in carico dei pazienti dimessi dai reparti target che necessitano di proseguire terapia antibiotica/antifungina



- Attività di formazione del personale dei reparti coinvolti
- Attività di formazione sulla profilassi peri-operatoria

- Attività di condivisione dei casi più complessi mediante incontri multi-disciplinari

- Identificazione precoce e azioni su problematiche emergenti

Fase di intervento

1 reparto alta intensità
1 reparto degenza sub-intensiva
1 reparto degenza ordinaria chirurgico

Periodo pre-intervento (marzo-maggio 2023)

Periodo intervento (marzo-dicembre 2024)

Δ indicatori

- consumo antibiotici
- antibiotici AwaRE
- durata della terapia antibiotica
- microrganismi alert (CR)
- *C. difficile* o candidemie
- sviluppo infezioni nosocomiali
- appropriatezza diagnostica
- appropriatezza terapeutica
- source control

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- appropriatezza diagnostica
- appropriatezza terapeutica
- source control

Report periodico nei reparti target per il consumo degli antibiotici

1 Infettivologo

1 Farmacista

2 volte a settimana nei reparti target
Monitoraggio antibiotici

Antibiotici Access

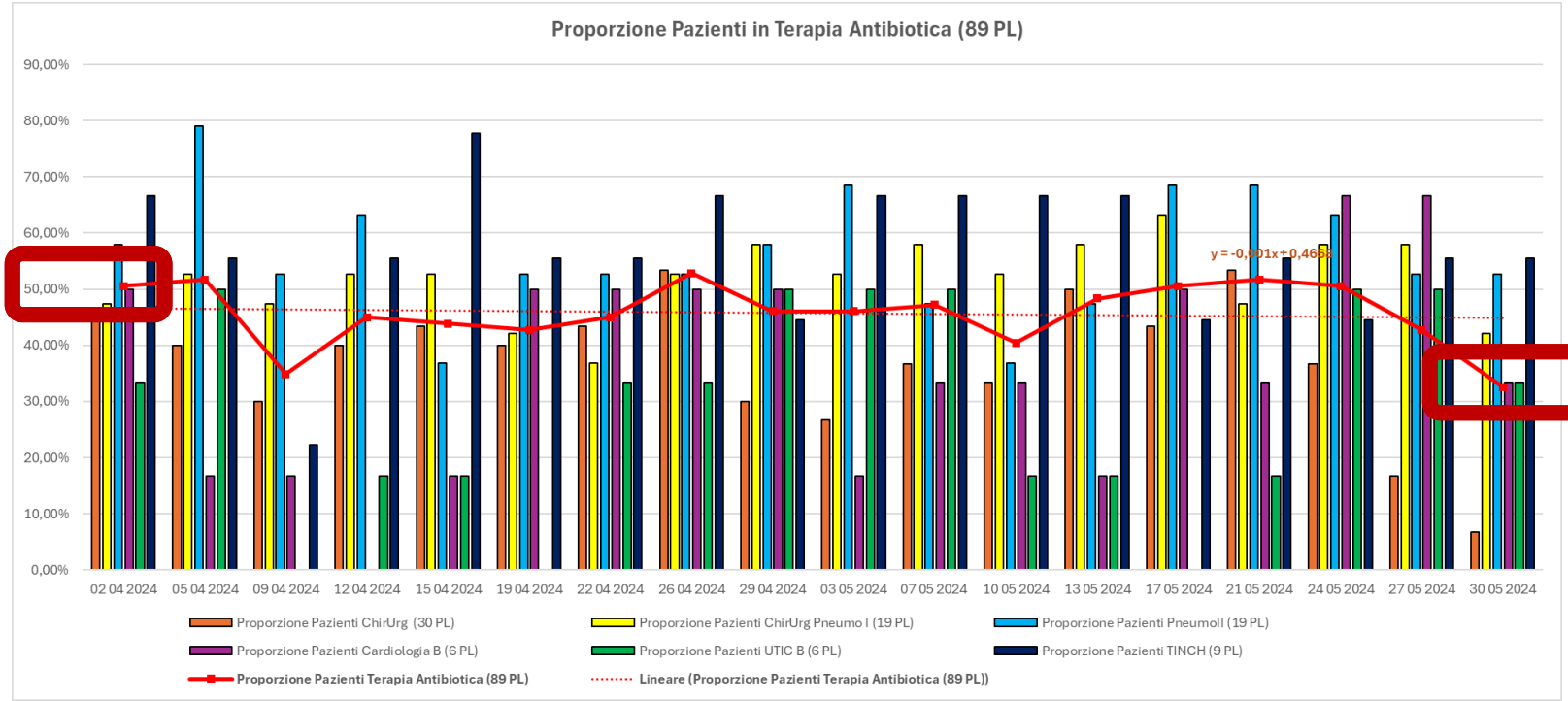
Antibiotici Alert

Antibiotici Reserve

Risultati preliminari I (periodo marzo-maggio 2024)

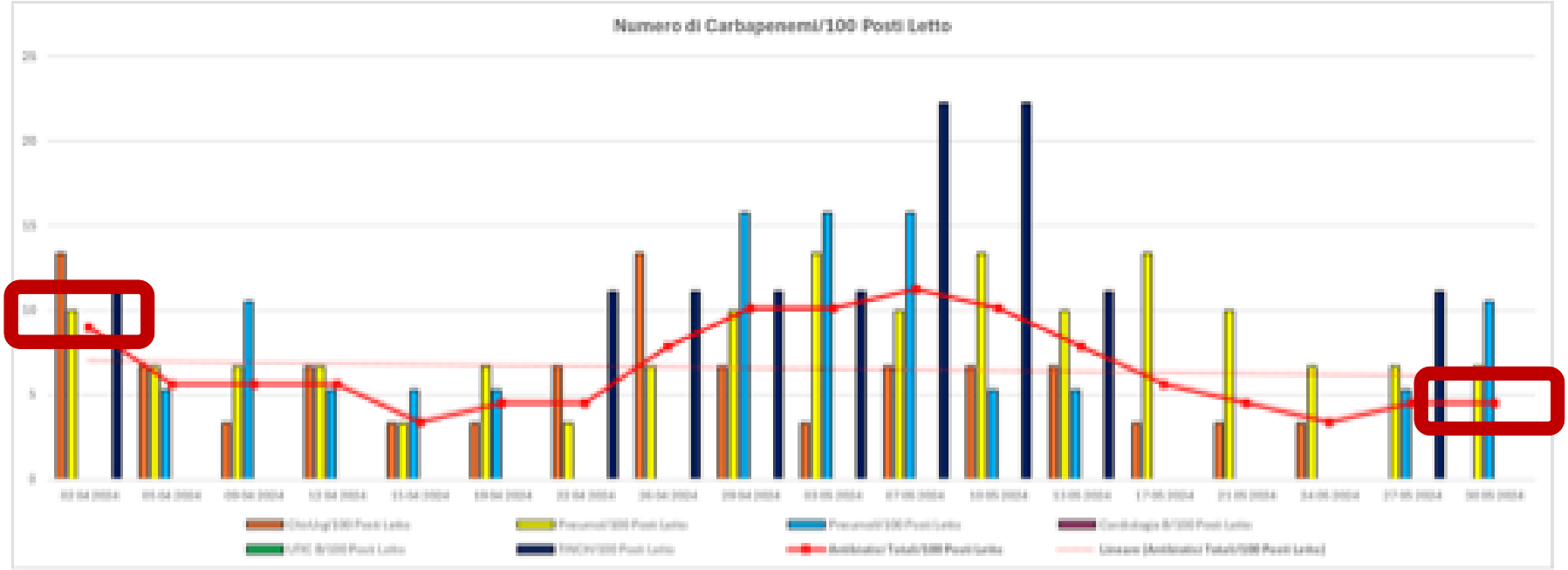
Riduzione della percentuale dei pazienti in terapia antibiotica

(da circa il 51% a circa il 33% del 30/05)

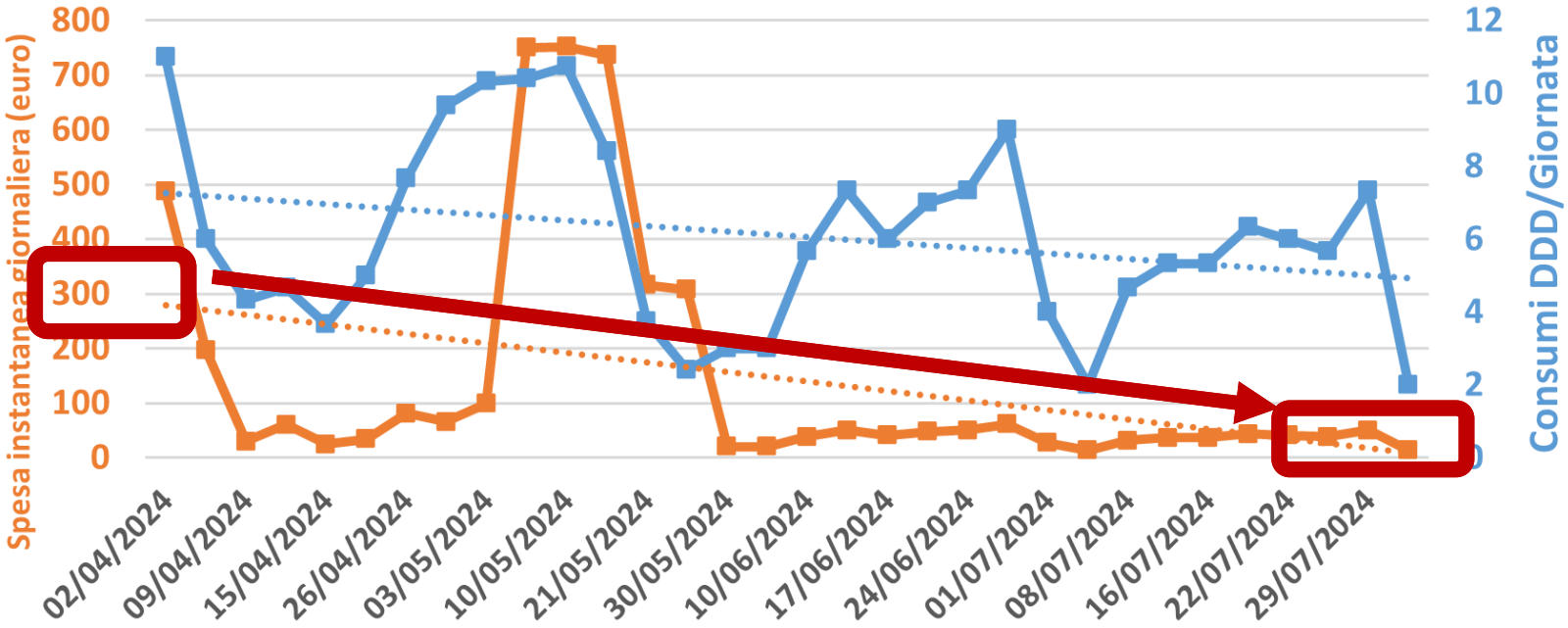


Risultati preliminari II (periodo marzo-maggio 2024)

Riduzione nel consumo dei carbapenemi
(da circa 8/100 posti letto a 4/100 posti letto)

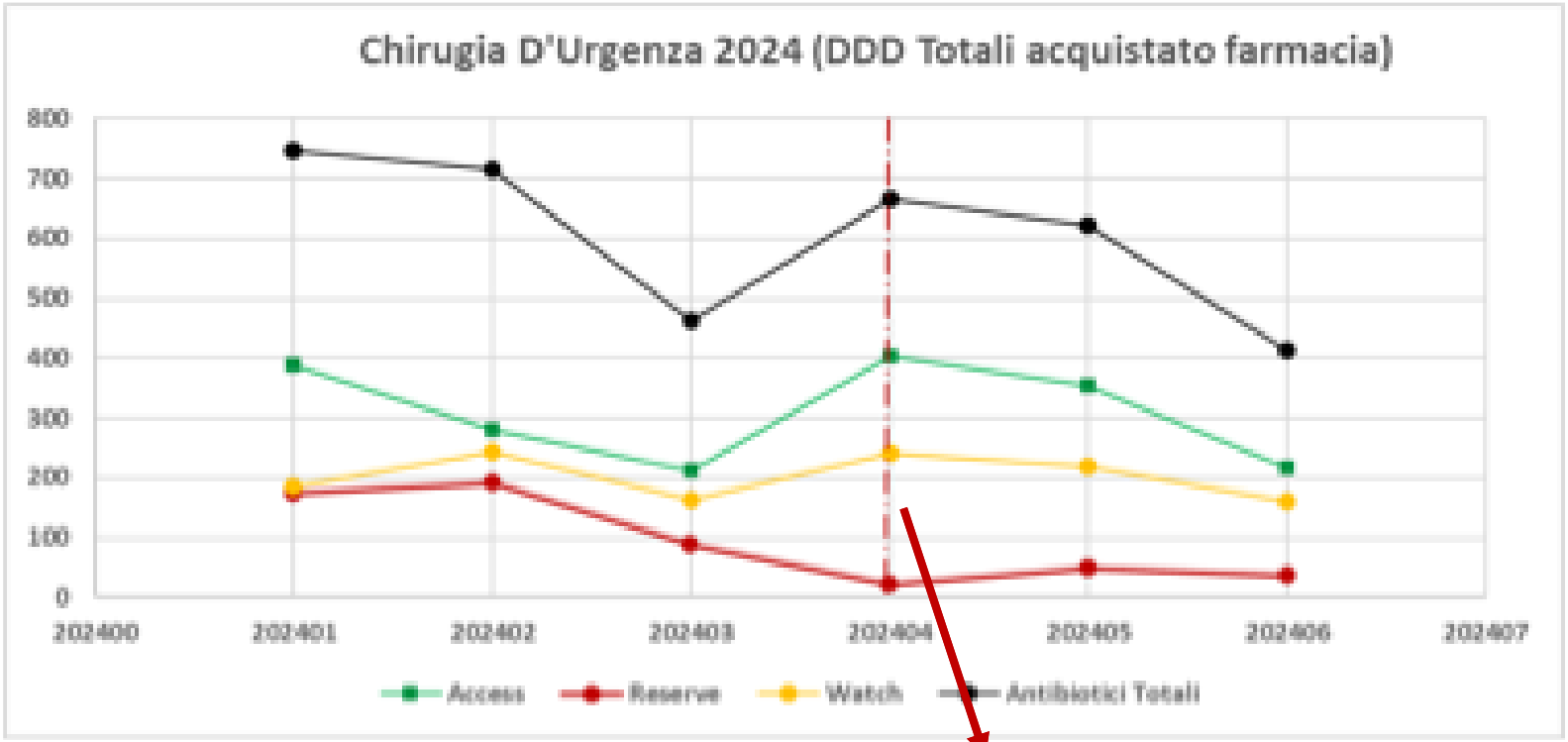


Riduzione dei costi dei carbapenemi nei reparti target



Risultati preliminari III (periodo marzo-maggio 2024)

Riduzione nel consumo degli antibiotici nel reparto di Chirurgia d'Urgenza

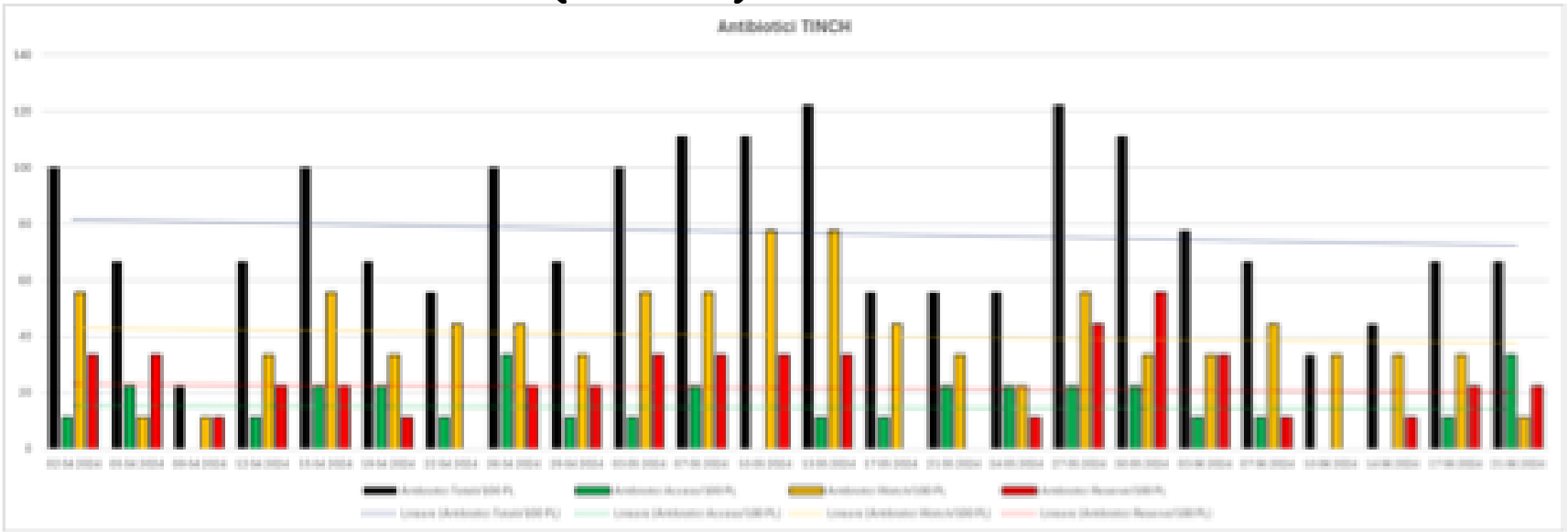


Report periodico del consumo di antibiotici inviato ai consulenti

Risultati preliminari IV (periodo marzo-maggio 2024)

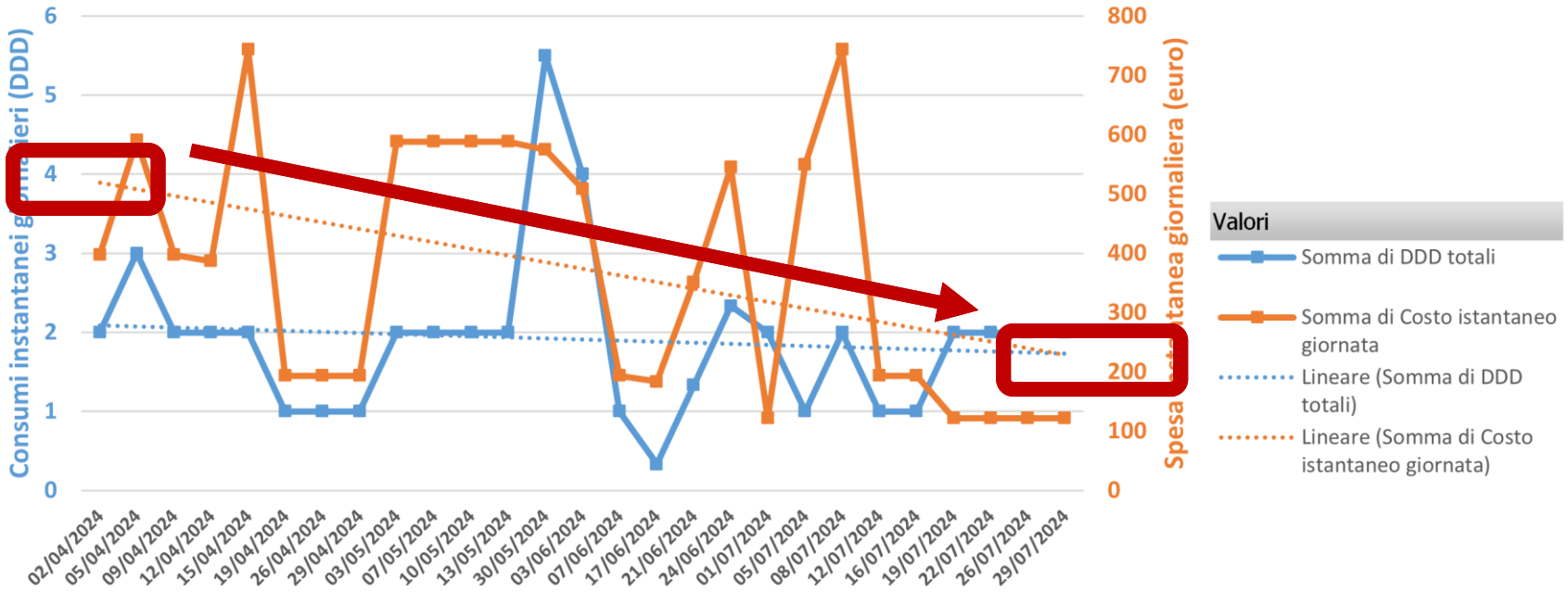
TERAPIA INTENSIVA NEUROCHIRURGICA

- Riduzione del consumo globale degli antibiotici/100 posti letto, da circa 100/100 posti letto a circa 67/100 posti letto
- Riduzione evidente per tutte le classi di antibiotici, compresi gli antibiotici ad alto costo (Reserve)



Luglio-Settembre 2024: ASSENZA DI COLONIZZAZIONI/INFEZIONI DA MDR

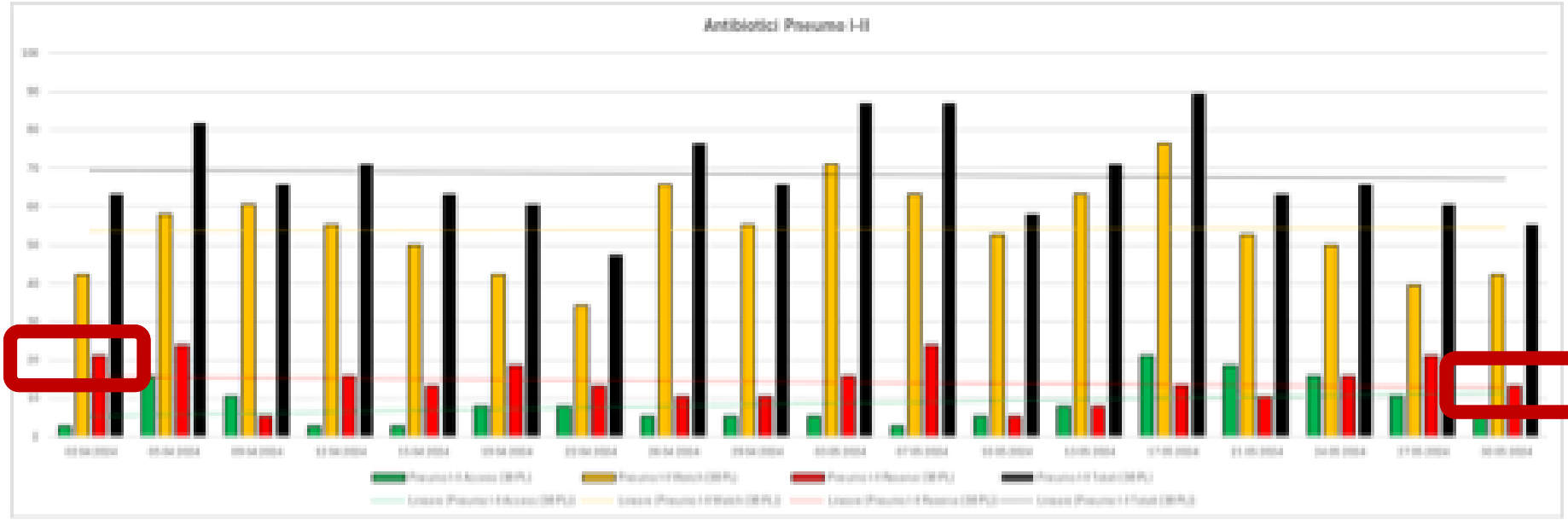
Riduzione dei costi dei farmaci ad alto costo in TI NCH



Risultati preliminari V (periodo marzo-maggio 2024)

PNEUMOLOGIA (SUB-INTENSIVA)

- **Riduzione del consumo globale degli antibiotici/100 posti letto,** da 63/100 posti letto a 55/100 posti letto
- **Riduzione maggiormente evidente per gli antibiotici ad alto costo (Reserve)**, da 22/100 posti letto a 11/100 posti letto



LIMITAZIONI

- I dati presentati sono ovviamente preliminari
- Al momento disponibili dati relativi solo al consumo degli antibiotici nei reparti target
- Mancano infatti dati fondamentali riguardanti il motivo dell'utilizzo di questi antibiotici (terapia empirica vs mirata), l'appropriatezza e la durata della terapia, le azioni effettuate dal consulente dedicato (de-escalation, sospensione, escalation)
- Mancano dati sull'incidenza e sulla prevalenza dei microrganismi MDR, su *C. difficile* e su infezioni invasive da Candida.

Conclusioni

- AMS è un processo lungo e non facile
- Necessario approccio multidisciplinare (Farmacia Ospedaliera, Microbiologia, altri Specialisti)>>> criticità consumi, outbreaks, nuovi patogeni emergenti
- Necessario approccio di gestione diagnostica e terapeutica condiviso per un obiettivo comune
- Necessaria collaborazione stretta con Igienisti per accurato Infection Control