ESITI CLINICI: UN IMPEGNO ED UNA RESPONSABILITÀ CONDIVISI

10° CONGRESSO NAZIONALE SIFaCT

24-26 novembre 2022
Centro congressi Fontana di Trevi
Roma

Sifact
SOCIETÀ ITALIANA DI FARMACIA CLINICA E TERAPIA

La gestione infettivologica di un paziente pediatrico in area critica

Daniele Dona'

REGIONE DEL VENETO
Azienda Ospedale Università Padova

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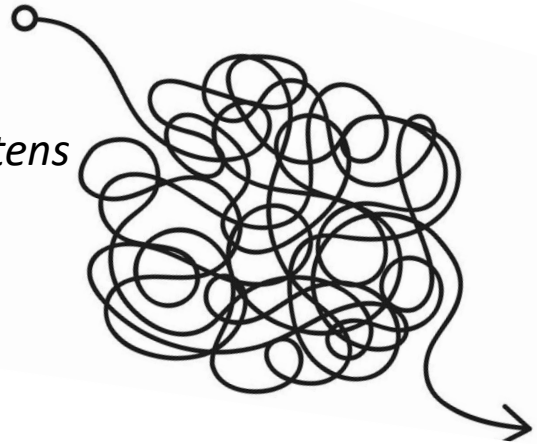
UNIVERSITÀ DEGLI STUDI DI PADOVA

The Problem

Antimicrobial Resistance

*a **global crisis** that threatens a century of progress*



The Solution

Antimicrobial Stewardship

RESISTENZA AGLI ANTIBIOTICI, UN PROBLEMA GLOBALE

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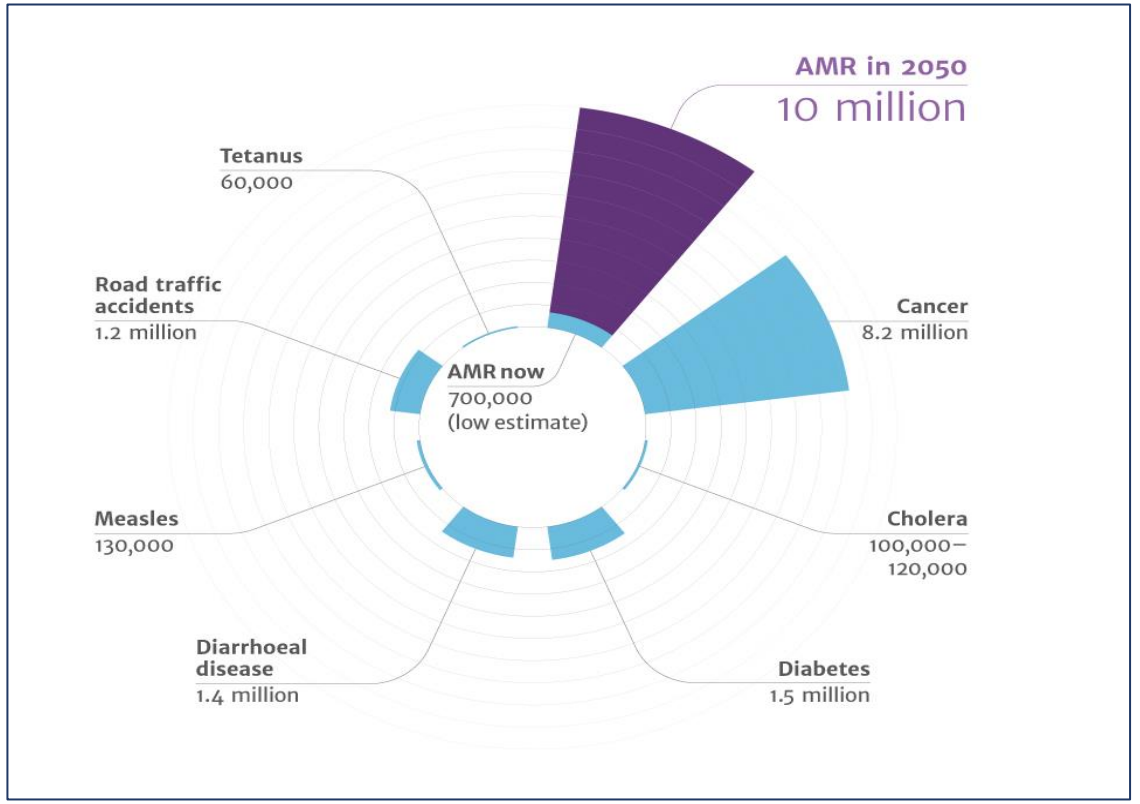
CDC (USA) 2013

DH (UK) 2013

WHO 2014



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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**

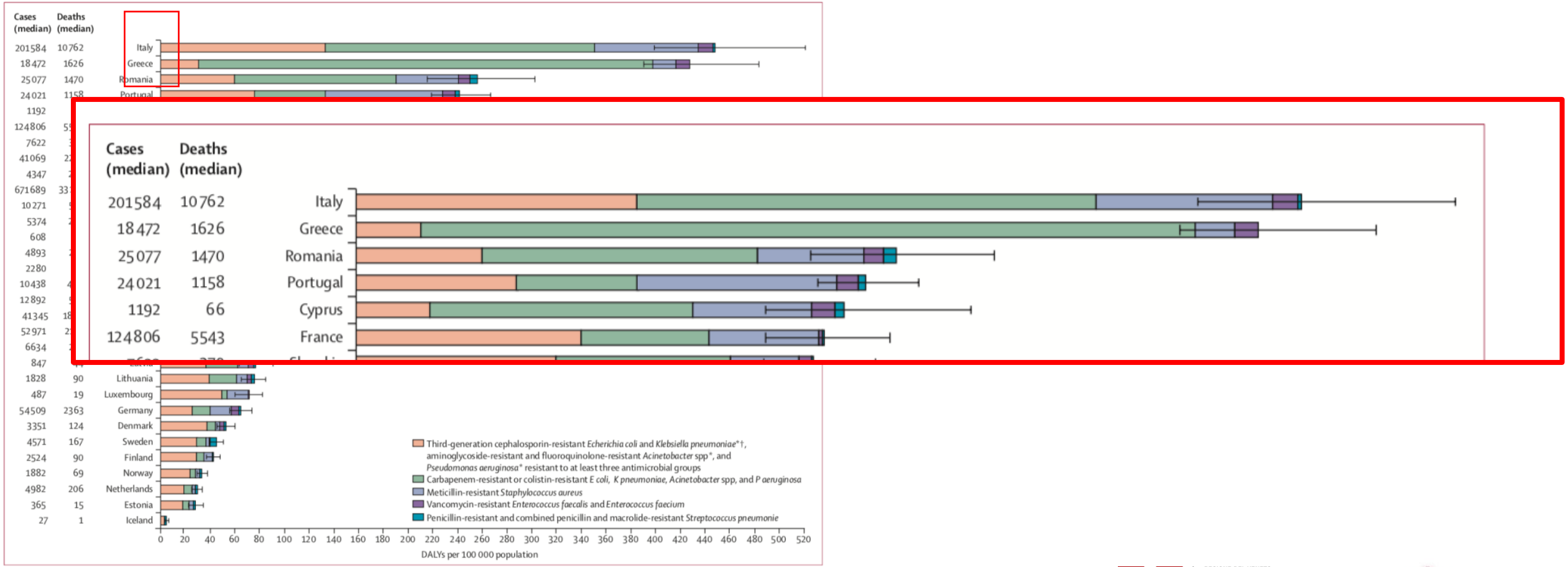


Figure 3: Burden of infections with antibiotic-resistant bacteria in DALYs, EU and European Economic Area, 2015

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**

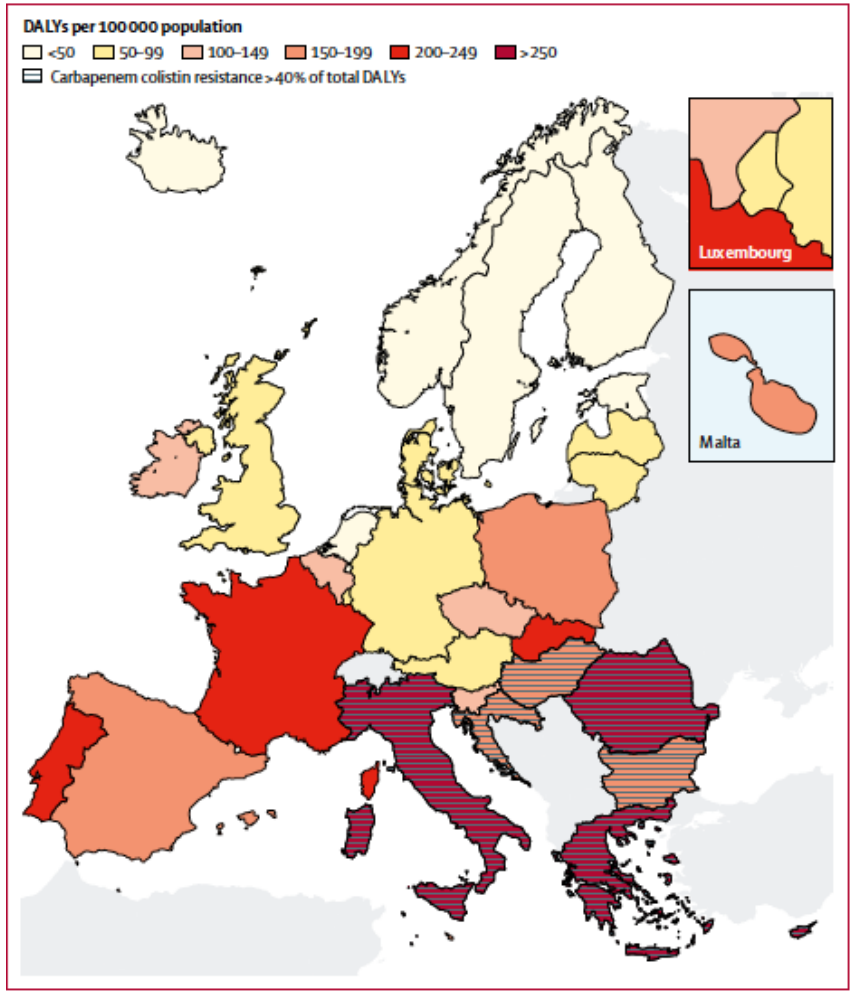
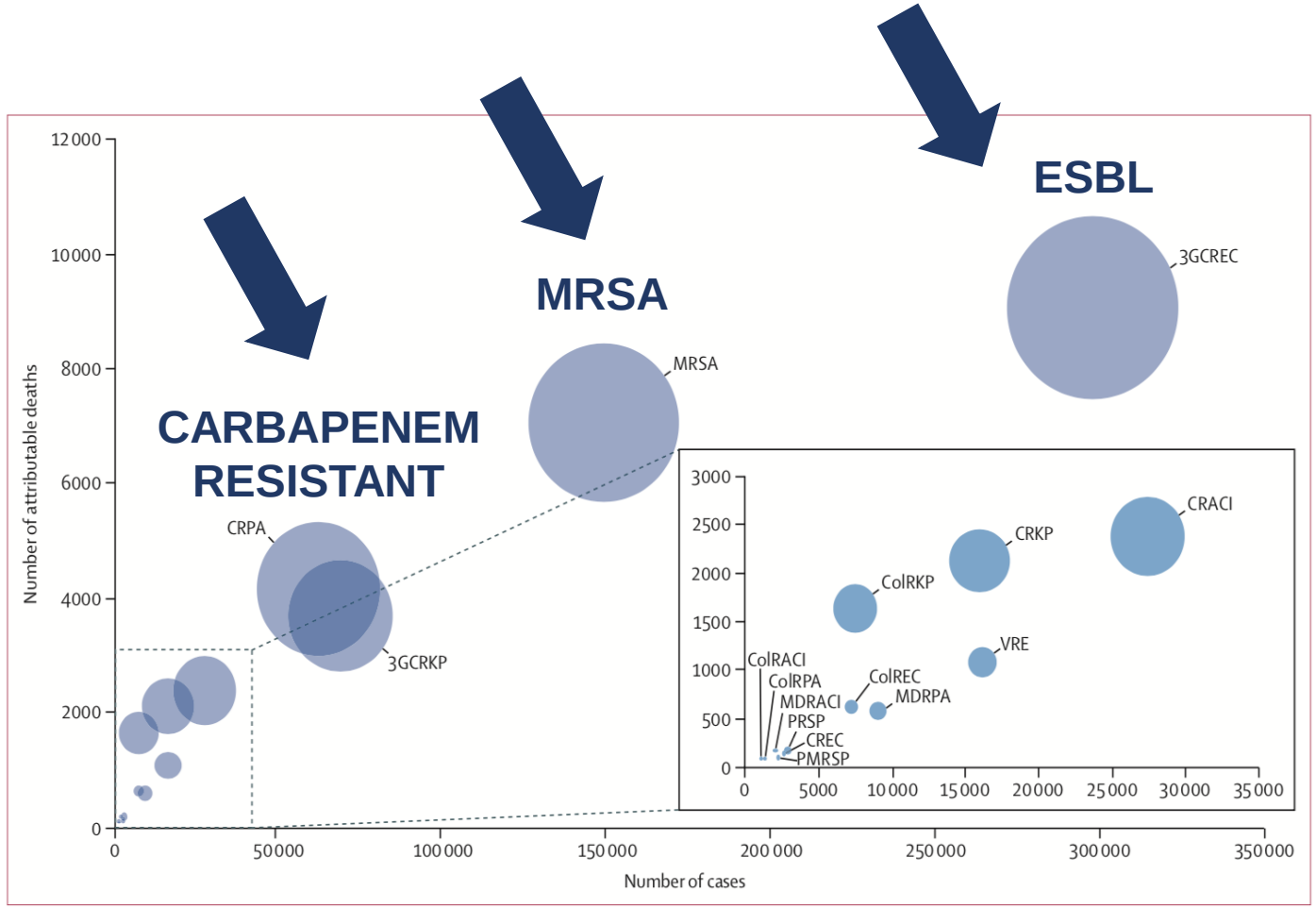


Figure 4: **Model estimates of the burden of infections with selected antibiotic-resistant bacteria of public health importance in DALYs per 100 000 population, EU and European Economic Area, 2015**
Greece did not report data on *S pneumoniae* isolates to the European Antimicrobial Resistance Surveillance Network in 2015. DALYs=disability-adjusted life-years.



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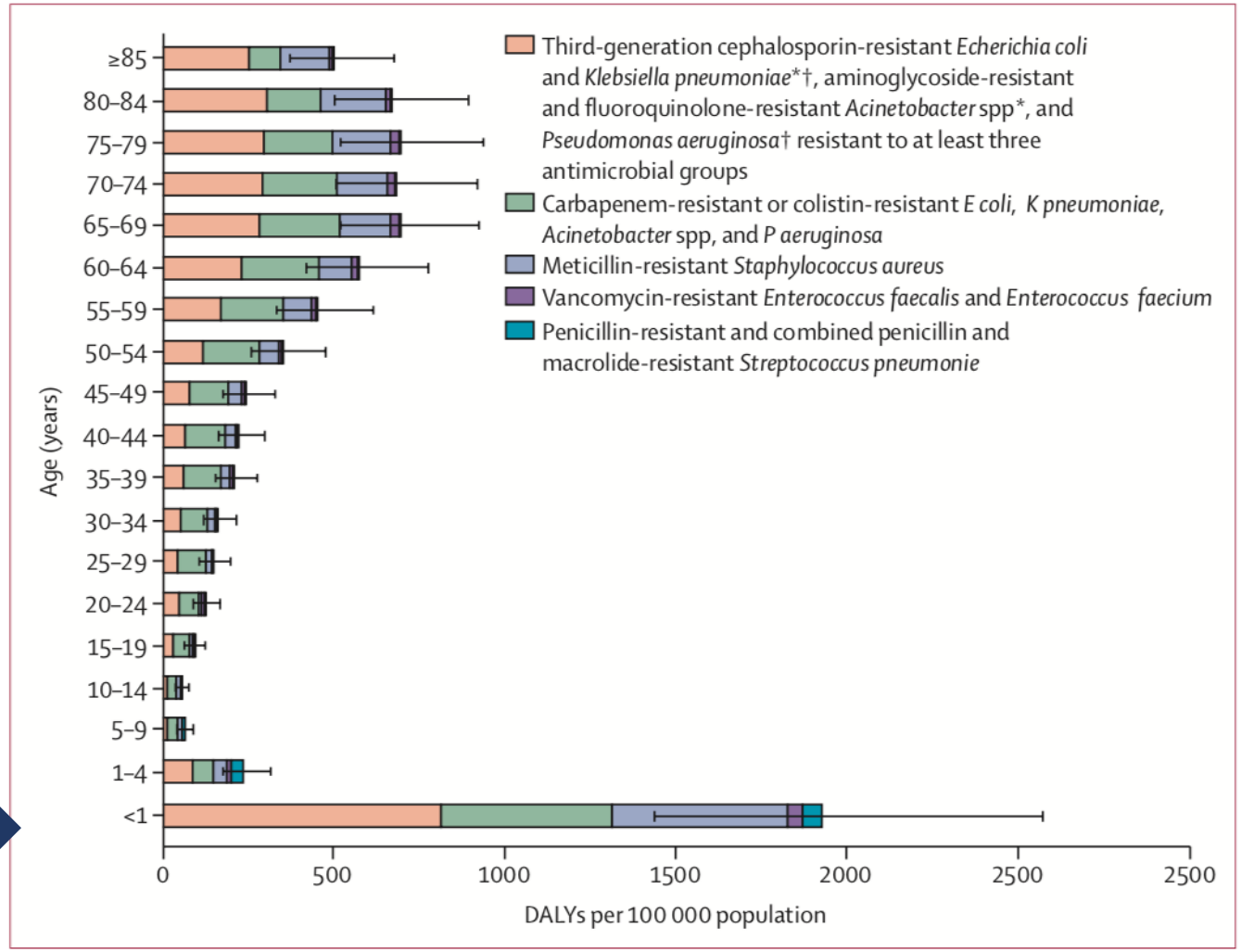
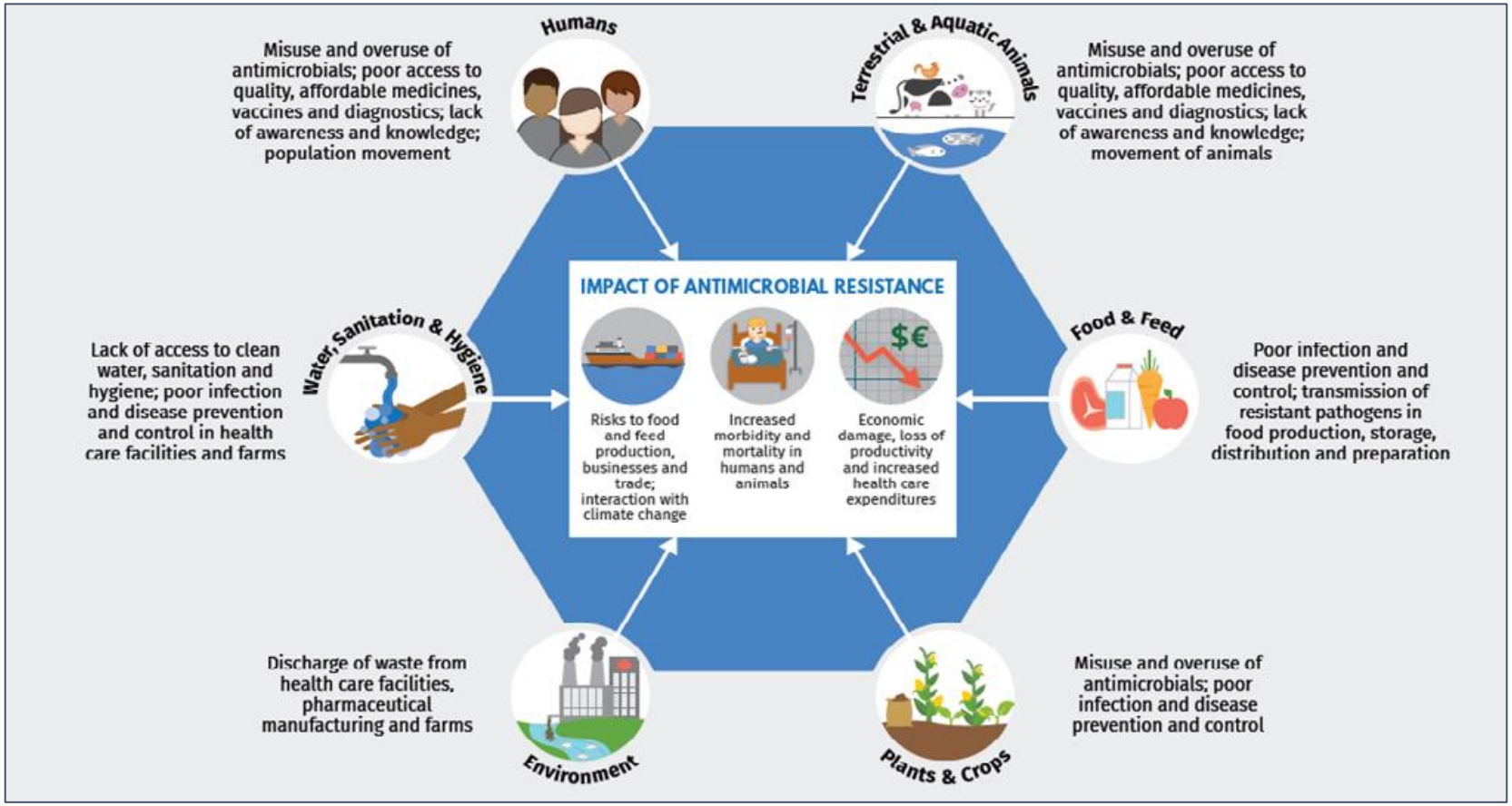


L'abuso di antibiotici è diventato la **causa principale** dell'aumento dei livelli di resistenza antimicrobica



NO TIME TO WAIT:
SECURING THE FUTURE FROM DRUG-RESISTANT INFECTIONS

IACG | Interagency Coordination Group on Antimicrobial Resistance

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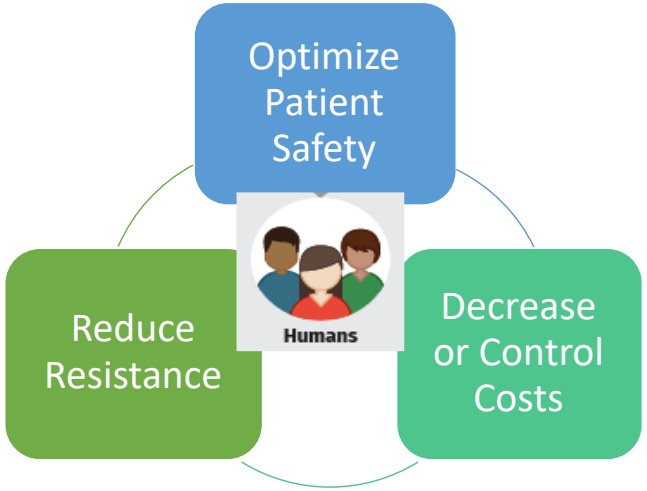
Università degli Studi di Padova

2007

PROGRAMMA DI STEARDSHIP ANTIBIOTICA



IDSA
Infectious Diseases Society of America

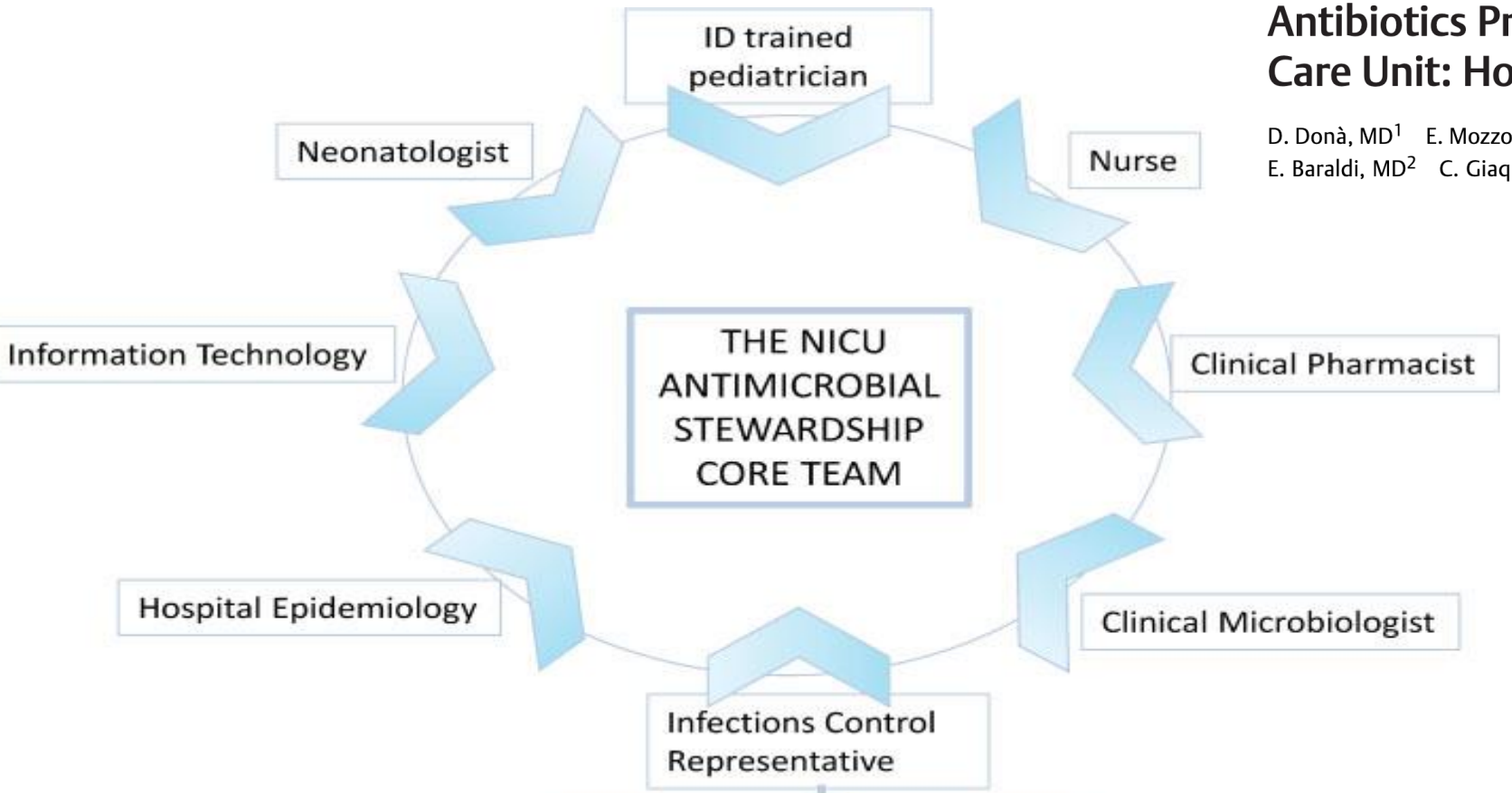
Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship

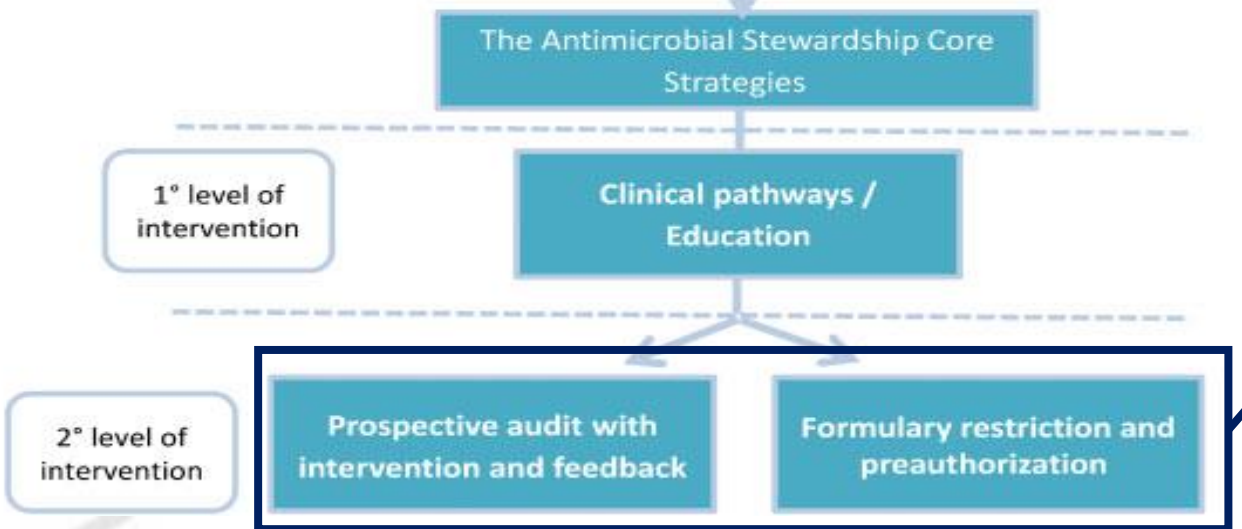
Timothy H. Dellit,[1] Robert C. Owens,[2] John E. McGowan, Jr.,[3] Dale N. Gerding,[4] Robert A. Weinstein,[5] John P. Burke,[6] W. Charles Huskins,[7] David L. Paterson,[8] Neil O. Fishman,[9] Christopher F. Carpenter,[10] P. J. Brennan,[9] Marianne Billeter,[11] and Thomas M. Hooton[12]

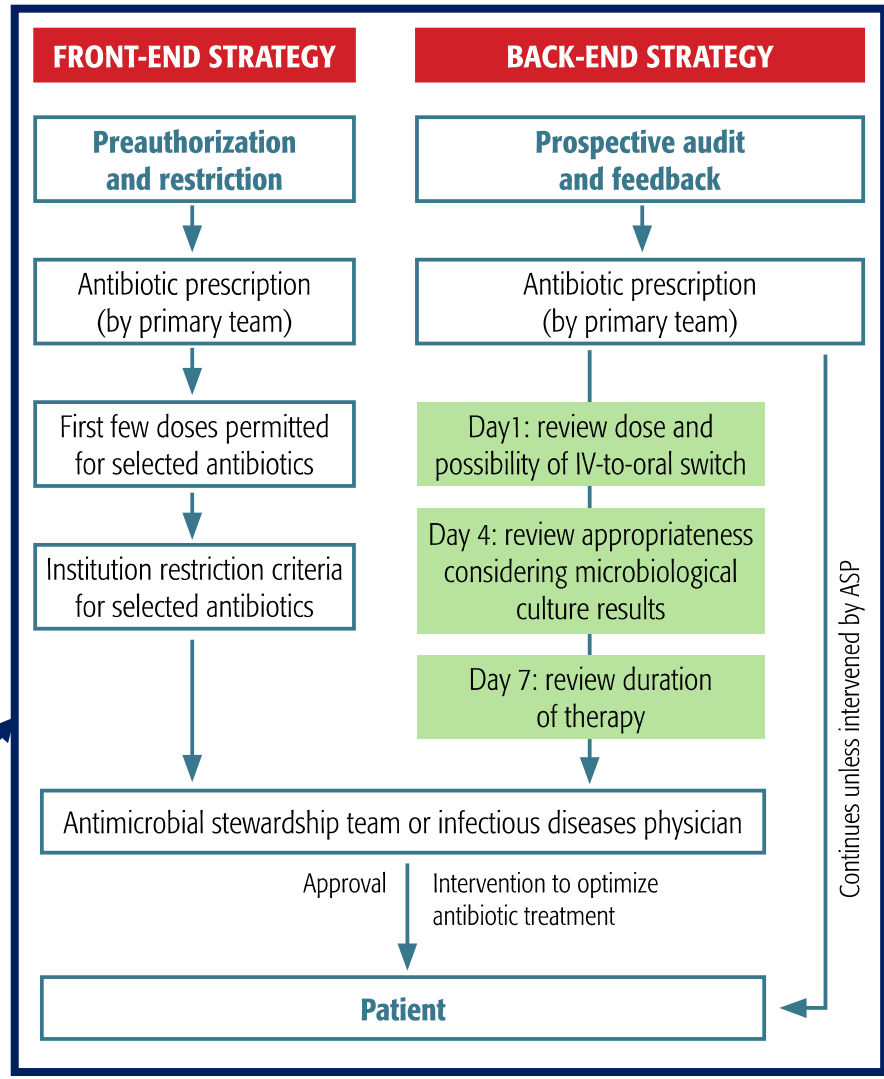
«insieme di interventi coordinati che hanno lo scopo di promuovere l'uso appropriato degli antimicrobici indirizzando nella scelta ottimale del tipo di antibiotico, del dosaggio, della durata della terapia e della via di somministrazione»

Antibiotics Prescriptions in the Neonatal Intensive Care Unit: How to Overcome Everyday Challenges

D. Donà, MD[1] E. Mozzo, MD[1] V. Mardegan, MD[2] U. Trafojer, MD[2] P. Lago, MD[2] S. Salvadori, MD[2]
E. Baraldi, MD[2] C. Giaquinto, MD[1]







ASP: interventi di provata efficacia

Journal of the Pediatric Infectious Diseases Society

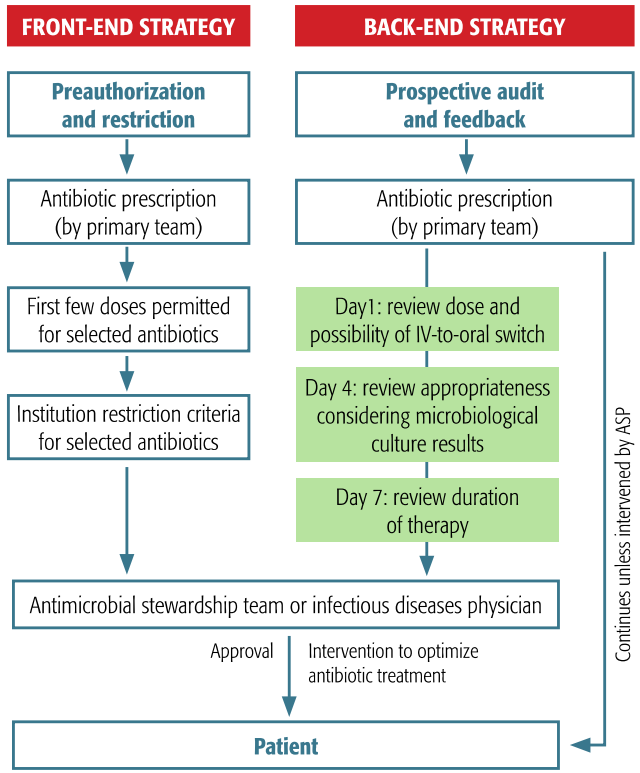
ORIGINAL ARTICLE

Policy Statement: Antibiotic Stewardship in Pediatrics

Jeffrey S. Gerber,[1,2] Mary Anne Jackson,[3] Pranita D. Tamma,[4,©] Theoklis E. Zaoutis,[1,2] and the AAP Committee on Infectious Diseases and Pediatric Infectious Diseases Society

[1]Department of Pediatrics, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania, USA, [2]Division of Infectious Diseases, Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, USA, [3]Department of Pediatrics, Section of Infectious Disease, Children's Mercy Hospital, UMKC School of Medicine, Kansas City, Missouri, USA, and [4]Department of Pediatrics, Division of Pediatric Infectious Diseases, The Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

CORE STRATEGIES



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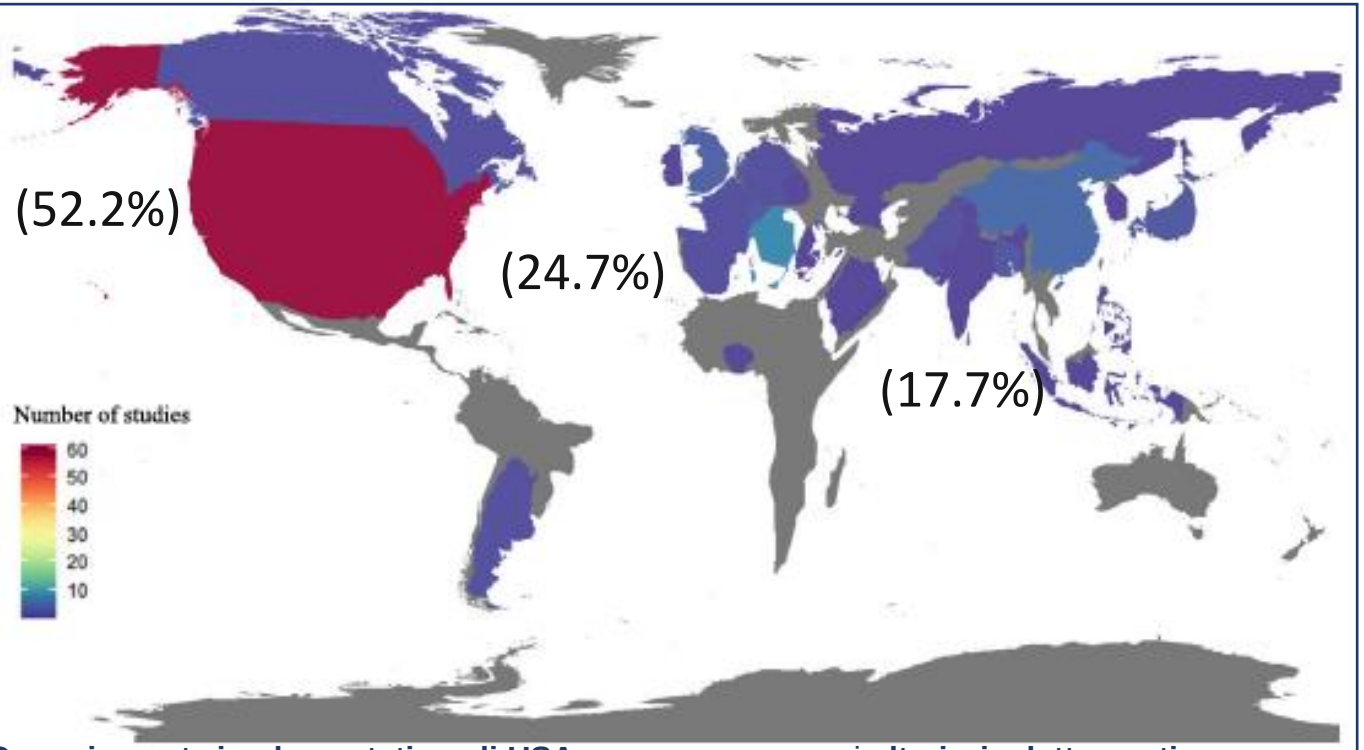
SUPPLEMENT STRATEGIES

A. Education
B. Guideline and clinical pathways
C. Antimicrobial cycling
D. Antimicrobial order forms
E. Combination therapy
F. Streamlining or de-escalation of therapy
G. Dose optimizing
H. Parenteral to oral conversion

Implementation and impact of pediatric antimicrobial stewardship programs: a systematic scoping review

2019

D. Donà[1,2,3†], E. Barbieri[1*†], M. Daverio[4], R. Lundin[3], C. Giaquinto[1,3], T. Zaoutis[5,3] and M. Sharland[2,3]



ASO ampiamente implementati negli USA, ma sono necessari **ulteriori adattamenti** affinché vengano implementati anche in **Europa, Asia, America Latina e Africa**.

41.916 articoli screenati

113 eleggibili per inclusione

- Quasi l'80% degli studi mostra una riduzione significativa dell'inappropriata prescrizione di antibiotici dopo l'implementazione di una stewardship antibiotica

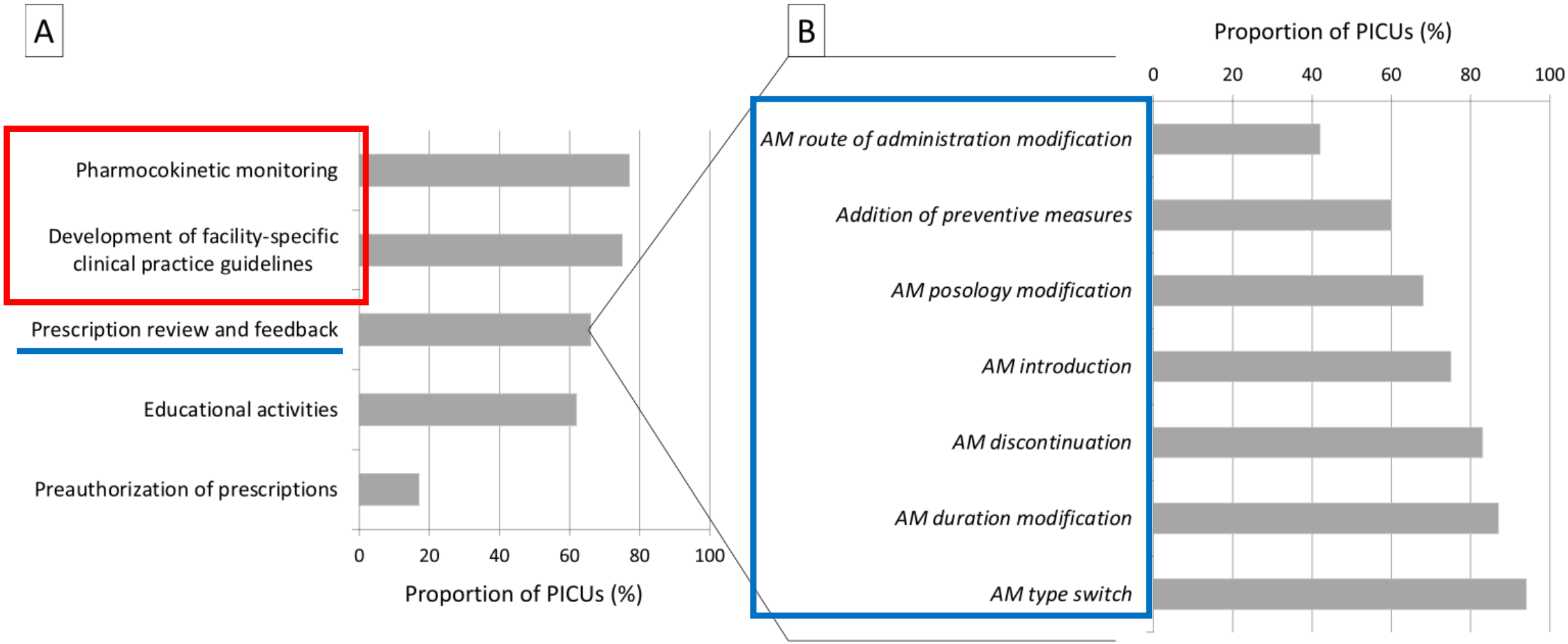
- Nella maggior parte dei casi ciò è dovuto è ad una riduzione nella prescrizione stessa

European Journal of Pediatrics (2022) 181:2873–2877
https://doi.org/10.1007/s00431-022-04481-0

SHORT COMMUNICATION

Antimicrobial stewardship programs in European pediatric intensive care units: an international survey of practices

Maité Clos[1] · Luregn J. Schlapbach[2,3] · Julie Arata-Bardet[1] · Etienne Javouhey[4,5] · Guillaume Mortamet[1,5,6] · on behalf of the European Society of Neonatal and Pediatric Intensive Care (ESPNIC) Section on Infection, Inflammation, and Sepsis



ONLINE REVIEW ARTICLE

Elisavet Chorafa, MD, MSc[1]
Vasiliki Komatsiouli, PharmD, MSc[1]
Elias Iosifidis, MD, PhD[1]
Maria Kourti, MD, PhD[1]
Maria Sdougka, MD[2]
Emmanuel Roilides, MD, PhD[1]

Antimicrobial Stewardship Programs in PICU settings: A Systematic Review

Pediatric Critical Care Medicine

DATA SYNTHESIS: Thirteen articles were found: 11 that applied ASP in PICUs, and two at hospital level. All PICU-dedicated ASPs applied a multimodal intervention combining strategies simultaneously; audit with feedback (6/11) and facility-specific clinical practice guidelines (7/11) were the most common strategies. A multidisciplinary team was formulated in all ASPs except for three biomarker-based interventions. Six of 11 studies included techniques to enhance behavior change and one implemented a behavior-based intervention. Antibiotic consumption was evaluated in all ASPs, cost in three of 11, antibiotic resistance in one of 11, length of hospitalization in six of 11, and mortality in eight of 11. All hospital-wide ASPs used audit with feedback in addition to facility-specific clinical practice guidelines and assessed antimicrobial consumption, expenditures, length of stay, and mortality.

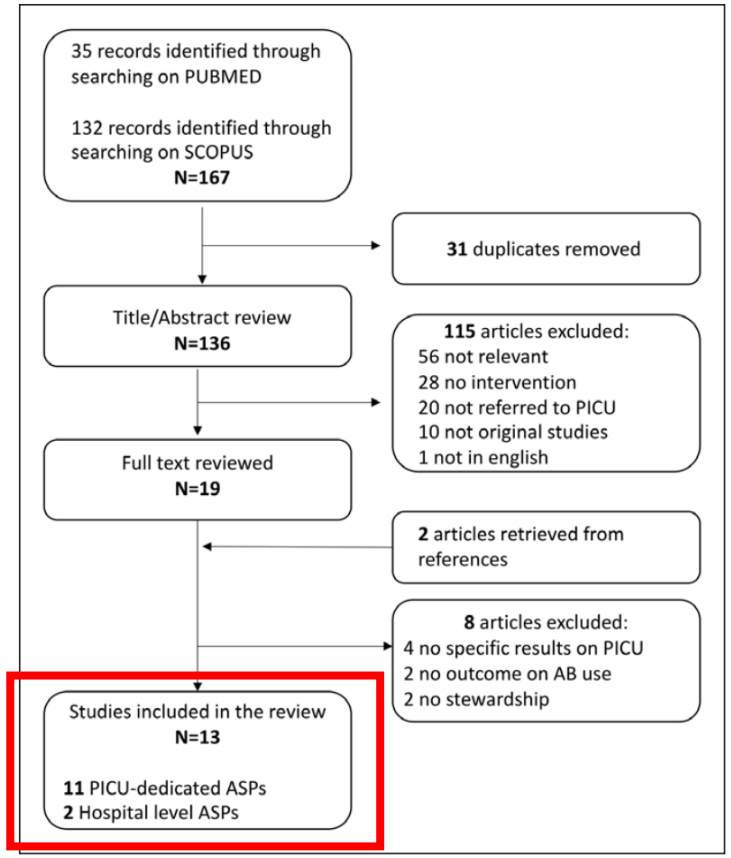


Figure 1. Flowchart of the study selection process. *One study published results in three different time points ("Handshake" strategy). AB = antibiotics, ASP = antimicrobial stewardship program.

Antimicrobial Stewardship Programs in PICU settings: A Systematic Review

Study	Intervention: ASP core strategy & activities							Diagnostics	Optimization	Other
	Audit and feedback	Pre-authorization	Didactic Education	Facility specific Clinical Practice Guidelines	Target specific infectious disease syndromes	Prescriber-led Review of appropriateness	CDS=Computerized Clinical Decision Support systems			Restriction of specific antimicrobial agents
Aizawa et al., 2018	✓	✓[2]								
Jones et al., 2019	✓[1]			✓		✓				✓[5]
Downes et al., 2018			✓	✓	✓		✓			
Lee et al., 2016	✓[1]		✓	✓	✓					
Bobillo-Perez et al., 2019										
Haque et al., 2018	✓					✓				
Ding et al., 2007		✓[2]	✓	✓						
Murni et al., 2015	✓[6]		✓	✓	✓					
Stocker et al., 2012	✓[7]			✓		✓				✓

Study	Structure/ASP core personnel
Aizawa et al., 2018	PID physician, pharmacists, microbiologists, clerks
Jones et al., 2019	PICU consultant, microbiologist, antimicrobial pharmacist, medical and nursing staff, project management personnel
Downes et al., 2018	Biomarker-based intervention, ASP team[8]
Lee et al., 2016	ASP pharmacist, PID physician
Bobillo-Perez et al., 2019	Biomarker-based intervention without dedicated ASP team
Haque et al., 2018	Paediatric intensivist, critical care pharmacist specially trained in ASP,PID physician
Ding et al., 2007	No dedicated ASP team
Murni et al., 2015	Doctors, nurses, allied workers at the PICU ward
Stocker et al., 2012	PICU physicians, pharmacists, nurses

Antimicrobial Stewardship Programs in PICU settings: A Systematic Review

Study	Outcome: Antimicrobial use/ consumption								Expenditures		Resistance	Patient Safety					
	DOT	Doses per Picu day	Antimicrobial prescription rate	Antimicrobial treatment Days	Antibiotic free days	Rate of de-escalation	Antimicrobial courses	LOT	Appropriateness	Antimicrobial cost	Healthcare cost	Antimicrobial Resistance	Mortality	Days of Hospitalization	PICU readmissions	Infection relapse rate	Length of stay	Infection rate
Aizawa et al., 2018	↓[9]												<->[10]		<->		<->	
Jones et al., 2019		↓[11]							↑[12]				<->				<->	<->
Downes et al., 2018	↓[13]							<->[13]									<->	
Lee et al., 2016	↓[14]								↑	↓[15]			<->				<->	
Bobillo-Perez et al., 2019			↓	↓	↑	↑[16]							<->			<->	<->	<->
Haque et al., 2018	↓[17]								↑[18]	↓			<->					
Ding et al., 2007			↓[19]					<->	↑[20]	↓		↓					<->	
Murni et al., 2015			<->						↑[21]				↓					↓
Stocker et al., 2012							<->		↑[22]				<->[23]	<->		<->		

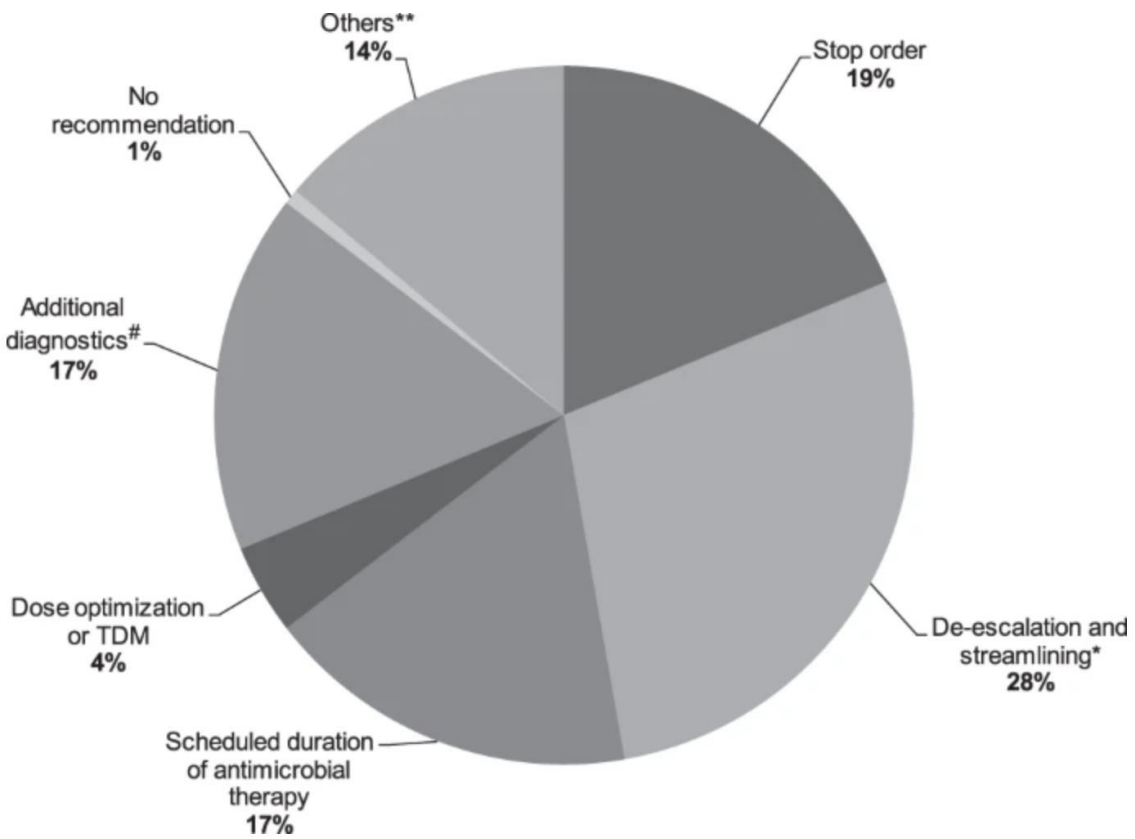
Article | Open Access | Published: 01 June 2020

Antibiotic stewardship in the PICU: Impact of ward rounds led by paediatric infectious diseases specialists on antibiotic consumption

Hanna Renk, Eva Sarmisak, Corinna Spott, Matthias Kumpf, Michael Hofbeck & Florian Hölzl

Scientific Reports **10**, Article number: 8826 (2020) | Cite this article

2570 Accesses | **7** Citations | **1** Altmetric | Metrics



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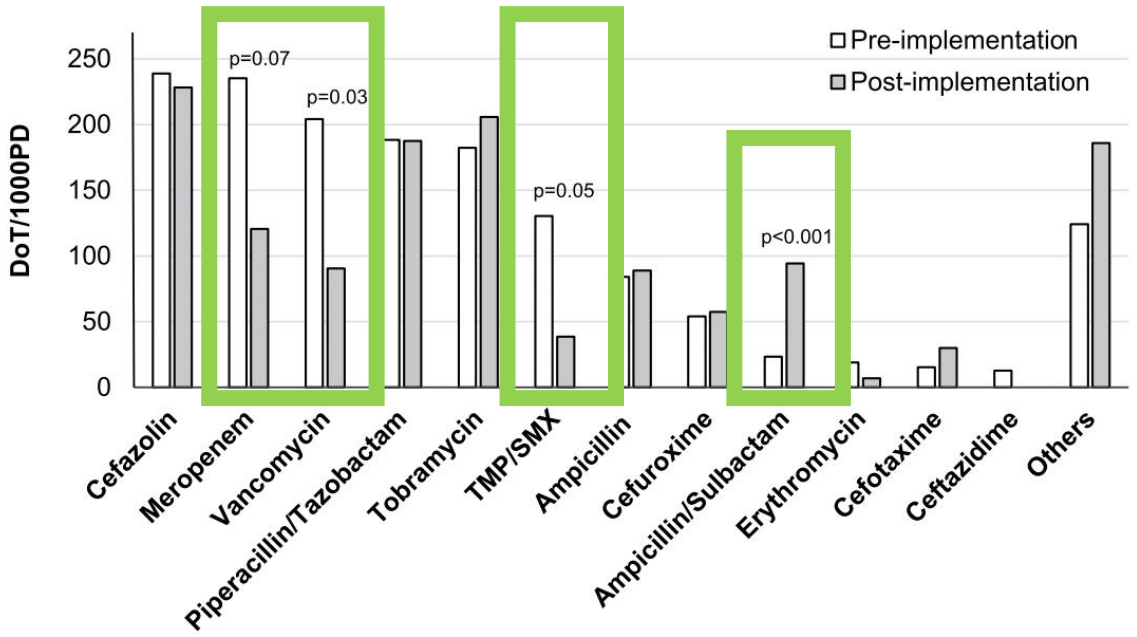
INTERVENTO:

Once weekly infectious disease ward round using academic detailing and prospective audit with feedback focused on antimicrobial choice and consumption



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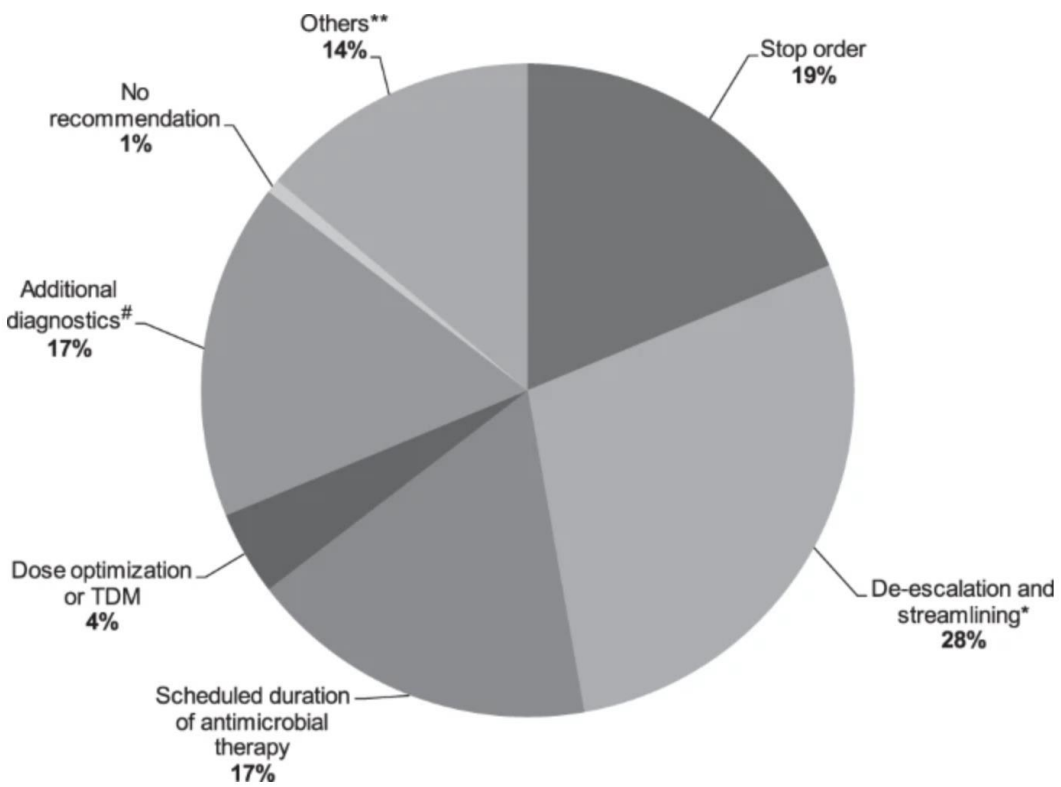

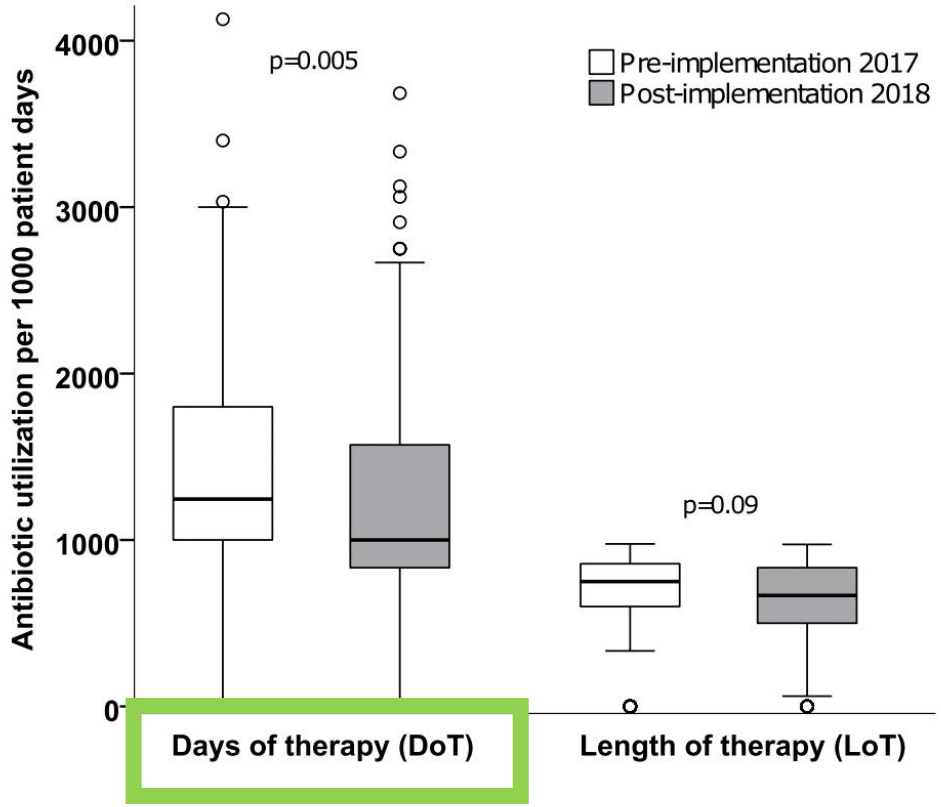

BMJ Open Quality

Impact of pharmacist-led antibiotic stewardship program in a PICU of low/middle-income country

Anwarul Haque,[1] Kashif Hussain,[2] Romesa Ibrahim,[1] Qalab Abbas,[1] Shah Ali Ahmed,[1] Humaira Jurair,[1] Syed Asad Ali[1]

Multidisciplinary-team pilot project of **pharmacist-led** prospective-audit-with-feedback ASP from April to June 2016

Table 1 Patients' characteristics and antibiotics data during the pre-ASP and ASP periods

Variable	ASP−n (%)	ASP+n (%)	P value
Median age in months (IQR)	26 (93)	24 (65)	0.485
Gender male	150 (62.5)	86 (63)	
PRISM-III	5.68 ± 5.14	7.4 ± 6.3	
Diagnosis			
Respiratory system diseases	27 (20)	31 (24.4)	> 0.05
Cardiovascular system diseases	12 (9)	13 (10.2)	
Neurological diseases	25 (18.5)	16 (12.6)	
Surgical disease	58 (43)	41 (32.3)	
Miscellaneous	13 (9.5)	26 (20.5)	
Empirical	57 (42)	60 (47.4)	
Prophylaxis	58 (43)	55 (43.2)	
Therapeutic	20 (15)	12 (9.4)	
Intervention	None	29 (22.6)	
Dose	None	11 (8.5)	
		(11.7)	
		.6)	
		.6)	
		(45)	
		)	
Patient's days (PtD)	557	492	
DOT/1000 PtD	1937/0.557=**3477**	651/0.492=**1323**	<0.0001
DOT-vanco	346	174	0.002
DOT-mero	323	154	0.001
DOT-colis	115	100	0.70
DOT-ceftri	532	186	0.00
Cost in PKR	2 212 468	929 568	0.00
Mortality (%)	22 (16.2)	20 (15.7)	

ASP, antibiotic stewardship programme; CVS, cerebrovascular disease; DOT, days of therapy; PKR, Pakistani Rupee; Pt D, patient days; PRISM, Paediatric Risk of Mortality.

Table 1 Patients' characteristics and antibiotics data during the pre-ASP and ASP periods

Variable	ASP−n (%)	ASP+n (%)	P
Median age in months (IQR)	26 (93)	24 (65)	
Gender male	150 (62.5)	86 (63)	

STEPS PER IMPLEMENTARE UN PROGRAMMA DI STEWARDSHIP ANTIBIOTICA

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1

Focalizzarsi su una malattia (ad esempio batteriemia, batteriuria asintomatica, profilassi chirurgica)

2

Utilizzare strategie differenti di **Antibiotic Stewardhisp** per **cambiare il comportamento dei medici prescrittori** e ridurre la prescrizione inappropriate di antibiotici

3

“**Misurare qualcosa**”

4

Mostrare i risultati per cambiare il comportamento dei prescrittori

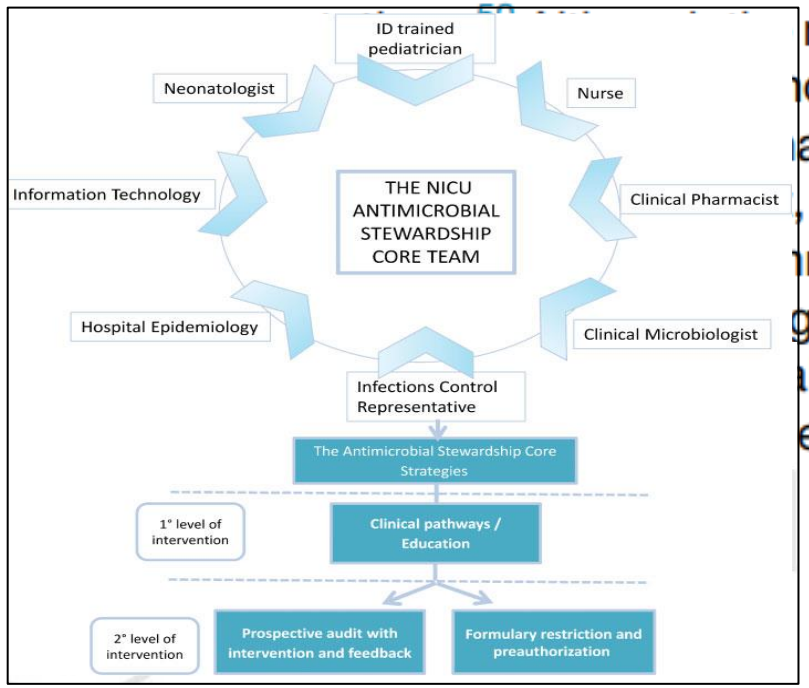
Antimicrobial Stewardship in area critica

ESSENTIAL PARTICIPANTS

The Antimicrobial Stewardship Team

In their 2007 guidelines, The IDSA and the Pediatric Infectious Diseases Society of America recommended creation of a multidisciplinary, interprofessional antimicrobial stewardship team for developing and implementing interventions in health care insti-

members may vary by the size and resources of the institution.



Role of the Neonatologist

When few guidelines exist to guide antibiotic use, clinicians may be more likely to be influenced by institutional protocols or their fellow neonatologists.[51] Neonatologists may be more receptive to implementing changes in their practice if advocated by a well-respected peer rather than ID doctors or pharmacists. The neonatologist on the antibiotic stewardship team can help determine which stewardship metrics are meaningful to their peers and which interventions are preferred. He or she can coordinate with the NICU leadership to present data at division meetings and conferences. Ultimately, for stewardship efforts to be sustained, a paradigm shift is necessary from an ID physician restricting antibiotic use to the NICU and stewardship teams leading efforts to improve antibiotic use. This point is especially true in resource-limited settings, where the stewardship ID physician has other responsibilities, such as clinical care and infection control.

Fig. 1 Pharmacist role within a hospital AMS programme. [a]Pre-authorisation requires clinicians to receive approval for certain antimicrobials before they are prescribed. *AMS* antimicrobial stewardship, *IV* intravenous Adapted from [14, 36]

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International Journal of Clinical Pharmacy (2018) 40:948–952
https://doi.org/10.1007/s11096-018-0675-z

COMMENTARY

CrossMark

Role of pharmacists in antimicrobial stewardship programmes

Javier Garau[1] · Matteo Bassetti[2]

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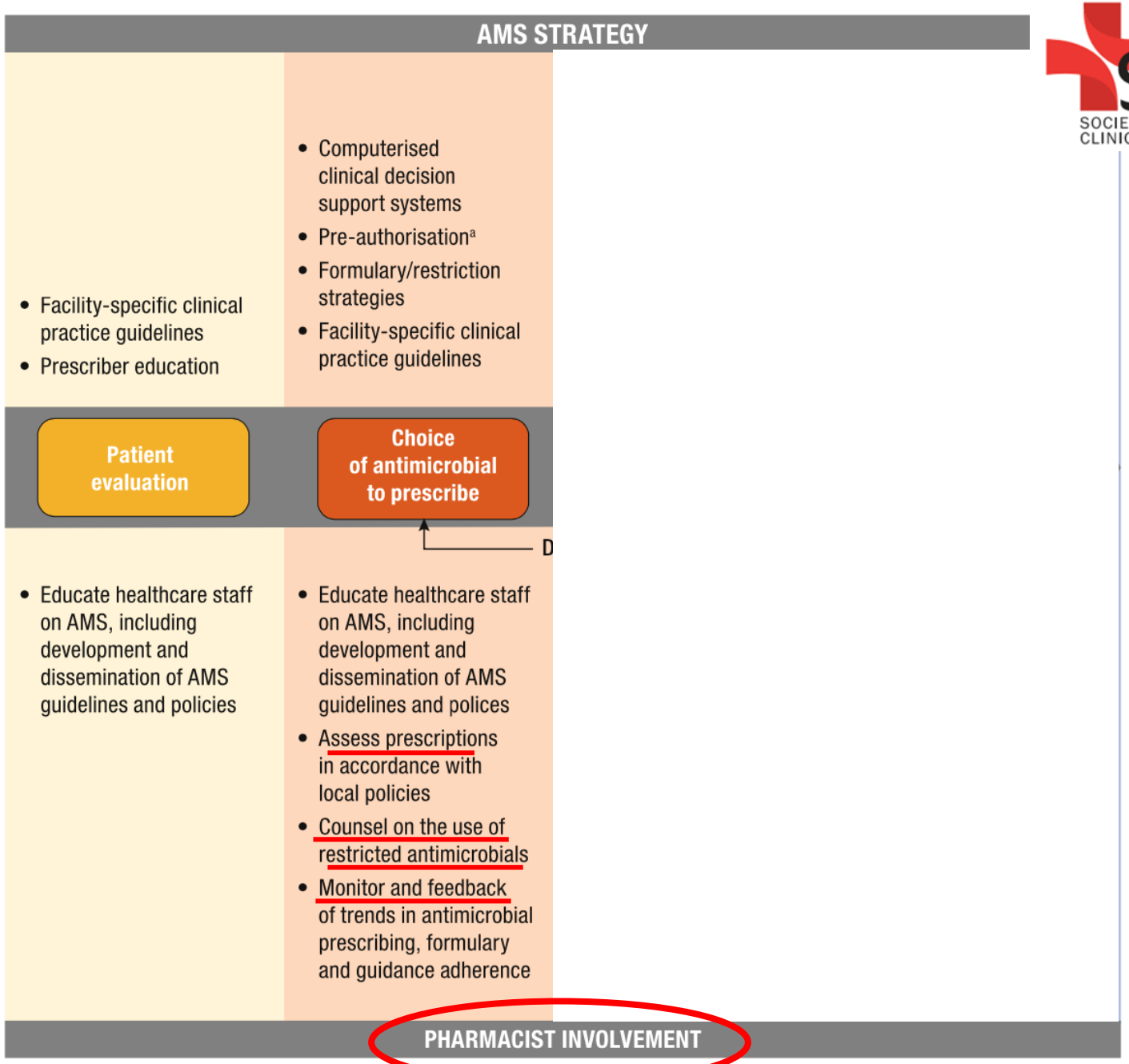

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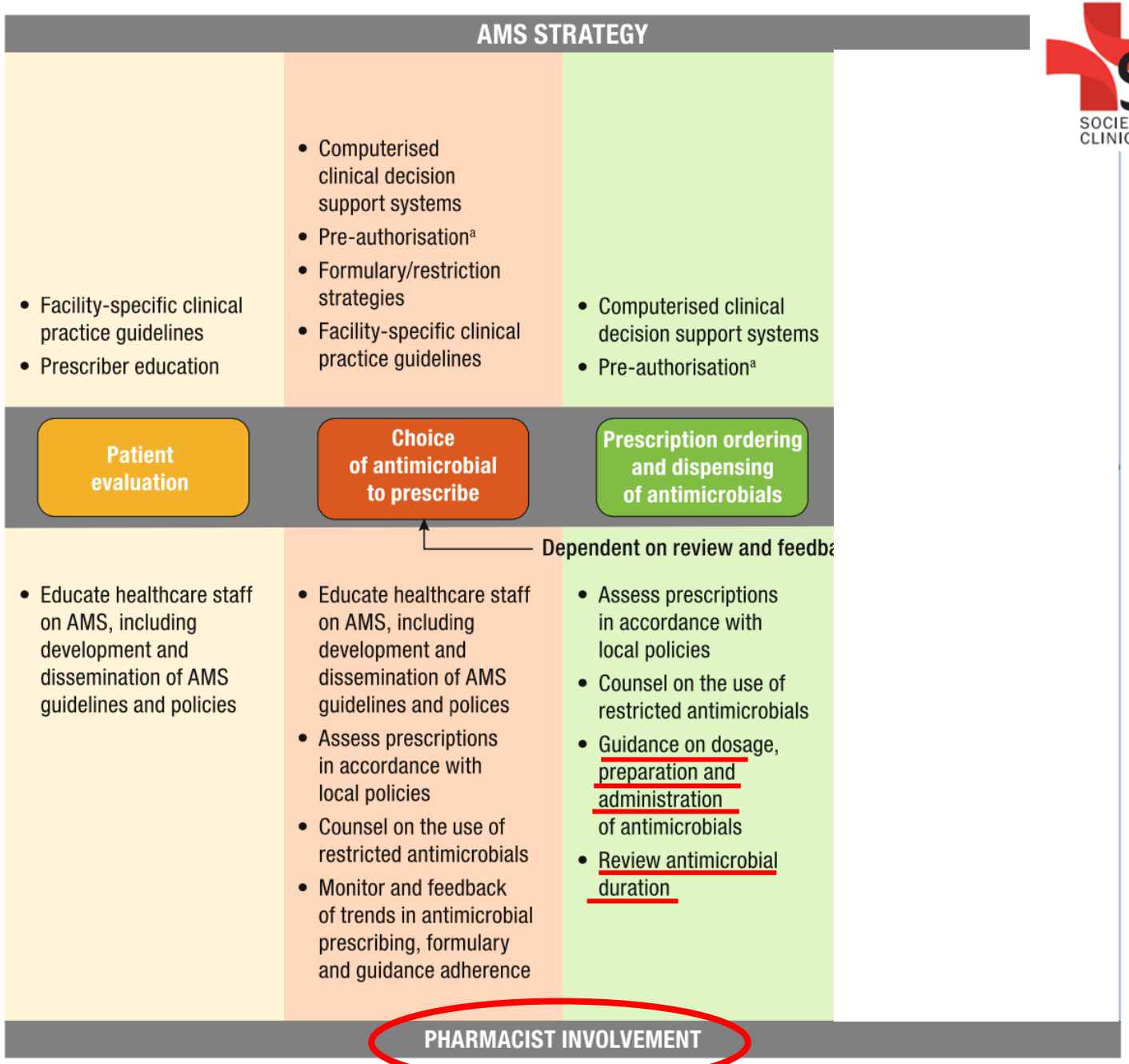

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COMMENTARY

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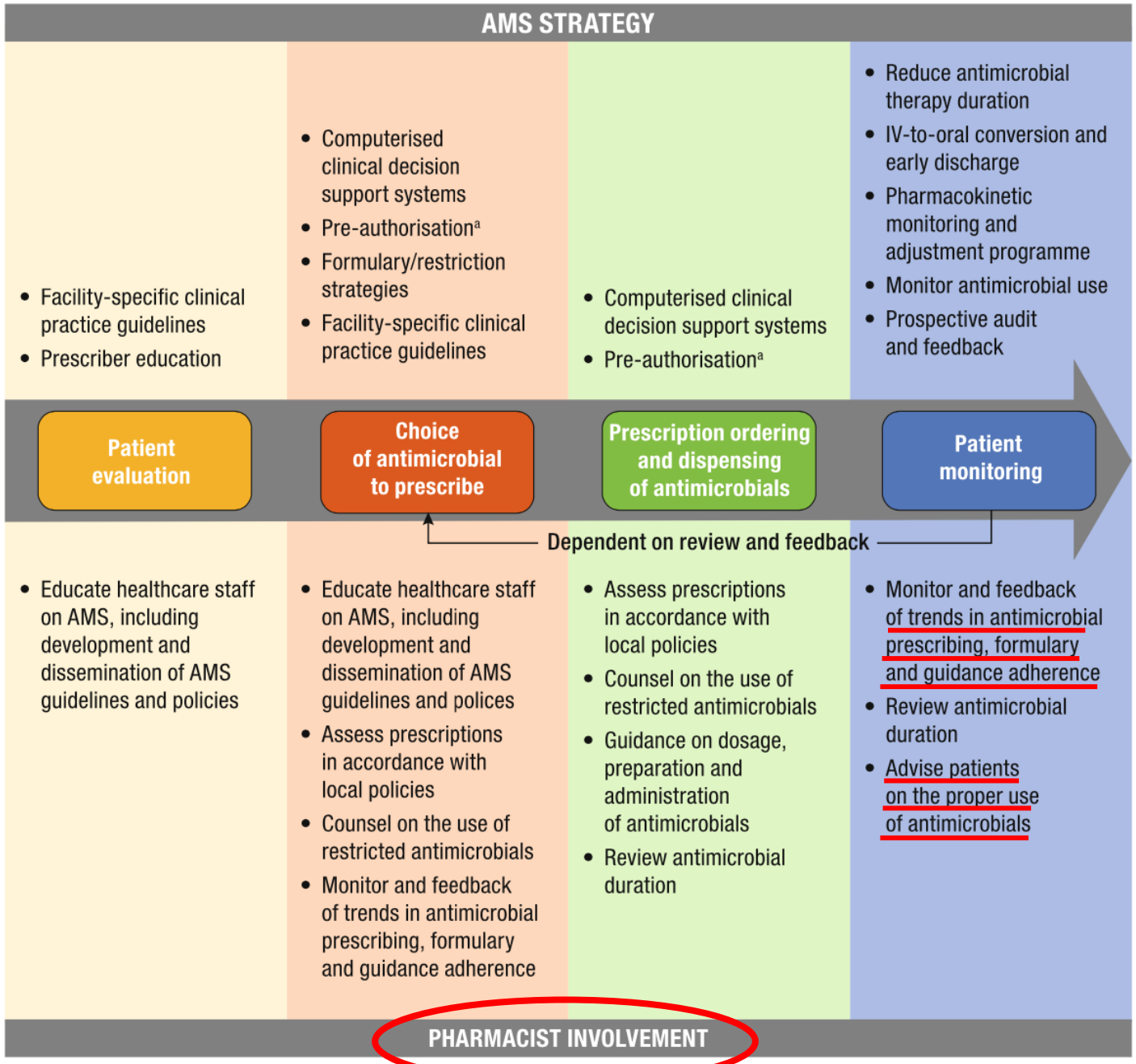
Javier Garau[1] · Matteo Bassetti[2]

Fig. 1 Pharmacist role within a hospital AMS programme. [a]Pre-authorisation requires clinicians to receive approval for certain antimicrobials before they are prescribed. *AMS* antimicrobial stewardship, *IV* intravenous Adapted from [14, 36]



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https://doi.org/10.1007/s11096-018-0675-z

COMMENTARY

Role of pharmacists in antimicrobial stewardship programmes

Javier Garau[1] · Matteo Bassetti[2]

FARE STEWARDSHIP:

Estendere le strategie di ASP

- Concentrarsi su sindromi infettive specifiche: il messaggio "vogliamo migliorare la diagnosi e il trattamento dei bambini con polmonite nosocomiale" meglio di "vogliamo ridurre l'uso non necessario di vancomicina".
    - Esempi: CAP, infezione di cute e tessuti molli, appendiciti, osteomieliti, prevenzione di ferrite del sito chirurgico

- Concentrati sulle sottopopolazioni che rappresentano una piccola percentuale ma ricevono un'alta percentuale di antibiotici.
    - Esempi: trapiantati di organi solidi o di cellule staminali ematopoietiche, **neonati**, bambini al pronto soccorso e bambini con una condizione clinicamente complessa, come quelli con fibrosi cistica o sottoposti ad intervento chirurgico

FARE STEWARDSHIP: Misurare

"Measure Something"

Neil Fishman, 2010

Misurazione per uso istituzionale interno:

- Mostrare l'efficacia di un programma o di un'iniziativa di stewardship (ad es. miglioramento della sicurezza del paziente, riduzione dell'uso di antimicrobici)
- Analisi comparativa interna dell'uso di antibiotici

Misurazione per benchmarking esterno

- Uso di antibiotici
- Misure di quality improvement

FARE STEWARDSHIP: Cosa misurare

- **Numero e tipo di interventi**
- **Diminuzione dell'uso di antibiotici**
- **Risultati di specifiche iniziative**
  - Miglioramento della profilassi antibiotica per chirurgia (% con antibiotico somministrato correttamente)
  - Miglioramento nel non trattare un batteriuria asintomatica (% di pazienti trattati impropriamento prima e dopo l'intervento)

FARE STEWARDSHIP: Cosa misurare

Table 2
Useful antimicrobial stewardship metrics for the NICU

Primary Drivers	Secondary Drivers	Metrics
Avoid redundant antibiotic use	Reduce concurrent use of antibiotics with anaerobic spectrum of activity	DOT of concurrent use of piperacillin-tazobactam, meropenem, or imipenem with metronidazole >1 d
Reduce broad spectrum antibiotic use	Reduce use of broad-spectrum perioperative antibiotic prophylaxis for clean surgical procedures	DOT of noncefazolin perioperative prophylaxis for cardiac surgery
	Reduce use of vancomycin	DOT vancomycin
	Reduce use of third-generation cephalosporins	DOT third-generation cephalosporins
Reduce duration of antibiotic use	Avoid prolonged duration of postoperative prophylaxis	DOT of perioperative prophylaxis >48 h
	Avoid prolonged duration of culture-negative sepsis	Interquartile range of DOTs for duration of culture-negative sepsis
Avoid inadequate therapy	Reduce episodes of bug-drug mismatch for treatment of late-onset sepsis	DOT of inadequate therapy per 100 LOS evaluations

Infect Dis Clin N Am 28 (2014) 247–261 http://dx.doi.org/10.1016/j.idc.2014.01.005

LA NOSTRA ESPERIENZA IN PS

Educazione con intervento (A III)

Linee guida / algoritmi decisionali multidisciplinari (A I)

CLINICAL PATHWAY

Flow-Chart diagnostico-terapeutica specifica che ha lo scopo di guidare il medico attraverso dei percorsi che applicano le linee guida nella realtà e aiutano a determinare se un antibiotico deve essere prescritto, la terapia antibiotica più appropriata e la durata ottimale del trattamento.

antibiotics

MDPI

Article

Impact and Sustainability of Antibiotic Stewardship in Pediatric Emergency Departments: Why Persistence Is the Key to Success

Elisa Barbieri [1,*], Maia De Luca [2], Marta Minute [3], Carmen D'Amore [4], Marta Luisa Ciofi Degli Atti [4], Stefano Martelossi [3], Carlo Giaquinto [1], Liviana Da Dalt [5], Theoklis Zaoutis [6] and Daniele Dona [1]

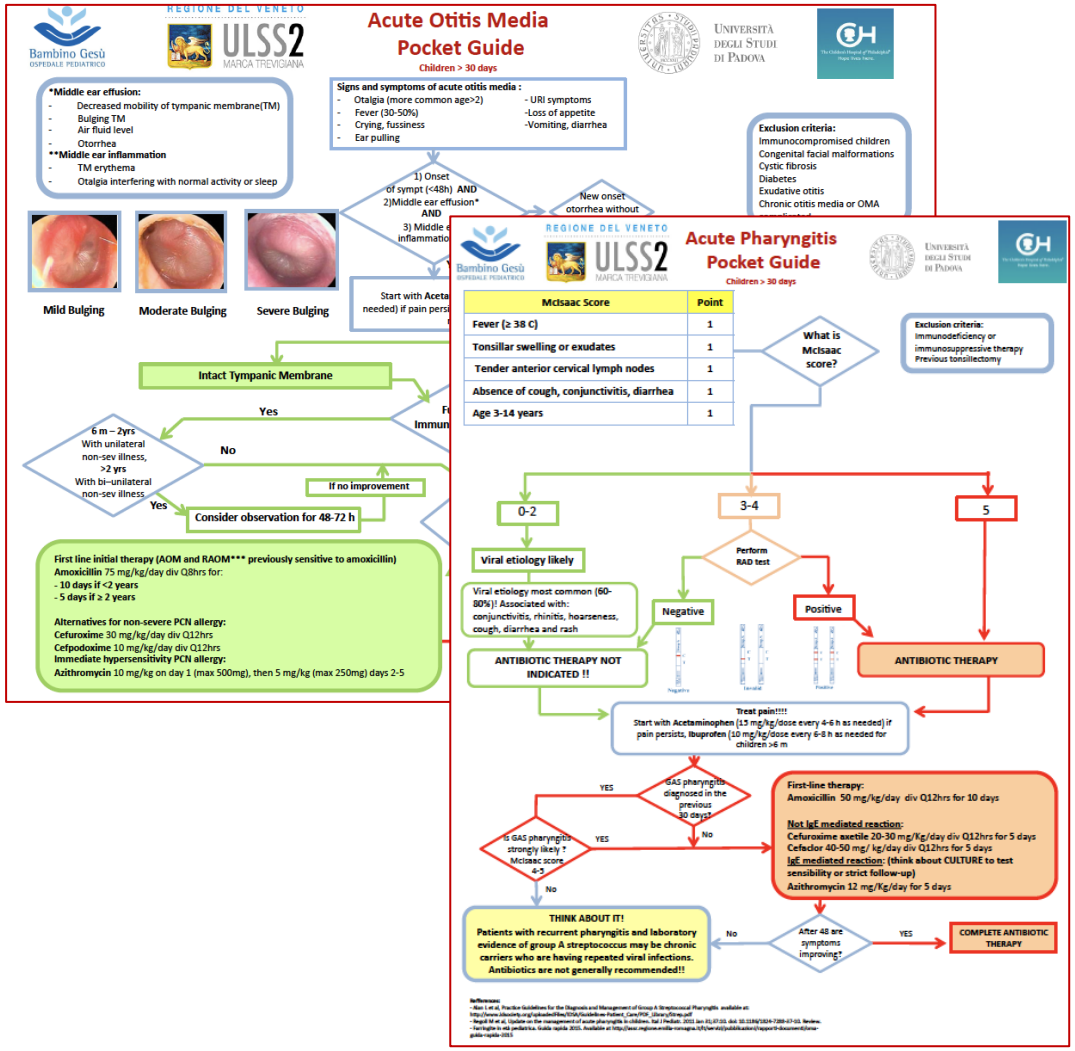
CLINICAL PATHWAYS e LEZIONI ANNUALI

<u>Setting</u>

3 differenti PS in Italia, Padova (24.000 accessi anno), Roma (100.000 accessi anno), Treviso (15.000 accessi anno)

<u>Intervention</u>

- Clinical pathways per faringite e otite (poster appesi e pocket card)
- Lezioni annuali ai medici prescrittori



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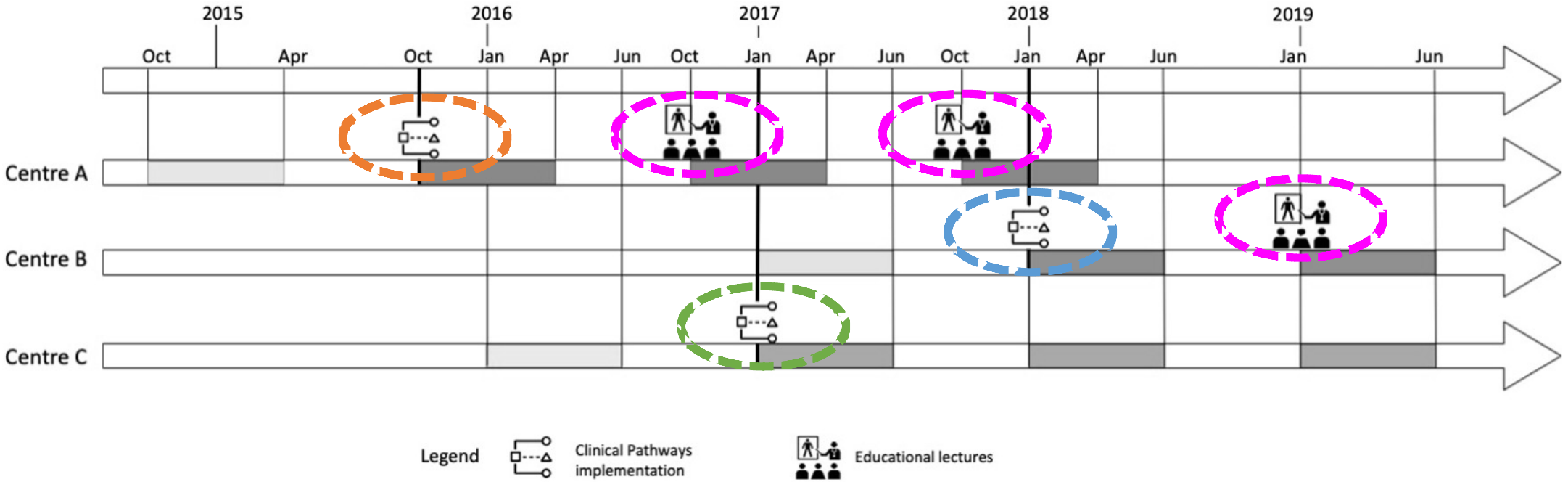
CLINICAL PATHWAYS e LEZIONI ANNUALI



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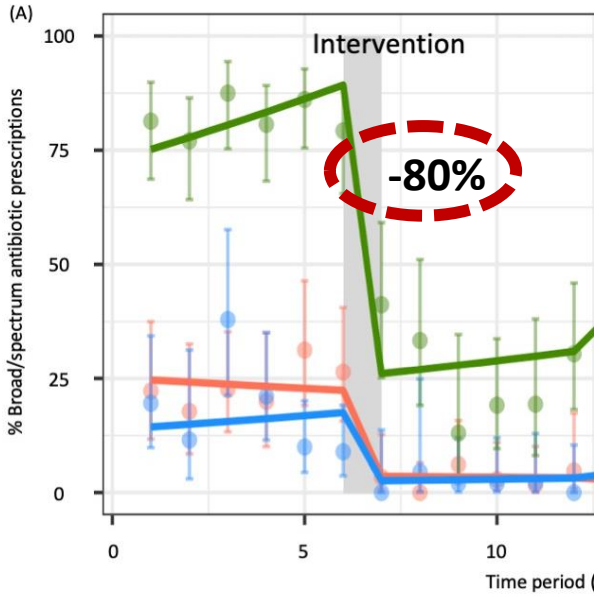
Risultati – FATTIBILITA'

Prescrizione di antibiotici ad ampio spettro per la faringotonsillite

Centre A

Centre B

Centre C

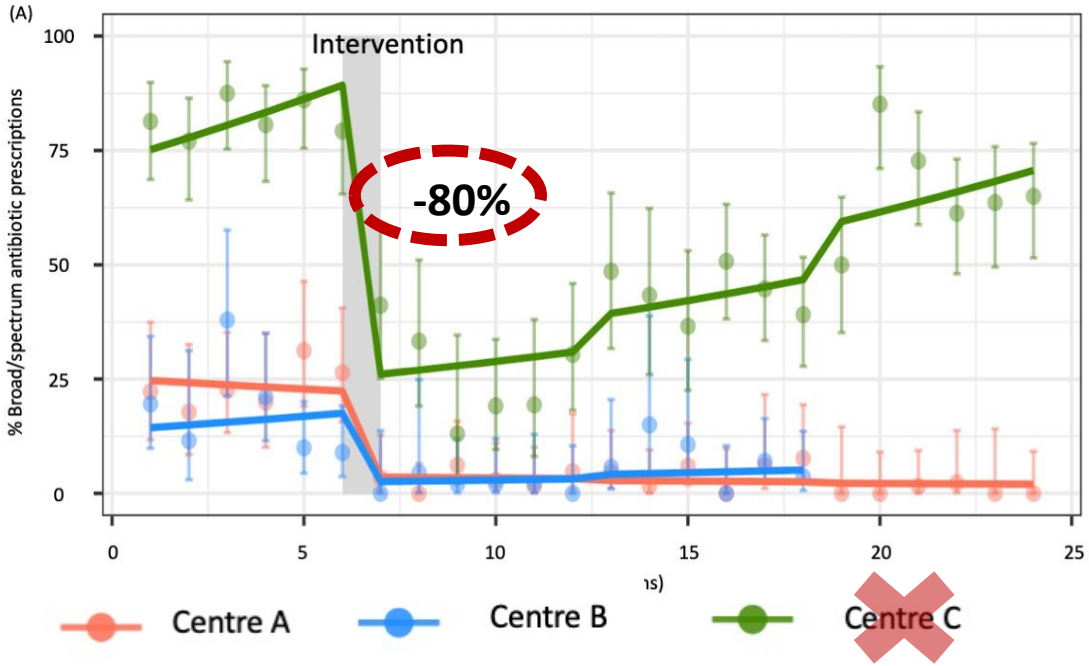


6 months pre-intervention
vs
6 months post-intervention

E' SOSTENIBILE NEL TEMPO?

Risultati – SOSTENIBILITA'

Prescrizione di antibiotici ad ampio spettro per la faringotonsillite



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E' SOSTENIBILE NEL TEMPO?

Risultati – FATTIBILITA'

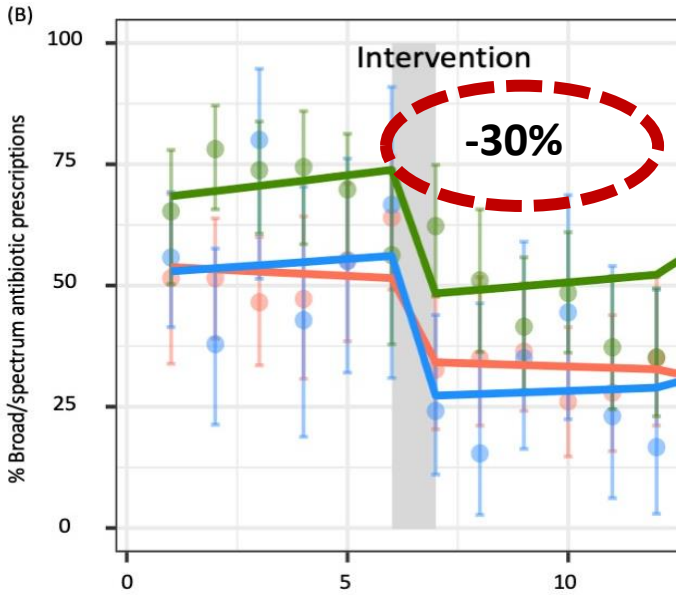
Prescrizione di antibiotici ad ampio spettro per OMA

Centre A

Centre B

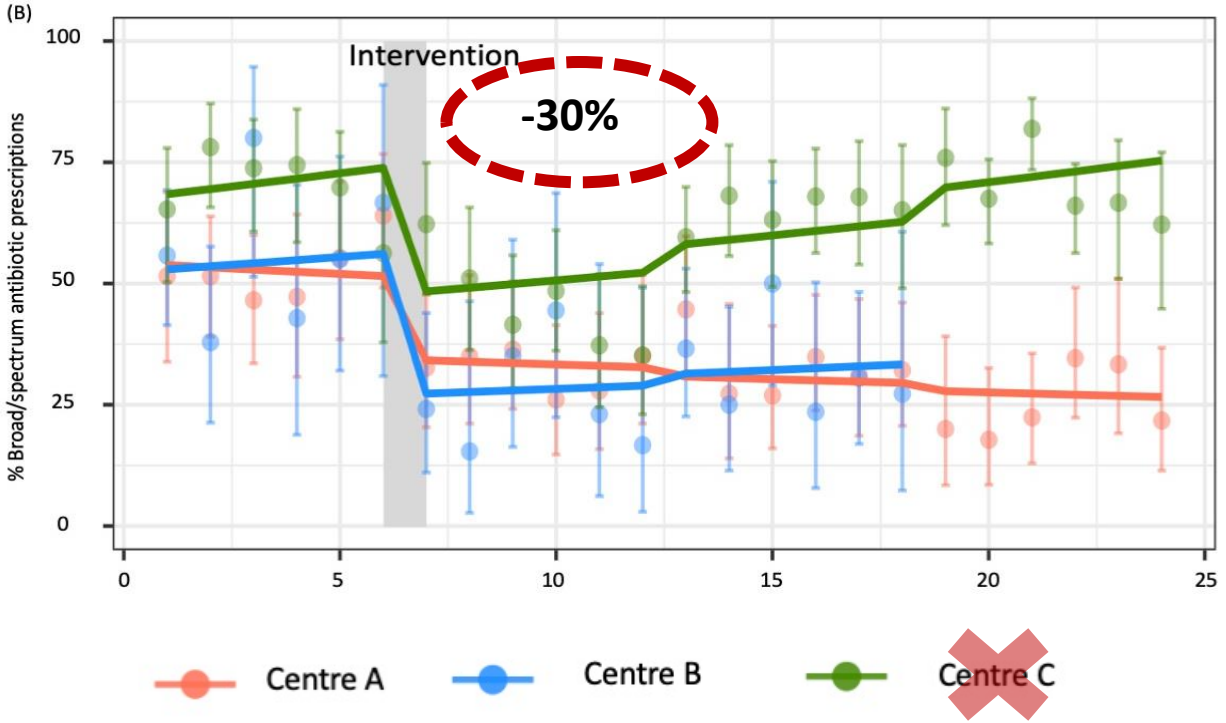
Centre C

6 months pre-intervention
vs
6 months post-intervention



Risultati – SOSTENIBILITA'

Prescrizione di antibiotici ad ampio spettro per OMA



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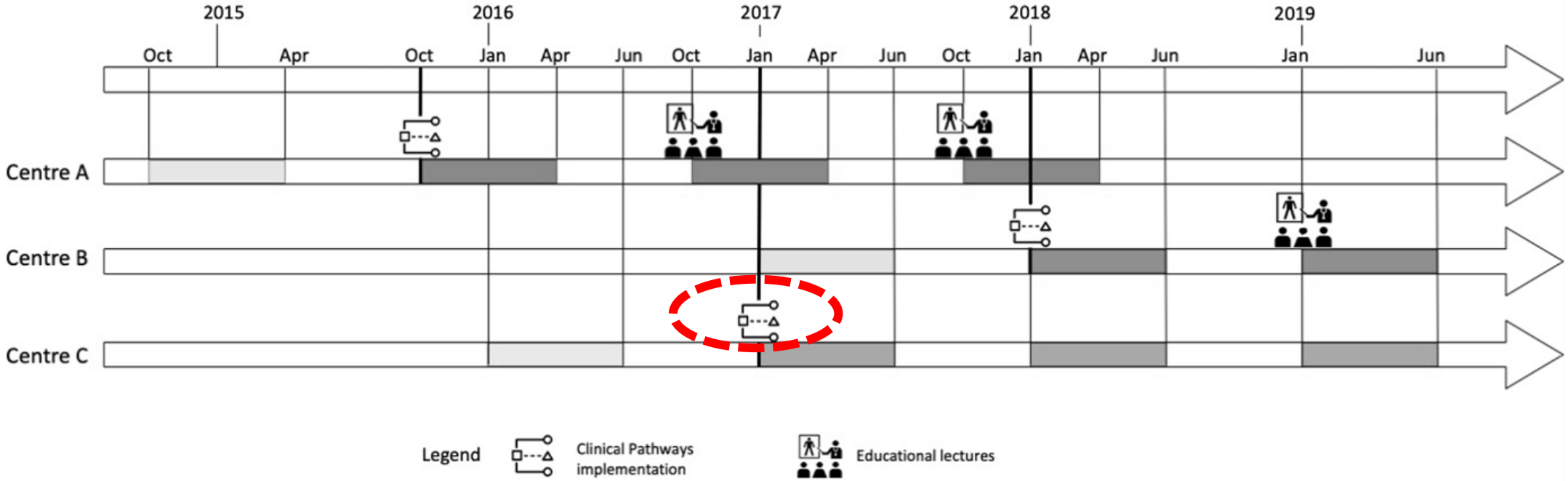

CONCLUSIONI

- Le **resistenze antibiotiche** rappresentano una grave **minaccia per la salute pubblica**
- La **stewardship antibiotica** è un'**iniziativa vitale** per la qualità e la sicurezza dei pazienti
- I programmi di stewardship antibiotica sono implementabili anche in **ambito pediatrico e neonatale**
- L'approccio educazionale con richiami annuali è essenziale per rendere gli interventi sostenibili nel tempo
- Serve un maggiore sforzo per implementare programmi di Stewardship antibiotica sia in ambito pediatrico che neonatale – **BISOGNA FARE SQUADRA**