

Antimicrobial stewardship

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Regione
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UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI FISIOPATOLOGIA
MEDICO-CHIRURGICA E DEI TRAPIANTI

Quali patogeni?



POLMONITI ALL'INGRESSO IN ICU (Dati GiViTI 2017)

POLMONITI NOSOCOMIALI ALL'INGRESSO IN ICU con microrganismi isolati: 779*

	n° isolati	% su isolati tot	n° MDR	% su gruppo
Numero totale di microrganismi isolati	1026		339	43.5
Gram +	243	31.2	99	40.7
<i>Staphylococcus aureus</i> [MRSA]	136	17.5	74	54.4
<i>Streptococcus pneumoniae</i> [resistente alla penicillina]	41	5.3	4	9.8
Gram -	503	64.6	257	51.1
<i>Pseudomonas aeruginosa</i> [MDR CARBA-R]	132	16.9	37	28.0
<i>Klebsiella</i> spp [ESBL/CARBA-R]	134	17.2	68/42	50.7/31.6
<i>Escherichia coli</i> [ESBL/CARBA-R]	96	12.3	32/1	33.3/1.0
<i>Acinetobacter</i> [CARBA-R]	87	11.2	73	83.9

* Pazienti con polmonite all'ingresso in ICU provenienti da ospedale o altra TI (microrganismi isolati nel 57.8% dei casi)

Quali patogeni?



CONFRONTO RESISTENZE 2005 - 2017

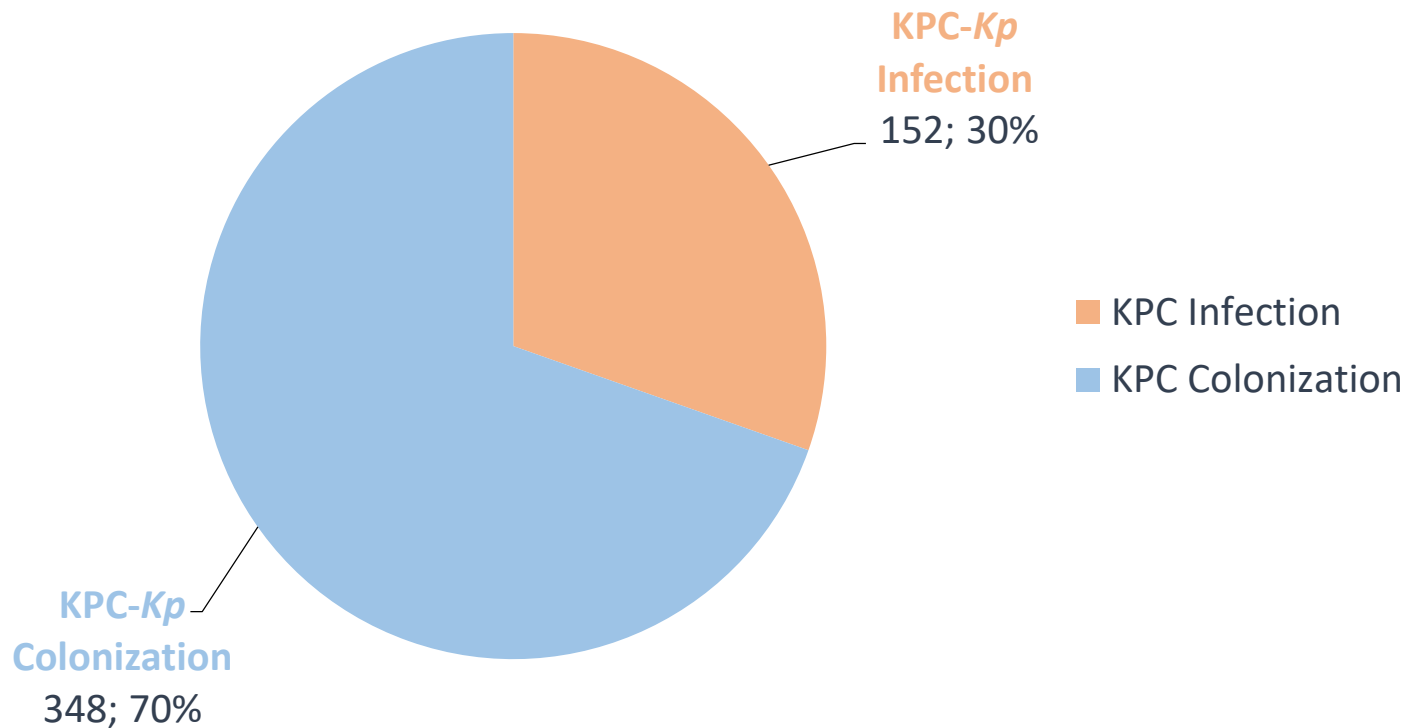
	<u>POLMONITI NOSOCOMIALI ALL'INGRESSO IN ICU (2017)</u>		<u>INFEZIONI DURANTE LA DEGENZA IN ICU (2005)</u>
	% su isolati tot	% MDR su gruppo	% MDR su gruppo
Totale microrganismi		43.5	26.8
Gram +	31.2	40.7	
<i>Staphylococcus aureus</i>	17.5	54.4 [MRSA]	13.0 [MRSA]
Gram -	64.6	51.1	
<i>Pseudomonas aeruginosa</i>	16.9	28.0 [MDR CARBA-R]	8.9 [MDR]
<i>Klebsiella spp</i>	17.2	50.7/31.6 [ESBL/CARBA-R]	6.0 [ESBL]
<i>Escherichia coli</i>	12.3	33.3/1.0 [ESBL/CARBA-R]	
<i>Acinetobacter</i>	11.2	83.9 [CARBA-R]	2.7 [CARBA-R]

Le infezioni in Terapia Intensiva. Rapporto del progetto di sorveglianza del GiViTI, anno 2005

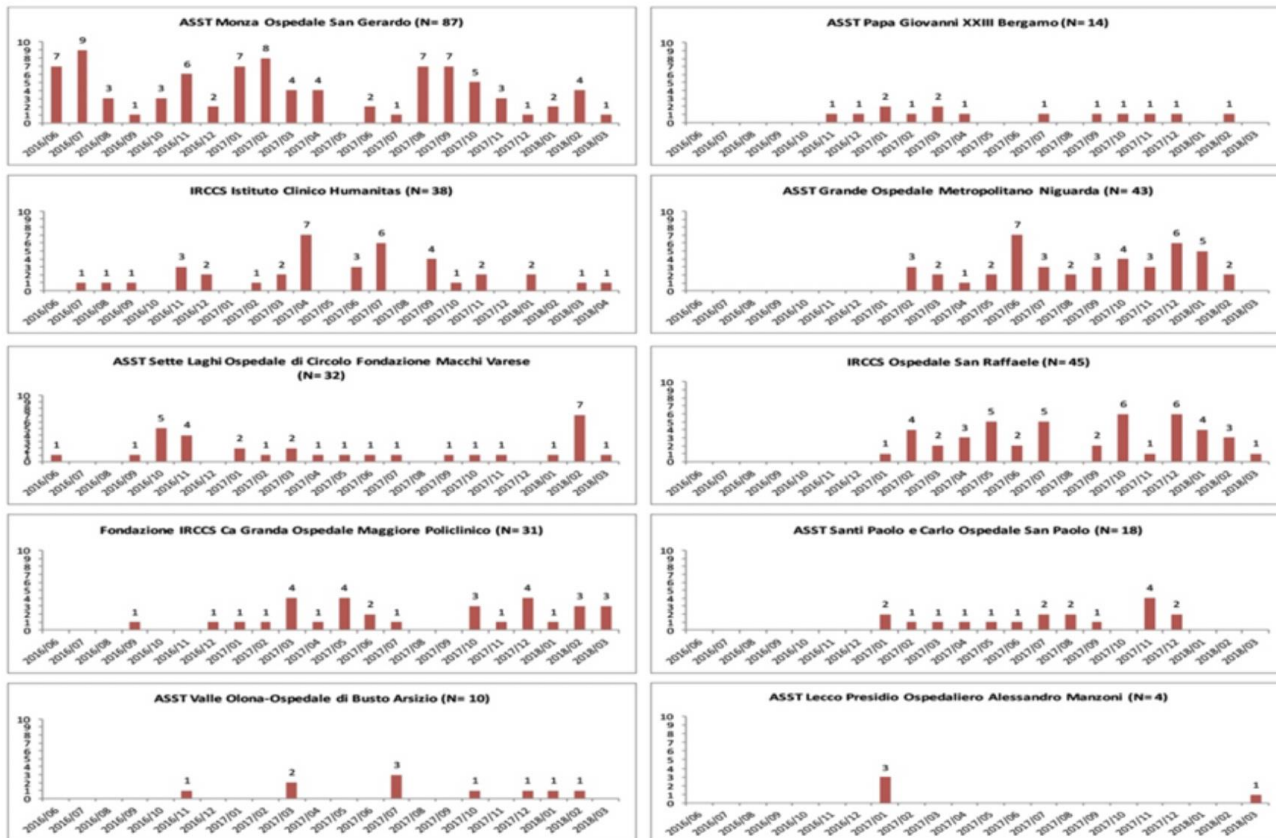
GiViTI, Rapporto Progetto PROSAFE - Petalo INFEZIONI 2018

KPC-*Kp* Infected and Colonized Patients

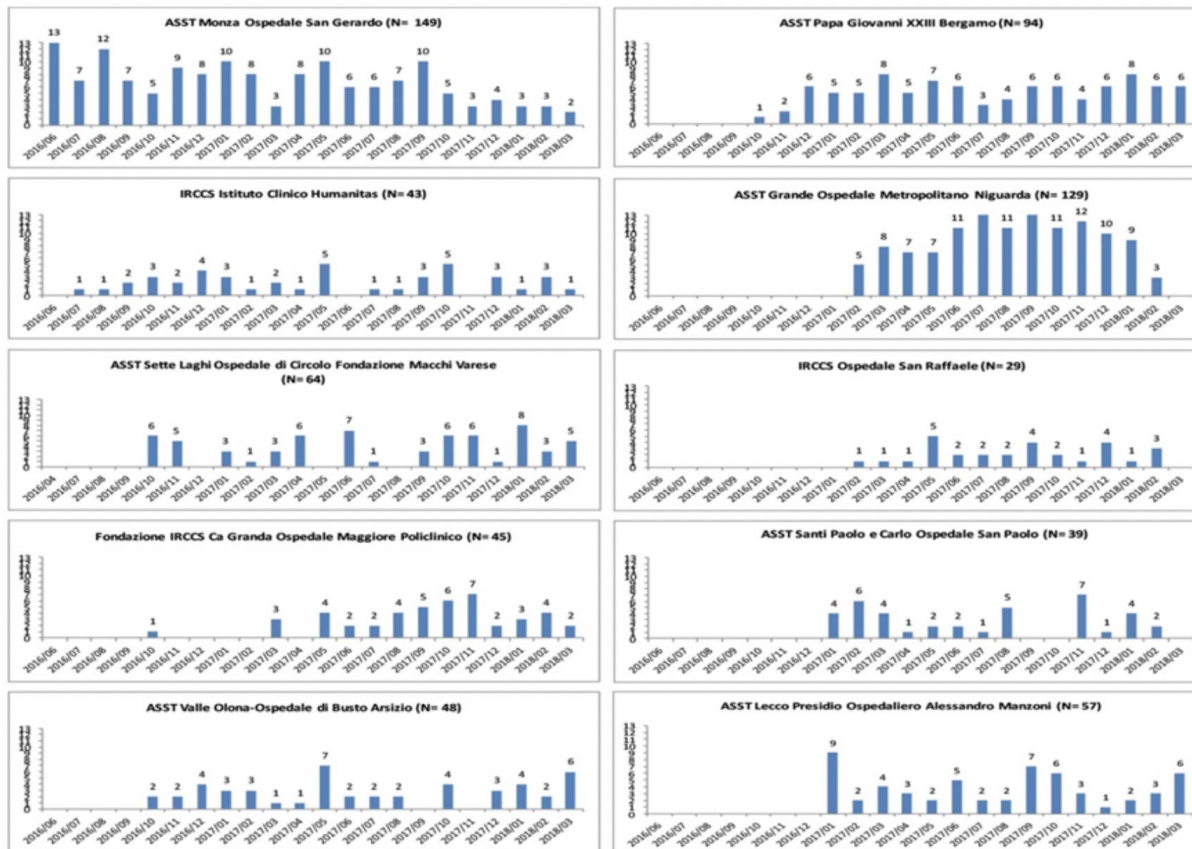
Patients enrolled from June 2016 to October 2017



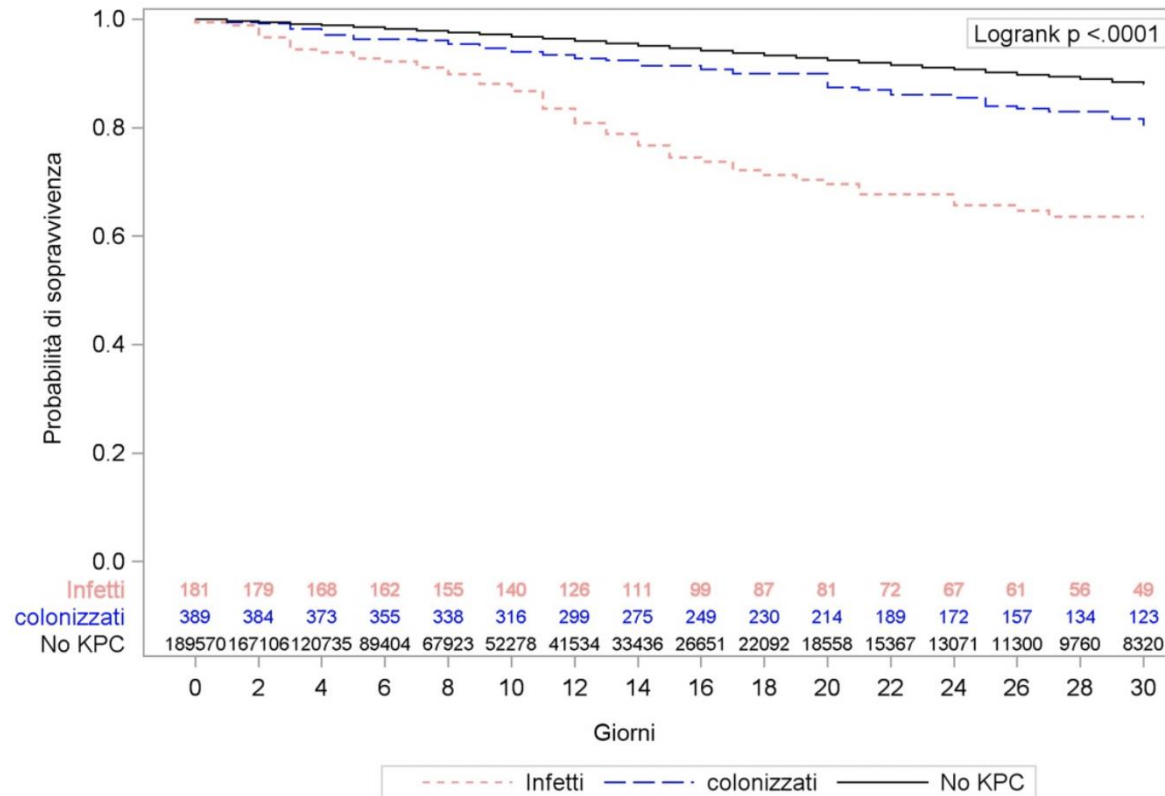
Distribuzione di frequenza dei pazienti infetti per centro e mese di isolamento



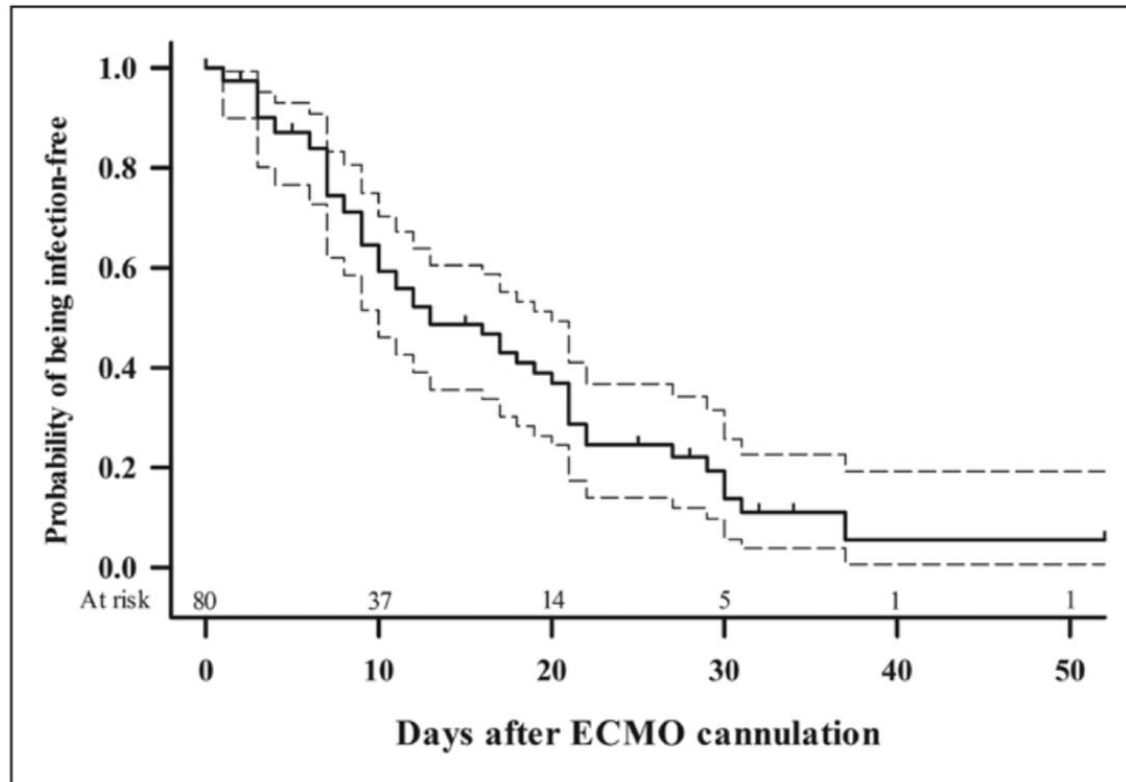
Distribuzione di frequenza dei pazienti colonizzati per centro e mese di isolamento



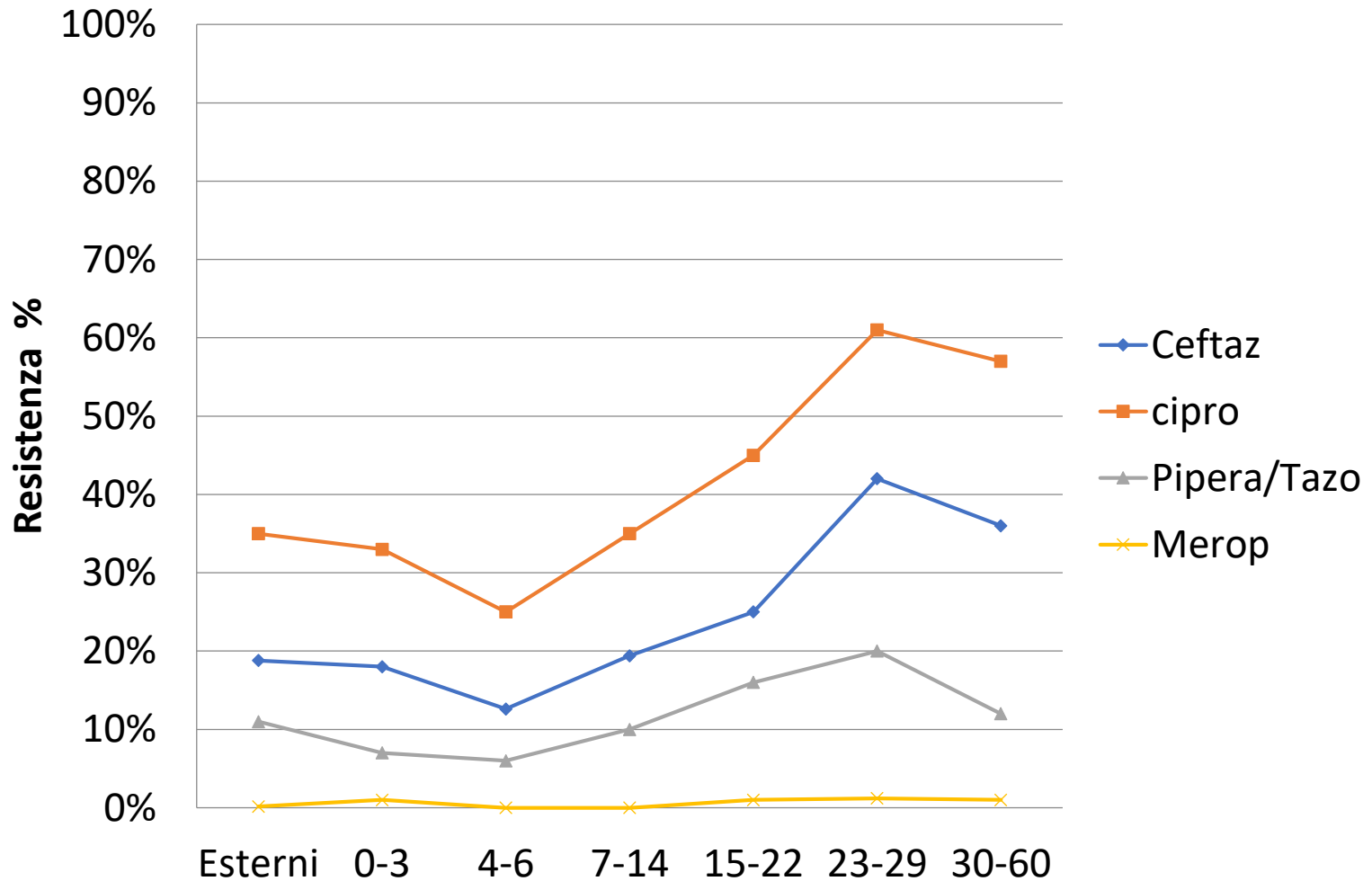
Mortalità a 30 giorni nei pazienti con infezione da KPC-*Kp*, colonizzati da KPC-*Kp* e pazienti non-KPC-*Kp*



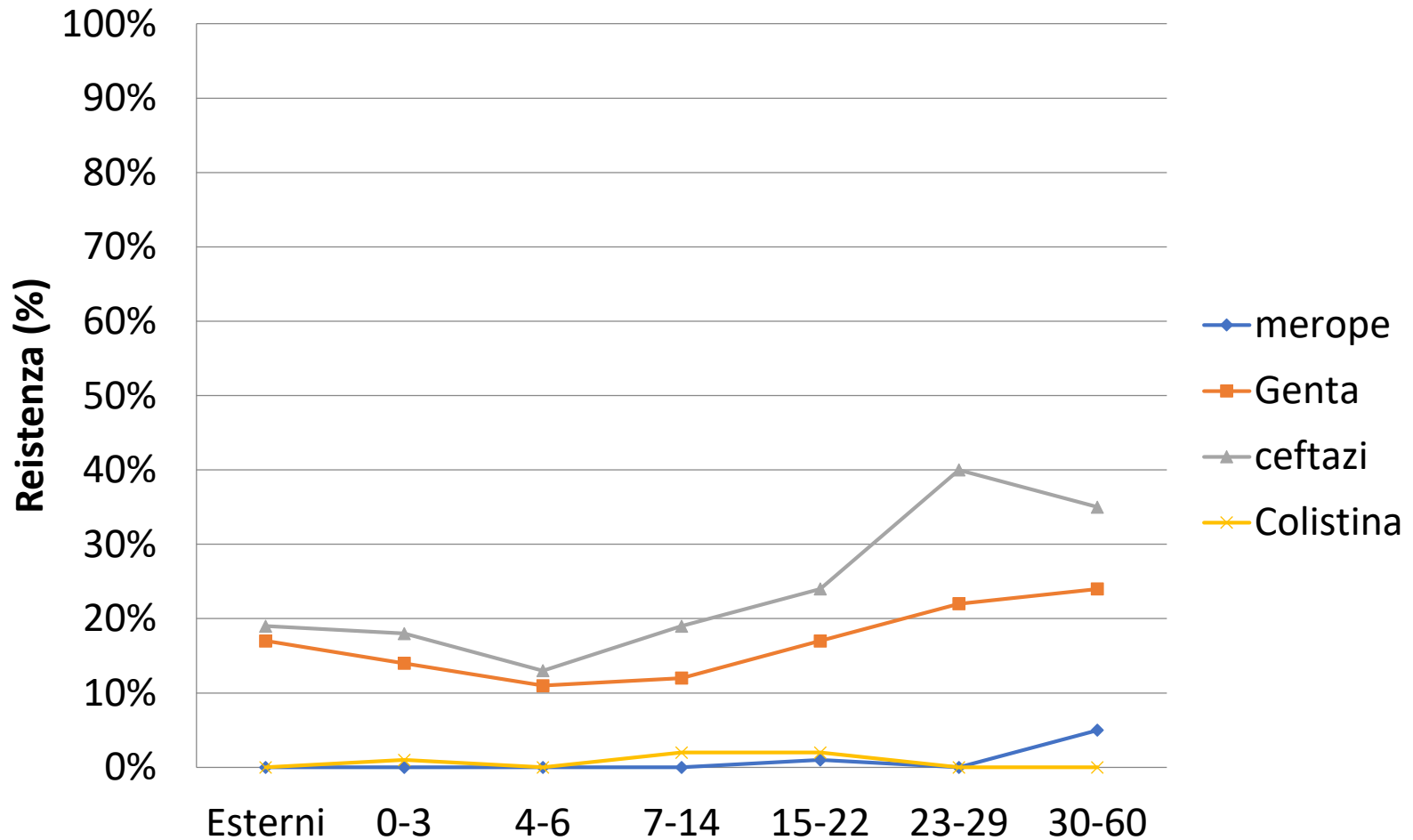
Probability of being infection-free



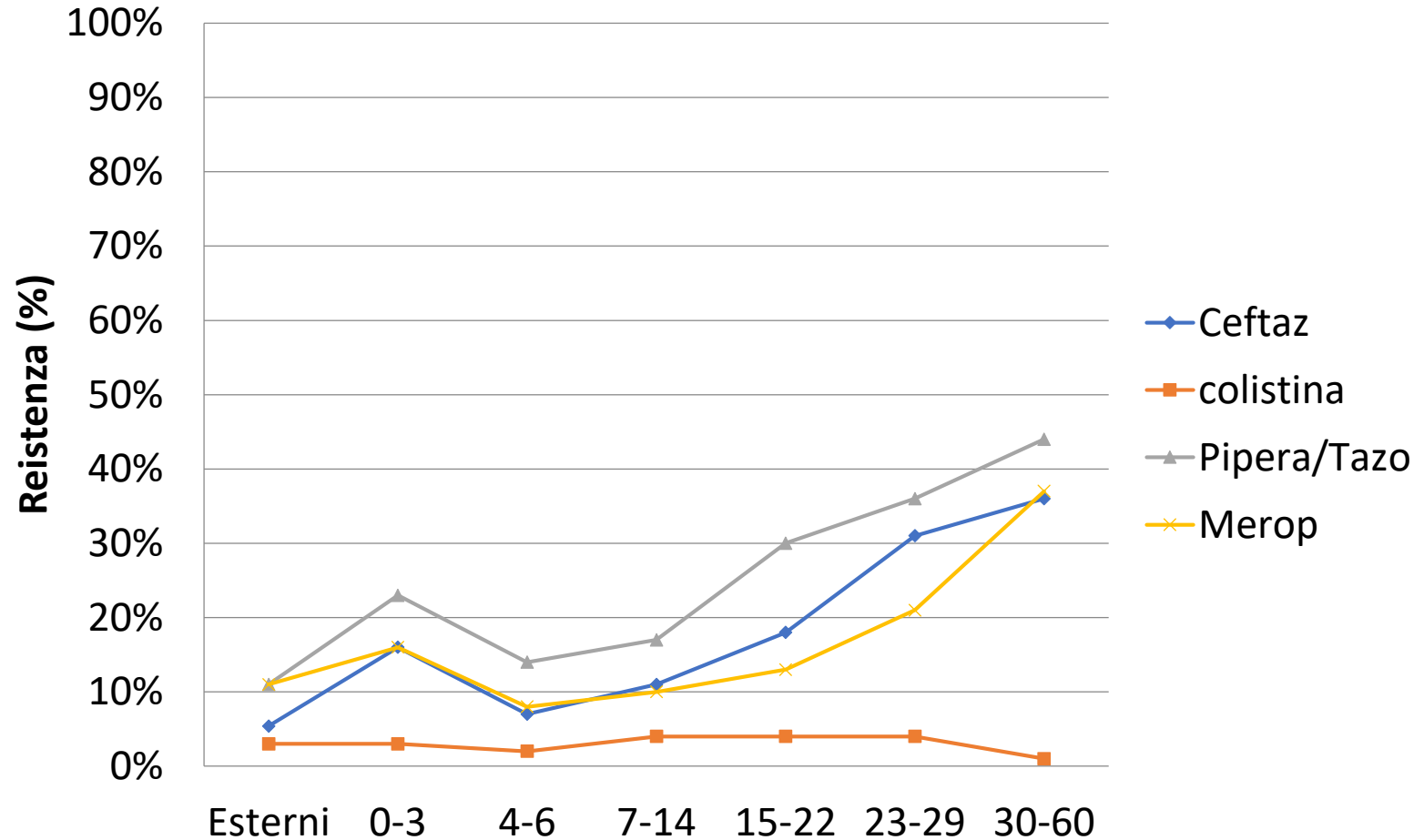
Resistenze per giornate di degenza : *E.coli* 2013-2015



Resistenze per giornate di degenza: *K.pneumoniae* 2013-2015



Resistenze per giornate di degenza: *P. aeruginosa* 2013-2015

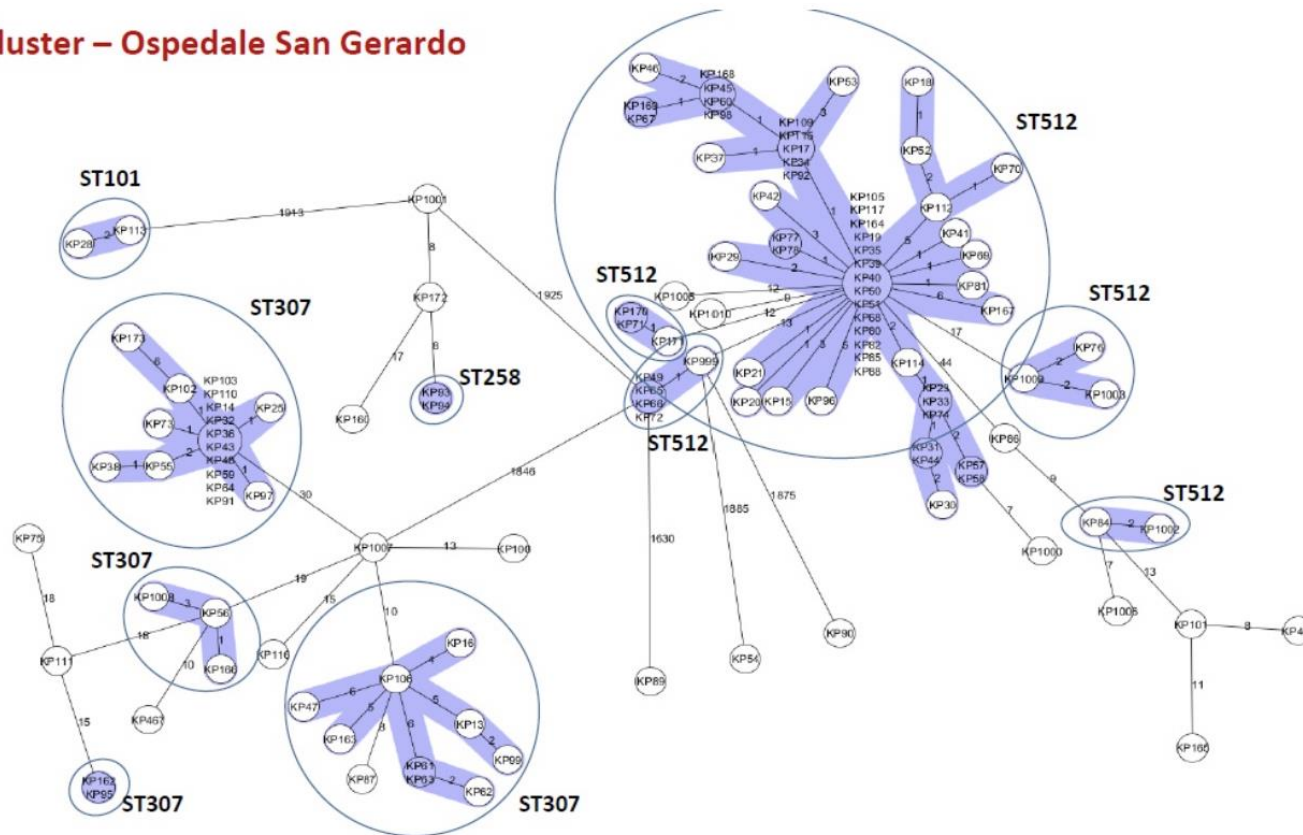


Next-Gen Sequencing Technologies



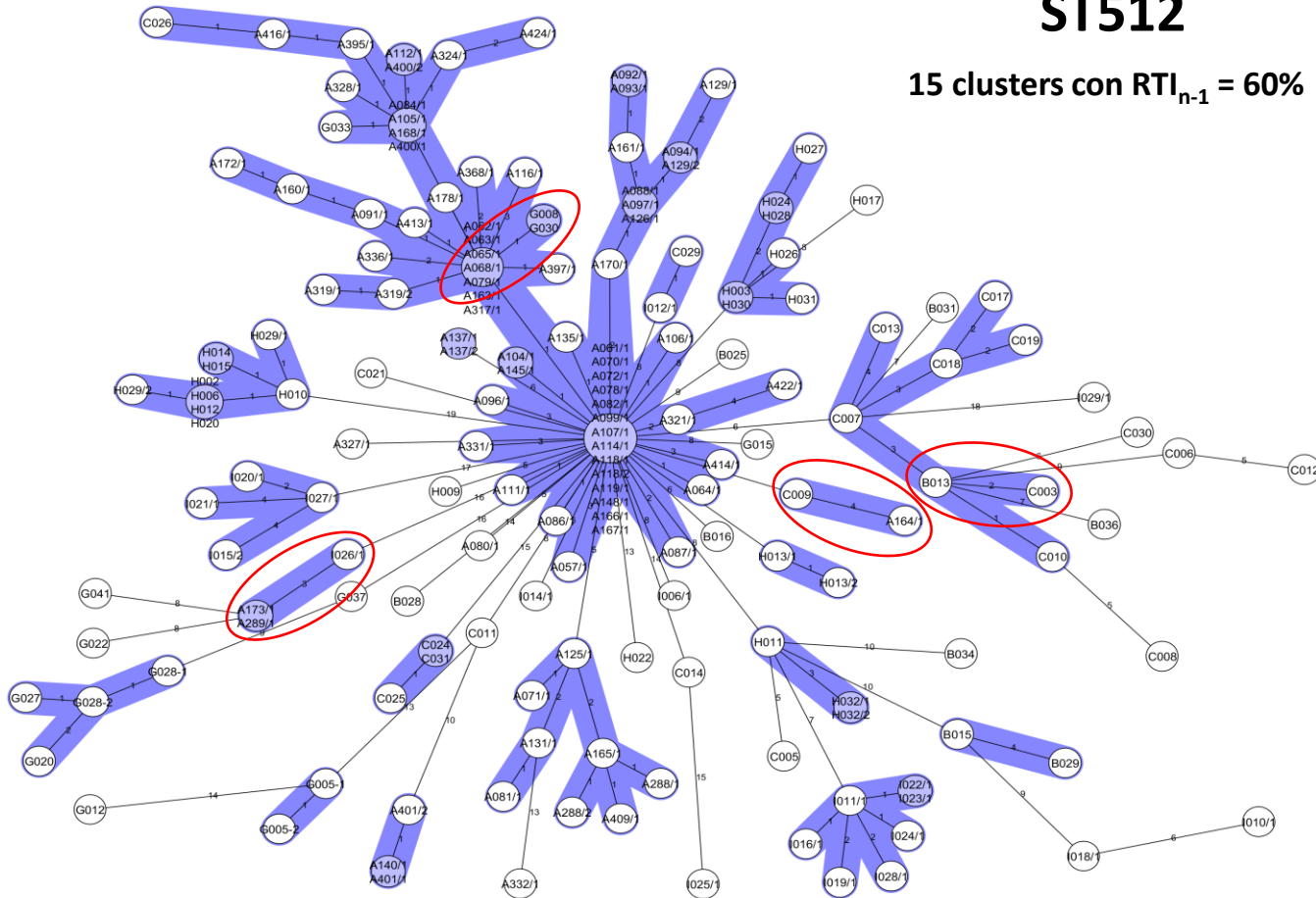
Cluster identificati presso l'ospedale San Gerardo

CCluster – Ospedale San Gerardo



ST512

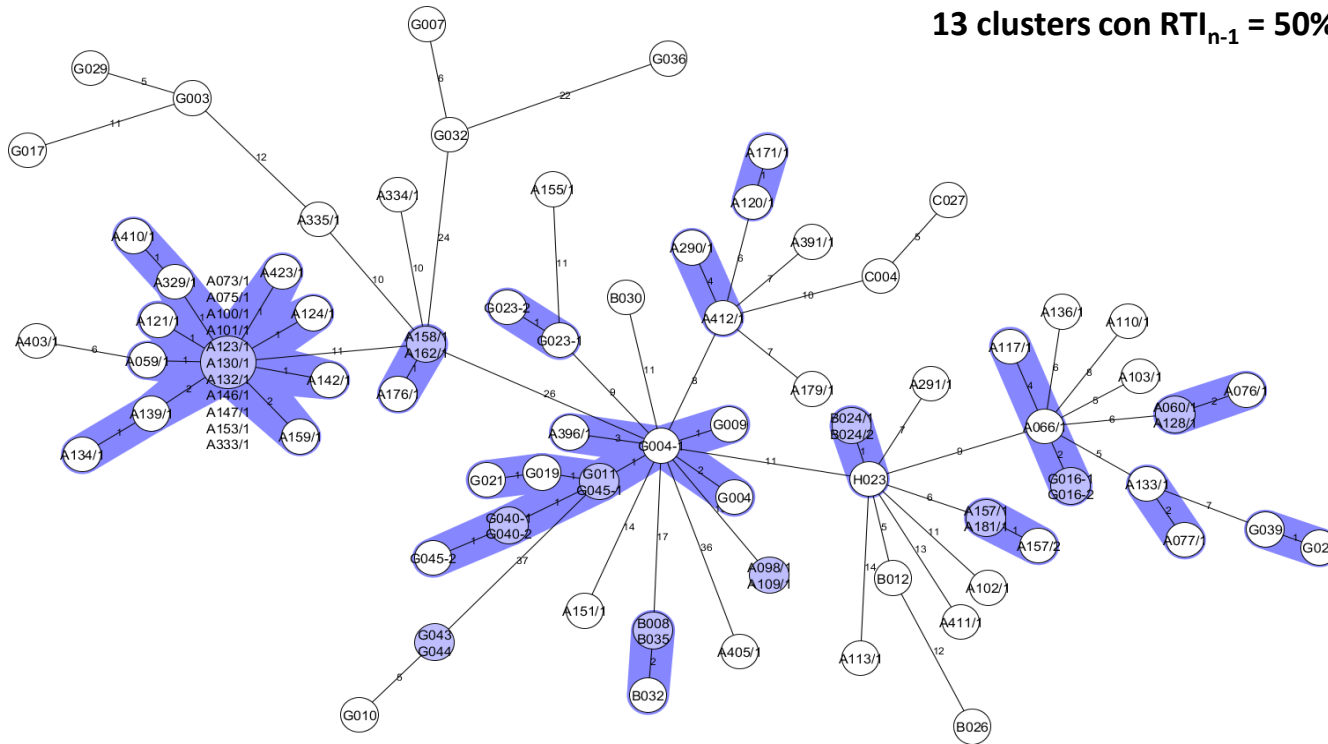
15 clusters con $RTI_{n-1} = 60\%$



cgMLST analysis identified 112 (70%) strains, as part of 15 clusters. We identified an unsuspected very large cluster spreading across 3 hospitals accounted for 55% of the episodes.

ST307

13 clusters con $RTI_{n-1} = 50\%$



ST307 (n=84) was the second clone isolated (28%), we identified 13 clusters similar to that of ST512 (65%), but with very small clusters indicating a higher diversity

Antimicrobial and «Diagnostic» stewardship

Nuovi strumenti diagnostici per:

- diagnosi eziologica rapida del patogeno e del meccanismi di resistenza
- stratificazione del paziente per gravità e prognosi

Global challenges...the need for innovation



Test rapidi per l'identificazione di CRE

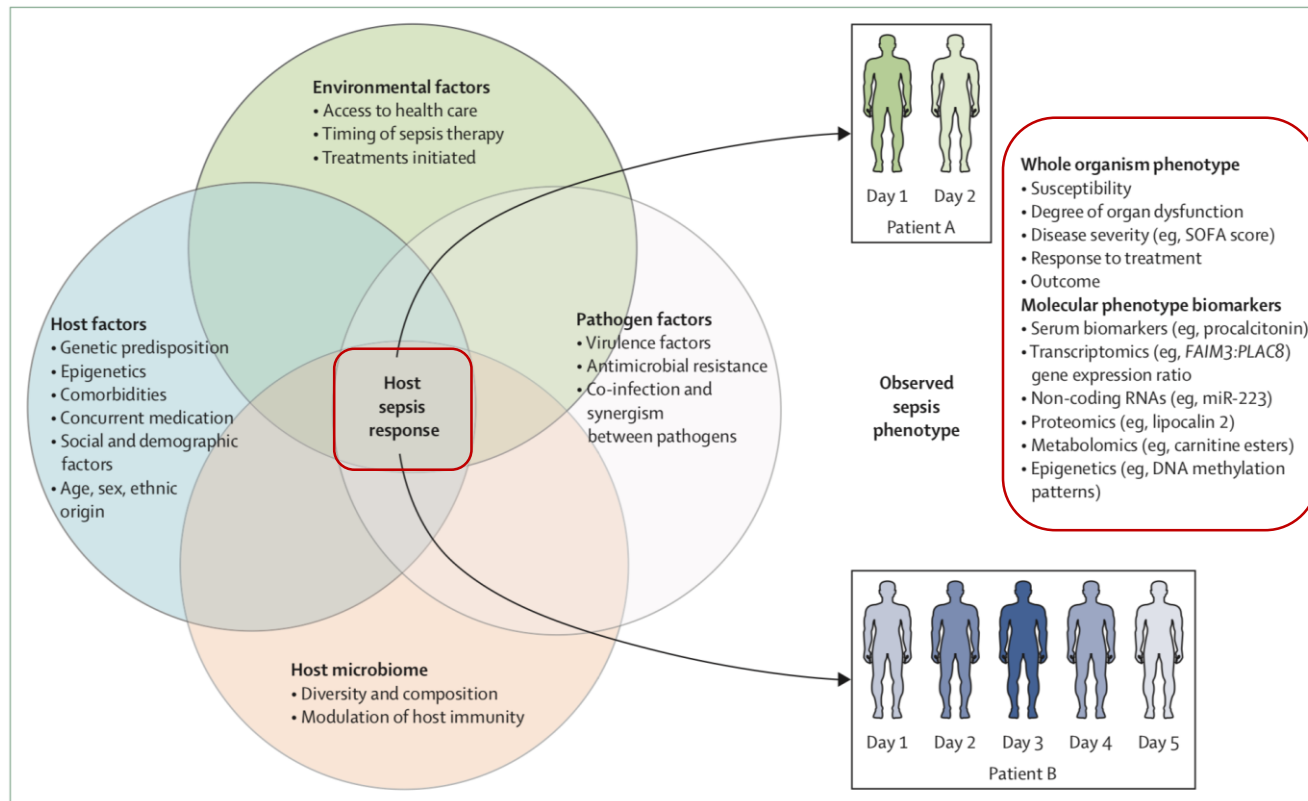


Geni che conferiscono resistenza

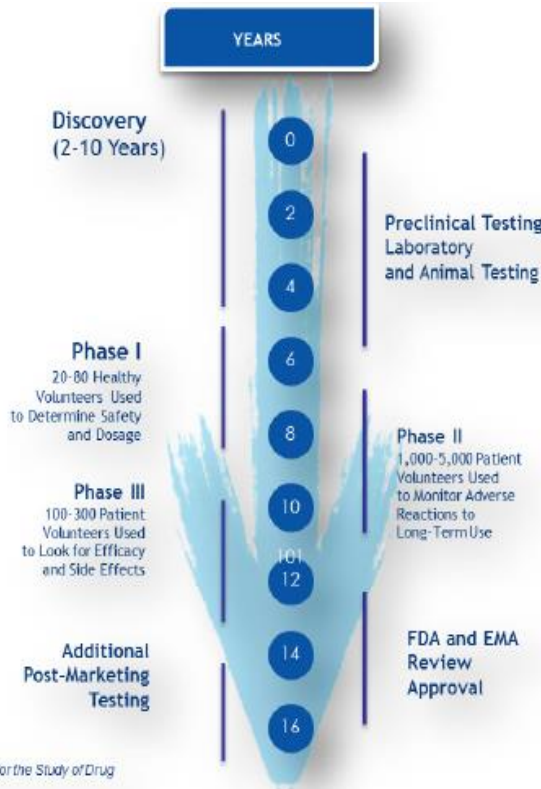
ID	Name	Occurrence	
KPC	Klebsiella pneumoniae carbapenemase	+++ Most common All over Europe	95%
VIM	Verona integron-encoded metallo-beta-lactamase	++ All over Europe	
NDM	New Delhi metallo-beta-lactamase	+ Mostly in central Europe	
IMP	metallo-β-lactamases	+ Low occurrence	
OXA-48	Carbapenem-hydrolysing oxacillinase-48	++ Mostly in western Europe	
CMY		First described in 2006	5%
Others: OXA 181, IMP 18, GEF, SME, IMI, NMC,...			

Covered by Carba-R
 Not covered by Carba-R

Nuovi strumenti diagnostici: Host gene expression

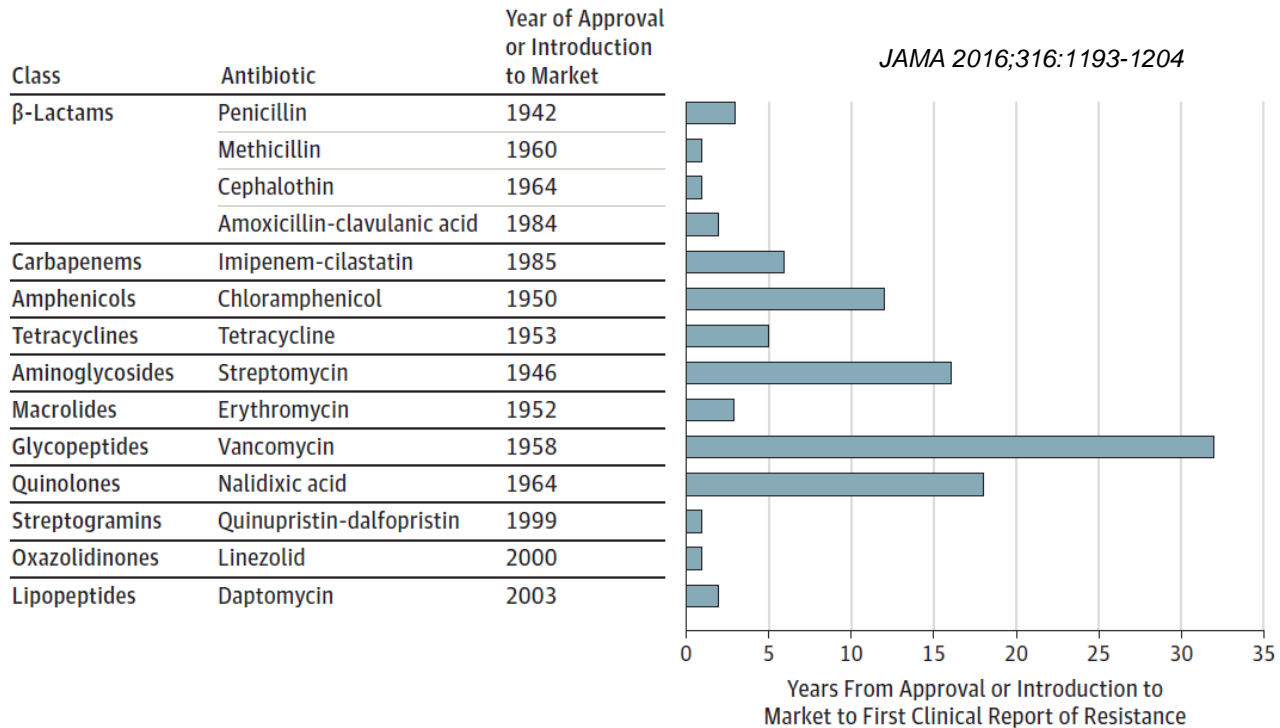


Ricerca e sviluppo dei farmaci: un processo lungo, complesso e molto costoso



INAPPROPRIATE ANTIBIOTIC PRESCRIBING AND SALES

Time From Antibiotic Approval or Introduction to Detection of Resistance in Clinical Samples



Antibiotico-resistenza: dimensione del fenomeno



Il pericolo per la salute umana rappresentato dall'antibiotico-resistenza è molto più preoccupante del crac finanziario del 2008

Jim O'Neill, UK Commercial Secretary to the Treasury

Antimicrobial Stewardship

A World Wide Web–Based Antimicrobial Stewardship Program Improves Efficiency, Communication, and User Satisfaction and Reduces Cost in a Tertiary Care Pediatric Medical Center

Allison L. Agwu,¹ Carlton K. K. Lee,^{1,3} Sanjay K. Jain,¹ Kara L. Murray,^{3,6} Jason Topolski,³ Robert E. Miller,⁵ Timothy Townsend,¹ and Christoph U. Lehmann^{4,2}

Divisions of ¹Pediatric Infectious Diseases and ²Health Information Sciences, ³Pediatric Pharmacy, ⁴Eudowood Neonatal Pulmonary Division, and ⁵Department of Pathology, Johns Hopkins Medical Institutions, Baltimore, Maryland; and ⁶Department of Pharmacy Services, Centennial Medical Center, Nashville, Tennessee

Infettivologo da considerarsi come valore aggiunto?

Impact of Routine Infectious Diseases Service Consultation on the Evaluation, Management, and Outcomes of *Staphylococcus aureus* Bacteremia

Timothy C. Jenkins,^{1,3} Connie S. Price,^{1,3} Allison L. Sabel,^{2,4} Philip S. Mehler,² and William J. Burman^{1,3}

¹Division of Infectious Diseases and ²Department of Patient Safety and Quality, Denver Health and Hospital Authority, and ³Department of Medicine, Division of Infectious Diseases, and ⁴Department of Preventive Medicine and Biometry, University of Colorado Health Sciences Center, Denver, Colorado

Conclusions. A policy of routine consultation with an infectious diseases specialist for patients with *S. aureus* bacteremia resulted in more-detailed evaluation, more-frequent detection of endocarditis and metastatic infection, and improved adherence to standards of care.

Antimicrobial Stewardship

Non è possibile avere un progetto di Antimicrobial Stewardship efficace senza:

- Dati epidemiologici microbiologici
- Dati di consumo degli antibiotici
- Un coordinamento centrale:
 - Impegno politico
 - Finanziamento adeguato e duraturo