La terapia antinfettiva nell'era della multiresistenza

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Review

Infections by multidrug-resistant Gram-negative Bacteria: What's new in our arsenal and what's in the pipeline?

Despoina Koulenti[a,b,c,*], Andrew Song[a], Aaron Ellingboe[a], Mohd Hafiz Abdul-Aziz[a,d], Patrick Harris[a,e,f], Emile Gavey[a], Jeffrey Lipman[a,b,g]

Table 1
Global priority list of antibiotic-resistant Gram-negative bacteria to guide research, discovery, and development of new antibiotics. World Health Organization, 2017 [13].

Priority 1: Critical	**Resistance spectrum**
Acinetobacter baumannii	carbapenem-resistant
Pseudomonas aeruginosa	carbapenem-resistant
Enterobacteriaceae	carbapenem-resistant, third-generation cephalosporin-resistant
Priority 2: High	
Helicobacter pylori	clarithromycin-resistant
Campylobacter	fluoroquinolone-resistant
Salmonella spp.	fluoroquinolone-resistant
Neisseria gonorrhoeae	third-generation cephalosporin-resistant, fluoroquinolone-resistant
Priority 3: Medium	
Haemophilus influenzae	ampicillin-resistant
Shigella spp.	fluoroquinolone-resistant

Clinical Infectious Diseases
MAJOR ARTICLE

2017;65(11):1884–96

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Corrado Girmenia,[1] Alice Bertaina,[2] Alfonso Piciocchi,[3] Katia Perruccio,[4] Alessandra Algarotti,[5] Alessandro Busca,[6] Chiara Cattaneo,[7] Anna Maria Raiola,[8] Stefano Guidi,[9] Anna Paola Iori,[1] Anna Candoni,[10] Giuseppe Irrera,[11] Giuseppe Milone,[12] Giampaolo Marcacci,[13] Rosanna Scime,[14] Maurizio Musso,[15] Laura Cudillo,[16] Simona Sica,[17] Luca Castagna,[18] Paolo Corradini,[19] Francesco Marchesi,[20] Domenico Pastore,[21] Emilio Paolo Alessandrino,[22] Claudio Annaloro,[23] Fabio Ciceri,[24] Stella Santarone,[25] Luca Nassi,[26] Claudio Farina,[27] Claudio Viscoli,[28] Gian Maria Rossolini,[29,30] Francesca Bonifazi,[31,*] and Alessandro Rambaldi,[5,32,*] for the Gruppo Italiano Trapianto di Midollo Osseo (GITMO) and Associazione Microbiologi Clinici Italiani (AMCLI).

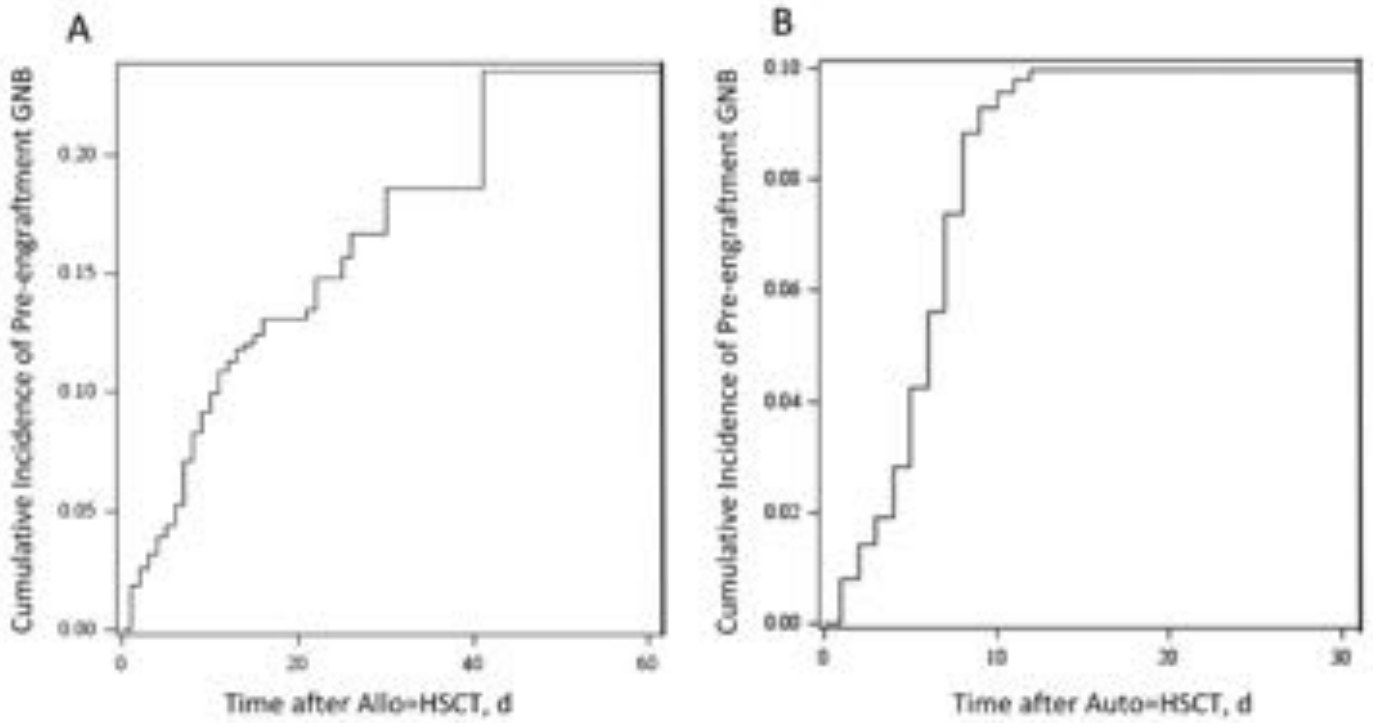

Figure 1. Cumulative incidence curve for gram-negative bacteremia (GNB) after allogeneic hematopoietic stem cell transplantation (allo-HSCT) (*A*) and auto-HSCT (*B*) in the SIGNB-GITMO-AMCLI epidemiological survey.

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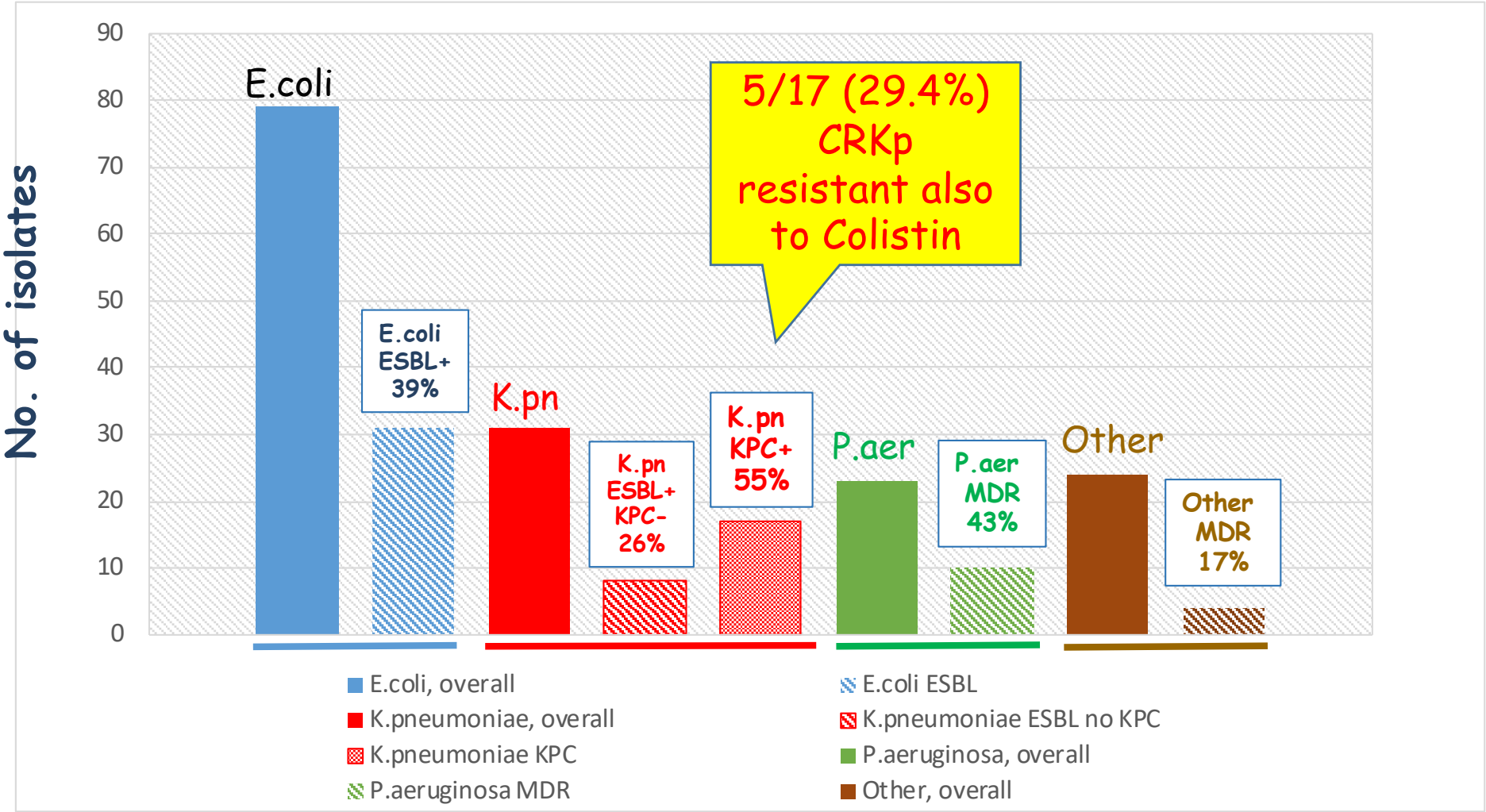
Gram-negative isolates and resistance patterns: 157 isolates from Allo-SCT



Clinical Infectious Diseases
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Incidence of ESBL+CS-GNB in allo-HSCT:
- 36/149 (24%) GNBs
- 36/1118 (3.2%) allo-HSCTs

Incidence of CR-GNB in allo HSCT:
- 29/149 (19%) GNBs
- 29/1118 (2.6%) allo-HSCTs

Overall MDR/XDR
- 43.6% of GNBs
- 5.8% of allo-HSCTs

Incidence of ESBL+CS-GNB in auto-HSCT:
- 39/151 (25.8%) GNBs
- 39/1625 (2.4%) auto-HSCTs

Incidence of CR-GNB in auto-HSCT:
- 9/151 (5.9%) GNBs
- 9/1625 (0.5%) auto-HSCTs

Overall MDR/XDR
- 31.8% of GNBs
- 3.0% of auto-HSCTs

Table 3. Distribution of Gram-Negative Species and Antimicrobial Susceptibility Patterns

Pathogen and Resistance Pattern[a]	Allo-HSCT (n = 149)	Auto-ASCT (n = 151)
Escherichia coli, total No. (%)	77 (51.7)	92 (60.9)
Ceph-S, carba-S, No. (% of *E. coli*)	46 (59.7)	63 (68.5)
Ceph-NS, carba-S, No. (% of *E. coli*)	30 (39.0)	29 (31.5)
Ceph-NS, carba-NS, No. (% of *E. coli*)	1 (1.3)	0
Klebsiella pneumoniae, total No. (%)	28 (18.8)	23 (15.2)
Ceph-S, carba-S, No. (% of *K. pneumoniae*)	6 (21.4)	7 (30.4)
Ceph-NS, carba-S, No. (% of *K. pneumoniae*)	6 (21.4)	10 (43.5)
Ceph-NS, carba-NS, No. (% of *K. pneumoniae*)	16 (57.1)	6 (26.1)
Other Enterobacteriaceae, total No. (%)	9 (6.0)[b]	10 (6.6)[c]
Ceph-S, carba-S, No. (% of other Enterobacteriaceae)	8 (88.9)	10 (100)
Ceph-NS, carba-S, No. (% of other Enterobacteriaceae)	0	0
Ceph-NS, carba-NS, No. (% of other Enterobacteriaceae)	1 (11.1)	0
Pseudomonas aeruginosa, total No. (%)	21 (14.1)	13 (8.6)
Non-MDR *P. aeruginosa*, No. (% of *P. aeruginosa*)	13 (61.9)	12 (92.3)
MDR *P. aeruginosa*, No. (% of *P. aeruginosa*)	8 (38.1)	1 (7.7)
Other gram-negative bacteria, total No. (%)	14 (9.4)[d]	13 (8.6)[e]
Non-MDR, No. (% of other gram-negative bacteria)	11 (78.6)	11 (84.6)
MDR, No. (% of other gram-negative bacteria)	3 (21.4)	2 (15.4)

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Risk factors for pre-engraftment Gram negative infections

Multivariate analysis

Allo-HSCT		Auto-HSCT	
Variable	**HR (95% CI), p**	Variable	**HR (95% CI), p**
Age (+10y)	1.16 (1.06-1.27), 0.001	Age (+10y)	1.20 (1.06-1.36), 0.004
Other diseases vs acute leukemia	0.65 (0.46-0.92), 0.01	Lymphoma vs other diseases	1.86 (1.30-2.66), <0.001
Donor MMR MMU CB	 4.14 (2.31-7.42), <0.001 2.92 (1.47-5.81), 0.002 3.50 (1.32-9.29), 0.01	Antibacterial prophylaxis vs no prophylaxis	0.50(0.34-0.75), <0.001
Ex vivo T-cell depletion	0.13 (0.03-0.53). 0.004		
Days of pre-engraftment neutropenia	1.02 (1.01-1.03), <0.001		

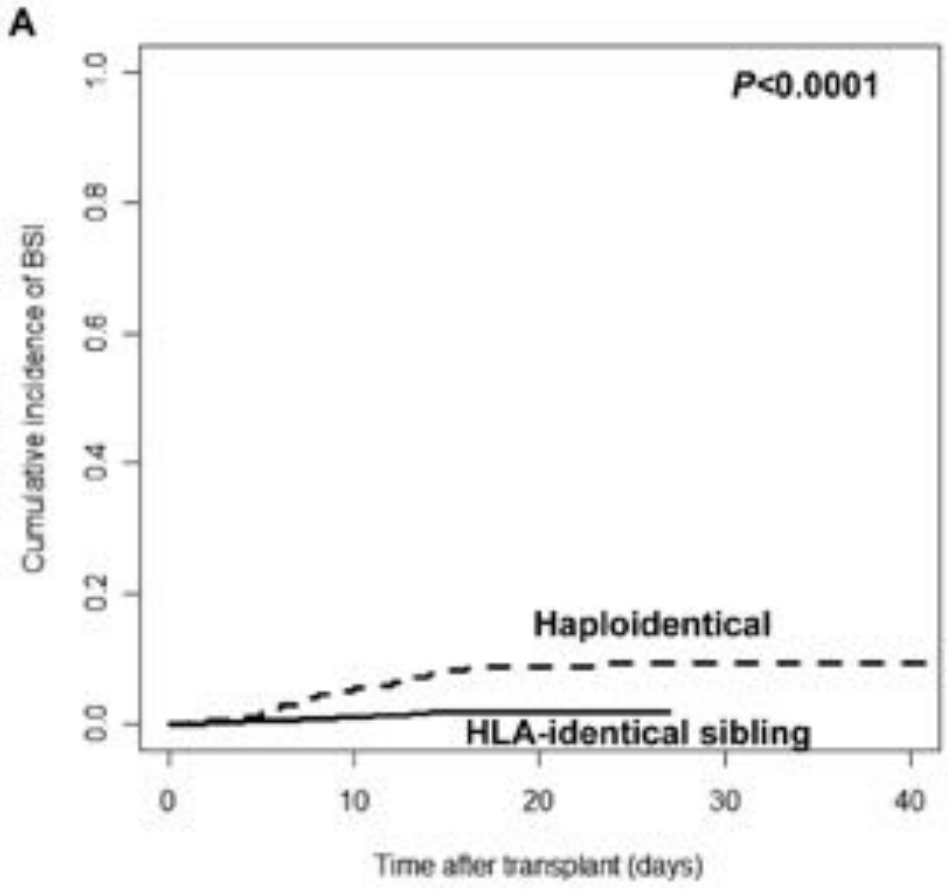
Clinical Infectious Diseases
SUPPLEMENT ARTICLE

Incidence, Risk Factors, Microbiology and Outcomes of Pre-engraftment Bloodstream Infection After Haploidentical Hematopoietic Stem Cell Transplantation and Comparison With HLA-identical Sibling Transplantation

Chen-Hua Yan, Yu Wang, Xiao-Dong Mo, Yu-Qian Sun, Feng-Rong Wang, Hai-Xia Fu, Yao Chen, Ting-Ting Han, Jun Kong, Yi-Fei Cheng, Xiao-Hui Zhang, Lan-Ping Xu, Kai-Yan Liu, and Xiao-Jun Huang

Peking University People's Hospital, Peking University Institute of Hematology, Beijing Key Laboratory of Hematopoietic Stem Cell Transplantation, China

Carbapenem resistant enterobacteria:
5.6% of GNB, 0.3% of transplants



The multivariate analysis also suggested that BSI was a risk factor for increased all-cause mortality at 3 months after haploidentical HSCT (hazard ratio = 2.281; 95% confidence interval: 1.334, 3.900; P = .003).

Clinical Infectious Diseases
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2017;65(11):1884–96

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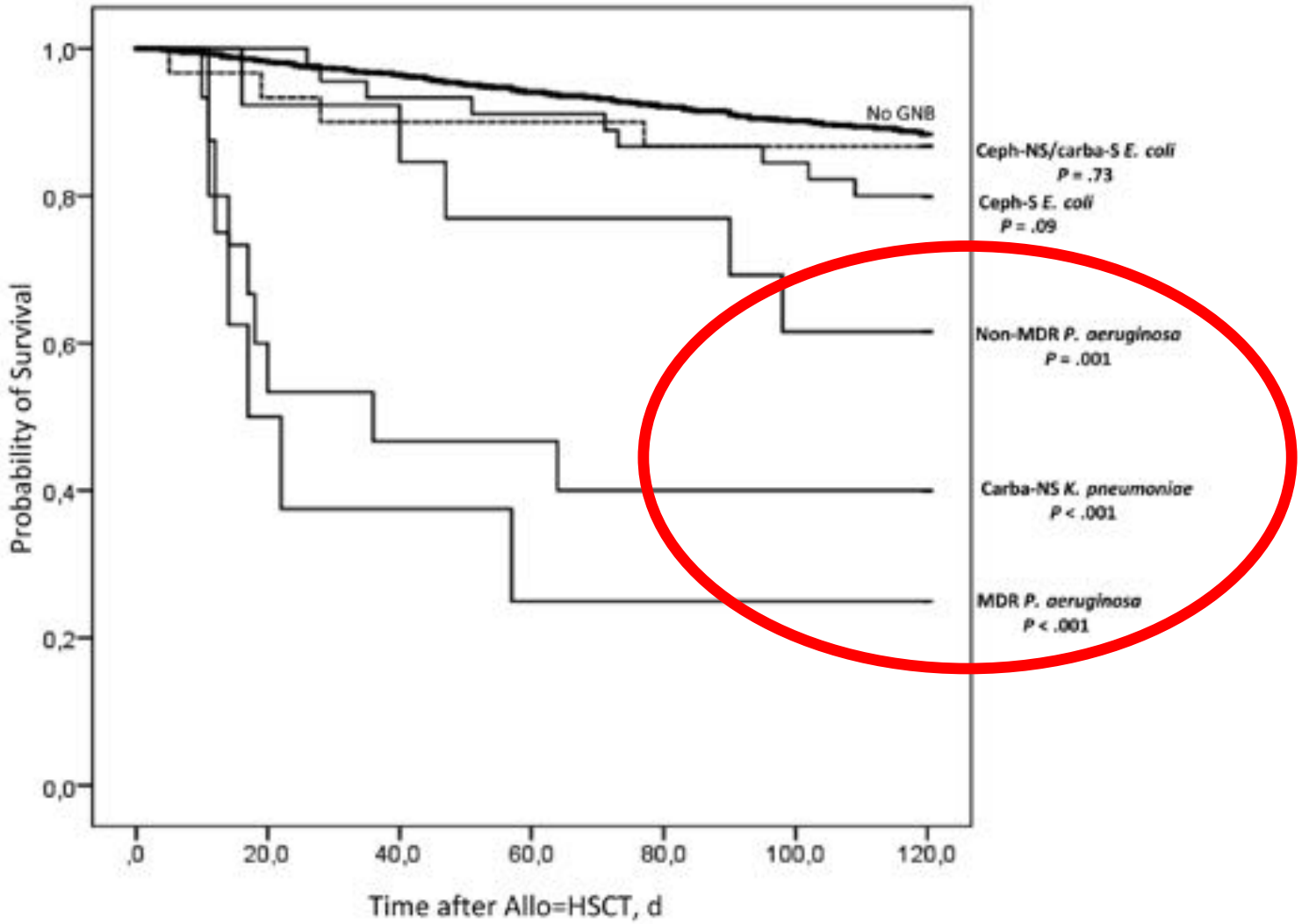
The mortality rate 30 days after the diagnosis of GNB was 17.9% (25 of 140 patients), and in 96% of patients (24 of 25) the infection was considered the primary cause of death. Of 46 patients who died before engraftment, the cause of death was a GNB in 18 (39.1%).



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AMCLI associazione microbiologi clinici italiani

Probability of mortality at 4 months from transplant: Multivariate analysis

Allo-HSCT		Auto-HSCT	
Variable	**HR (95% CI), p**	Variable	**HR (95% CI), p**
Age (+10y)	1.10 (1.01-1.20) 0.03	Lymphoma vs other diseases	6.17 (2.78-1.6) <0.001
Other diseases vs acute leukemia	0.42 (0.29-0.63) <0.001	Phase of the und disease at transplant: noCR vs CR	4.8 (2.19-10.34), <0.001
Phase of the und disease at transplant: noCR vs CR	2.16 (1.47-3.15) <0.001	Pre transplant neutropenia	3.82 (1.80-8.12) 0.001
Pre auto-HSCT	1.76 (1.19-2.63) 0.006	Days of pre engraftment neutropenia (PMN<100/cmm)	1.07 (1.04-1.18) <0.001
Days of pre engraftment neutropenia (PMN<100/cmm)	1.03(1.01-1.04) <0.001	Gram neg bacterial infection	2.43 (1.22-4.84) 0.01
Acute II-IV GVHD	2.15 (1.21-3.82) 0.009		
Gram neg bacterial infection	2.13 (1.45-3.13) <0.001		

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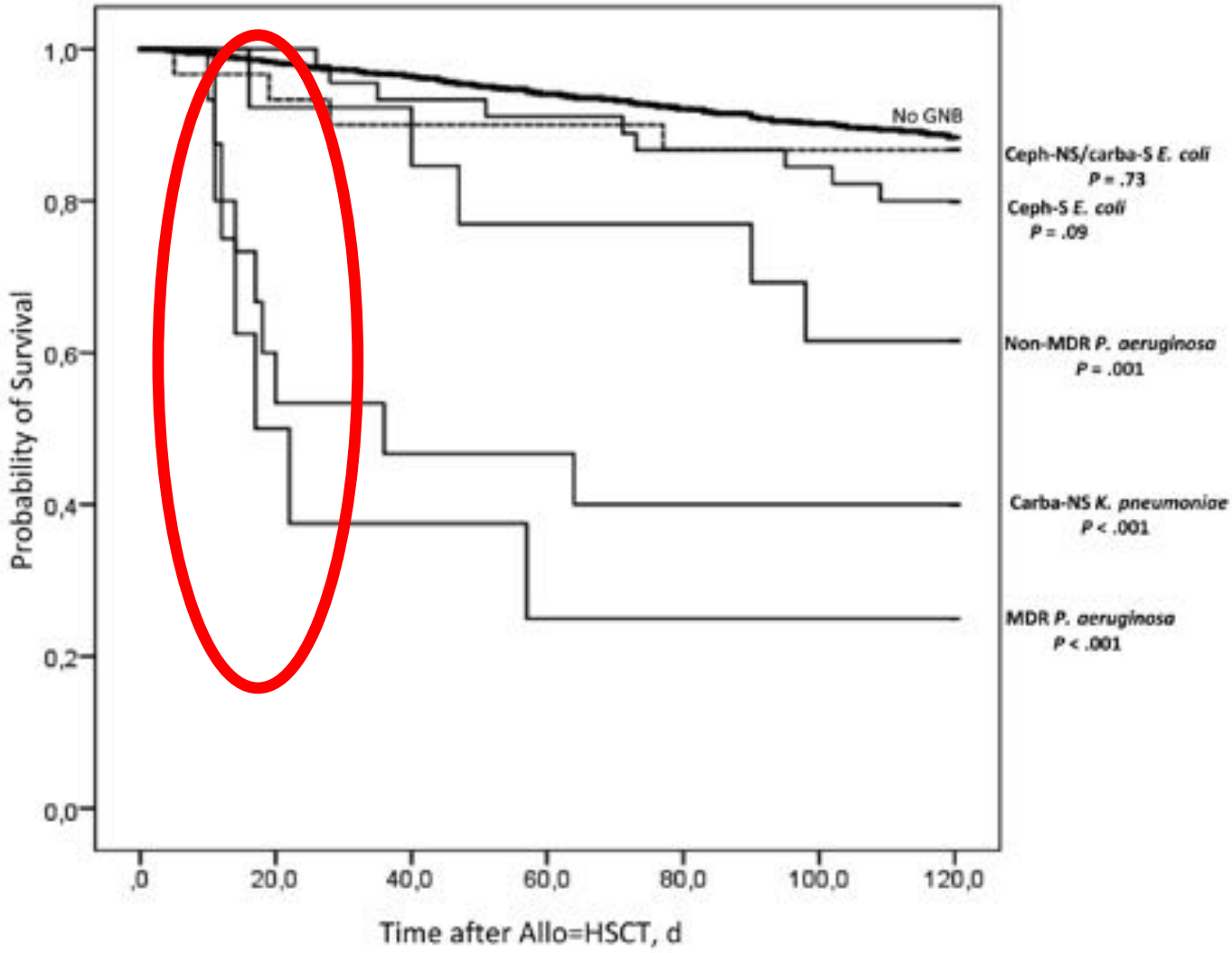


Published Ahead of Print on April 10, 2015, as doi:10.3324/haematol.2015.125484.

EUROPEAN HEMATOLOGY ASSOCIATION
haematologica
Journal of the European Hematology Association

Management of carbapenem resistant *klebsiella pneumoniae* infections in stem cell transplant recipients: an italian multidisciplinary consensus statement

by Corrado Girmenia, Claudio Viscoli, Alfonso Piciocchi, Laura Cudillo, Stefano Botti, Antonio Errico, Loredana Sarmati, Fabio Ciceri, Franco Locatelli, Maddalena Giannella, Matteo Bassetti, Carlo Tascini, Letizia Lombardini, Ignazio Majolino, Claudio Farina, Francesco Luzzaro, Gian Maria Rossolini, and Alessandro Rambaldi

- CRKp carriers, at onset of febrile neutropenia or other signs of possible infection
  - CTAT based on the susceptibility pattern of the colonizing isolate with the inclusion of at least two active agents, if possible, is strongly recommended (**AII**).
  - The use of standard empiric antibiotic therapy, not including CRKp-active drugs, is discouraged (**AII**).
  - In SCT centers with an ongoing outbreak of CRKp, the choice of empiric CTAT may be considered also in febrile patients who are not colonized, or with an unknown colonization status. (**BII**). Prompt withdrawal of CTAT with downgrading to more traditional drugs is recommended if cultures come back negative for CRKp, also taking into consideration the clinical findings (**AII**).

Susceptibility pattern of the colonizing isolate

At least two active agents

Standard empiric antibiotic therapy discouraged in patients with colonization by MDR bacteria

Consider active empiric therapy also in noncolonized patients during an ongoing outbreak

GUIDELINE ARTICLE

Haematologica 2013; 98 (12)

Targeted therapy against multi-resistant bacteria in leukemic and hematopoietic stem cell transplant recipients: guidelines of the 4th European Conference on Infections in Leukemia (ECIL-4, 2011)

Diana Averbuch,[1] Catherine Cordonnier,[2] David M. Livermore,[3] Malgorzata Mikulska,[4] Christina Orasch,[5] Claudio Viscoli,[4] Inge C. Gyssens,[6,7,8] Winfried V. Kern,[9] Galina Klyasova,[10] Oscar Marchetti,[5] Dan Engelhard,[1] and Murat Akova[11] on behalf of ECIL4, a joint venture of EBMT, EORTC, ICHS, ESGICH/ESCMID and ELN

Table 4. ECIL4 Recommendations: targeted treatment of infections due to resistant Gram-negative and -positive bacteria (based on in vitro susceptibility).

Resistant bacteria	Treatment options
Carbapenem-resistant *Enterobacteriaceae*	– Colistin/polymyxin B* BII – Tigecycline* BIII – Aminoglycosides* BIII – Fosfomycin* CIII
Beta-lactam-resistant** *Pseudomonas aeruginosa*	– Colistin/polymyxin B* AII – Fosfomycin* CIII
Beta-lactam-resistant** *Acinetobacter spp.*	– Colistin/polymyxin B* BIII – Tigecycline* BIII
Stenotrophomonas maltophilia (TMP-SMX) AI	– Trimethoprim-sulfamethoxazole – Fluoroquinolone (ciprofloxacin or moxifloxacin) BII – Ticarcillin-clavulanate BII – In seriously-ill or neutropenic patients, combination therapy can be considered (e.g. TMP-SMX + ceftazidime or ticarcillin-clavulanate) CIII
Vancomycin-resistant *Enterococcus faecalis*	– Linezolid AII – Daptomycin BII – Tigecycline BIII

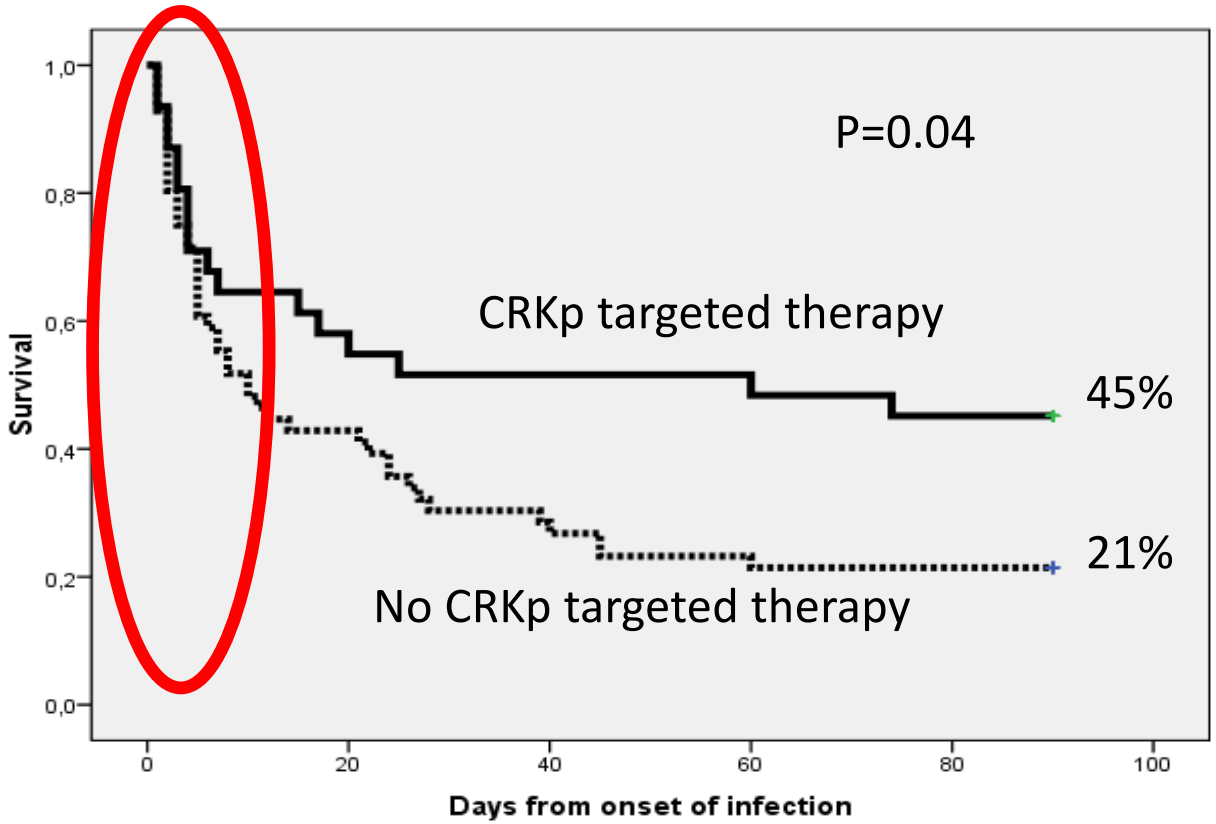
Bone Marrow Transplantation (2014), 1–7

www.nature.com/bmt

ORIGINAL ARTICLE

Infections by carbapenem-resistant *Klebsiella pneumoniae* in SCT recipients: a nationwide retrospective survey from Italy

C Gimenia[1], GM Rossolini[2,3,4], A Piciocchi[5], A Bertaina[6], G Pisapia[7], D Pastore[8], S Sica[9], A Severino[10], L Cudillo[11], F Ciceri[12], R Scimè[13], L Lombardini[14], C Viscoli[15], A Rambaldi[16] and the Gruppo Italiano Trapianto Midollo Osseo (GITMO)[17]



Risk factors for bloodstream infections due to colistin-resistant KPC-producing *Klebsiella pneumoniae*: results from a multicenter case–control–control study

Clin Microbiol Infect 2015; **21**: 1106.e1–1106.e8

D. R. Giacobbe[1], V. Del Bono[1], E. M. Trecarichi[2], F. G. De Rosa[3], M. Giannella[4], M. Bassetti[5], A. Bartoloni[6], A. R. Losito[2], S. Corcione[3], M. Bartoletti[4], E. Mantengoli[6], C. Saffioti[7], N. Pagani[3], S. Tedeschi[4], T. Spanu[7], G. M. Rossolini[8,9,10], A. Marchese[11], S. Ambretti[12], R. Cauda[2], P. Viale[4], C. Viscoli[1] and M. Tumbarello[2], for ISGRI-SITA (Italian Study Group on Resistant Infections of the Società Italiana Terapia Antinfettiva)

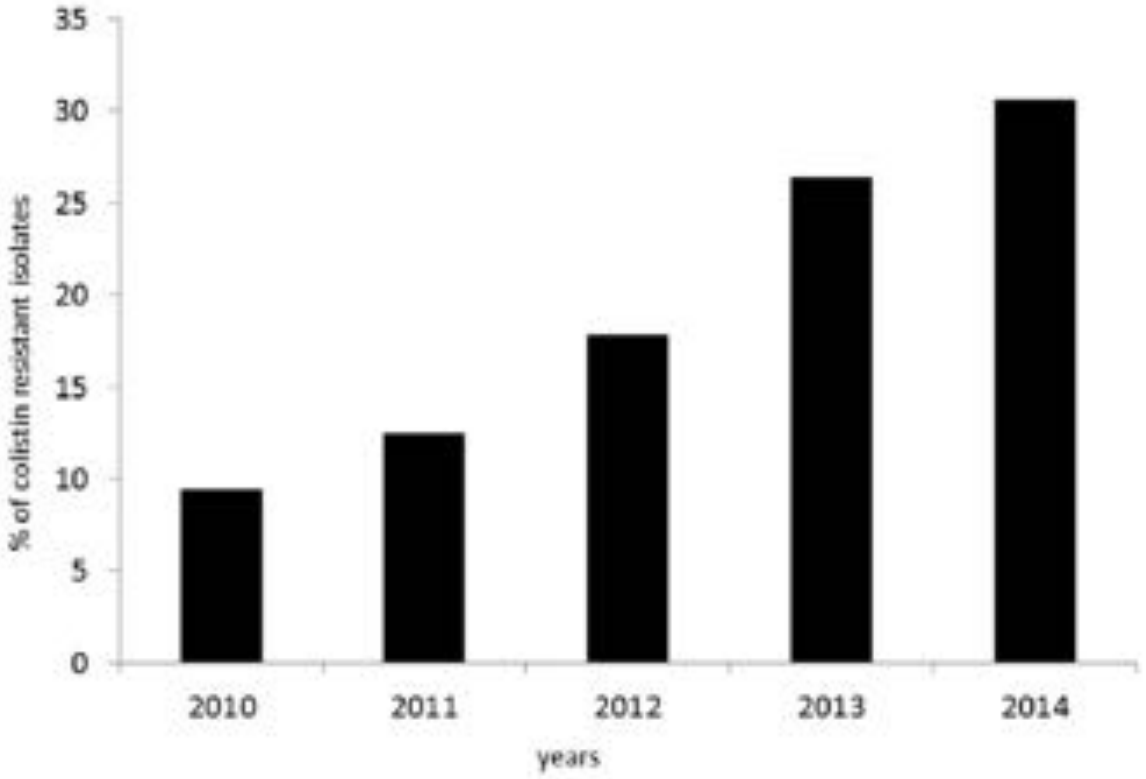


FIG. 1. Increase in colistin resistance (ColR) among blood *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae* isolates during the study period (χ^2 for trend, $p < 0.001$).

Clinical Infectious Diseases
MAJOR ARTICLE

Clinical Infectious Diseases® 2017;64(6):711–8

Colistin Resistance in Carbapenem-Resistant *Klebsiella pneumoniae:* Laboratory Detection and Impact on Mortality

Laura J. Rojas,[1,2,3] Madiha Salim,[4] Eric Cober,[5] Sandra S. Richter,[6] Federico Perez,[3,7] Robert A. Salata,[7] Robert C. Kalayjian,[8] Richard R. Watkins,[9,10] Steve Marshall,[3] Susan D. Rudin,[1,3] T. Nicholas Domitrovic,[1,3] Andrea M. Hujer,[1,3] Kristine M. Hujer,[1,3] Yohei Doi,[11] Keith S. Kaye,[4] Scott Evans,[12] Vance G. Fowler Jr,[13,14] Robert A. Bonomo,[1,2,3,7,15,16] and David van Duin[17]; for the Antibacterial Resistance Leadership Group

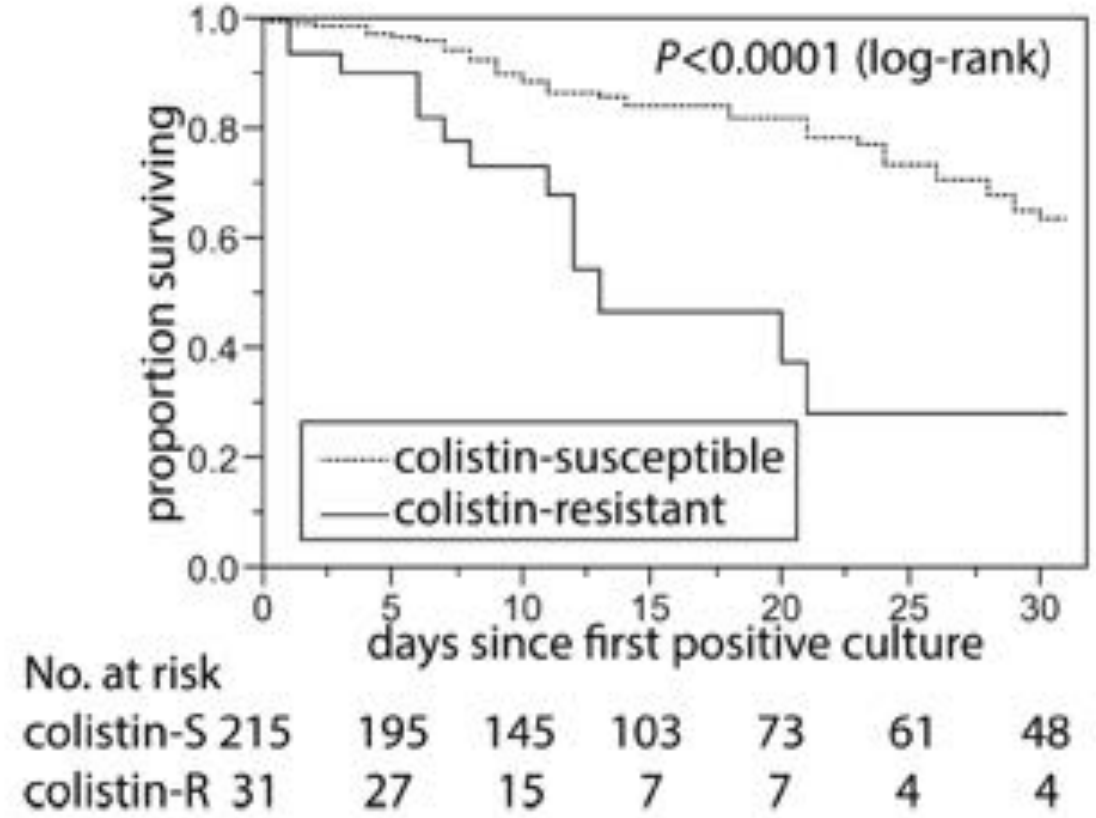


Figure 4. Kaplan-Meier curve showing the 30-day in-hospital survival for patients with colistin-resistant carbapenem-resistant *Klebsiella pneumoniae* (CRKp) as compared to colistin-susceptible CRKp. Patients were censored at the time of hospital discharge.

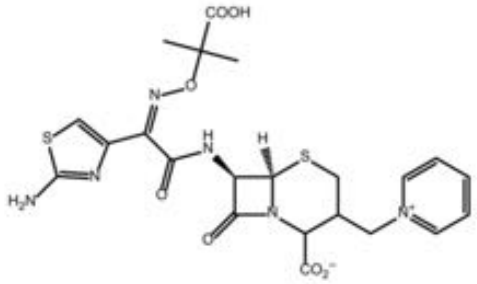
Clinical Infectious Diseases
INVITED ARTICLE
REVIEW OF ANTI-INFECTIVE AGENTS: Louis D. Saravolatz, Section Editor

Ceftazidime/Avibactam and Ceftolozane/Tazobactam: Second-generation β-Lactam/β-Lactamase Inhibitor Combinations

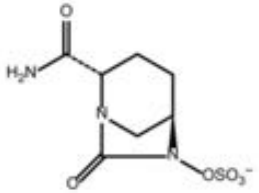
Clinical Infectious Diseases® 2016;63(2):234–41

David van Duin[1] and Robert A. Bonomo[2,3,4,5]

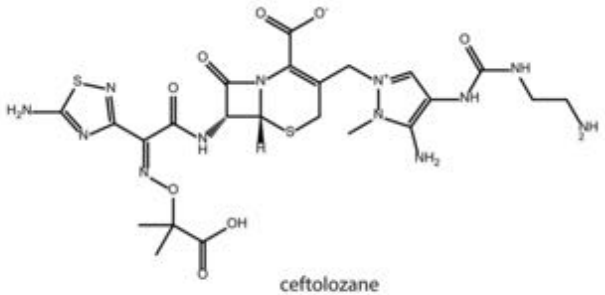
[1]Division of Infectious Diseases, University of North Carolina, Chapel Hill; [2]Research Service, Louis Stokes Cleveland Department of Veterans Affairs Medical Center, [3]Division of Infectious Diseases and HIV Medicine, Department of Medicine, [4]Department of Molecular Biology and Microbiology, and [5]Department of Pharmacology, Case Western Reserve University School of Medicine, Cleveland, Ohio



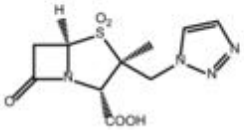
ceftazidime



avibactam



ceftolozane



tazobactam

Isolates	Ceftazidime/ avibactam	Ceftolozane/ tazobactam
	% susceptible	
E.coli ESBL	100	93 - 96
K.pneumoniae ESBL	100	42 - 79
KPC + enterobacteriaceae	97 – 100	1 - 4
Merop NS P.aeruginosa	87	78 - 96
XDR P.aeruginosa	67 - 74	46

International Journal of Antimicrobial Agents 52 (2018) 443–450

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Review

Evaluation of the efficacy and safety of ceftazidime/avibactam in the treatment of Gram-negative bacterial infections: a systematic review and meta-analysis

Han Zhong[a,1], Xian-Yuan Zhao[b,1], Zai-Li Zhang[a], Zhi-Chun Gu[a], Chi Zhang[a], Yuan Gao[b,*], Min Cui[a,*]

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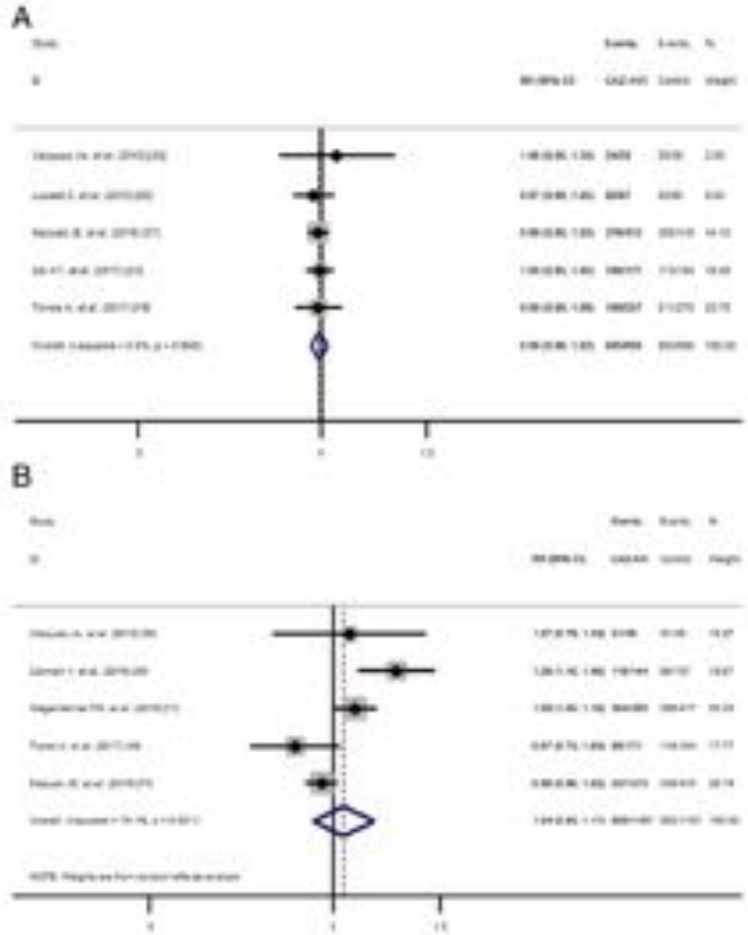
[b] Department of Critical Care, Ren Ji Hospital, School of Medicine, Shanghai Jiao Tong University, 160 Pujian Road, Shanghai 200127, China



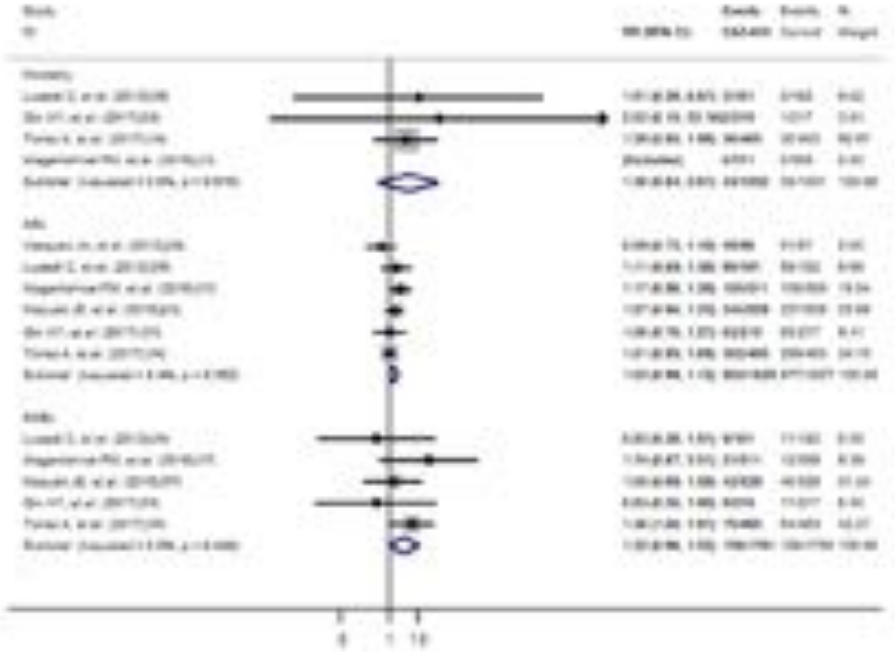


Fig. 3. Safety of ceftazidime/avibactam (CAZ-AVI) compared with other treatments in the safety population, including mortality, adverse events (AEs) and serious adverse events (SAEs). RR, risk ratio; CI, confidence interval.

Fig. 2. Effects of ceftazidime/avibactam (CAZ-AVI) compared with other treatments at test-of-cure visit: (A) clinical response of CAZ-AVI in clinically evaluable population and (B) microbiological response of CAZ-AVI in microbiologically modified intent-to-treat population. RR, risk ratio; CI, confidence interval.

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Table 3
Subgroup analysis of clinical response, microbiological response and mortality in the ceftazidime/avibactam (CAZ-AVI)-treated group compared with other treatments

Subgroup	Clinical response			Microbiological response			Mortality		
	RR (95% CI)	No. of participants (no. of studies)	I^2	RR (95% CI)	No. of participants (no. of studies)	I^2	RR (95% CI)	No. of participants (no. of studies)	I^2
Pathogens									
CRE	**1.61 (1.13–2.29)**	281 (4)	61.7	–	–	–	**0.29 (0.13–0.63)**	277 (3)	0
ESBL-positive organisms	1.00 (0.90–1.12)	172 (2)	0	1.18 (0.67–2.07)	24 (1)	0	–	–	–
CAZ-NS organisms	0.99 (0.91–1.07)	319 (3)	0	1.00 (0.88–1.13)	332 (4)	0	–	–	–
Infections									
cIAI	0.95 (0.91–1.00)	1313 (4)	0	0.96 (0.91–1.01)	967 (2)	0	1.68 (0.41–6.96)	1693 (3)	0
cUTI	1 (0.96–1.01)	1155 (3)	0	**1.13 (1.05–1.21)**	1186 (3)	43.6	–	–	–
BSI	**2.11 (1.54–2.88)**	140 (2)	0	–	–	–	0.35 (0.12–1.05)	140 (2)	0
HAP/VAP	0.943 (0.859–1.035)	726 (1)	0	0.8669 (0.729–1.029)	155 (1)	0	1.26 (0.797–1.993)	808 (1)	0
Renal status *									
Normal renal function	0.98 (0.95–1.01)	2622 (4)	0	–	–	–	–	–	–
Moderate renal function	0.82 (0.60–1.11)	209 (4)	65.9	–	–	–	–	–	–
Augmented renal function	1.04 (0.88–1.22)	108 (1)	0	–	–	–	–	–	–
APACHE II score									
≤10	0.99 (0.94–1.04)	462 (2)	0	–	–	–	–	–	–
10–30	1.13 (0.81–1.56)	876 (4)	85.3	–	–	–	–	–	–

RR, risk ratio; CI, confidence interval; CRE, carbapenem-resistant Enterobacteriaceae; ESBL, extended-spectrum β-lactamase; CAZ-NS, ceftazidime-non-susceptible; cIAI, complicated intra-abdominal infection; cUTI, complicated urinary tract infection; BSI, bloodstream infection; HAP, hospital-acquired pneumonia; VAP, ventilator-acquired pneumonia; APACHE, Acute Physiology and Chronic Health Evaluation.

* Normal renal function, creatinine clearance (Cl_{Cr}) >50 mL/min; moderate renal function, Cl_{Cr} >30 to ≤50 mL/min; and augmented renal function, Cl_{Cr} ≥150 mL/min.

RAPID RISK ASSESSMENT

Emergence of resistance to ceftazidime-avibactam in carbapenem-resistant *Enterobacteriaceae*

12 June 2018

frontiers in Microbiology

REVIEW
published: 30 January 2019
doi: 10.3389/fmicb.2019.00080

Infections Caused by Carbapenem-Resistant *Enterobacteriaceae*: An Update on Therapeutic Options

Chau-Chyun Sheu[1,2], Ya-Ting Chang[2,3], Shang-Yi Lin[2,3], Yen-Hsu Chen[2,4,5] and Po-Ren Hsueh[6,7]**

TABLE 3 | Potential combination therapeutic strategies and new antibiotics for the treatment of carbapenem-resistant *Enterobacteriaceae* infections.

Combination therapeutic strategies
High-dose tigecycline
High-dose prolonged-infusion of carbapenem
Double-carbapenem therapy
New antibiotics
Ceftazidime/avibactam
Meropenem/vaborbactam
Plazomicin
Eravacycline
New antibiotics in development
Imipenem/cilastatin and relebactam
Cefiderocol

Drugs
https://doi.org/10.1007/s40265-019-1055-2

Published online: 02 February 2019

REVIEW ARTICLE

Cefiderocol: A Siderophore Cephalosporin with Activity Against Carbapenem-Resistant and Multidrug-Resistant Gram-Negative Bacilli

George G. Zhanel[1,7] · Alyssa R. Golden[1] · Sheryl Zelenitsky[2] · Karyn Wiebe[2] · Courtney K. Lawrence[2] · Heather J. Adam[1,3] · Temilolu Idowu[4] · Ronald Domalaon[4] · Frank Schweizer[1,4] · Michael A. Zhanel[1] · Philippe R. S. Lagacé-Wiens[1,3] · Andrew J. Walkty[1,3] · Ayman Noreddin[5] · Joseph P. Lynch III[6] · James A. Karlowsky[1,3]

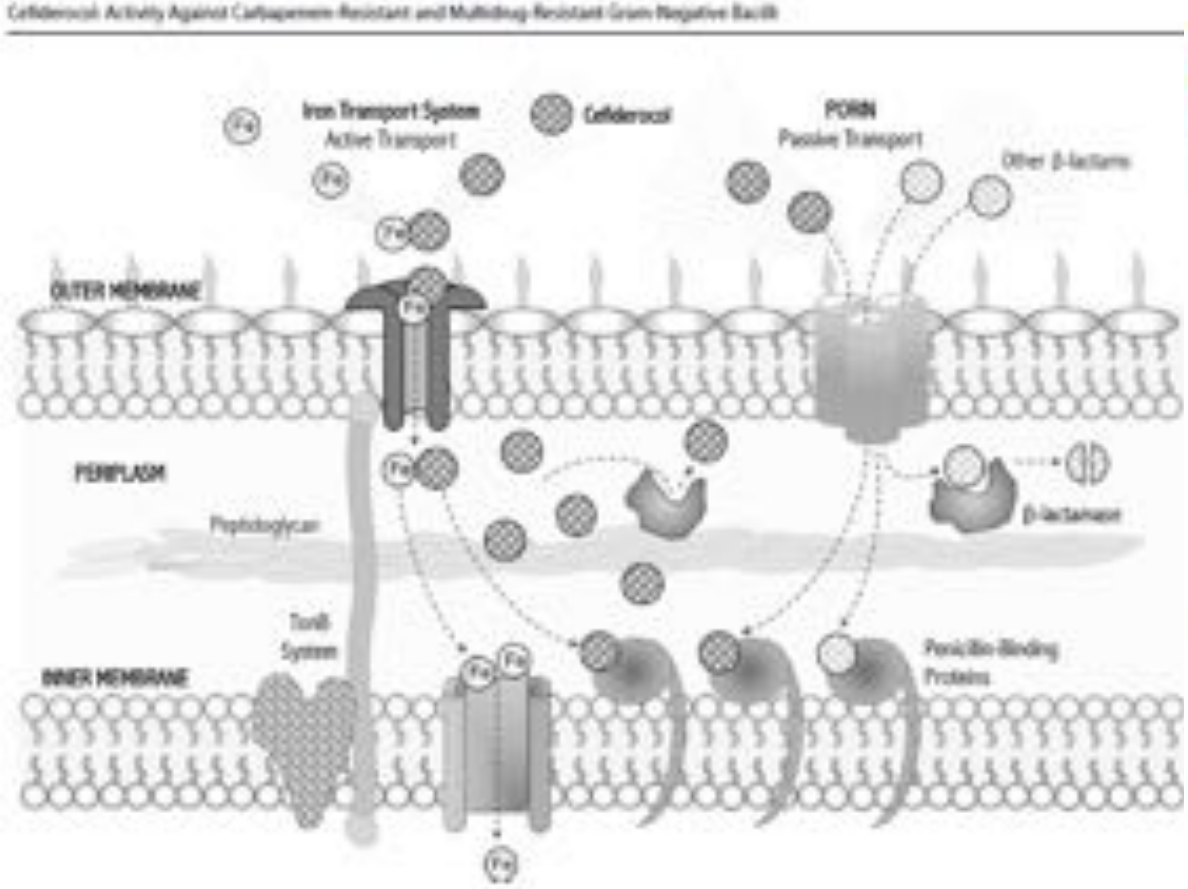


Fig. 3 Mechanism of action of cefiderocol against Gram-negative bacilli

Key Points

Cefiderocol is an injectable siderophore cephalosporin discovered by and being developed by Shionogi & Co., Ltd., Japan.

Cefiderocol has intrinsic structural stability against a variety of Ambler class A, C, and D β-lactamases, and it is the first agent with activity versus class B β-lactamases. This confers upon it activity against multidrug-resistant (MDR) Gram-negative bacilli, including MDR Enterobacteriales, *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and *Stenotrophomonas maltophilia*, all while possessing a safety and tolerability profile similar to other cephalosporins.

Cefiderocol is well positioned to help address the increasing number of infections caused by carbapenem-resistant and MDR Gram-negative bacilli, including extended-spectrum β-lactamase- and carbapenemase-producing strains (including metallo-β-lactamase producers).

Ambler Classification of β-lactamases

Ambler Class	A	B	C	D
Active Site	Serine	Metallo (zinc-binding thiol)	Serine	Serine
Enzyme Type	TEM, SHV, CTX-M, KPC	NMD-1, IMP, VIM	AmpC, CMY	OXA
Host Organisms	Enterobacteriaceae and Non-fermenters	Enterobacteriaceae and Non-fermenters	*Enterobacter* spp. *Citrobater* spp.	Enterobacteriaceae and Non-fermenters
Substrates	Ampicillin; cephalotin; penicillins; 3rd gen cephalosporins; Extended-spectrum cephalosporins; carbapenems	All β-lactams	Cephamycins; 3rd-generation cephalosporins	Cloxacillin; Extended-spectrum cephalosporins; carbapenems

Mediterranean Journal of Hematology and Infectious Diseases

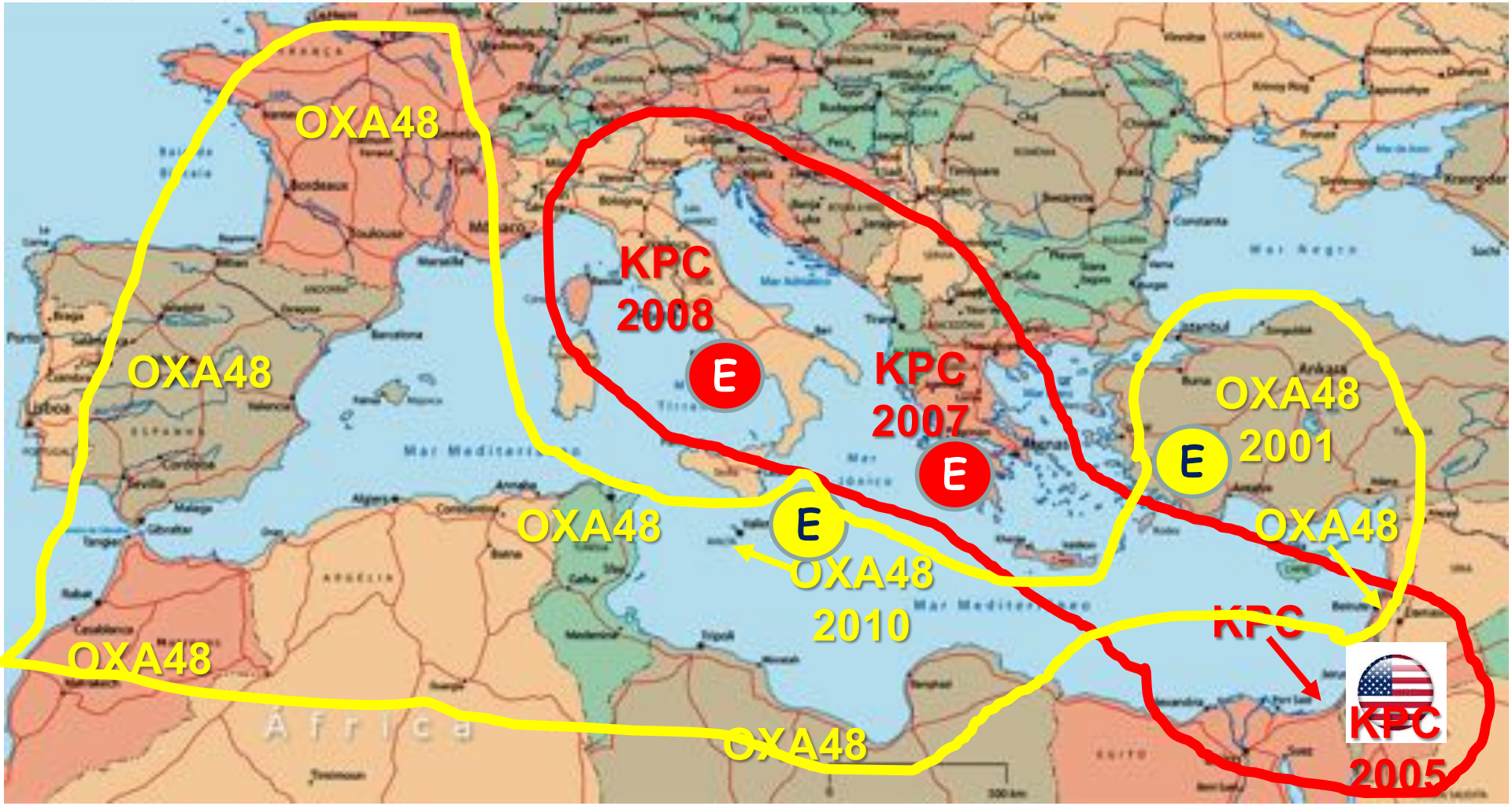
Review article

Epidemiology of Carbapenem Resistant *Klebsiella pneumoniae* Infections in Mediterranean Countries

2016, 8(1): e2016032,

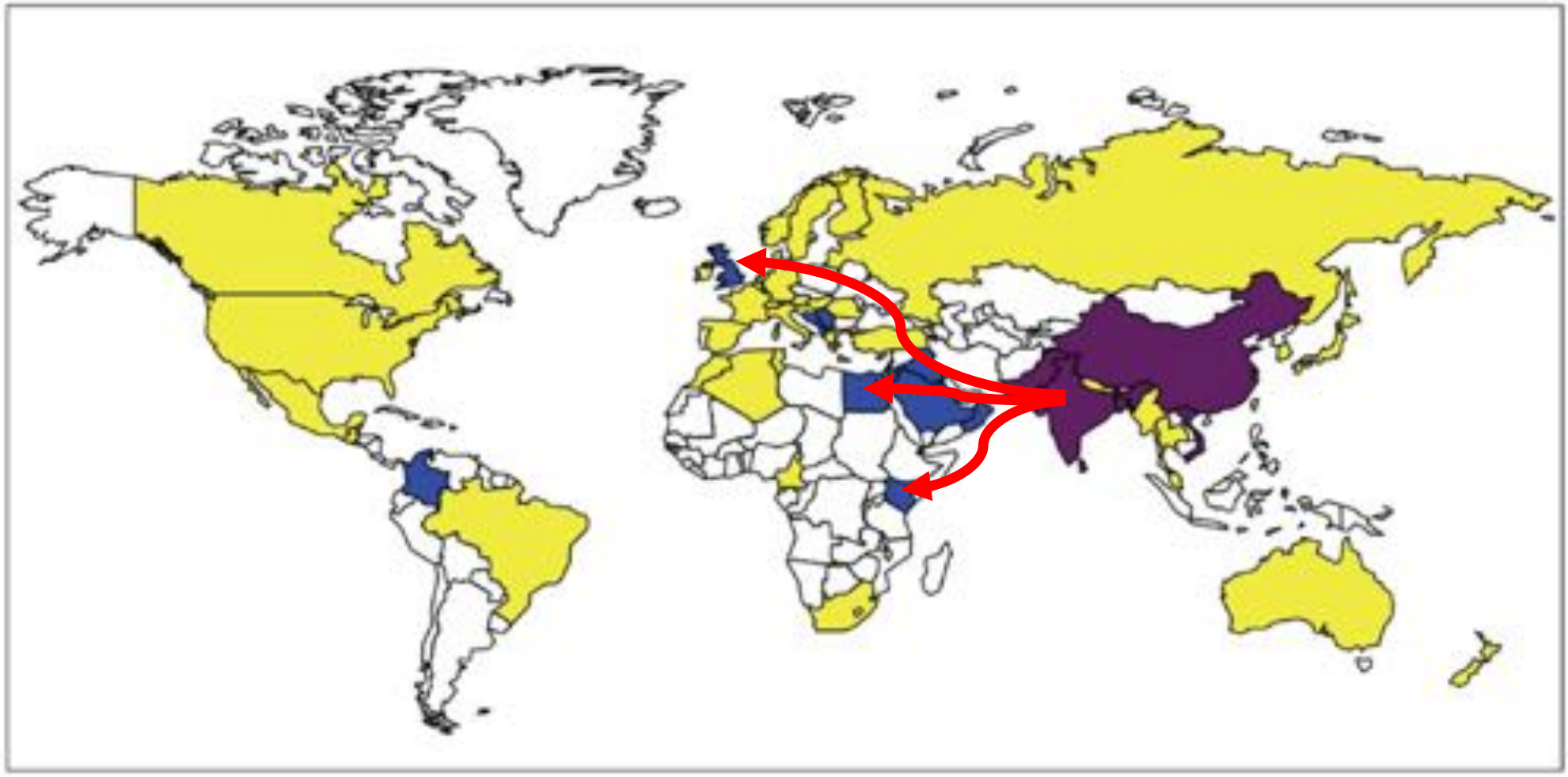
Corrado Girmenia , Alessandra Serrao and Martina Canichella

Inter-regional diffusion, endemicity



Geographic Distribution of NDM producers

Biomed Res Int. 2014;2014:249856.4



High prevalence of NDM producers (endemicity)
Outbreaks and interregional spread of NDM producers
Sporadic description of NDM producers

Anthropological and socioeconomic factors contributing to global

multiv

Peter Collignon,

Lancet Planet Health 2018;

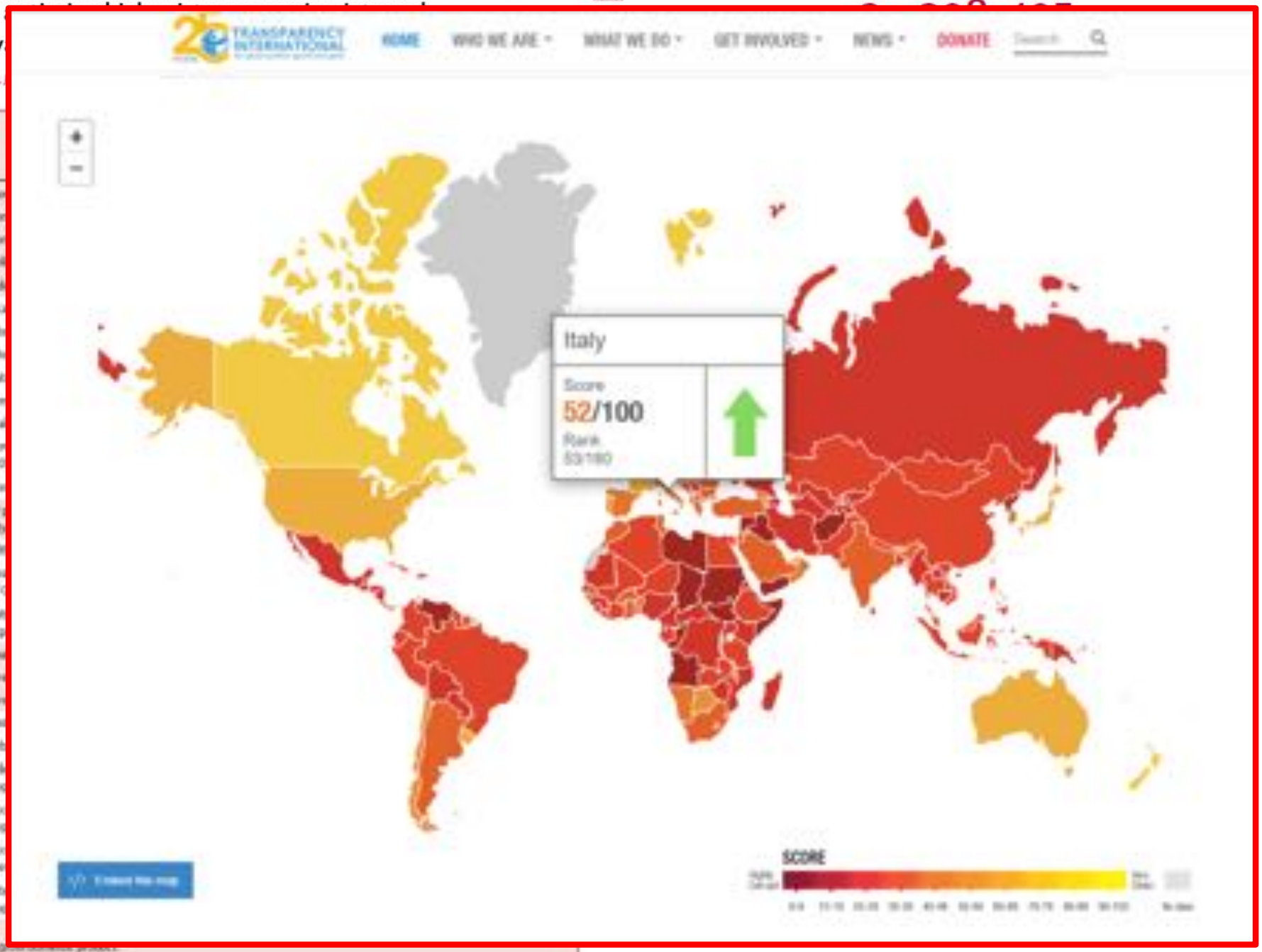
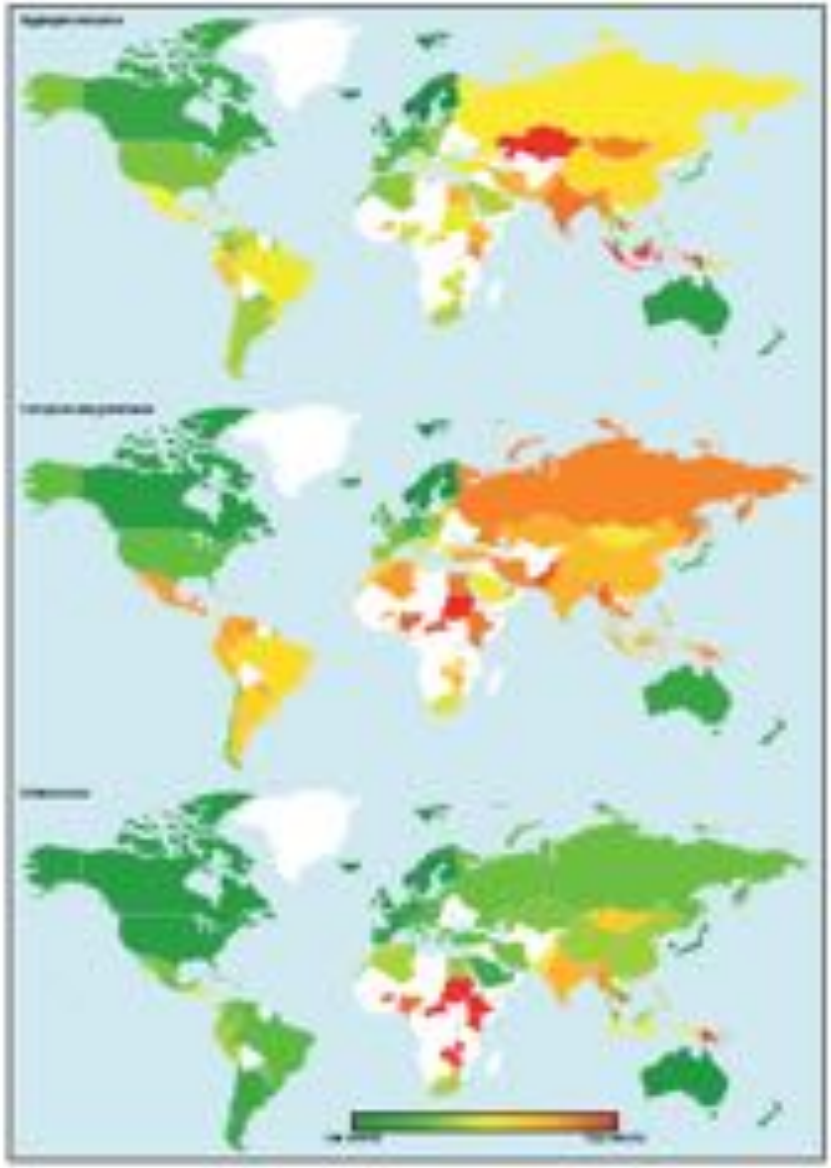


Table 1: Indices and measures

Lancet Planet Health 2018;
2: e398–405

Anthropological and socioeconomic factors contributing to global antimicrobial resistance: a univariate and multivariable analysis

Peter Collignon, John J Beggs, Timothy R Walsh, Sumanth Gandra, Ramanan Laxminarayan



	Effect on resistance rate of 1 SD increase in each explanatory variable (logit)	p value
Usage (standardised)	2·36	0·070
Governance index	−11·18	<0·0001
Health expenditure index	−6·34	0·0065
GDP per capita index (standardised)	3·36	0·11
Education index	8·59	0·0035
Infrastructure index	−13·24	0·0052
Climate index	−0·25	0·86
R^2	0·75	–

GDP=gross domestic product. R^2=coefficient of determination.

Table 3: Effect of changes in indices on the aggregate resistance rate

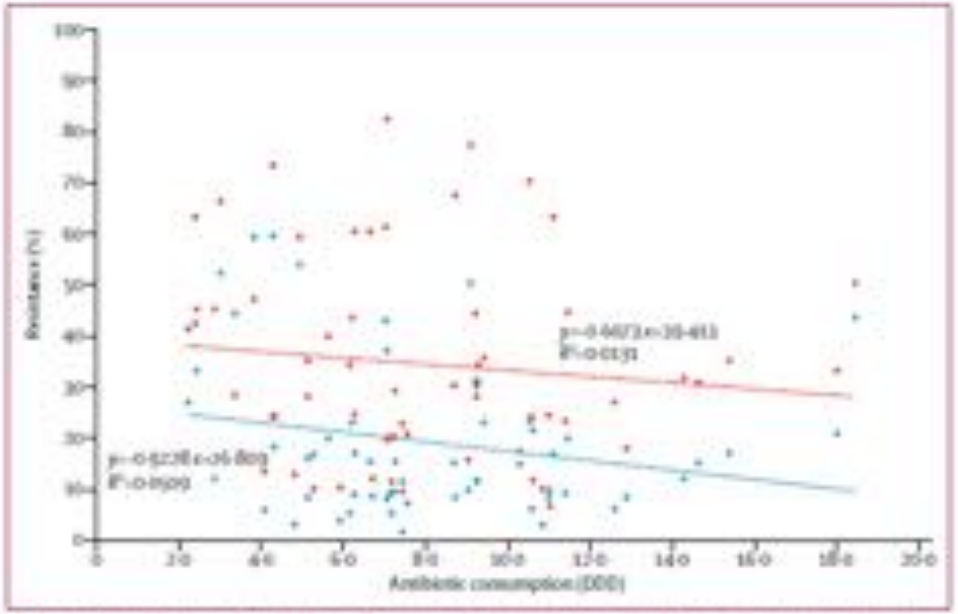


Figure 2: **Escherichia coli resistance levels for fluoroquinolones and third-generation cephalosporins compared with antibiotic consumption**

Anthropological and socioeconomic factors contributing to global antimicrobial resistance: a univariate and multivariable analysis

Peter Collignon, John J Beggs, Timothy R Walsh, Sumanth Gandra, Ramanan Laxminarayan

Lancet Planet Health 2018; 2: e398–405

Reduction of antibiotic consumption will not be sufficient to control antimicrobial resistance because contagion—the spread of resistant strains and resistance genes—seems to be the dominant contributing factor.

Improving sanitation, increasing access to clean water, and ensuring good governance, as well as increasing public health-care expenditure and better regulating the private health sector are all necessary to reduce global antimicrobial resistance.

News in the epidemiology and outcome of MDR/XDR Gram neg infections in HSCT populations

- Good news:
  - Tailored infection-control measures
  - New antibacterial drugs and new antimicrobial strategies (early, risk-based treatments)
- Bad news:
  - Infection-control measures may be difficult to apply and recrudescence of these infections frequently occurs
  - Emerging resistance to new molecules
- Continuous epidemiology survey is the key strategy that leads our fight against these infections particularly (but not only) in high risk populations