“NUEVOS BETALACTÁMICOS/INHIBIDORES DE BETALACTAMASAS: ¿ES ORO TODO LO QUE RELUCE?”

¿necesitamos los nuevos BL o BL/IBL o seguimos sin poder abandonar los viejos antibióticos?

FRANCISCO MORENO RAMOS
S. FARMACIA. HOSPITAL U. LA PAZ

PROA HULP
PROGRAMA DE OPTIMIZACIÓN DE USO DE ANTIMICROBIANOS

Servicio de FARMACIA
HOSPITAL UNIVERSITARIO LA PAZ

Escudo actual

Escudo anterior

Reviving old antibiotics

Ursula Theuretzbacher1*, J Antimicrob Chemother 2015; 70: 2177–2181

A new strategy to fight antimicrobial resistance:

the revival of old antibiotics

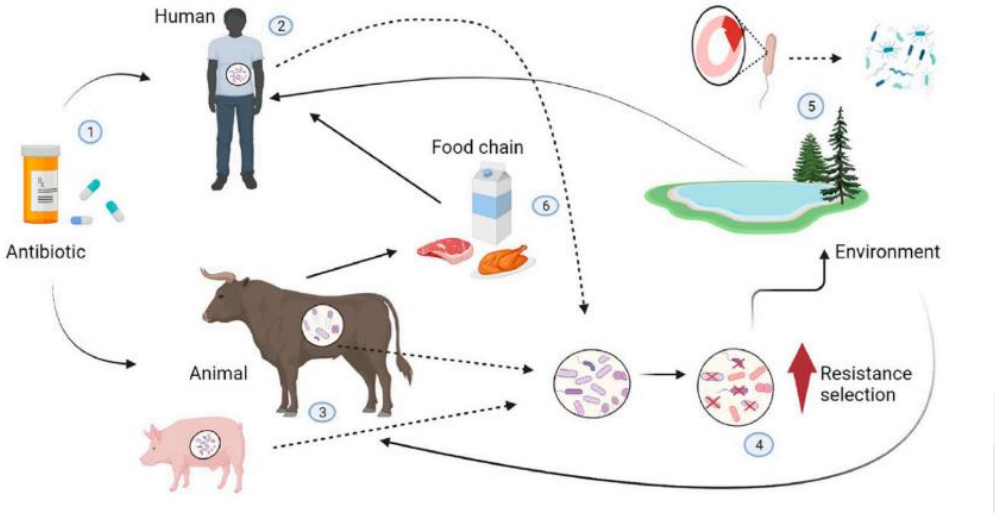
Expert. Microbiol. 24 October 2014

Current Treatment Strategies Against Multidrug-Resistant 2023

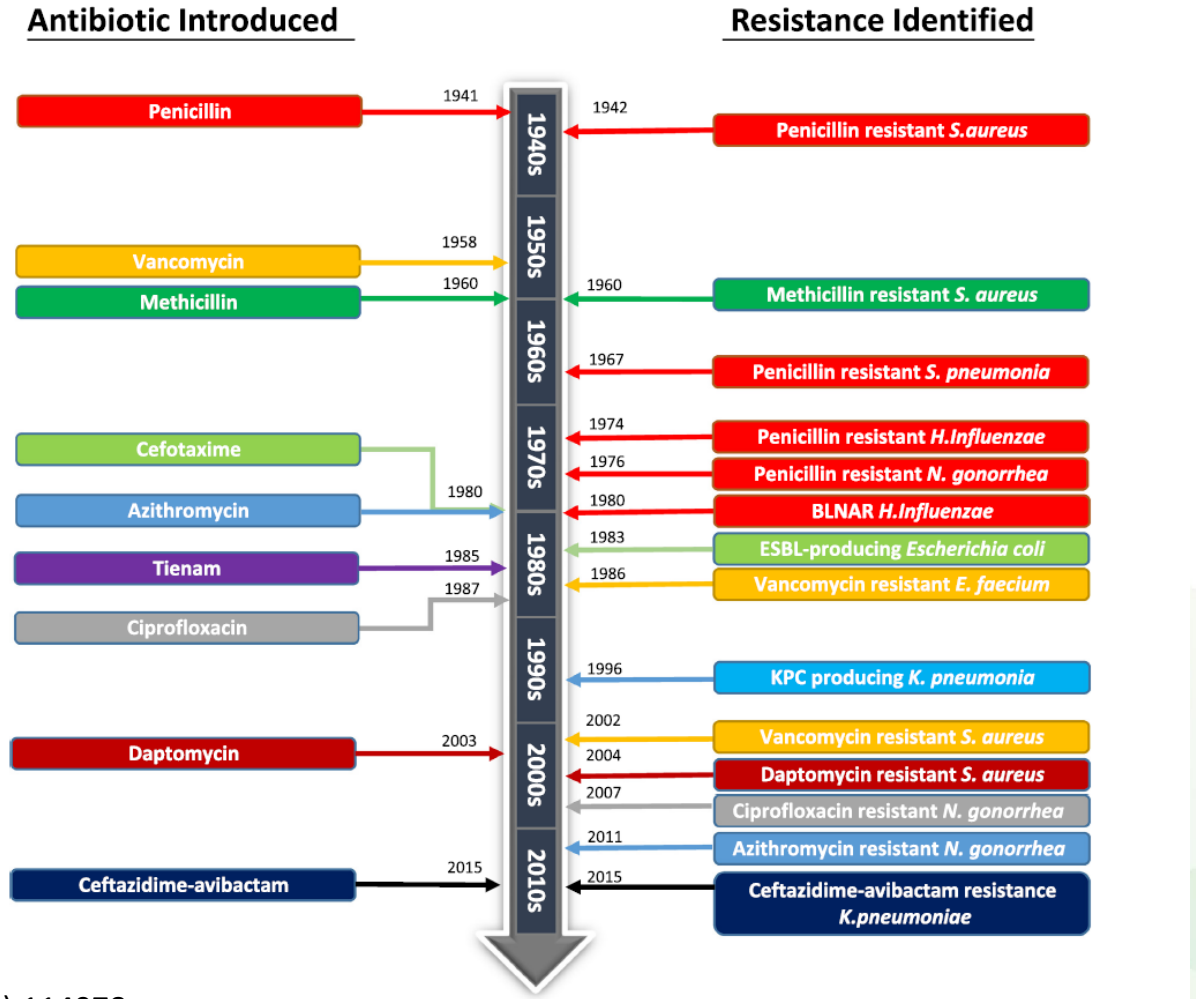
Antibiotic resistance can be a result of **three main** pathways:
(1)Enzyme inactivation;

(2) Decrease intracellular concentration,

(3) Modification of target sites



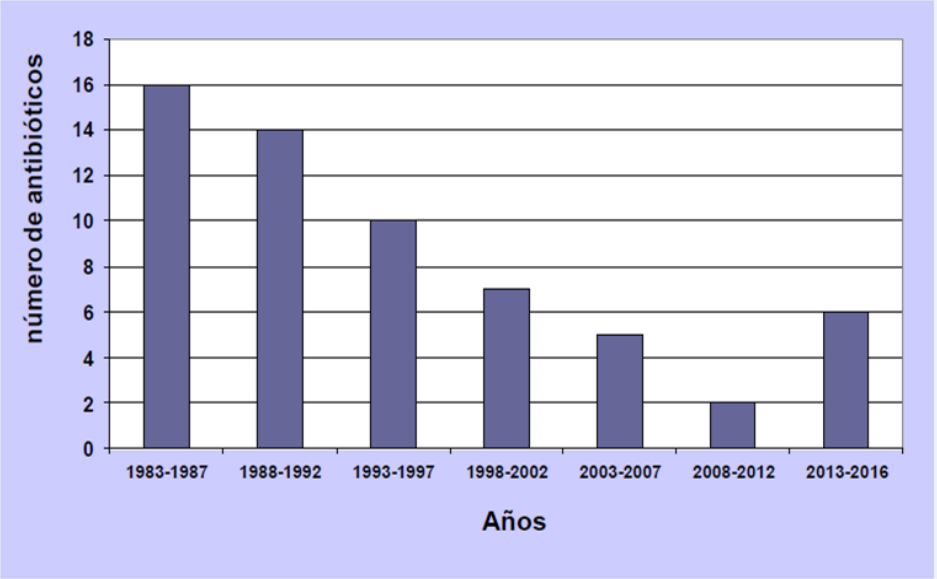
https://doi.org/10.1007/s00284-022-03061-7



Advanced Drug Delivery Reviews 181 (2022) 114078

Antibiotic Approvals in the Last Decade: Are We Keeping Up With Resistance?

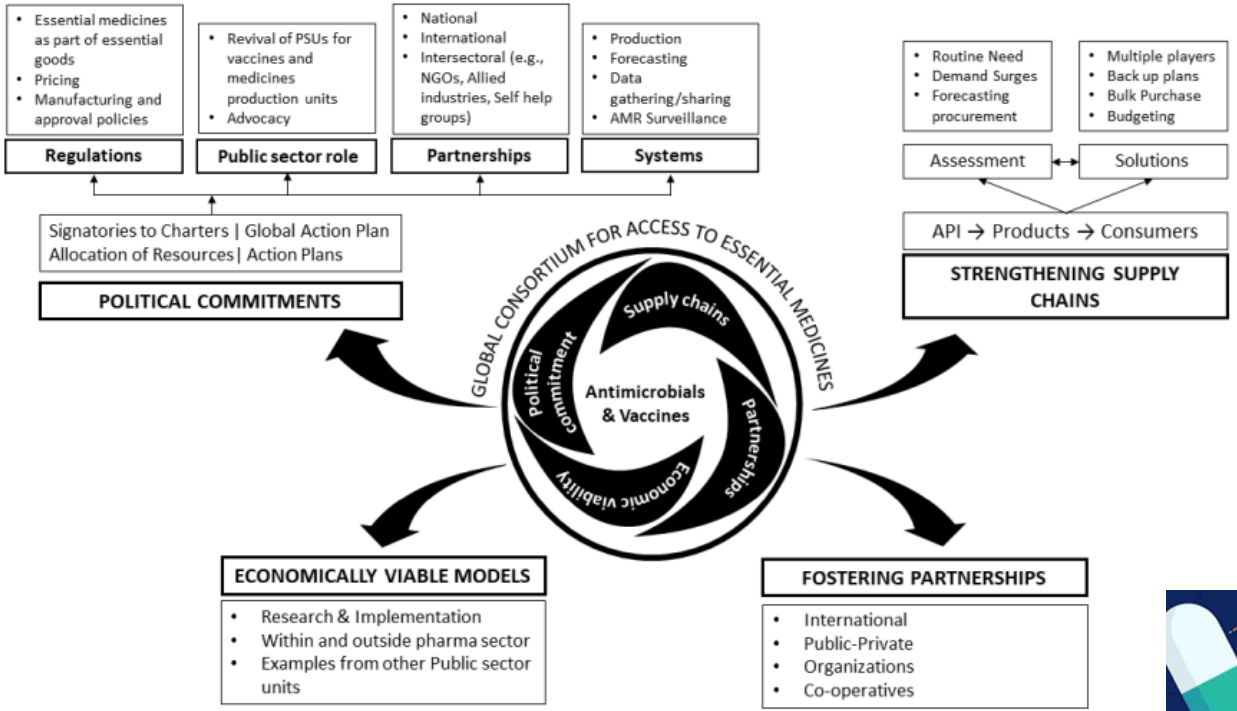
Elias B Chahine [1]



Ann Pharmacother. 2022 Apr;56(4):441-462

Shortage of essential antimicrobials: a major challenge to global health security

BMJ Global Health 2021



JULIO - DICIEMBRE DE 2022

INFORME SEMESTRAL SOBRE PROBLEMAS DE SUMINISTRO

MINISTERIO DE SANIDAD

agencia española de medicamentos y productos sanitarios

FIGURA 1

Problemas de suministro registrados

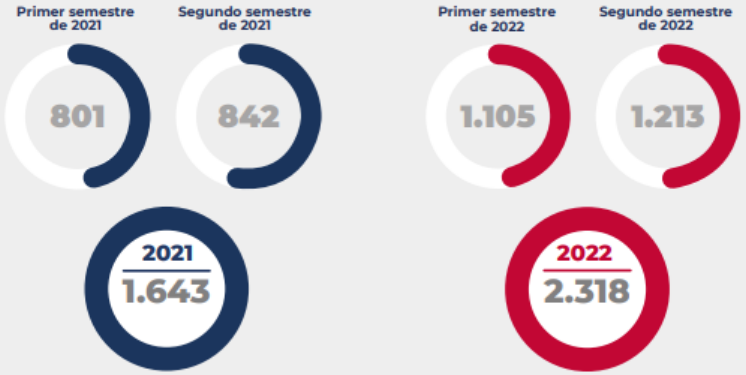
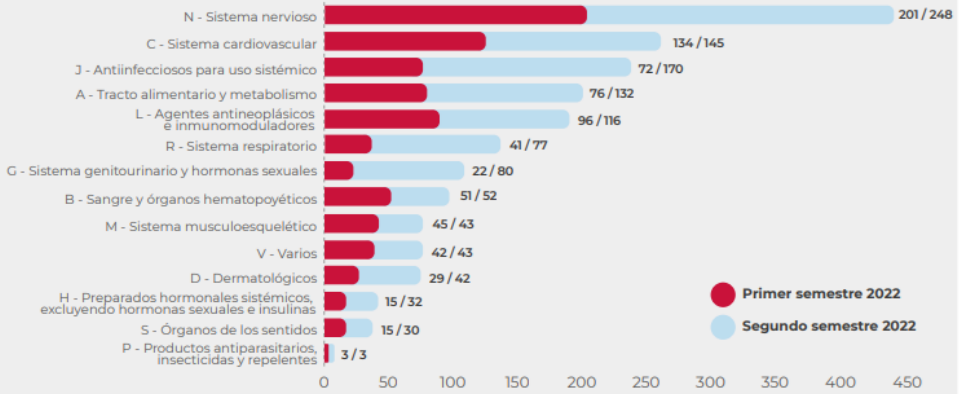


FIGURA 9

Problemas de suministro en función del grupo terapéutico (código ATC) en 2022



MINISTERIO DE SANIDAD Y POLÍTICA SOCIAL

agencia española de medicamentos y productos sanitarios

A — Antibióticos del grupo "Access" (Acceso) de la clasificación AWaRe

En este grupo se incluyen los antibióticos que constituyen la primera o segunda línea de tratamiento empírico para los síndromes infecciosos más prevalentes, en base a la evaluación de la evidencia disponible, con un perfil de seguridad favorable y un bajo potencial de generación y/o selección de resistencias.

W — Antibióticos del grupo "Watch" (Precaución) de la clasificación AWaRe

En este grupo se incluyen los antibióticos que presentan un mayor potencial de generación y/o selección de resistencias y desempeñan un papel clave en la medicina humana. Se trata de la opción más efectiva para un grupo limitado de síndromes infecciosos bien definido y su utilización debería ser monitorizada estrechamente y estar limitada a indicaciones específicas

R — Antibióticos del grupo "Reserve" (Reserva) de la clasificación AWaRe

En este grupo se incluyen antibióticos de "último recurso", con actividad frente a patógenos multi-resistentes (MDR) o extremadamente resistentes (XDR) y que deben utilizarse únicamente cuando el resto de alternativas terapéuticas no resulten de utilidad o hayan fracasado.

Plan Nacional Resistencia Antibióticos

World Health Organization

AWaRe

68 CONGRESO NACIONAL SEFH BILBAO 5-7 de OCT 2023

LAS TRES CATEGORÍAS DE ANTIBIÓTICOS PARA LA OMS

by @guiaprioam

ACCESIBLES	VIGILADOS	RESERVADOS
Penicilina	Quinolonas	Colistina
Amoxicilina	Cefalosporinas 3G	Cefalosporinas 4-5G
Ampicilina	Piperacilina/tzb	Aztreonam
Amoxicilina/clv	Carbapenemas	Fosfomicina IV
Cefazolina	Macrólidos	Tigeciclina
Cloxacilina	Glucopéptidos	Daptomicina
Aminoglucósidos		Linezolid
Clindamicina		
Doxiciclina		
Metronidazol		
Cotrimoxazol		
Nitrofurantoína		
Prioriza el uso de estos antibióticos	**Alta capacidad de inducir resistencias.** Resérvalos para infecciones graves sin opciones de tratamiento '🟢'	**Última alternativa.** Reservados para infecciones amenazantes en que hayan fallado el resto de opciones

Priority 1: CRITICAL#

Acinetobacter baumannii, carbapenem-resistant

Pseudomonas aeruginosa, carbapenem-resistant

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

Priority 2: HIGH

Enterococcus faecium, vancomycin-resistant

Staphylococcus aureus, methicillin-resistant, vancomycin intermediate and resistant

Helicobacter pylori, clarithromycin-resistant

Campylobacter, fluoroquinolone-resistant

Salmonella *spp.*, fluoroquinolone-resistant

Neisseria gonorrhoeae, 3rd generation cephalosporin-resistant, fluoroquinolone-resistant

Priority 3: MEDIUM

Streptococcus pneumoniae, penicillin-non-susceptible

Haemophilus influenzae, ampicillin-resistant

Shigella *spp.*, fluoroquinolone-resistant

World Health Organization priority pathogens list for R&D of new antibiotics.

Assessing Clinical Potential of Old Antibiotics against Severe Infections by Multi-Drug-Resistant Gram-Negative Bacteria Using In Silico Modelling

Table 4. Summary of old antibiotics with clinical potential against gram (-) isolates.

Old Antibiotics	*E. coli*	*K. pneumoniae*	*P. aeruginosa*	*A. baumannii*
Colistin	-	-	-	-
Polymyxin B	✓	✓	-	✓
Temocillin	✓	✓	-	-
Fosfomycin	✓	✓	-	-
Mecillinam	✓	-	-	-
Minocycline	-	-	-	-
Nitrofurantoin	-	-	-	-
Chloramphenicol	-	-	-	-

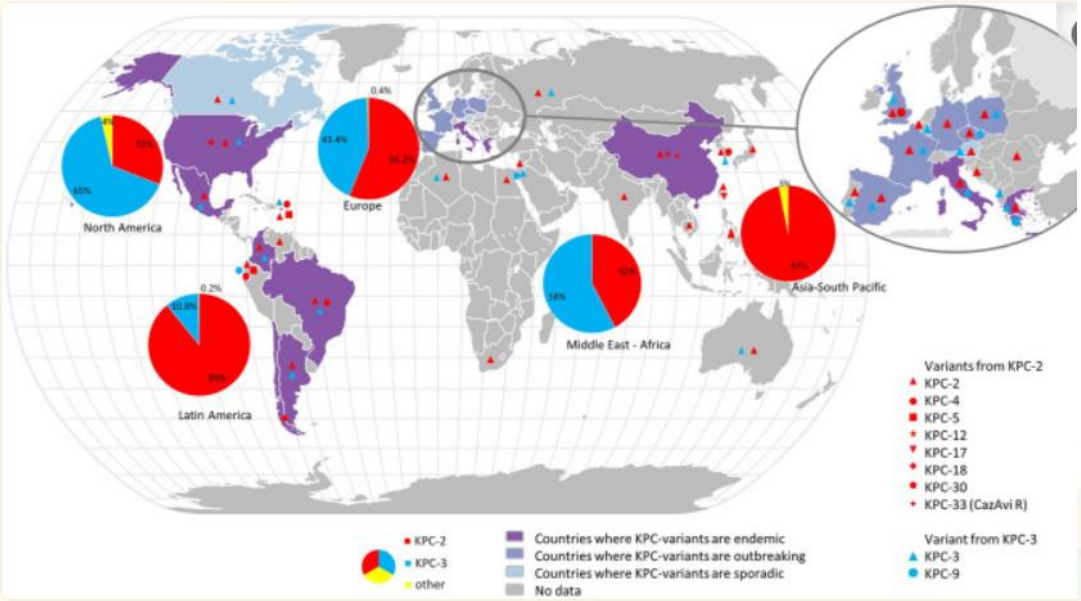
✓ attain preclinical PKPD targets, - do not attain preclinical PKPD targets.

Pharmaceuticals 2022, 15, 1501.

Klebsiella pneumoniae Carbapenemase Variants Resistant to Ceftazidime-Avibactam: an Evolutionary Overview

Claire AmarisHobson,

Antimicrob Agents Chemother. 2022 Sep 20;66(9)



Resistance to Ceftazidime/Avibactam, Meropenem/Vaborbactam and Imipenem/Relebactam in Gram-Negative MDR Bacilli: Molecular Mechanisms and Susceptibility Testing

Paolo Gaibani

Antibiotics 2022, 11, 628.

Priority 1: CRITICAL[#]

Acinetobacter baumannii, carbapenem-resistant

Pseudomonas aeruginosa, carbapenem-resistant

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

Acinetobacter baumannii, carbapenem-resistant

MUESTRA: **SANGRE.**

ANALISIS: **CULTIVO CONVENCIONAL**

RESULTADO DEFINITIVO:

CULTIVO. SE AISLA: ()

(1) Acinetobacter baumannii
(2) Providencia stuartii
(3) Pseudomonas aeruginosa

	(1) Valoración	CMI
CEFIDEROCOL	S	
AMPICILINA	R	>8
AMOXICILINA/CLAVUL.		
PIPERACILINA/TAZOBAC		
CEFOTAXIMA	R	>32
CEFTRIAXONA		
CEFEPIME		
ERTAPENEM		
IMIPENEM	R	>8
MEROPENEM	R	>32
COLISTINA	S	<=2
GENTAMICINA	R	>4
TOBRAMICINA	R	>4
AMIKACINA	R	>16
TIGECICLINA	S	<=1
CIPROFLOXACINO	R	>1
LEVOFLOXACINA	R	>1
COTRIMOXAZOL	R	>4/76
FOSFOMICINA		

* CMI en mcg/ml

MUESTRA: **SANGRE.**

ANALISIS: **CULTIVO CONVENCIONAL**

RESULTADO DEFINITIVO:

CULTIVO. SE AISLA: ()

(1) Acinetobacter baumannii

	(1) Valoración	CMI
CEFIDEROCOL	R	
CEFOTAXIMA	R	>64
IMIPENEM	R	>16
MEROPENEM	R	>16
COLISTINA	S	<=2
GENTAMICINA	R	>8
TOBRAMICINA	R	>8
AMIKACINA	R	16
CIPROFLOXACINO	R	>2
LEVOFLOXACINA	R	>4
COTRIMOXAZOL	R	>4/76

* CMI en mcg/ml

Tratamiento de infecciones graves por Acinetobacter baumannii

Medicina Intensiva 46 (2022) 700---710

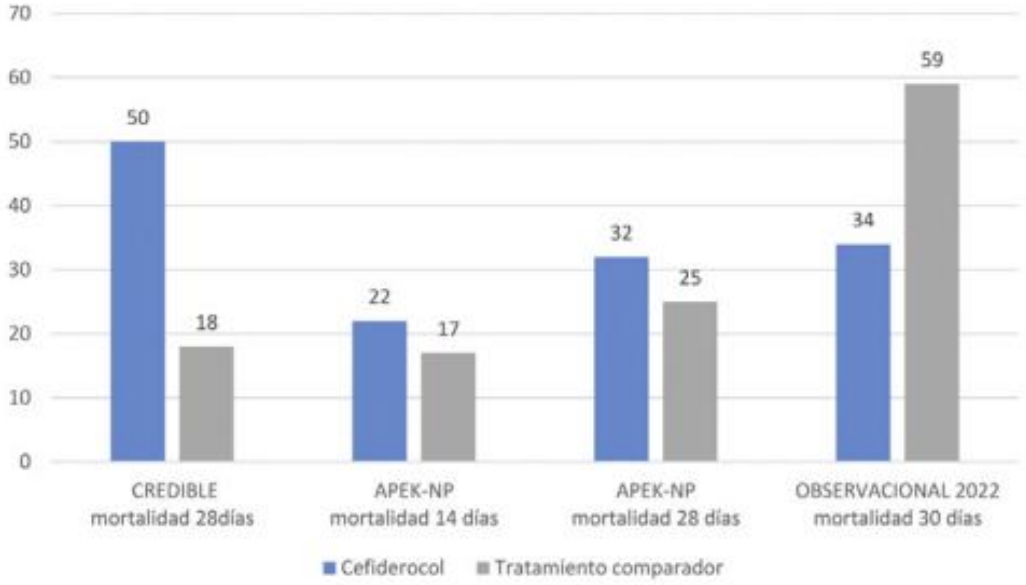
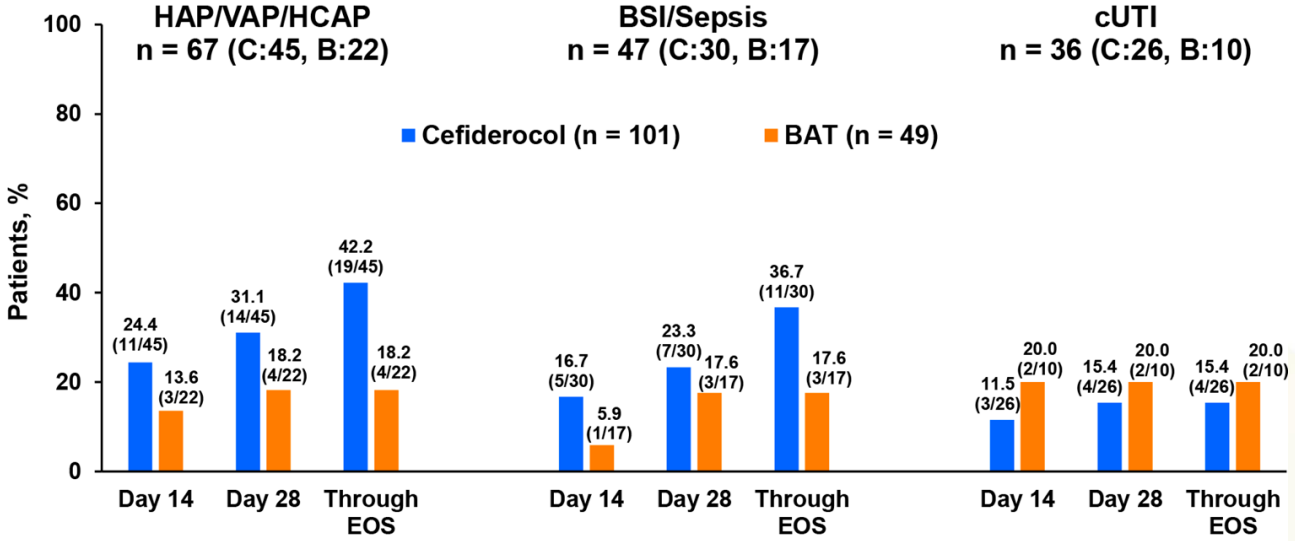


Figure 23 **CREDIBLE-CR All-Cause Mortality by Infection Site (Safety Population)**



BAT, best available therapy; BSI, bloodstream infection; CR, carbapenem-resistant; EOS, end of study; HAP, hospital acquired pneumonia; HCAP, healthcare-associated pneumonia; ITT, intent-to-treat; VAP, ventilator-associated pneumonia.

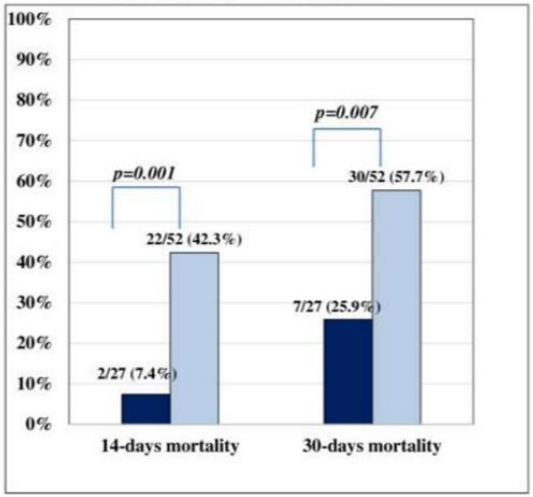
Lancet Infect Dis. 2021 Feb;21(2):226-240

Cefiderocol- Compared to Colistin-Based Regimens for the Treatment of Severe Infections Caused by Carbapenem- Resistant Acinetobacter baumannii

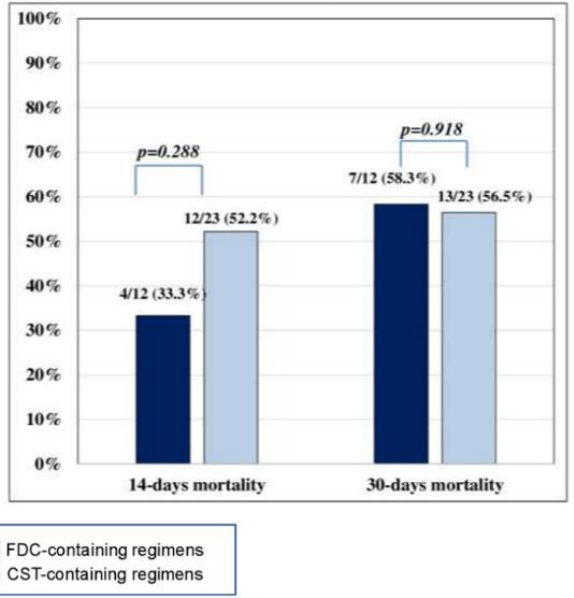
Marco Falcone,et al.

cefiderocol-containing regimens N=47	colistin-containing regimens N=77

Bloodstream infections



Ventilator-associated pneumonia



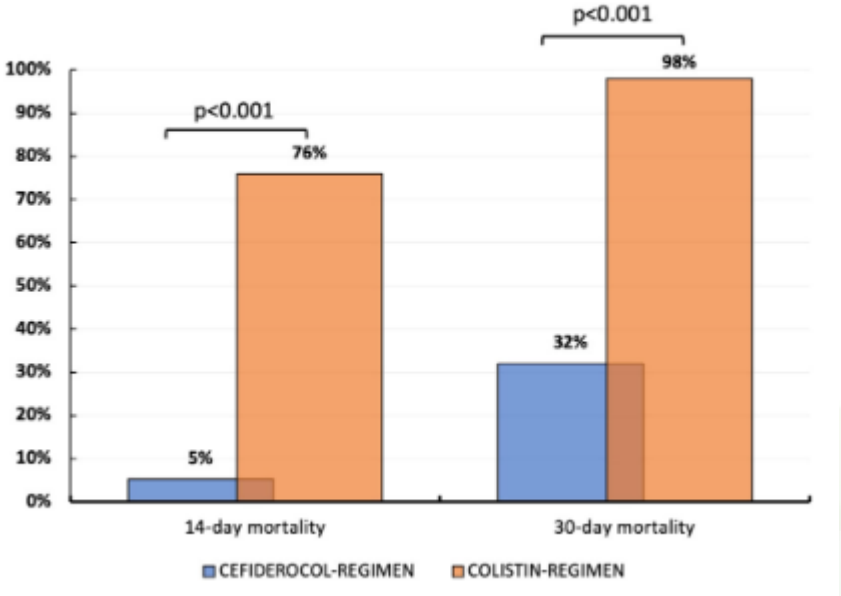
Antimicrobial Agents and Chemotherapy May 2022

Efficacy of cefiderocol- vs colistin-containing regimen for treatment of bacteraemic ventilator-associated pneumonia caused by carbapenem-resistant Acinetobacter baumannii in patients with COVID-19

A. Russoa,†,*

Table 1
Antibiotic regimens used in targeted therapy.

Treatment regimens	*n*=73 patients (%)
Colistin-containing regimens	**54 (74)**
Colistin monotherapy	12 (22.2)
Colistin + meropenem + tigecycline	12 (22.2)
Colistin + meropenem	9 (16.6)
Colistin + tigecycline	6 (11.1)
Colistin + fosfomycin	3 (5.5)
Colistin + trimethoprim/sulfamethoxazole	3 (5.5)
Colistin + trimethoprim/sulfamethoxazole + meropenem + tigecycline	3 (6)
Colistin + meropenem + fosfomycin	2 (4)
Colistin + meropenem + tigecycline + ampicillin/sulbactam	2 (4)
Colistin + trimethoprim/sulfamethoxazole + tigecycline	2 (4)
Cefiderocol-containing regimens	**19 (26)**
Cefiderocol + fosfomycin	6 (31.5)
Cefiderocol + fosfomycin + tigecycline	3 (15.8)
Cefiderocol + meropenem + fosfomycin + tigecycline	3 (15.8)
Cefiderocol + trimethoprim/sulfamethoxazole	2 (10.5)
Cefiderocol + tigecycline	1 (5.2)
Cefiderocol + trimethoprim/sulfamethoxazole	1 (5.2)
Cefiderocol + ampicillin/sulbactam	1 (5.2)
Cefiderocol + fosfomycin + ampicillin/sulbactam	1 (5.2)
Cefiderocol + meropenem + fosfomycin + tigecycline + trimethoprim/sulfamethoxazole	1 (5.2)
Cefiderocol monotherapy	0
Colistin aerosol	**33 (45.2)**



International Journal of Antimicrobial Agents 62 (2023) 106825

Cefiderocol use in Gram negative infections with limited therapeutic options: Is combination therapy the key?

Silvia Corcionea,

	Overall (n = 18) Median (IQR) or N (%)	Monotherapy (n = 4) Median (IQR) or N (%)	Combination therapy (n = 14) Median (IQR) or N (%)	p
30-days outcomes	4 (22.2)	2 (50)	2 (14.29)	0.355
admitted to ICU	1 (5.6)	1 (25)	0 (0)	
admitted to medicine ward	5 (27.8)	0 (0)	5 (35.71)	
discharge to low/no care need				

Journal of Infection and Public Health 15 (2022) 975–979

Acinetobacter baumannii, carbapenem-resistant

Comparative efficacy and safety of combination therapy with high-dose sulbactam or colistin with additional antibacterial agents for multiple drug-resistant and extensively drug-resistant Acinetobacter baumannii infections: A systematic review and network meta-analysis

J Glob Antimicrob Resist. 2021 Mar;24:136-147.

Jiating Liu

Our results indicate that **high-dose sulbactam combined with additional antibacterial** agents (including colistin) might be one of the promising options for the treatment of MDRAB or XDR-AB infections

Carbapenem-resistant Acinetobacter baumannii: Colonization, Infection and Current Treatment Options

Infect Dis Ther (2022) 11:683–694

Pseudomonas aeruginosa, carbapenem-resistant

MUESTRA: **SANGRE.** LOCALIZACION: **VIA PERIFERICA**

ANALISIS: **CULTIVO CONVENCIONAL**

RESULTADO DEFINITIVO:

CULTIVO. SE AISLA: ()

(1) Pseudomonas aeruginosa

		(1) Valoración CMI
CEFTOLOZANO/TAZOBACT	S	1
PIPERACILINA/TAZOBAC	I	8
CEFTAZIDIMA	I	2
CEFEPIME	I	2
AZTREONAM	I	4
IMIPENEM	I	1
MEROPENEM	S	<=0.25
COLISTINA	S	2
GENTAMICINA	S	<=1
TOBRAMICINA	S	<=1
AMIKACINA	S	2
CIPROFLOXACINO	I	<=0.25
FOSFOMICINA	S	64

* CMI en mcg/ml

Observaciones:
TIEMPO DE DETECCION 13 HORAS

ANTIBIOGRAMA INTERPRETADO CON LOS PUNTOS DE CORTE EUCAST

I: SENSIBLE INCREMENTANDO EXPOSICION

Observational Study > Clin Microbiol Infect. 2022 Apr;28(4):558-563.
doi: 10.1016/j.cmi.2021.03.034. Epub 2021 Nov 23.

Impact of 2020 EUCAST criteria on meropenem prescription for the treatment of Pseudomonas aeruginosa infections: an observational study in a university hospital

Aline Munting [1], Jean Regina [1], José Damas [1], Loïc Lhopitallier [1], Antonios Kritikos [2], Benoît Guery [1], Laurence Senn [3], Benjamin Viala [4]

Pseudomonas aeruginosa, carbapenem-resistant

Decreased expression of outer membrane porins (OprD)

Hyperproduction of AmpC enzymes

Upregulation of efflux pumps

Mutations in penicillin-binding protein targets

Biofilms

Table 2. Mechanisms of resistance contributing to reduced activity or resistance to beta-lactam–beta-lactamase inhibitors and cefiderocol in carbapenem-resistant *Pseudomonas aeruginosa*.

Mechanism	Ceftazidime-avibactam	Ceftolozane-tazobactam	Cefiderocol	Imipenem-relebactam	Meropenem-vaborbactam
Efflux pump extrusion	• Affected [54–5	• Not affected [56]	• Not affected [62]	• Not affected [55,67]	Affected [57]
Cell entry via OprD porin channel, mutations will decrease expression	• Not affected alone [56]	• Not affected alone [56]	• Not affected [62]	• Affected (imipenem) [6 • Not affected (I/R, low MIC) [67]	Affected (meropenem, vaborbactam) [57,69,70]
Class C – Constitutive basal AmpC/PDC-mediated hydrolysis	• Not affected [54]	• Not affected [54]	• Not affected [63]	• Not affected [67]	• Not affected [3]
Class C – De-repressed AmpC/PDC-mediated hydrolysis	• Stable [54] • Affected (with other mechanism [porin]) [57]	• Stable [54] Affected (with othe mechanism [porin, efflux]) [54,57]	• Stable and not affected [63]	• Stable [67]	• Possibly stable, no data on *Pseudomonas*
Class C – Increased AmpC/PDC-mediated hydrolysis via structural change	• Affected [54]	Affected [54]	• May be affected [64	• Variable [55]	Affected [3]
Class A – ESBLs (SHV, TEM, GES, PER, VEB) mediated hydrolysis	• Stable (except PER, GES, VEB) [58,59]	• Stable (except PER, GES, VEB) [58,59]	• Stable (and modestly affected by PER, VEB) [65]	• Stable or modestly affected [59]	• Stable [57]
Class A – Carbapenemases (KPC, GES) mediated hydrolysis	• Stable [58,59]	• Hydrolyzed [58,59]	• Stable and not affected [62,66]	• Stable or affected [59]	• Stable [57]
Class B – MBLs (VIM, IMP, NDM) mediated hydrolysis	• Hydrolyzed [59	• Hydrolyzed [59]	• Stable and not affected (but higher MICs for NDM isolates) [62,65]	Hydrolyzed [55,59]	Hydrolyzed [57
Class D – OXAs (chromosomal OXA-50) mediated hydrolysis	• Hydrolyzed [60	• Hydrolyzed [60]	• No data on *Pseudomonas*	Hydrolyzed [59]	Hydrolyzed [57
Class D – OXAs (plasmid OXA-2, OXA-10) mediated hydrolysis	• Stable or hydrolyzed [57,61]	• Stable or hydrolyzed [57,61]	• No data on *Pseudomonas*	• Stable [61,67]	Hydrolyzed [57
Cross-resistance	• Yes, with C/T	• Yes, with CZA	• May increase MIC but remains susceptible	• Yes, with C/T, CZA	• Yes, with C/T, CZA

EXPERT REVIEW OF ANTI-INFECTIVE THERAPY 2022, VOL. 20, NO. 8, 1
1094 https://doi.org/10.1080/14787210.2022.2071701

Evidencia de Ceftazidima-avibactam y aztreonam

Review

The Revival of Aztreonam in Combination with Avibactam against Metallo-β-Lactamase-Producing Gram-Negatives: A Systematic Review of In Vitro Studies and Clinical Cases

- **35 estudios in vitro**: sensibilidad **in vitro** de la combinación de AT**M y AVI** o CZA y ATM 2209 cepas gram negativos.
  - 80% cepas sensibes EPC metalobetalactamasa
  - 85% cepas sensibles *S. maltophilia* .
  - 6% cepas sensibles *P. aeruginosa;* (>90% presentan MIC ≥16 mg/L)
- **18 estudios iv vivo:** 94 pacientes: 83% BSI. Resolución clínica a 30 días 80%. Análisis bacteriemias (64 pacientes), 19% mortalidad CZA/ATM.
- **Estudio 102 bacteriemias EPC**; 82 NDM y 20 VIM (52 CZA/ATM y 50 OAA) **Mortalidad a 30 días 19,2% CZA/ATM vs 44% en OAA**

Esta combinación es segura en MBL Enterobacterales y *S. maltophilia*, pero no en *Pseudomonas.*

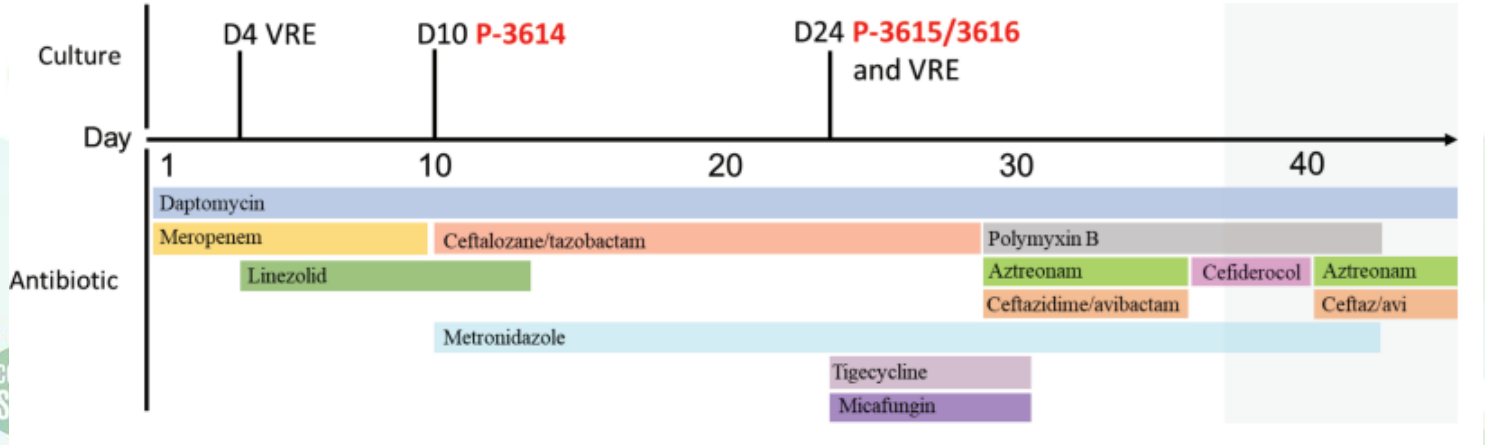
Solo un caso de Pseudomonas con CZA/ATM y amikacina de osteomielietis y desbridamiento quirúrgico

2 casos de Pseudomonas VIM CAZ/ATM Traqueobronquitis, Absceso cadera

Mularoni A. Int Infect Dis. 2021 Jul;108:510-512
Mauri C .Antibiotics (Basel). 2021 Aug 20;10(8):1012
Sempere A. Antimicrob Agents Chemother. 2022 Oct 18;66(10)
Falcone N. Clin Infect Dis. 2021 Jun 1;72(11):1871-1878

Pseudomonas aeruginosa, carbapenem-resistant

Evolution of cefiderocol non-susceptibility in Pseudomonas aeruginosa in a patient without previous exposure to the antibiotic. *Clin Infect Dis*. 2021;73(11):4472-4474. doi:10.1093/cid/ciaa1909



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

No.MUESTRA: 062410076 No.PETICION: 062410076 FECHA DE ENTRADA: 03/09/2023	PROCEDENCIA: GUSS URGENCIAS SERVICIO: URGENCIAS -CG- PLANTA: HABICAMA: DOCTOR: CALVO GARCIA, CARMEN	APELLIDOS: GONZALEZ CODES NOMBRE: MARGARITA No.HISTORIA: 758745
DIAGNOSTICO: -	TRATAMIENTO:	
OBSERVACIONES A LA MUESTRA: itu		
MUESTRA: ORINA	LOCALIZACION: ESPONTANEA	

ANALISIS: CULTIVO CONVENCIONAL

RESULTADO DEFINITIVO: FECHA DE RESULTADO: 05/09/2023

CULTIVO. SE AISLA: ()

(1)MAS DE 100.000 UFC/ML DE: Escherichia coli

	(1) Valoración	CMI
AMPICILINA	R	>8
TICARCILINA	R	>16
AMOXICILINA/CLAVUL.	S	<=8
PIPERACILINA/TAZOBAC	S	<=8
CEFUROXIMA	R	>8
CEFOTAXIMA	R	>16
CEFIXIMA	R	>1
CEFTAZIDIMA	R	16
CEFEPIME	R	>8
ERTAPENEM	S	<=0.5
IMIPENEM	S	<=1
COLISTINA	S	<=2
GENTAMICINA	S	<=2
TOBRAMICINA	S	<=2
NORFLOXACINO	R	1
CIPROFLOXACINO	I	0.5
LEVOFLOXACINA	I	1
COTRIMOXAZOL	R	>4/76
FOSFOMICINA	S	<=32
NITROFURANTOINA	S	<=32

* CMI en mcg/ml

Observaciones:

I: SENSIBLE EN INFECCION DEL TRACTO URINARIO

MICROORGANISMO PRODUCTOR DE BETA-LACTAMASA DE ESPECTRO EXTENDIDO

ANTIBIOGRAMA INTERPRETADO CON LOS PUNTOS DE CORTE EUCAST

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

Re-evaluation of cefepime or piperacillin/tazobactam to decrease use of carbapenems in ESBL-producing Enterobacterales urinary tract infections (REDUCE-UTI)

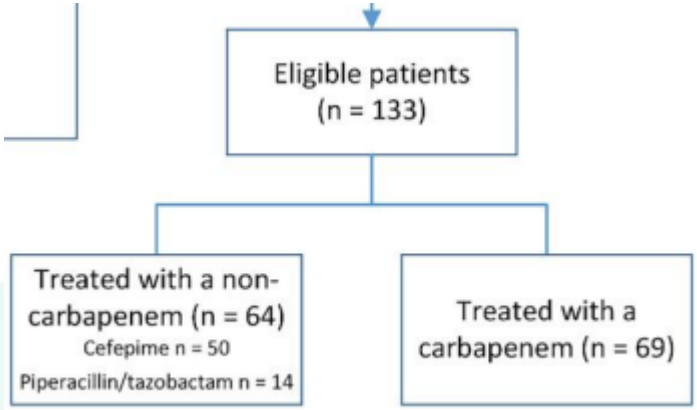


Table 2. Primary and secondary outcomes

Outcome, *n* (%)	CBP, *n* = 69	NCBP, *n* = 64	*P* value
Clinical cure	66 (95.7)	62 (96.9)	0.990
In-hospital mortality	1 (1.5)	0 (0.0)	0.990
Recurrence	1 (1.5)	2 (3.1)	0.608
Resistance emergence	3 (4.4)	2 (3.1)	0.999

CBPs were meropenem or ertapenem; NCBPs were cefepime or piperacillin/tazobactam.

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JAC Antimicrob Resist. 2023 Mar 17;5(2)

Assessing clinical cure of empirical piperacillin/tazobactam for ESBL urinary tract infections (ACCEPT—UTI)

Sylvia S. Stefanos1

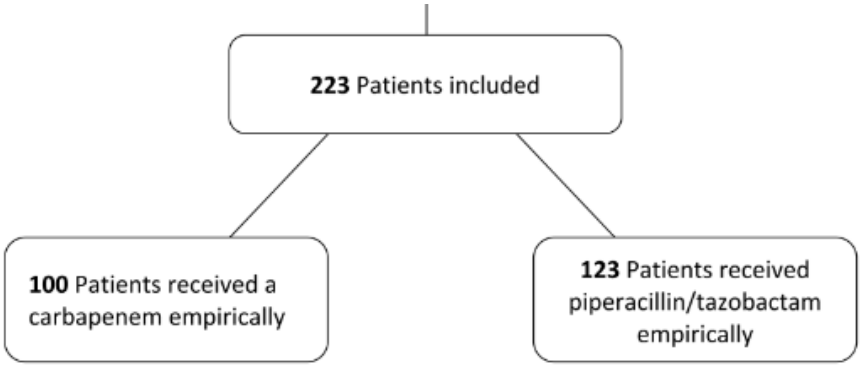

Table 3. Clinical success outcomes

Outcome	Full cohort: Carbapenem ($n = 100$) n (%)	Full cohort: TZP ($n = 123$) n (%)	Risk difference, % (95% CI)	P value
Primary outcome of clinical success[a]	58 (58)	70 (57)	−1.1 (−14.1, 12.0)	0.87
Individual components of clinical success				
Symptom or WBC resolution in 48 h	75 (75)	85 (69)	−5.9 (−17.7, 5.9)	0.33
Temperature resolution in 48 h	88 (88)	120 (98)	9.7 (2.6, 16.5)	0.005
Absence of 6 month readmission for ESBL UTI	83 (83)	100 (81)	−1.7 (−11.8, 8.4)	0.74

JAC Antimicrob Resist. 2023 May 11

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

MUESTRA: **ORINA** LOCALIZACION: **ESPONTANEA**

ANALISIS: **CULTIVO CONVENCIONAL**

RESULTADO DEFINITIVO:

CULTIVO. SE AISLA: ()

(1)MAS DE 100.000 UFC/ML DE: Klebsiella pneumoniae

	(1) Valoración	CMI
CEFTAZIDIMA/AVIBACTA	S	<=2
CEFTOLOZANO/TAZOBACT	R	>4
MEROPENEM/VARBOVACTA	S	0.03
AMPICILINA	R	>8
TICARCILINA	R	>16
PIPERACILINA	R	>16
AMOXICILINA/CLAVUL.	R	>32/16
PIPERACILINA/TAZOBAC	R	>16
CEFUROXIMA	R	>8
CEFOTAXIMA	R	>32
CEFIXIMA	R	>1
CEFTAZIDIMA	R	>32
CEFEPIME	R	>8
AZTREONAM	R	>4
ERTAPENEM	R	>1
IMIPENEM	R	>8
MEROPENEM	R	32
COLISTINA	S	<=2
GENTAMICINA	R	>4
TOBRAMICINA	R	>4
AMIKACINA	S	<=8
TIGECICLINA	S	<=1
NORFLOXACINO	R	>1
CIPROFLOXACINO	R	>1
LEVOFLOXACINA	R	>1
COTRIMOXAZOL	R	>4/76
FOSFOMICINA	R	>64
NITROFURANTOINA	R	>64

* CMI en mcg/ml

Observaciones:

MICROORGANISMO PRODUCTOR DE CARBAPENEMASA

SE DETECTA CARBAPENEMASA TIPO KPC

CONSIDERAR PRECAUCIONES DE CONTACTO. CONSULTAR CON MEDICINA PREVENTIVA.

ANTIBIOGRAMA INTERPRETADO CON LOS PUNTOS DE CORTE EUCAST

ANALISIS: **CULTIVO CONVENCIONAL**

RESULTADO DEFINITIVO: FECHA

CULTIVO. SE AISLA: ()

(1)MAS DE 100.000 UFC/ML DE: Escherichia coli
(2)MAS DE 100.000 UFC/ML DE: Klebsiella pneumoniae

	(1) Valoración	CMI	(2) Valoración	CMI
CEFTAZIDIMA/AVIBACTA			S	<=2
CEFTOLOZANO/TAZOBACT			R	>4
AMPICILINA	S	<=4	R	>8
TICARCILINA	S	<=8	R	>16
PIPERACILINA			R	>16
AMOXICILINA/CLAVUL.	S	<=8	R	>32
PIPERACILINA/TAZOBAC	S	<=8	R	>16
CEFUROXIMA	S	<=4	R	>8
CEFOTAXIMA	S	<=1	R	>32
CEFIXIMA	S	<=1	R	>1
CEFTAZIDIMA	S	<=1	R	>32
CEFEPIME	S	<=1	R	>8
AZTREONAM			R	>4
ERTAPENEM	S	<=0.5	R	>1
IMIPENEM	S	<=1	I	4
MEROPENEM			S	2
COLISTINA	S	<=2	S	<=2
GENTAMICINA	S	<=2	S	<=2
TOBRAMICINA	S	<=2	R	>4
TIGECICLINA			S	<=1
NORFLOXACINO	S	<=0.5	R	>1
CIPROFLOXACINO	S	<=0.25	R	>1
LEVOFLOXACINA	S	<=0.5	R	>1
COTRIMOXAZOL	S	<=2/38	S	<=2/38
FOSFOMICINA	S	<=32	R	>64
NITROFURANTOINA	S	<=32	R	>64

* CMI en mcg/ml

Observaciones:

SE DETECTA CARBAPENEMASA TIPO OXA-48

MICROORGANISMO PRODUCTOR DE BETA-LACTAMASA DE ESPECTRO EXTENDIDO

MICROORGANISMO PRODUCTOR DE CARBAPENEMASA

I: SENSIBLE EN INFECCION DEL TRACTO URINARIO

ANTIBIOGRAMA INTERPRETADO CON LOS PUNTOS DE CORTE EUCAST

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

A Systematic Review of Single-Dose Aminoglycoside Therapy for Urinary Tract Infection: Is It Time To Resurrect an Old Strategy?

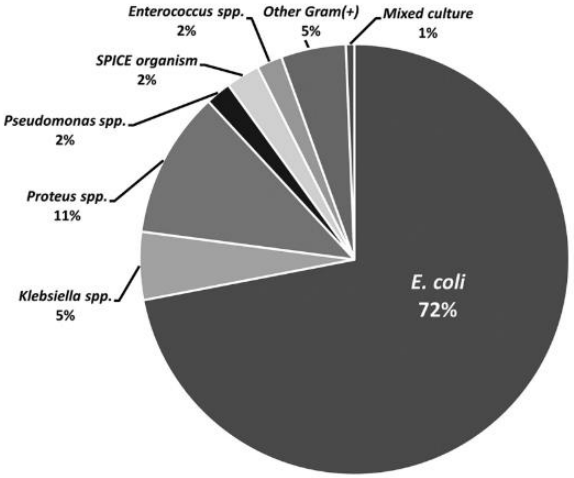

FIG 2 Distribution of bacteria from urine cultures. SPICE organism, any of the following: *Serratia* spp., *Providencia* spp., *Morganella* spp., *Citrobacter* spp., or *Enterobacter* spp.

TABLE 2 Provider considerations for evaluating the appropriateness of single-dose AG therapy for UTI[a]

Single-dose AG therapy may be appropriate
Lower tract infection (cystitis)
Local endemicity of organisms resistant to first-line UTI agents
Inpatient admission may be averted
Questionable patient adherence to oral therapy
Patient preference over oral therapy
Otherwise healthy individual
Alternative therapy recommended
Urosepsis/bacteremia
Previous infection with AG-resistant organism
High risk of *Enterococcus* sp. infection
Chronic renal insufficiency
Patient history of significant AG-mediated adverse drug event

[a]AG, aminoglycoside; UTI, urinary tract infection.

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

Figure 6. Antimicrobials with activity against carbapenem-resistant Gram-negative bacteria.

Antimicrobial agent	Carbapenemase-producing *Enterobacterales*			*Pseudomonas aeruginosa*	*Acinetobacter baumannii*	*Stenotrophomonas maltophilia*
	KPC	MBL	OXA-48			
Aztreonam–avibactam						
Cefiderocol						
Ceftazidime–avibactam						
Ceftolozane–tazobactam						
Colistin						
Eravacycline						
Fosfomycin						
Imipenem–relebactam						
Meropenem–vaborbactam						
Plazomicin						
Tigecycline						

Green, susceptibility anticipated to be >80%; yellow, susceptibility anticipated to be 30% to 80%; red, intrinsic resistance or susceptibility anticipated to be <30%.
Abbreviations. KPC: *Klebsiella pneumoniae* carbapenemase, MBL: metallo-beta-lactamase.
Adapted from Tamma PD, Hsu AJ. Defining the role of novel β-lactam agents that target carbapenem-resistant Gram-negative organisms. J Pediat Infect Dis 2019; 8: 251-60[110].

TERAPIA COMBINADA

ALTO RIESGO: BITERAPIA. Susceptible a B-lactamicos

Ceftazidima-avibactam / Meropenem-vaborbactam / Meropenem (CMI ≤ 8)

+

Antimicrobianos	Origen
Colistina	Neumonía adquirida en la comunidad y nosocomial
Tigeciclina	Infección intraabdominal complicada (si la utilizamos en neumonía nosocomial, bacteriemia o ITU complicada considerar doble dosis)
Aminoglucósidos	ITU complicada (si la utilizamos en neumonía nosocomial considerar dosis mayores)
Fosfomicina	ITU complicada (o como tercer fármaco en cualquier foco)

Karaiskos I, (2019) **The “Old” and the “New” Antibiotics for MDR Gram-Negative Pathogens: For Whom, When, and How.** Front. Public Health 7:151. doi: 10.3389/fpubh.2019.00151

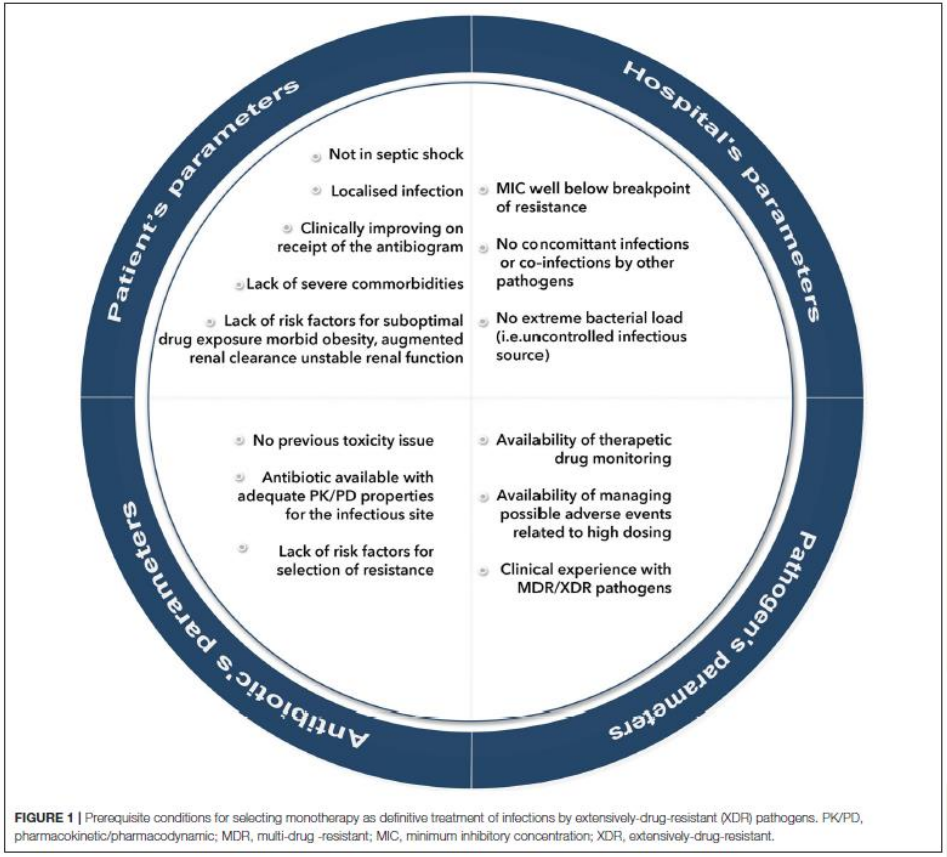

FIGURE 1 | Prerequisite conditions for selecting monotherapy as definitive treatment of infections by extensively-drug-resistant (XDR) pathogens. PK/PD, pharmacokinetic/pharmacodynamic; MDR, multi-drug -resistant; MIC, minimum inhibitory concentration; XDR, extensively-drug-resistant.

Karaiskos I, (2019) **The "Old" and the "New" Antibiotics for MDR Gram-Negative Pathogens: For Whom, When, and How.** Front. Public Health 7:151. doi: 10.3389/fpubh.2019.00151

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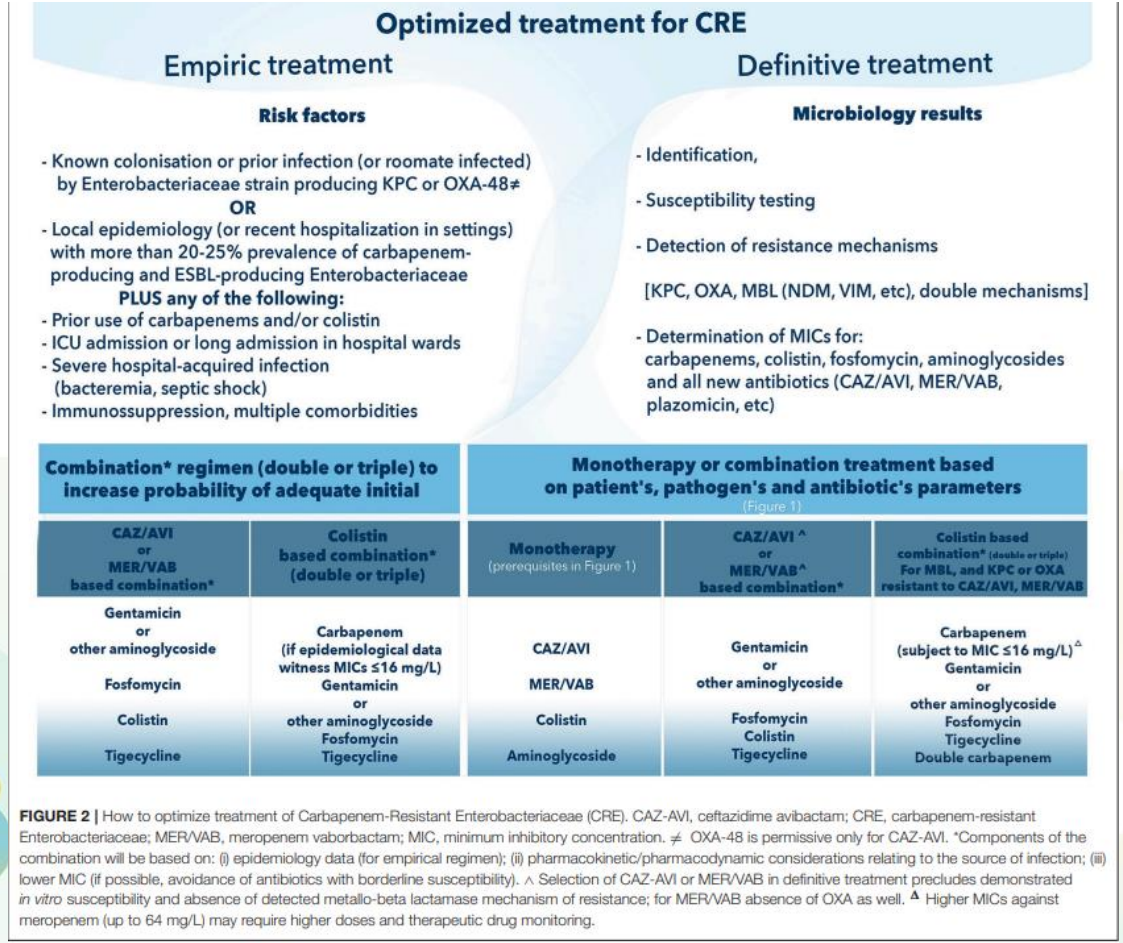

FIGURE 2 | How to optimize treatment of Carbapenem-Resistant Enterobacteriaceae (CRE). CAZ-AVI, ceftazidime avibactam; CRE, carbapenem-resistant Enterobacteriaceae; MER/VAB, meropenem vaborbactam; MIC, minimum inhibitory concentration. ≠ OXA-48 is permissive only for CAZ-AVI. *Components of the combination will be based on: (i) epidemiology data (for empirical regimen); (ii) pharmacokinetic/pharmacodynamic considerations relating to the source of infection; (iii) lower MIC (if possible, avoidance of antibiotics with borderline susceptibility). ^ Selection of CAZ-AVI or MER/VAB in definitive treatment precludes demonstrated *in vitro* susceptibility and absence of detected metallo-beta lactamase mechanism of resistance; for MER/VAB absence of OXA as well. Δ Higher MICs against meropenem (up to 64 mg/L) may require higher doses and therapeutic drug monitoring.

Karaiskos I, (2019) **The "Old" and the "New" Antibiotics for MDR Gram-Negative Pathogens: For Whom, When, and How.** Front. Public Health 7:151. doi: 10.3389/fpubh.2019.00151

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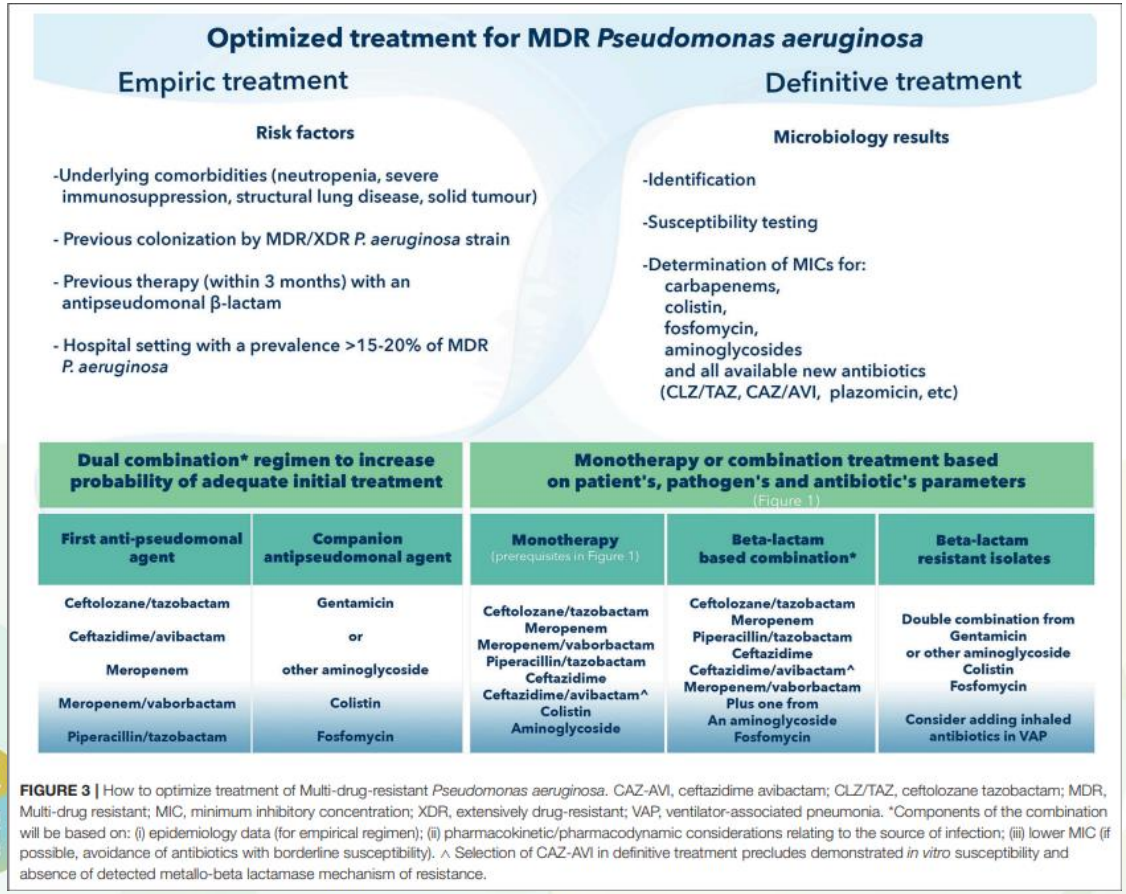

FIGURE 3 | How to optimize treatment of Multi-drug-resistant *Pseudomonas aeruginosa*. CAZ-AVI, ceftazidime avibactam; CLZ/TAZ, ceftolozane tazobactam; MDR, Multi-drug resistant; MIC, minimum inhibitory concentration; XDR, extensively drug-resistant; VAP, ventilator-associated pneumonia. *Components of the combination will be based on: (i) epidemiology data (for empirical regimen); (ii) pharmacokinetic/pharmacodynamic considerations relating to the source of infection; (iii) lower MIC (if possible, avoidance of antibiotics with borderline susceptibility). ^ Selection of CAZ-AVI in definitive treatment precludes demonstrated *in vitro* susceptibility and absence of detected metallo-beta lactamase mechanism of resistance.

Progress in Alternative Strategies to Combat Antimicrobial Resistance: Focus on Antibiotics

Jayaseelan Murugaiyan

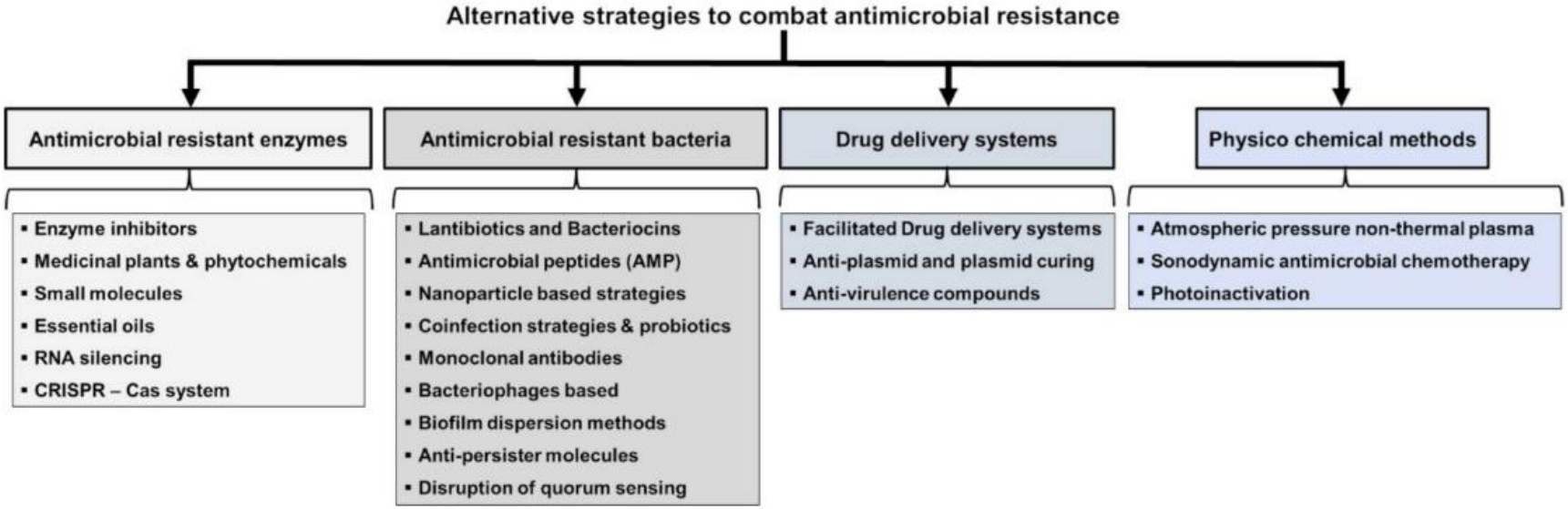

Figure 1. Categories of alternative strategies to combat antimicrobial resistance.

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CONCLUSIONES

¿necesitamos los nuevos BL o BL/IBL o seguimos sin poder abandonar los viejos antibióticos?

Gracias por su atención

Eskerrik asko zure arretagatik

Gràcies per la seva atenció

Grazas pola súa atención

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