



*un Mar de  
ciència*

**Antibiòtics: ús i  
abús**

Santiago Grau Cerrato  
Servei de Farmàcia  
Hospital del Mar  
Parc de Salut Mar

Fue bonito mientras duró.....

ON THE ANTIBACTERIAL ACTION OF CULTURES OF A  
PENICILLIUM, WITH SPECIAL REFERENCE TO THEIR  
USE IN THE ISOLATION OF *B. INFLUENZÆ*.

ALEXANDER FLEMING, F.R.C.S.

*From the Laboratories of the Inoculation Department, St. Mary's Hospital, London.*

Received for publication May 10th, 1929.

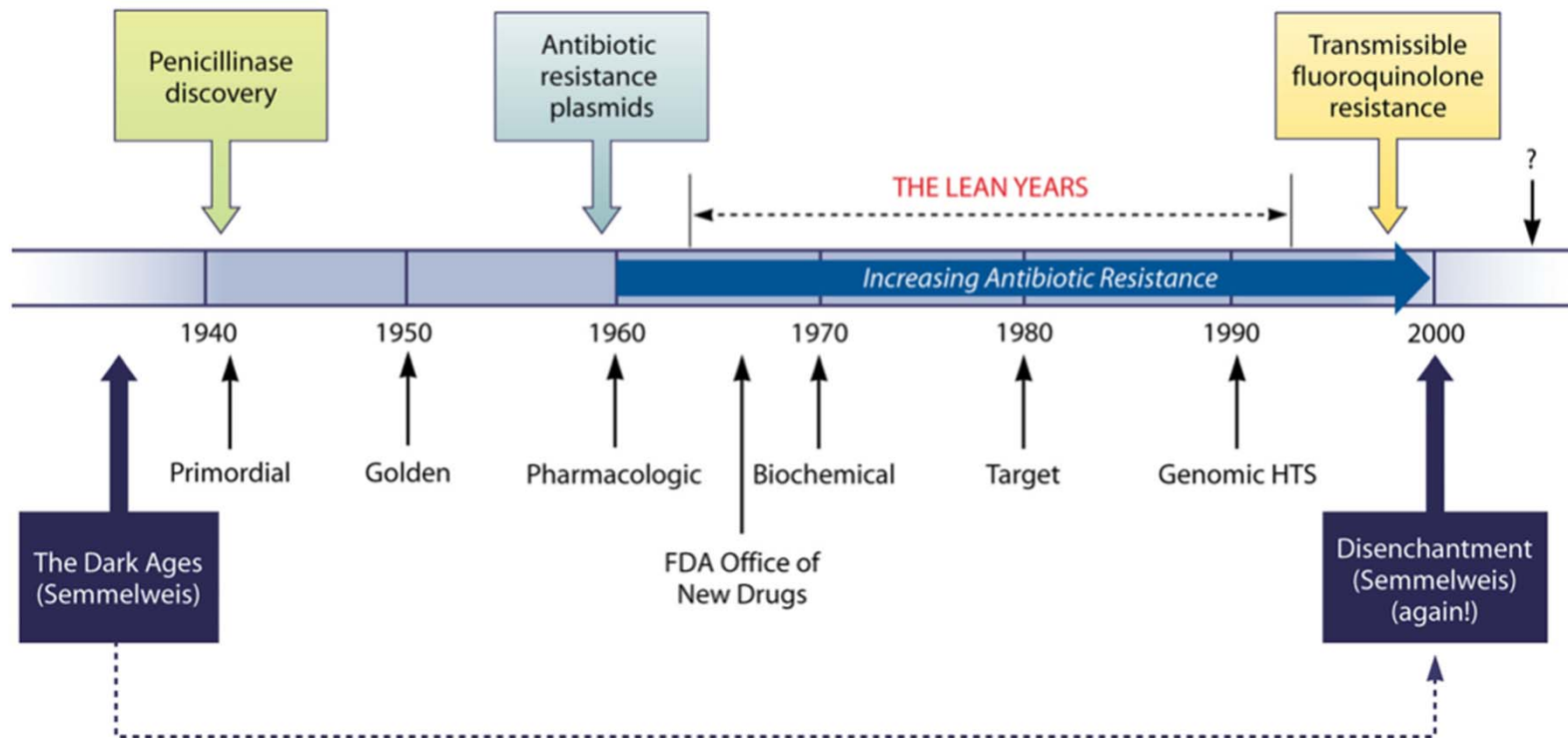
*British Journal of Experimental Pathology* 10:226–236.

# Reducción mortalidad era antibiótica

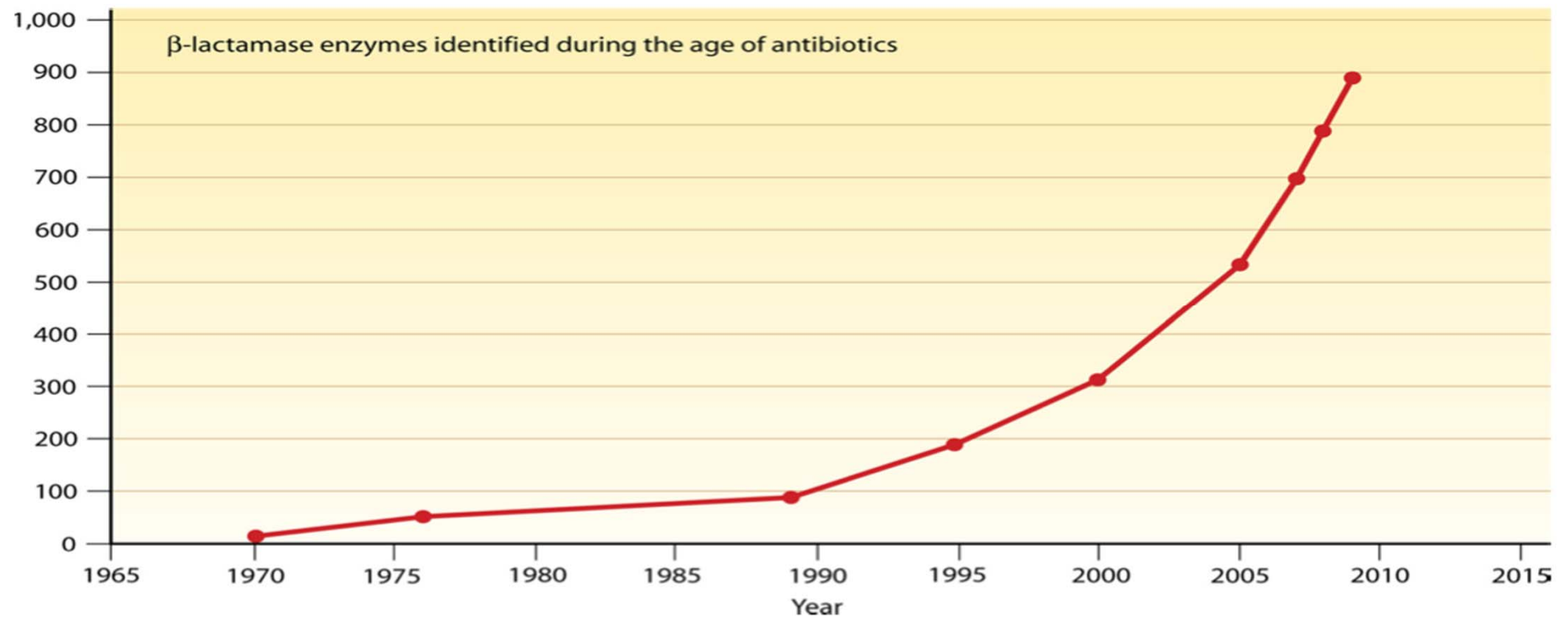
Infección	Mortalidad Pre-atb (%)	Mortalidad (%)	Reducción mortalidad (%)
CAP	23	7	16
HAP	60	30	30
Endocarditis	100	25	75
Meningitis	80	< 20	60
SSTI	11	< 5	10

IDSA. Clin Infect Dis 2011;52:S397-S428

### Events in the Age of Antibiotics



# betalactamasas



Journal of Antimicrobial Chemotherapy Advance Access published June 23, 2011

*J Antimicrob Chemother*  
doi:10.1093/jac/dkr261

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Antimicrobial  
Chemotherapy**

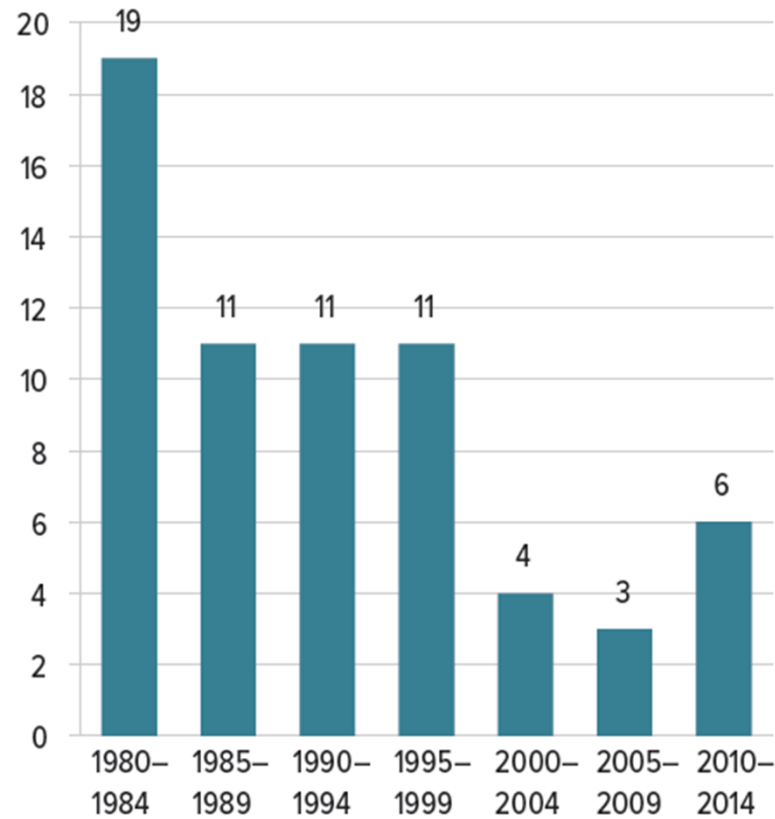
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## **The urgent need for new antibacterial agents**

**Richard Wise\* on behalf of the BSAC Working Party on The Urgent Need: Regenerating Antibacterial Drug  
Discovery and Development†**

*British Society for Antimicrobial Chemotherapy, Griffin House, 53 Regent Place, Birmingham B1 3NJ, UK*

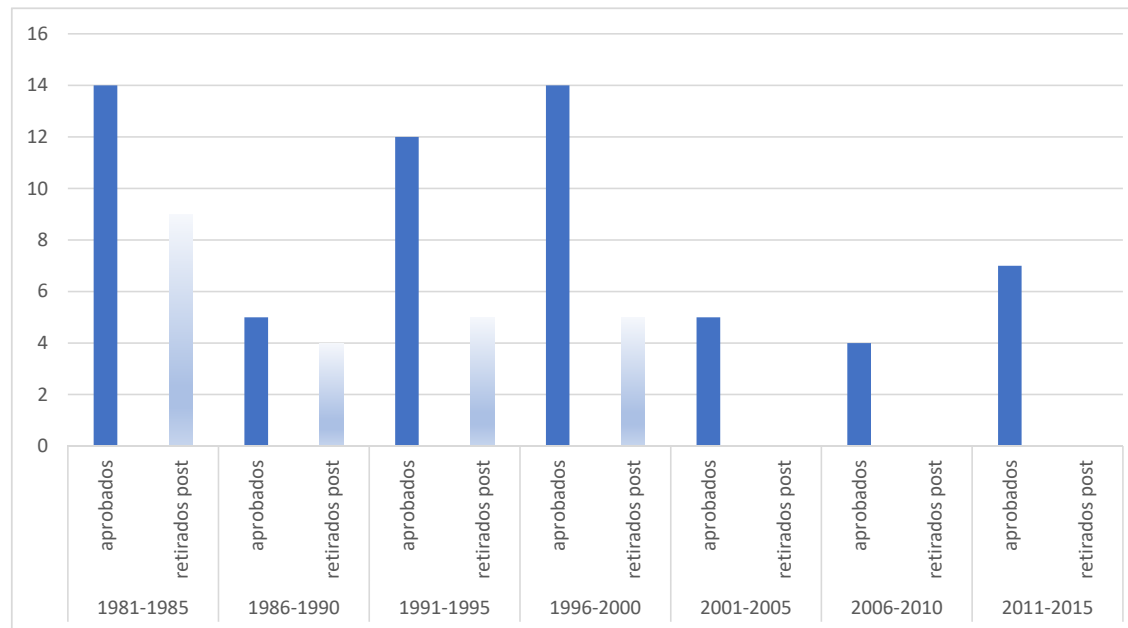
**Figure 3 Number of Antibacterial New Drug Application Approvals Versus Year Intervals**



The number of new antibiotics developed and approved has decreased steadily over the past three decades (although four new drugs were approved in 2014), leaving fewer options to treat resistant bacteria.

\* Drugs are limited to systemic agents. Data courtesy of the CDC<sup>5</sup> and the FDA Center for Drug Evaluation and Research.

# Aprobaciones de antibióticos por la FDA 1981-2015.



Las barras azules muestran el total de aprobaciones de nuevos antibióticos durante cada periodo. Las barras con gradiente de color muestran los antibióticos que fueron retirados con posterioridad.



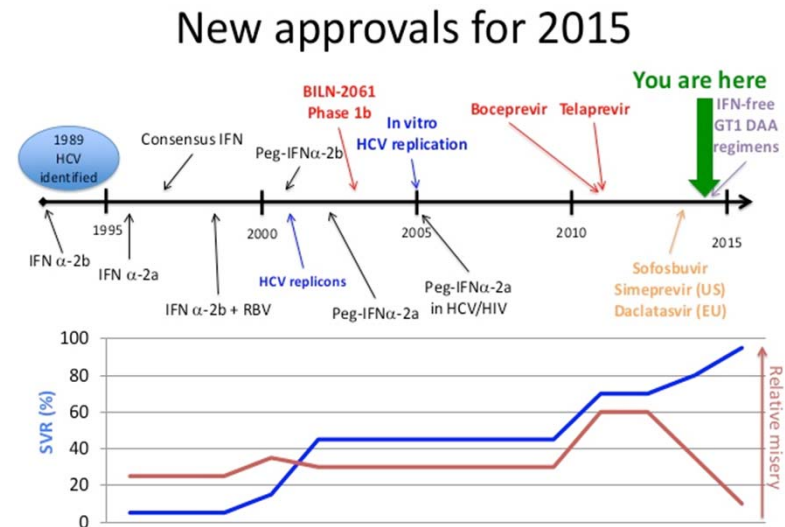
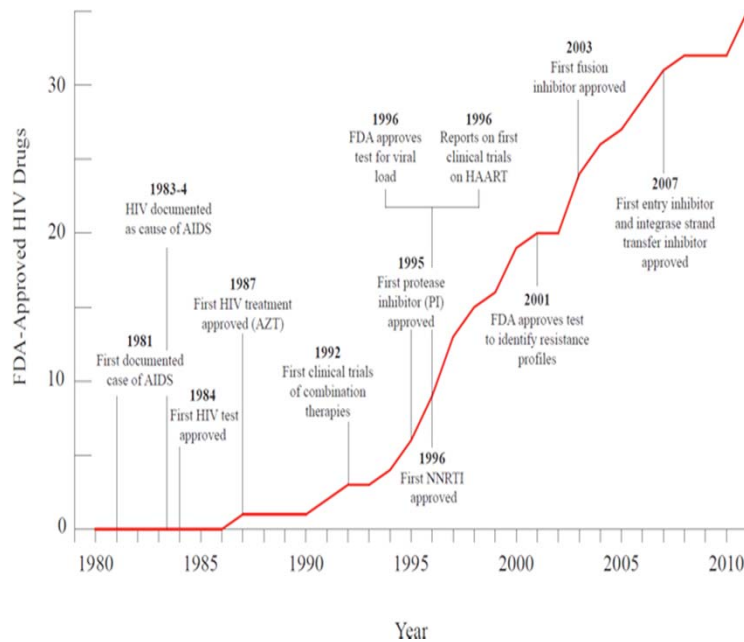
# **What Has Kept the Antibiotic Miracle Alive?**

Thomas F. O'Brien, M.D.

N ENGL J MED 365;10 NEJM.ORG SEPTEMBER 8, 2011

Three billion years of bacterial evolution had invented them, but only 70 years of antibiotic use has now selected, mobilized, and spread these resistance genes through infecting bacteria.

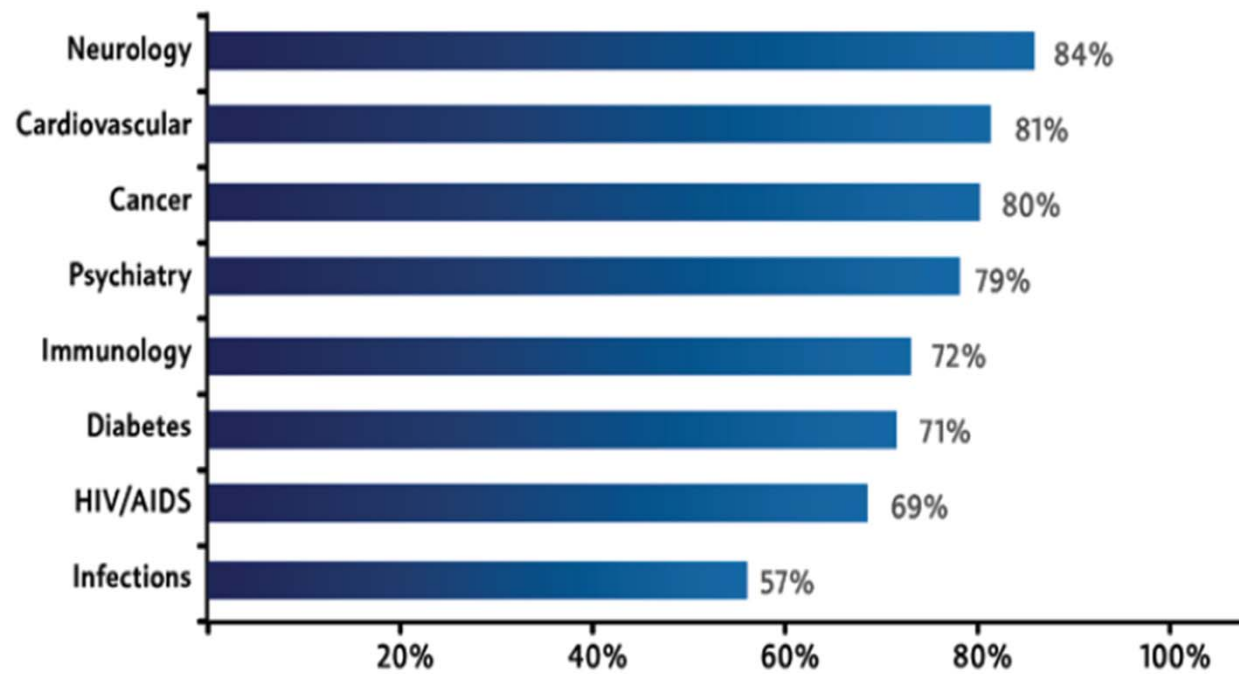
# Aprobación de nuevos antivirales (VIH y hepatitis C)



Fauci, 2003; FDA, 2011a,b; Fischl et al., 1987; Simon et al., 2006

# Nuevas terapias por especialidad

PERCENTAGE POTENTIAL FIRST-IN-CLASS MEDICINES IN SELECTED THERAPEUTIC AREAS



"Innovation in the Biopharmaceutical Pipeline: A Multi-Dimensional  
[www.analysisgroup.com/uploadedFiles/Publishing/Articles/2012\\_Innovation\\_in\\_the\\_Biopharmaceutical\\_pipeline.pdf](http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/2012_Innovation_in_the_Biopharmaceutical_pipeline.pdf)



## ENERGY & COMMERCE COMMITTEE

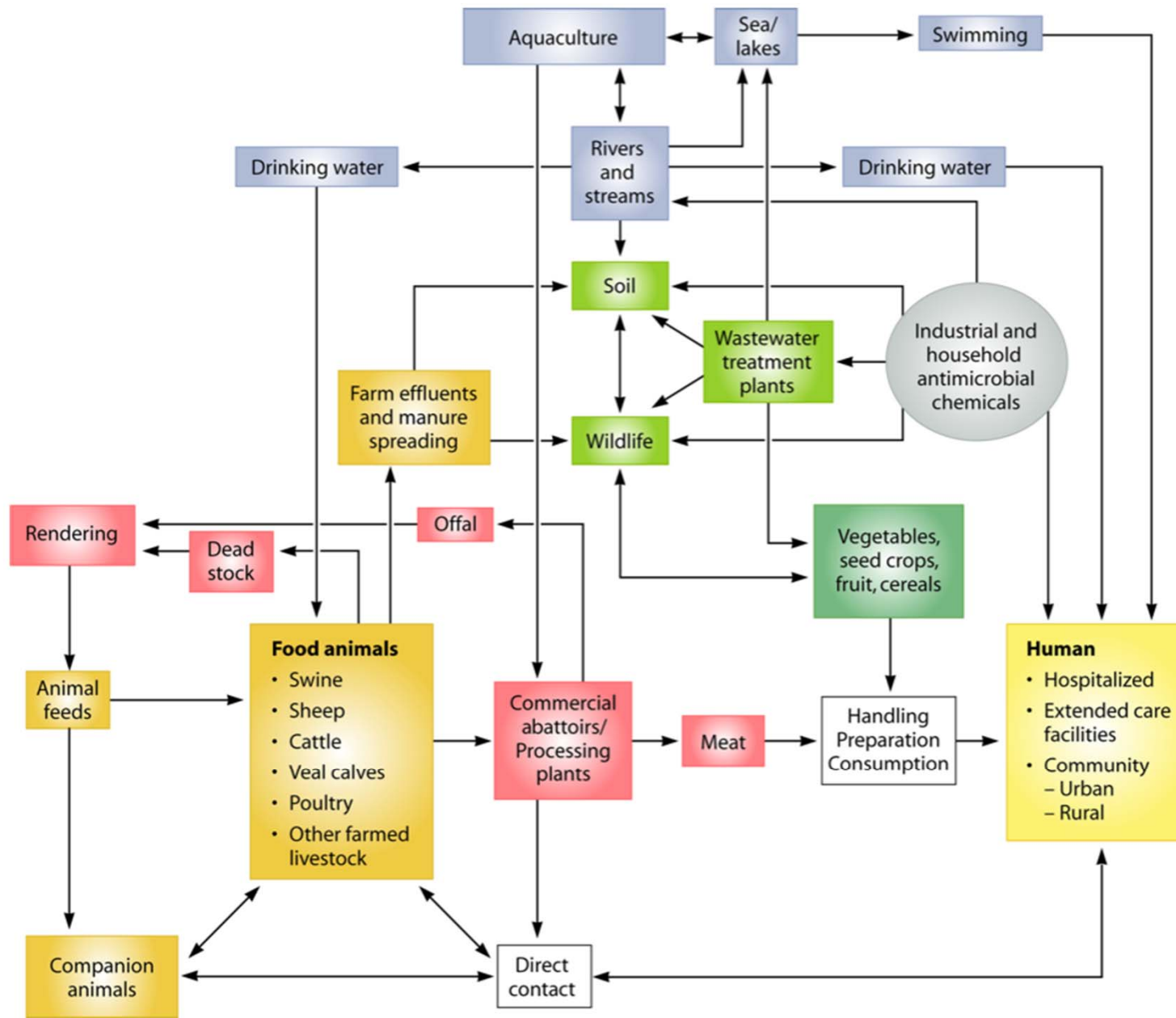
UNITED STATES HOUSE OF REPRESENTATIVES  
CHAIRMAN FRED UPTON

### **Solutions for Patients: Clearing the Path to New Treatments and Cures**

- 1.- Facilitar el acceso a nuevos tratamientos a los pacientes más graves
- 2.- Acortar el tiempo para que estos tratamientos lleguen al mercado
- 3.- Incentivar el desarrollo de nuevos antibióticos
- 4.- Los procesos regulatorios y la limitación de la recuperación de las inversiones, aleja a los innovadores del desarrollo de tratamientos que los pacientes necesitan desesperadamente
- 5.- Fomentar normas mejoradas y transparentes para la aprobación de antibióticos para que lleguen a los pacientes en el momento oportuno.

<http://energycommerce.house.gov/brand/breathing-new-life-life-sciences#sthash.oECfZGYN.dpuf>

March 2013



[guardian.co.uk](http://guardian.co.uk)

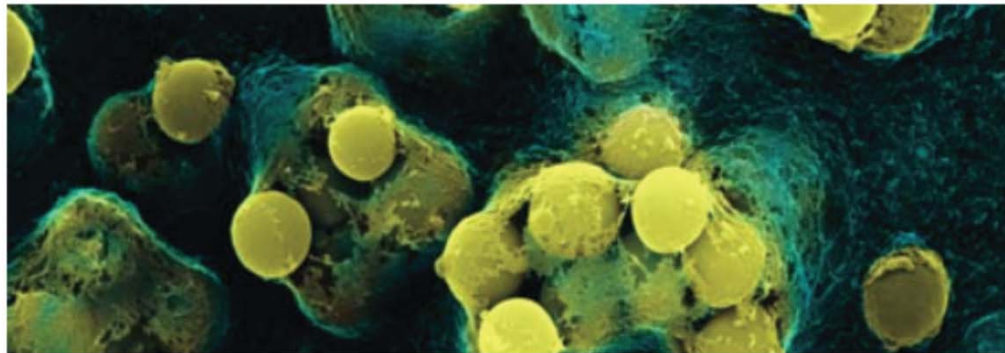
# Are you ready for a world without antibiotics?

Antibiotics are a bedrock of modern medicine. But in the very future, we're going to have to learn to live without them once again. And it's going to get nasty



**Sarah Boseley**  
The Guardian, Thursday 12 August 2010

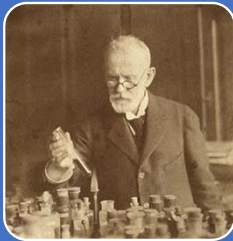
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## 1859 – Charles Darwin

- On the origin of species by natural selection
- Supervivencia de los microorganismos más resistentes



## 1908 – Paul Ehrlich

- Tripanosomas resistentes a los arsenicales



## 1945 – Alexander Fleming

- Aviso sobre desarrollo de resistencias derivadas de la venta de OTC de antibióticos



# Prácticas cuestionables

- Conocimiento de los médicos sobre antibioticoterapia

# Prácticas cuestionables

- Dispensación de antibióticos sin receta

*J Antimicrob Chemother*  
doi:10.1093/jac/dkx003

**Journal of  
Antimicrobial  
Chemotherapy**

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**Obtaining antibiotics online from within the UK: a  
cross-sectional study**

Sara Elizabeth Boyd<sup>1,2\*</sup>, Luke Stephen Prockter Moore<sup>1,2</sup>, Mark Gilchrist<sup>1,2</sup>, Ceire Costelloe<sup>2</sup>,  
Enrique Castro-Sánchez<sup>2</sup>, Bryony Dean Franklin<sup>3,4</sup> and Alison Helen Holmes<sup>1,2</sup>

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# Enfermedades Infecciosas y Microbiología Clínica

[www.elsevier.es/eimc](http://www.elsevier.es/eimc)

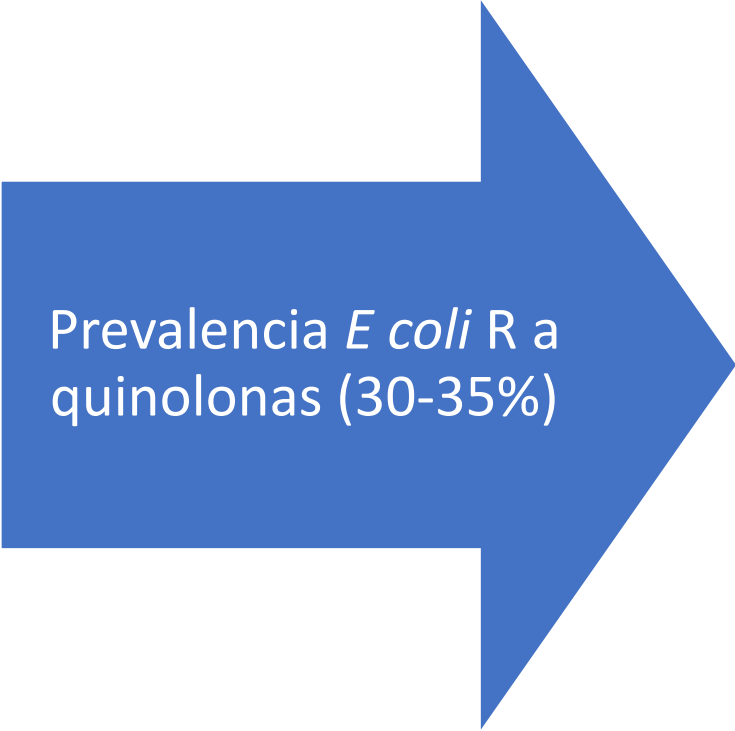


Original Article


## Knowledge and perceptions of junior and senior Spanish resident doctors about antibiotic use and resistance: Results of a multicenter survey<sup>☆</sup>

Carolina Navarro-San Francisco<sup>a</sup>, M. Dolores Del Toro<sup>b</sup>, Javier Cobo<sup>c</sup>, José H. De Gea-García<sup>e</sup>, Sergio Vañó-Galván<sup>d</sup>, Francisco Moreno-Ramos<sup>a</sup>, Jesús Rodríguez-Baño<sup>b</sup>, José Ramón Paño-Pardo<sup>a,\*</sup>

## *E coli*

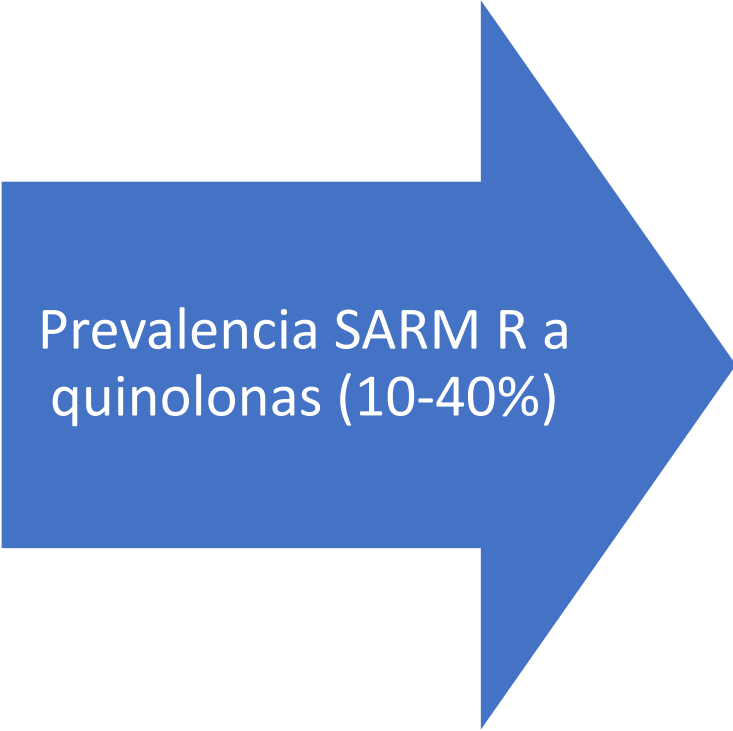


Prevalencia *E coli* R a  
quinolonas (30-35%)




Respondedores:  
- correcto: 42,38%  
- No respuesta: 25,3%

# SARM

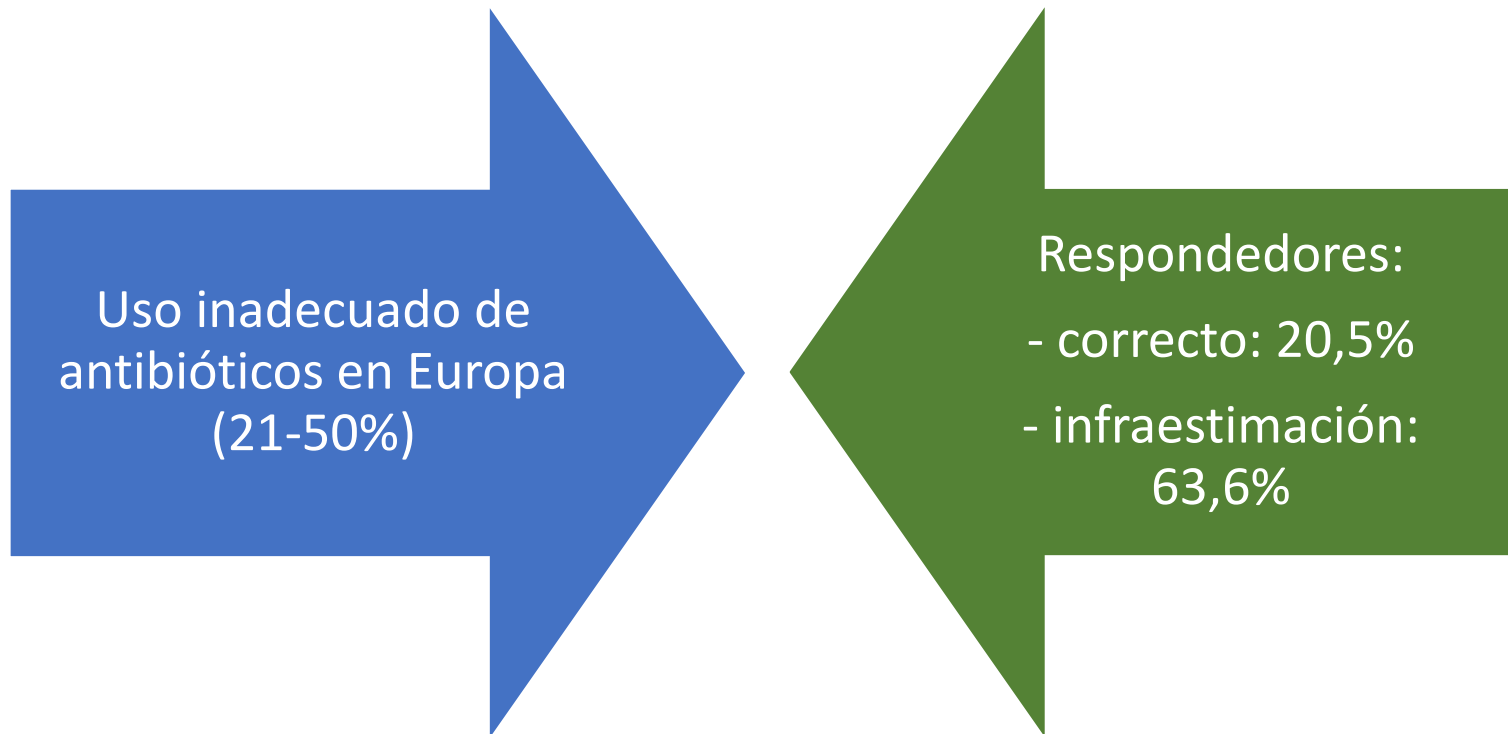


Prevalencia SARM R a  
quinolonas (10-40%)



Respondedores:  
- correcto: 20,2%  
- No respuesta: 49,8%

# Adecuación uso de antimicrobianos



# Prácticas cuestionables

- Uso de antibióticos en veterinaria







=



5,000.000 US\$

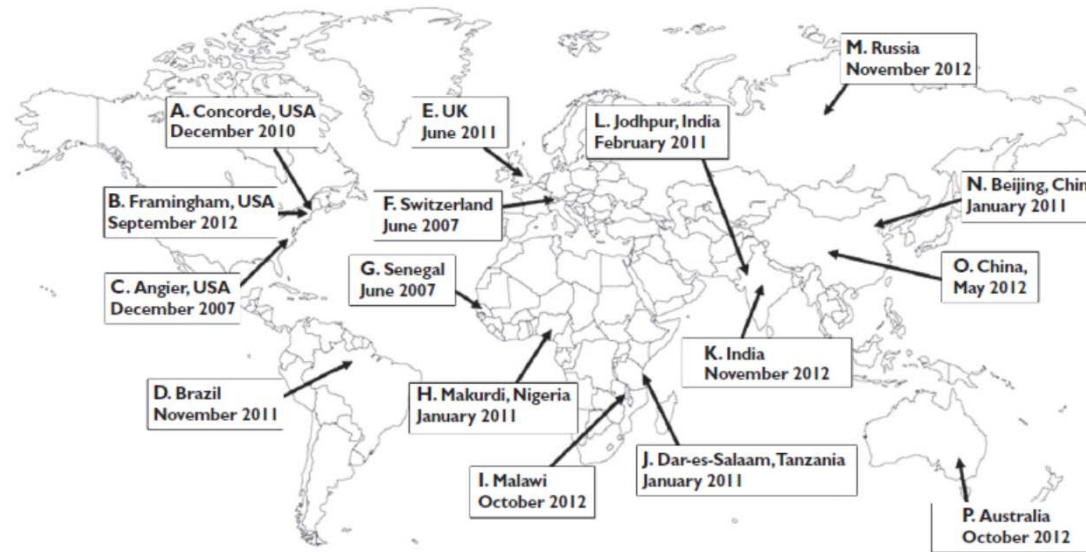
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## Superbugs in food: a severe public health concern



[www.thelancet.com/infection](http://www.thelancet.com/infection) Published online May 28, 2013 [http://dx.doi.org/10.1016/S1473-3099\(13\)70141-5](http://dx.doi.org/10.1016/S1473-3099(13)70141-5)

Localizaciones donde se han fabricado antibióticos considerados con calidad por debajo de la estándar







**A medida que se hundía, una voz hueca y extraña  
resonó en su interior. No hay forma de evitarlo.  
Soy gaviota.  
Soy limitado por la naturaleza.**



Richard Bach

"It could be the most terrifying motion picture  
I have ever made!" — *Alfred Hitchcock*

"...and  
remember,  
the next  
screen  
you hear  
may be  
your tomb!"



# ALFRED HITCHCOCK'S "The Birds"

TECHNICOLOR®

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ROD TAYLOR · JESSICA TANDY  
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A Fascinating  
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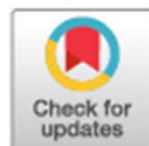
Screenplay by EVAN HUNTER · Directed by ALFRED HITCHCOCK





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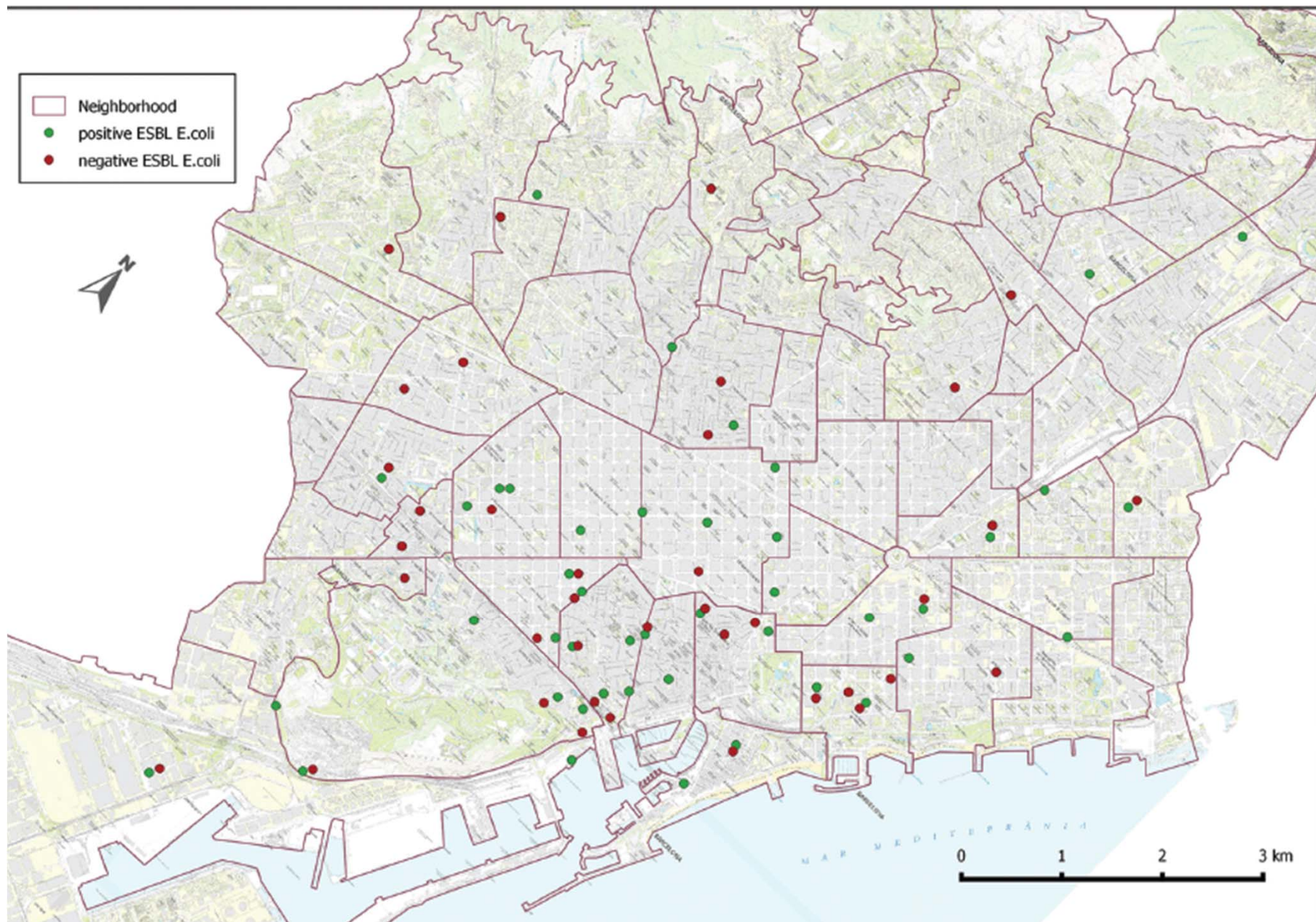


# Prevalence of Extended-Spectrum- $\beta$ -Lactamase- and/or Carbapenemase-Producing *Escherichia coli* Isolated from Yellow-Legged Gulls from Barcelona, Spain

Andrea Vergara,<sup>a</sup> Cristina Pitart,<sup>a,b</sup> Tomás Montalvo,<sup>c,d</sup>  Ignasi Roca,<sup>b</sup> Sara Sabaté,<sup>c</sup> Juan Carlos Hurtado,<sup>a,b</sup> Raquel Planell,<sup>c</sup> Francesc Marco,<sup>a</sup> Beatriz Ramírez,<sup>c</sup> Víctor Peracho,<sup>c</sup> Mercé de Simón,<sup>c</sup>  Jordi Vila<sup>a,b</sup>









Journal of Antimicrobial Chemotherapy Advance Access published January 10, 2017

*J Antimicrob Chemother*  
doi:10.1093/jac/dkw533

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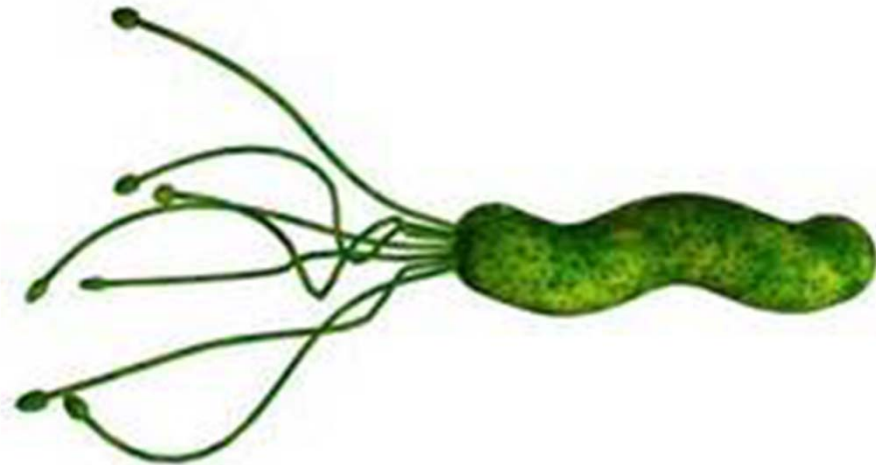
## **Spread of *mcr-1*-carrying Enterobacteriaceae in sewage water from Spain**

C. M. Ovejero<sup>1†</sup>, J. F. Delgado-Blas<sup>1†</sup>, W. Calero-Caceres<sup>2</sup>, M. Muniesa<sup>2</sup> and B. Gonzalez-Zorn<sup>1\*</sup>



¿Sólo antibióticos?

Takeuchi H, Trang VT, Morimoto N, et al. World J Gastroenterol 2014;20:8971-8



# Bacteriófagos

- Virus que infectan bacterias
- Se acoplan a receptores específicos de la superficie de la bacteria.
- Actúan mediante endolisinas capaces de romper las moléculas del péptidoglicano de las bacterias.

Schmelcher M, et al. JAC 2015



© XVIVO / Barcroft USA

# Infecciones urinarias



Jepson RG, et al. Cochrane Database Syst Rev 2012;10:CD001321



# Gusanos

**Figure 1. Maggots on a Wound**



Cherniack EP. Altern MED REV 2010;15:124-35

miel



Israili ZH. Am J Ther 2014;21:304-23





Health

## Analysis: Antibiotic apocalypse

By James Gallagher  
Health editor, BBC News website

🕒 19 November 2015 | [Health](#)

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**A terrible future could be on the horizon, a future which rips one of the greatest tools of medicine out of the hands of doctors.**

