



Sociedad Europea de  
Microbiología Clínica y  
Enfermedades Infecciosas  
(ESCMID)

Centro Europeo para la  
Prevención y Control de  
Enfermedades  
Infecciosas (ECDC) y la (AEM)



**EUCAST**

EUROPEAN COMMITTEE  
ON ANTIMICROBIAL  
SUSCEPTIBILITY TESTING

European Society of Clinical Microbiology and Infectious Diseases

- ❖ Revisar los PCC de los fármacos europeos ya existentes.
- ❖ Determinar los PCC de los nuevos fármacos y sus PC epidemiológicos.
- ❖ Definir la metodología para las pruebas de sensibilidad a los antimicrobianos.

Dr. Luis Martínez

Dr. Rafael Cantón





## EUCAST

- Consulta a los profesionales de la industria.
- Decisiones consensuadas sin votar.
- Financiada por la ESCMID, ECDC y los Comités nacionales de punto de corte.
- Sus documentos están disponibles en la página WEB de EUCAST gratuitamente.
- Tienen puntos de corte clínicos, epidemiológicos (ECOFF) y puntos de corte PK/PD no relacionados con especies.

## CLSI

- La industria es parte del proceso de toma de decisiones.
- Decisiones tomadas por votación.
- Se financia por miembros de la industria, instituciones gubernamentales, sociedades, laboratorios y venta de sus documentos
- Los documentos se venden.
- Puntos de corte clínicos.

Organization

EUCAST News

Clinical breakpoints

Expert rules

Setting breakpoints

MIC distributions

Zone diameter distributions

Antimicrobial susceptibility testing

Antifungal susceptibility testing (AFST)

Frequently Asked Questions (FAQ)

Meetings

EUCAST Presentations

Documents

Information for industry

Links



search term Search

QUICK NAVIGATION

## The European Committee on Antimicrobial Susceptibility Testing - EUCAST

EUCAST is a standing committee jointly organized by ESCMID, ECDC and European national breakpoint committees. EUCAST deals with breakpoints and technical aspects of phenotypic in vitro antimicrobial susceptibility testing and functions as the breakpoint committee of EMA and ECDC. EUCAST does not deal with antibiotic policies, surveillance or containment of resistance or infection control. The Steering Committee is the decision making body. It is supported by a General Committee with representatives from European and other countries, FESCI and ISC. The Steering Committee also consults on EUCAST proposals with experts within the fields of infectious diseases and microbiology, pharmaceutical companies and susceptibility testing device manufacturers.

EUCAST has a subcommittee on antifungal susceptibility testing and on methods for detection of resistance mechanisms of clinical and/or epidemiological importance.

Subcommittees on expert rules for antimicrobial susceptibility testing and

### EUCAST News



03 May 2013

**Compliance of manufacturers**

02 May 2013

**EUCAST SOP 6.0 on management on websites**

24 Apr 2013

**FAQ document updated!**

24 Apr 2013

**EUCAST Posters at ECCMID 2013**

24 Apr 2013

**EUCAST methods updated**

Microsoft Excel

Inicio Insertar Diseño de página Fórmulas Datos Revisar Vista

Portapapeles Fuente Alineación Número Estilos Celdas

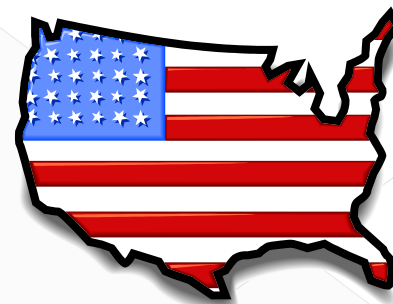
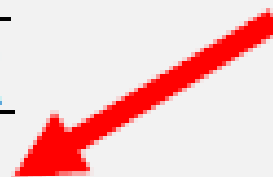
A1 Enterobacteriaceae

Breakpoint\_table\_v\_3.1 [Sólo lectura] [Modo de compatibilidad]

|    | B                            | C                        | D                                    | E                 | F                 | G                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----|------------------------------|--------------------------|--------------------------------------|-------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  |                              |                          |                                      |                   |                   | <b>EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11</b>                                                                                                                                                                                                                                                                                                                                                          |
| 2  |                              |                          |                                      |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3  |                              |                          |                                      |                   |                   | <b>Disk diffusion (EUCAST standardised disk diffusion method)</b>                                                                                                                                                                                                                                                                                                                                                              |
| 4  |                              |                          |                                      |                   |                   | <b>Medium:</b> Mueller-Hinton agar<br><b>Inoculum:</b> McFarland 0.5<br><b>Incubation:</b> Air, 35±1°C, 18±2h<br><b>Reading:</b> Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light.<br><b>Quality control:</b> <i>Escherichia coli</i> ATCC 25922                                                                                    |
| 5  | <b>MIC breakpoint (mg/L)</b> | <b>Disk content (µg)</b> | <b>Zone diameter breakpoint (mm)</b> | <b>Notes</b>      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 6  | <b>S ≤</b>                   | <b>R &gt;</b>            |                                      | <b>S ≥</b>        | <b>R &lt;</b>     | Numbers for comments on MIC breakpoints<br>Letters for comments on disk diffusion                                                                                                                                                                                                                                                                                                                                              |
| 7  |                              |                          |                                      |                   |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 8  | -                            | -                        | -                                    | -                 | -                 |                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 9  | 8 <sup>1</sup>               | 8                        | 10                                   | 14 <sup>A,B</sup> | 14 <sup>B</sup>   | 1/A. Wild type Enterobacteriaceae are categorised as susceptible to aminopenicillins. Some countries prefer to categorise wild type isolates of <i>E. coli</i> and <i>P. mirabilis</i> as intermediate. When this is the case, use the MIC breakpoint S ≤ 0.5 mg/L and the corresponding zone diameter breakpoint S ≥ 50 mm.<br>B. Ignore growth that may appear as a thin inner zone on some batches of Mueller-Hinton agars. |
| 10 | 8 <sup>1,2</sup>             | 8 <sup>2</sup>           | 10-10                                | 14 <sup>A,B</sup> | 14 <sup>B</sup>   | 2. For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L.                                                                                                                                                                                                                                                                                                                                     |
| 11 | 8 <sup>1</sup>               | 8                        | -                                    | Note <sup>C</sup> | Note <sup>C</sup> | C. Susceptibility inferred from ampicillin.                                                                                                                                                                                                                                                                                                                                                                                    |
| 12 | 8 <sup>1,3</sup>             | 8 <sup>3</sup>           | 20-10                                | 17 <sup>A,B</sup> | 17 <sup>B</sup>   | 3. For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.                                                                                                                                                                                                                                                                                                                                   |
| 13 | 8                            | 16                       | 30                                   | 20                | 17                |                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 14 | 8 <sup>4</sup>               | 16 <sup>4</sup>          | 30-6                                 | 20                | 17                | 4. For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.                                                                                                                                                                                                                                                                                                                                    |
| 15 | 8                            | 16                       | 75                                   | 23                | 23                |                                                                                                                                                                                                                                                                                                                                                                                                                                |



|        | S | R |
|--------|---|---|
| EUCAST | W | V |
| CLSI   | W | W |





# EUCAST: Formato puntos de corte

## Enterobacteriaceae

| Monobactams            | MIC breakpoint (mg/L) |     | Disk content (µg) | Zone diameter breakpoint (mm) |
|------------------------|-----------------------|-----|-------------------|-------------------------------|
|                        | S ≤                   | R > |                   |                               |
| Aztreonam <sup>1</sup> | 1                     | 4   | 30                | 27                            |

<sup>1</sup> It itself influence the categorization of susceptibility. In many areas, ESBL detection and characterization is recommended or mandatory for infection control purposes.

**S ≤ , R >**

MIC R > 4 mg/L  $\equiv$   $\geq 8$  mg/L

Zone R < 24 mm  $\equiv$   $\leq 23$  mm

**S ≤ 1, R > 4**

**Susceptible**

**I**

**Resistant**

**0.5**

**1**

**2**

**4**

**8**

**16**

**32**

**64**

**128**

**Susceptible**

**I**

**Resistant**

**S ≤ 1, R ≥ 8**



# ABREVIATURAS

# EUCAST

*Enterococcus* spp.

| Tetracyclines | MIC breakpoint (mg/L) |     | Disk content (µg) | Zone diameter breakpoint (mm) |     |
|---------------|-----------------------|-----|-------------------|-------------------------------|-----|
|               | S ≤                   | R > |                   | S ≥                           | R < |
| Doxycycline   | -                     | -   | -                 | -                             | -   |
| Minocycline   | -                     | -   | -                 | -                             | -   |
| Tetracycline  | -                     | -   | -                 | -                             | -   |
| Tigecycline   | 0.25 <sup>1</sup>     | 0.5 | 15                | 18                            | -   |

“—” No se recomienda realizar test de sensibilidad: No se han de hacer pero si se testan no se deben informar y si se informan informarlos como R.

| Miscellaneous                                               | MIC breakpoint (mg/L) |     | Disk content (µg) | Zone diameter breakpoint (mm) |     |
|-------------------------------------------------------------|-----------------------|-----|-------------------|-------------------------------|-----|
|                                                             | S ≤                   | R > |                   | S ≥                           | R < |
| Chloramphenicol                                             | -                     | -   | -                 | -                             | -   |
| Colistin                                                    | -                     | -   | -                 | -                             | -   |
| Daptomycin                                                  | IE                    | IE  | -                 | IE                            | IE  |
| Fosfomycin IV                                               | -                     | -   | -                 | -                             | -   |
| Fosfomycin-trometamol (uncomplicated UTI only)              | -                     | -   | -                 | -                             | -   |
| Fusidic acid                                                | -                     | -   | -                 | -                             | -   |
| Linezolid                                                   | 4                     | 4   | 10                | 19                            | -   |
| Metronidazole                                               | -                     | -   | -                 | -                             | -   |
| Mupirocin                                                   | IE                    | IE  | -                 | IE                            | IE  |
| Nitrofurantoin (uncomplicated UTI only)                     | 64                    | 64  | 100               | 15                            | -   |
| Rifampicin                                                  | -                     | -   | -                 | -                             | -   |
| Spectinomycin                                               | -                     | -   | -                 | -                             | -   |
| Trimethoprim (uncomplicated UTI only) <sup>1</sup>          | 0.032                 | 1   | 5                 | 50                            | 2   |
| Trimethoprim-sulfamethoxazole (co-trimoxazole) <sup>2</sup> | 0.032                 | 1   | 1.35-23.75        | 50                            | 2   |

“IE”. No hay evidencias suficientes para establecer un punto de corte. (Informar los valores de CMI con comentarios pero sin interpretación clínica).

# ABREVIATURAS

# EUCAST

## *Moraxella catarrhalis*

| Cephalosporins    | MIC breakpoint (mg/L) |      | Disk content (µg) | Zone diameter breakpoint (mm) |     |
|-------------------|-----------------------|------|-------------------|-------------------------------|-----|
|                   | S ≤                   | R >  |                   | S ≥                           | R < |
| Cefaclor          | 0.5                   | 0.5  | 30                | IP                            |     |
| Cefadroxil        | -                     | -    | -                 | -                             | -   |
| Cefalexin         | -                     | -    | -                 | -                             | -   |
| Cefazolin         | -                     | -    | -                 | -                             | -   |
| Cefepime          | 0.25                  | 0.25 | 30                |                               |     |
| Cefixima          | 0.5 <sup>1</sup>      | 1    | 5                 |                               |     |
| Cefotaxime        | 1 <sup>1</sup>        | 2    | 5                 | 20                            | 17  |
| Cefoxitin         | NA                    | NA   |                   | NA                            | NA  |
| Cefpodoxime       | 0.25 <sup>1</sup>     | 0.5  | 10                | IP                            | IP  |
| Ceftazidime       | -                     | -    | -                 | -                             | -   |
| Cefibuten         | 1 <sup>1</sup>        | 1    | 30                | IP                            | IP  |
| Ceftriaxone       | 1 <sup>1</sup>        | 2    | 30                | 24                            | 21  |
| Cefuroxime        | 1                     | 2    | 30                | IP                            | IP  |
| Cefuroxime axetil | 0.125                 | 2    | 30                | IP                            | IP  |

“NA”. No aplicables. Sólo se usan como test de screening.

| Carbapenems | MIC breakpoint (mg/L) |     | Disk content (µg) | Zone diameter breakpoint (mm) |     |
|-------------|-----------------------|-----|-------------------|-------------------------------|-----|
|             | S ≤                   | R > |                   | S ≥                           | R < |
| Doripenem   | 1 <sup>1</sup>        | 1   | 10                | 30                            | 30  |
| Ertapenem   | 0.5 <sup>1</sup>      | 0.5 | 10                | 28                            | 28  |
| Imipenem    | 2 <sup>1</sup>        | 2   | 10                | 28                            | 28  |
| Meropenem   | 2 <sup>1</sup>        | 2   | 10                | 33                            | 33  |

“IP”. Son puntos de corte que están por establecer.

| Monobactams | MIC breakpoint (mg/L) |     | Disk content (µg) | Zone diameter breakpoint (mm) |     |
|-------------|-----------------------|-----|-------------------|-------------------------------|-----|
|             | S ≤                   | R > |                   | S ≥                           | R < |
| Aztreonam   | 16                    | 16  |                   | 16                            | 16  |

# ¿COMO SE ESTABLECEN LOS PUNTOS DE CORTE CLÍNICOS?

Trabajos preclínicos y clínicos

Puntos PK/PD de los fármacos

Distribución de las CMI<sub>s</sub> de los microorganismos

**SMC** : calcula la probabilidad de alcanzar el PK/PD relacionado con la eficacia

Los PCC de EUCAST y del CLSI se calculan para una única dosificación, que es la dictada por la FDA o la EMA. No tienen en cuenta todas las posibles pautas de dosificación.

## ¿PUNTOS DE CORTE PK/PD NO RELACIONADOS CON ESPECIES?

Se basan en datos PK/PD independientes de las distribuciones de CMI de las distintas especies .

Se utilizarán para especies sin PCC definidos. No deben usarse en microorganismos en los que no se recomienda realizar sensibilidad, ni para los que la especie no es una buena diana.

También se usan para establecer los puntos de corte clínicos.





[Menu](#) [Login](#)

## Antimicrobial wild type distributions of microorganisms

### Search

Method: ☒ MIC ☐ Disk diffusion  
Antimicrobial: Antimicrobial... Species: Escherichia coli Disk content: Disk

Species: Escherichia coli (Method: MIC)

These distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance

[Show All Graphs](#)

|                                            | 0.002 | 0.004 | 0.008 | 0.016 | 0.032 | 0.064 | 0.125 | 0.25 | 0.5 | 1    | 2     | 4     | 8     | 16   | 32   | 64   | 128  | 256  | 512 | S≤   | R>   | ECOFF |
|--------------------------------------------|-------|-------|-------|-------|-------|-------|-------|------|-----|------|-------|-------|-------|------|------|------|------|------|-----|------|------|-------|
| <a href="#">Amikacin</a>                   | 0     | 0     | 0     | 2     | 1     | 1     | 8     | 46   | 153 | 1635 | 5440  | 2659  | 648   | 174  | 59   | 37   | 4    | 5    | 45  | 8.0  | 16.0 | 8.0   |
| <a href="#">Ampicillin</a>                 | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 9   | 96   | 737   | 1670  | 669   | 42   | 11   | 692  | 600  | 58   | 693 | 8.0  | 8.0  | 8.0   |
| <a href="#">Ampicillin-clavulanic acid</a> | 0     | 0     | 0     | 0     | 0     | 0     | 4     | 4    | 34  | 1026 | 8970  | 19912 | 15313 | 7157 | 2931 | 524  | 330  | 577  | 65  | 8.0  | 8.0  | 8.0   |
| <a href="#">Ampicillin</a>                 | 0     | 0     | 0     | 0     | 0     | 0     | 1     | 13   | 84  | 1845 | 10572 | 11331 | 2181  | 423  | 570  | 3796 | 1534 | 6683 | 187 | 8.0  | 8.0  | 8.0   |
| <a href="#">Ampicillin-sulbactam</a>       | 0     | 0     | 0     | 0     | 0     | 0     | 6     | 11   | 71  | 393  | 2935  | 1949  | 744   | 1998 | 1605 | 1085 | 0    | 0    | 0   | 8.0  | 8.0  | 8.0   |
| <a href="#">Cefazolin</a>                  | 0     | 0     | 0     | 4     | 1103  | 1085  | 613   | 132  | 36  | 17   | 22    | 37    | 25    | 21   | 36   | 58   | 0    | 3    | 0   | 1.0  | 4.0  | 0.2   |
| <a href="#">Cefazolin</a>                  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 2    | 31  | 60   | 25    | 22    | 3     | 0    | 4    | 2    | 0    | 1    | 0   | ND   | ND   | 4.0   |
| <a href="#">Cefadroxil</a>                 | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 0   | 0    | 0     | 8     | 27    | 7    | 2    | 1    | 3    | 2    | 0   | 16.0 | 16.0 | 16.0  |
| <a href="#">Cefalexin</a>                  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 1   | 0    | 7     | 77    | 18    | 2    | 0    | 1    | 3    | 5    | 0   | 16.0 | 16.0 | 16.0  |
| <a href="#">Cefalothin</a>                 | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 1   | 4    | 110   | 598   | 1800  | 1060 | 181  | 38   | 51   | 10   | 8   | ND   | ND   | 32.0  |
| <a href="#">Cefazolin</a>                  | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0    | 37  | 131  | 67    | 27    | 12    | 5    | 4    | 1    | 1    | 0    | 0   | ND   | ND   | ND    |

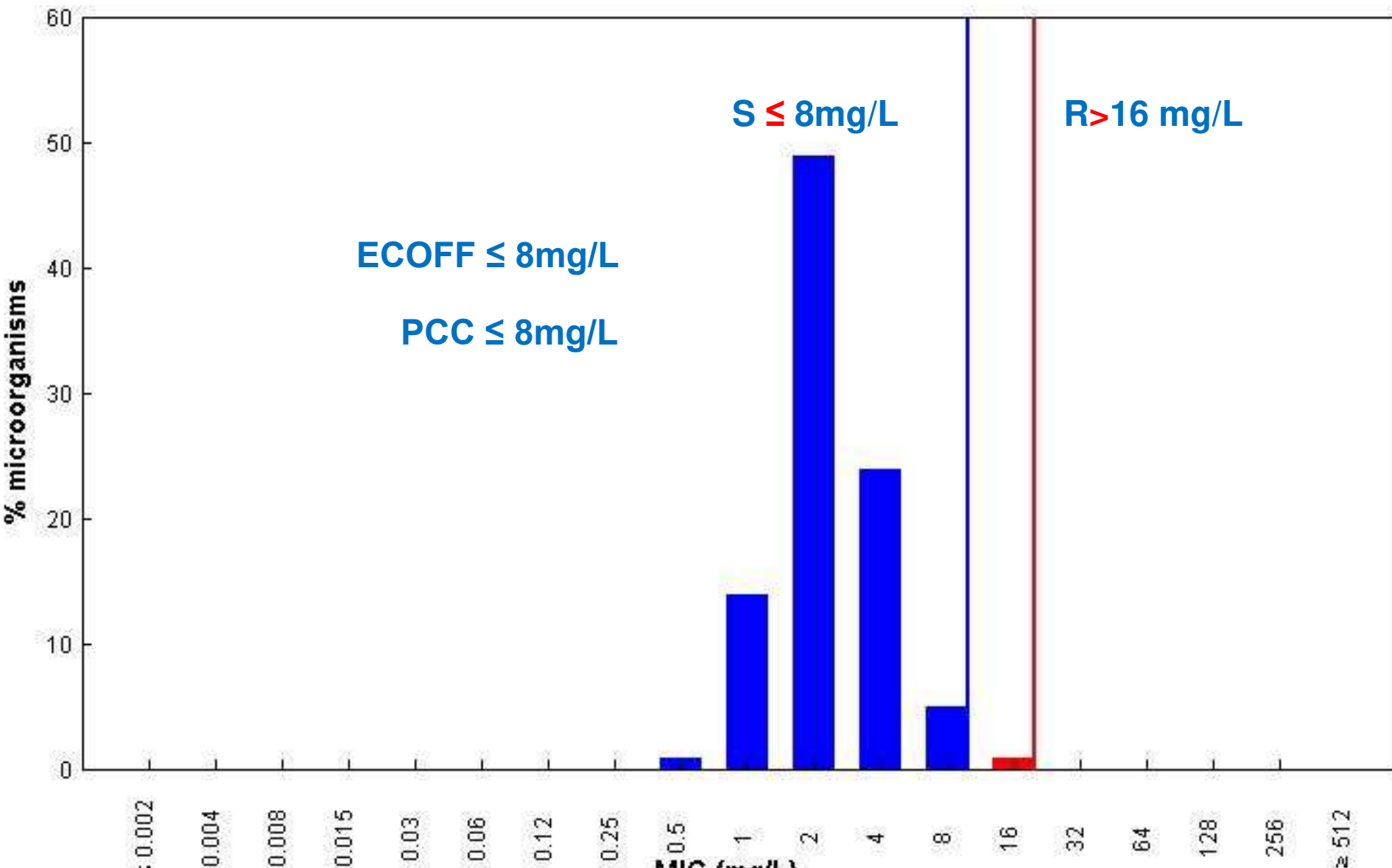
# CUT-OFF EPIDEMIOLOGICO (ECOFF)

- Es la MIC más alta que separa las poblaciones que **carecen o no expresan mecanismos de resistencia** de aquellas que lo presentan y expresan.
- Un microorganismo se define como salvaje **cuando no tiene resistencias ni adquiridas ni por mutaciones.**

# Amikacin / *Escherichia coli*

## EUCAST MIC Distribution - Reference Database 2013-05-12

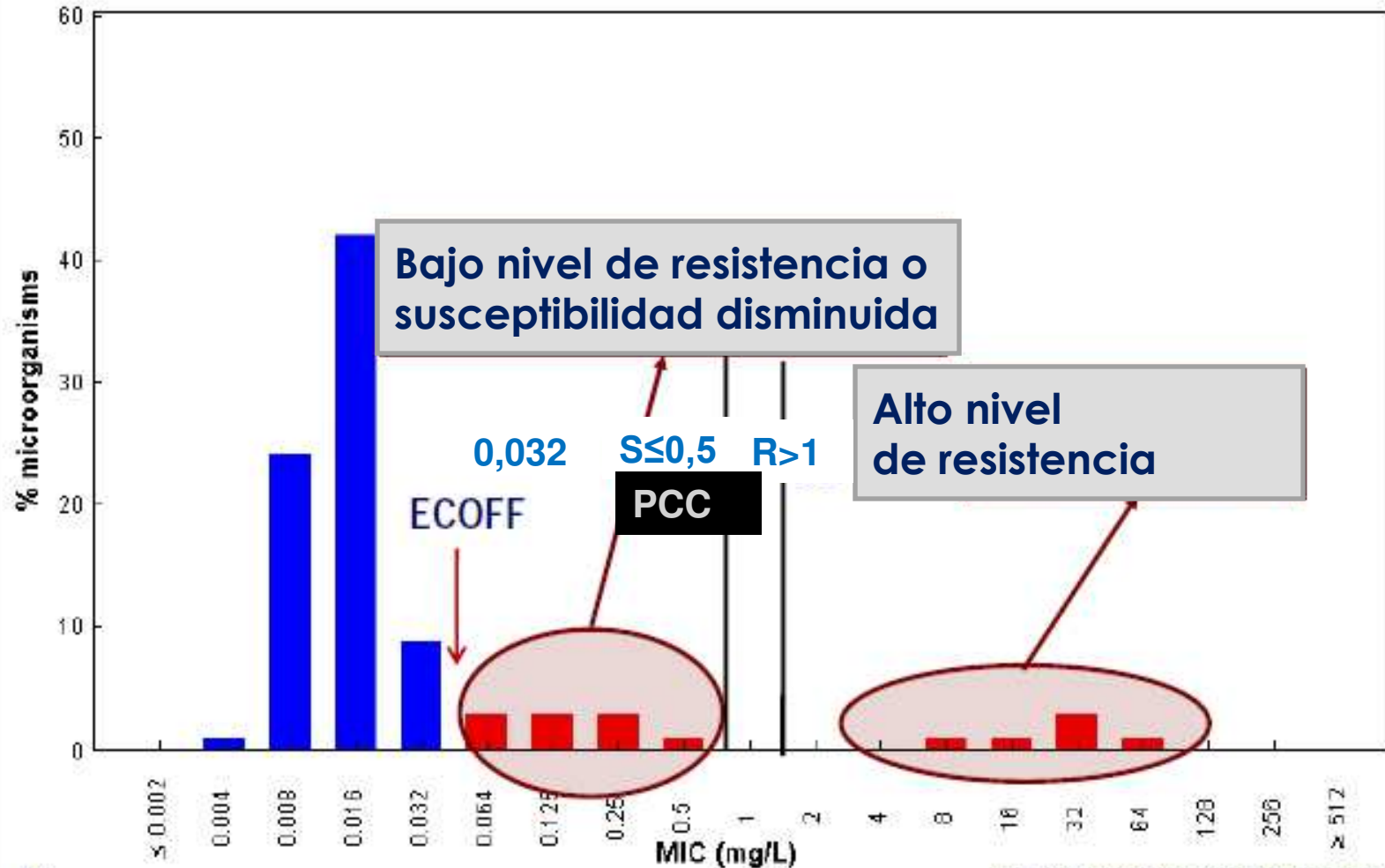
MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance



# Ciprofloxacin / *Escherichia coli*

## EUCAST MIC Distribution - Reference Database

MIC distributions include collated data from multiple sources, geographical areas and time periods and can never be used to infer rates of resistance



MIC

Epidemiological cut-off: WT  $\leq 0.032$  mg/L

17877 observations (82 data sources)

Clinical breakpoints: S  $\leq 0.5$  mg/L, R  $> 1$  mg/L



# SHORT BOARD

www.redzsurfboard.com





|         | ENTEROBACTERIACEAE |       |             |             |         |
|---------|--------------------|-------|-------------|-------------|---------|
|         | CLSI 2013          |       | EUCAST 2013 |             | Cambios |
|         | S≤                 | R≥    | S≤          | R>          |         |
| AMP     | 8                  | 32    | 8           | 8           |         |
| AMC     | 8/4                | 32/16 | 8/2 (fija)  | 8           |         |
| CTX     | 1                  | 4     | 1           | 2           |         |
| CXM     | 8                  | 32    | 8           | 8           |         |
| ETP     | 0,5                | 2     | 0.5         | 1           |         |
| FOX     | 8                  | 32    | NA          | NA          |         |
| PTZ     | 16/4               | 128/4 | 8/4 (fija)  | 16/4 (fija) | >R      |
| CAZ     | 4                  | 16    | 1           | 4           | >R      |
| FEP     | 8                  | 32    | 1           | 4           | >R      |
| ATM     | 4                  | 16    | 1           | 4           | >R      |
| GEN/TOB | 4                  | 16    | 2           | 4           | >R      |
| AMK     | 16                 | 64    | 8           | 16          | >R      |
| CIP     | 1                  | 4     | 0.5         | 1           | >R      |
| LEV     | 2                  | 8     | 1           | 2           | >R      |
| IMP/MRP | 1                  | 4     | 2           | 8           | >S      |

# CAMBIO DE CLSI A EUCAST. CEFALOSPORINAS DE ESPECTRO EXTENDIDO EN ENTEROBACTERIAS

P. LAPARRA, B. GOMILA, V. DOMÍNGUEZ, R. IGUAL, R. MORENO.  
Hospital General de Castellón

**OBJETIVOS:** A partir del 1 de enero de 2013 adoptaremos en nuestro laboratorio, los puntos de corte recomendados por el EUCAST (European Committee on Antimicrobial Susceptibility Testing) para la interpretación clínica de la CMI. El objeto de este estudio es analizar los cambios que se producirán al adoptar la nueva guía. Tomamos como ejemplo la sensibilidad de *Escherichia coli* aislados en orina, que hasta ahora eran informados según las normas del CLSI (Clinical and Laboratory Standards Institute).

**MATERIAL Y METODOS:** Estudio retrospectivo de 5 años en el que se comparan los puntos de corte del CLSI 2011 y EUCAST 2012, (Tabla 1), para cefalosporinas de espectro extendido (cefotaxima (CTX), ceftazidima (CFTZ) y cefepime (CEFP)) de *Escherichia coli* aislados en orina de pacientes del Hospital General de Castellón y del Hospital La Magdalena.

Los datos se obtuvieron con el programa de gestión del Laboratorio Gestlab y para todos los cálculos elegimos una cepa por paciente, la primera del año. Para el cultivo de orina utilizamos un medio cromogénico (CHROMagar, BD) y la CMI se determinó con el sistema Vitek2 (Biomérieux), que hasta la fecha aplicaba la normativa del CLSI. Para el cálculo de los puntos EUCAST utilizamos los valores recomendados por este organismo en su Web [www.eucast.org](http://www.eucast.org).



|             | CLSI 2011 |     | EUCAST 2012 |    |
|-------------|-----------|-----|-------------|----|
|             | S         | R   | S           | R  |
| CEFOTAXIMA  | ≤1        | ≥4  | ≤1          | ≥2 |
| CEFTAZIDIMA | ≤4        | ≥16 | ≤1          | ≥4 |
| CEFEPIME    | ≤8        | ≥32 | ≤1          | ≥4 |

## RESULTADOS:

Se aislaron 2407 *E. coli* correspondientes a 1897 pacientes (1554 del Hospital general y 343 del Hospital La Magdalena). En 265 pacientes se aisló *E. coli* productor de BLEE. Hasta la fecha los aislamientos productores de BLEE se informaban, según CLSI 2009, como resistentes a las cefalosporinas de amplio espectro.

Los resultados de resistencia en la Tabla 2.

## (%) RESISTENCIAS EN E. COLI [2008-2012]

|             | CLSI 2011 |        | EUCAST 2012 |        |
|-------------|-----------|--------|-------------|--------|
|             | R total   | R BLEE | R Total     | R BLEE |
| CEFOTAXIMA  | 13,2      | 85,6   | 13,2        | 85,6   |
| CEFTAZIDIMA | 5,6       | 33,2   | 9           | 55     |
| CEFEPIME    | 1,3       | 9,4    | 6,9         | 49,8   |

## CONCLUSIONES:

- La adopción de las normas EUCAST generará unos informes de sensibilidad diferentes y en consecuencia los tratamientos que se aplicarán se harán de acuerdo con ellos.
- La sensibilidad de CTX se mantiene igual ya que el punto de corte es el mismo para las dos guías. Sin embargo el EUCAST tiene puntos de corte más bajos para CFTZ y CEFP que los del CLSI, lo que conlleva a un aumento de los porcentajes de resistencias para estos antibióticos.
- En el caso de *E. coli* productores de BLEES no los informaremos como resistentes a cefalosporinas de espectro extendido, sino que lo haremos según su categoría de CMI, con lo que habrá más sensibilidad a éstas.

|     | CLSI 2011 |    | EUCAST 2012 |    |
|-----|-----------|----|-------------|----|
|     | ≤S        | ≥R | ≤S          | >R |
| CTX | 1         | 4  | 1           | 2  |
| CAZ | 4         | 16 | 1           | 4  |
| CEF | 8         | 32 | 1           | 4  |

|     | CLSI 2011 |      | EUCAST |      |
|-----|-----------|------|--------|------|
|     | % S       | % R  | % S    | % R  |
| CTX | 86,8      | 13,2 | 86,8   | 13,2 |
| CAZ | 94,4      | 5,6  | 91     | 9    |
| CEF | 98,7      | 1,3  | 93,1   | 6,9  |

**2407 *E.coli***  
**1897 Pacientes**

**265**  
**pacientes**  
**con**  
**BLEES**

|     | CLSI 2009 | CLSI 2011 |      | EUCAST 2012 |      |
|-----|-----------|-----------|------|-------------|------|
|     | % R       | % S       | % R  | % S         | % R  |
| CTX | 100       | 14,3      | 85,6 | 14,3        | 85,6 |
| CAZ | 100       | 66,7      | 33,2 | 44,9        | 55   |
| CEF | 100       | 90,5      | 9,4  | 50,1        | 49,8 |

# ¿QUÉ HA PASADO CON LA INTERPRETACIÓN DE LAS BLEES?

❖ EL CLSI informaba los microorganismos BLEES como resistentes a CEFAS de 3ª, 4ª y aztreonam .

❖ El EUCAST interpretaba como I un resultado S y como R un resultado I.

❖ En 2010 recomiendan informar las CMI's tal cual se obtienen independiente del mecanismo de resistencia.

❖ Esta recomendación se hace extensiva a las carbapenemas y carbapenemasas.



Los  
modelos  
PK/PD

Sostienen que

Con dosis elevadas de CEFALOSPORINAS y CARBAPENEMAS se obtienen  $T > CMI > 50\%$ , cuando la CMI están entre 1-4 mg/L.

Estudios en  
animales

Sugieren que

Microorganismos portadores de BLEES no se comportan peor que los no BLEES con similares CMIs.  
**La CMI es MEJOR PREDICTOR** de la evolución que el mecanismo de resistencia

Estudios clínicos en infecciones por *E.coli* y *K.pneumoniae* BLEE o con carbapenemasas tipo VIM.

Apoyan

que con los nuevos puntos de corte se obtienen mejores éxitos terapéuticos que con los puntos del CLSI.

## **Are susceptibility tests enough, or should laboratories still seek ESBLs and carbapenemases directly?**

David M. Livermore<sup>1,2\*</sup>, Jenny M. Andrews<sup>3</sup>, Peter M. Hawkey<sup>4</sup>, Pak-Leung Ho<sup>5</sup>, Yoram Keness<sup>6</sup>, Yohei Doi<sup>7</sup>, David Paterson<sup>8</sup> and Neil Woodford<sup>2</sup>

- 1- No hay evidencias de que BGNs BLEES con MICs bajas a carbapenemas respondan bien a estos antimicrobianos.**
- 2- Los test que determinan CMI no son precisos para detectar categorías S , I y R en un rango de 1-4 mg/L.**
- 3- Al final concluyen que se deben detectar las BLEES y las carbapenemasas e informarlas con fines clínicos y epidemiológicos.**

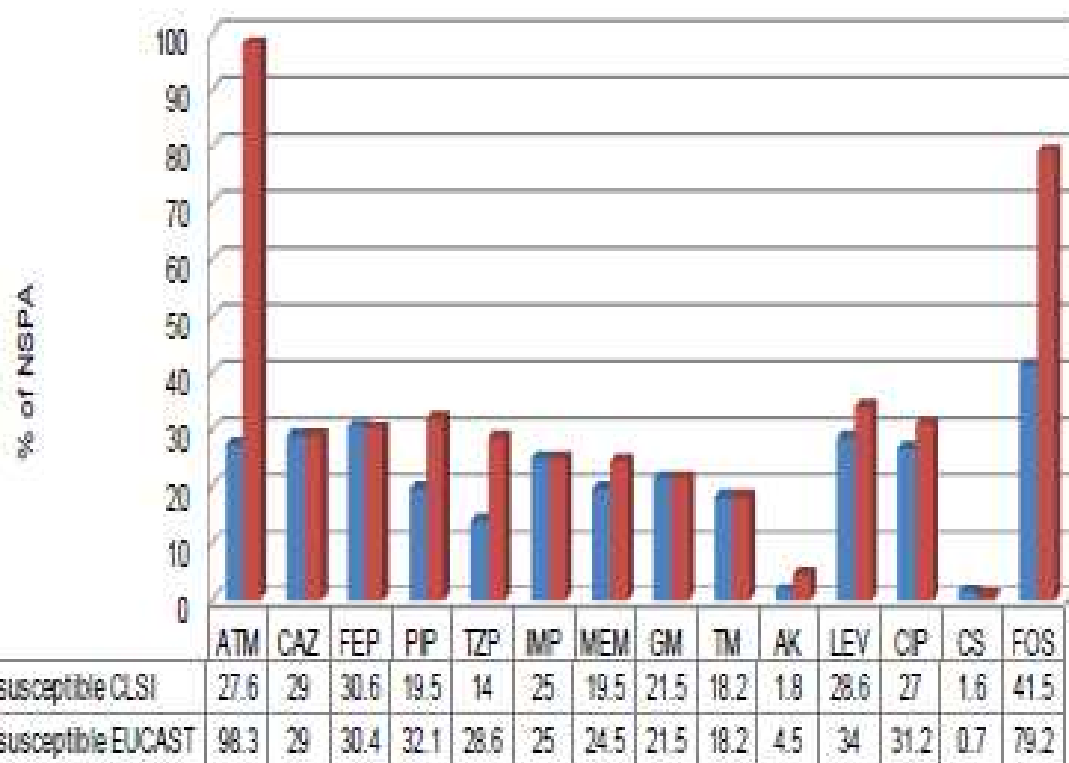
## *P.aeruginosa*

| ANTIMICROBIANO | CLSI 2011 |       | EUCAST 2013 |     | Cambios |
|----------------|-----------|-------|-------------|-----|---------|
|                | S ≤       | R ≥   | S ≤         | R > |         |
| FEP            | 8         | 32    | 8           | 8   |         |
| CAZ            | 8         | 32    | 8           | 8   |         |
| GEN/TOB        | 4         | 16    | 4           | 4   |         |
| PTZ            | 16/4      | 128/4 | 16          | 16  | >R      |
| MRP            | 2         | 8     | 2           | 8   |         |
| IMP            | 2         | 8     | 4           | 8   | >S      |
| CT             | 2         | 8     | 4           | 4   | >S      |
| ATM            | 8         | 32    | 1           | 16  | >R      |
| AMK            | 16        | 64    | 8           | 16  | >R      |
| CIP            | 1         | 4     | 0.5         | 1   | >R      |
| LEVO           | 2         | 8     | 1           | 2   | >R      |

# Effect of differences in antibiotic clinical breakpoints between the CLSI and EUCAST on the definitions for acquired resistance in *Pseudomonas aeruginosa*.

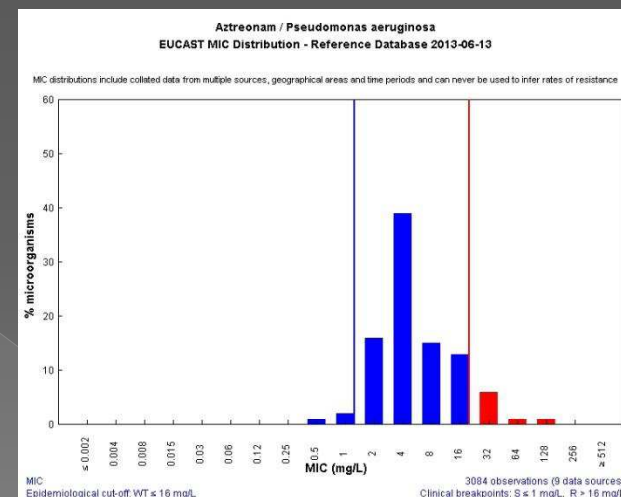
Ariadna Ocampo-Soler, Gabriel Cabot, Cristina Rodríguez, Fe Tubau, Carmen Peñar, Antonio Oliver and Luis Martínez Martínez<sup>1</sup> U. H. Marqués de Valdecilla-IMVA, Santander, Spain. <sup>2</sup>H. Son Espases, Palma de Mallorca, Spain. <sup>3</sup>H. Bellvitge, Barcelona, Spain.

## Percentages of NSPA using CLSI and EUCAST criteria



## EUCAST

ECOFF  $\leq 16$   
PCC  $S \leq 1$   $R > 16$   
PK/PD  $S \leq 4$   $R > 8$



## CLSI

$S \leq 8$   $R \geq 32$

The percentages of CAZ, IMP, GM and TOB NSPA showed no differences according to both committees. The percentage of FEP NSPA showed a minor difference between

|                                                                                    | STAPHYLOCOCCUS. SP |      |                                      |                |           |
|------------------------------------------------------------------------------------|--------------------|------|--------------------------------------|----------------|-----------|
|                                                                                    | CLSI 2011          |      | EUCAST 2013                          |                | Cambios   |
|                                                                                    | S≤                 | R≥   | S≤                                   | R>             |           |
| PENI <i>S. aureus</i>                                                              | 0.12               | 0.25 | 0,12                                 | 0.12           |           |
| OXA <i>S. aureus</i> y <i>S.lugdunensis</i>                                        | 2                  | 4    |                                      | Nota >2=MR     | Gen mec A |
| OXA <i>S.coagulasa</i> negativa                                                    | 0.25               | 0.5  |                                      | Nota > 0.25 MR | Gen mec A |
| FOX (Screening) <i>S.aureus</i> ,<br><i>S.lugdunensis</i> y <i>S.saprophyticus</i> | 4                  | 8    |                                      | > 4 =MR        |           |
| ERTP                                                                               | 2                  | 8    | INFORMAR SENSIBLES SI<br>ES S LA CFX |                |           |
| IMP                                                                                | 4                  | 16   |                                      |                |           |
| MRP                                                                                | 4                  | 16   |                                      |                |           |
| TEC <i>S.aureus</i>                                                                | 8                  | 32   | 2                                    | 2              | >R        |
| TEC <i>S.coagulasa</i> negativa                                                    | 8                  | 32   | 4                                    | 4              | >R        |
| VAN <i>S.aureus</i>                                                                | 2                  | 16   | 2                                    | 2              |           |
| VAN Staf.coagulasa negativa                                                        | 4                  | 32   | 4                                    | 4              |           |
| DAPT                                                                               | 1                  |      | 1                                    | 1              |           |
| LZD                                                                                | 4                  | 8    | 4                                    | 4              | > R       |
| CIPR                                                                               | 1                  | 4    | 1                                    | 1              |           |
| AC. FUS                                                                            | 1                  | 4    | 1                                    | 1              |           |
| SXT                                                                                | 2/38               | 4/76 | 2                                    | 4              |           |
| CLART                                                                              | 2                  | 8    | 1                                    | 2              | > R       |
| ERI                                                                                | 0.5                | 8    | 1                                    | 2              | > S       |
| CLI                                                                                | 0.5                | 4    | 0.25                                 | 0.5            | > R       |
| RIF                                                                                | 1                  | 4    | 0.06                                 | 0.5            | > R       |
| MPC                                                                                | 4                  | 8    | 1                                    | 256            | > R       |



## Microscan automated system (Siemens Healthcare Diagnostics)

|                                                                       |                                                                                                                                 |                                                                                                                                               |                                                                                                       |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| EUCAST terminology implemented                                        | In computer database                                                                                                            | S ≤                                                                                                                                           | Yes                                                                                                   |
|                                                                       |                                                                                                                                 | R >                                                                                                                                           | Yes                                                                                                   |
|                                                                       |                                                                                                                                 | -                                                                                                                                             | No                                                                                                    |
|                                                                       |                                                                                                                                 | IE                                                                                                                                            | No                                                                                                    |
|                                                                       | In reports                                                                                                                      | S ≤                                                                                                                                           | Yes                                                                                                   |
|                                                                       |                                                                                                                                 | R >                                                                                                                                           | Yes                                                                                                   |
|                                                                       |                                                                                                                                 | -                                                                                                                                             | Most "-" do not have interpretations reported                                                         |
|                                                                       |                                                                                                                                 | IE                                                                                                                                            | No                                                                                                    |
| EUCAST Expert Rules implemented                                       | Some exceptions in current rules will be corrected in new software release Jan-March 2013. All rules can be customised by user. |                                                                                                                                               |                                                                                                       |
| EUCAST organism groups with no test in the system                     | <i>H. influenzae</i><br><i>M. catarrhalis</i><br>Strep A, C and G                                                               | <i>N. meningitidis</i><br><i>N. gonorrhoeae</i><br><i>S. pneumoniae</i>                                                                       | Gram-negative anaerobes<br>Gram-positive anaerobes<br>Viridans streptococci (except <i>S. bovis</i> ) |
| Agents in EUCAST tables but not available in the system               | Trimethoprim<br>Chloramphenicol<br>Fusidic acid<br>Rifampicin                                                                   | Ampicillin-sulbactam with fixed 4 mg/l sulbactam<br>Amoxicillin-clavulanic acid with fixed 2 mg/l clavulanic acid<br>All agents for anaerobes |                                                                                                       |
| Agents available but EUCAST breakpoints not implemented in the system | Roxithromycin<br>Telithromycin<br>Doxycycline<br>Tigecycline (Gram-positive organisms)                                          |                                                                                                                                               |                                                                                                       |

The accuracy of data in these tables is not verified by EUCAST and the inclusion of any materials or devices does not indicate endorsement by EUCAST

## Vitek 2 automated system (bioMérieux)

|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                         |                                                         |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| EUCAST terminology implemented                                        | In computer database                                                                                                                                                                                                                                                                                                                                                                                                | S ≤                                                                                                                                                                                                                                                     | Yes                                                     |
|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     | R >                                                                                                                                                                                                                                                     | No. Will be in V2S 7.01 s/w, due Q1 2014.               |
|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     | -                                                                                                                                                                                                                                                       | No. Will be in V2S 7.01 s/w, due in Q1 2014.            |
|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     | IE                                                                                                                                                                                                                                                      | No. Will be in V2S 7.01 s/w, due in Q1 2014.            |
|                                                                       | In reports                                                                                                                                                                                                                                                                                                                                                                                                          | S ≤                                                                                                                                                                                                                                                     | Yes                                                     |
|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     | R >                                                                                                                                                                                                                                                     | No. Will be in V2S 7.01 s/w, due Q1 2014.               |
|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     | -                                                                                                                                                                                                                                                       | Reported "blank". Will be in V2S 7.01 s/w, due Q1 2014. |
|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                     | IE                                                                                                                                                                                                                                                      | Reported "blank". Will be in V2S 7.01 s/w, due Q1 2014. |
| EUCAST Expert Rules implemented                                       | All applicable rules dealing with intrinsic resistance, therapeutic interpretation and deduction are implemented in software version V2S 5.03 (2011), 5.04(2011), & 6.01 (2012). There are additional rules but none should be contrary to EUCAST rules in these software version.                                                                                                                                  |                                                                                                                                                                                                                                                         |                                                         |
| EUCAST organism groups with no test in the system                     | <i>H. influenzae</i><br><i>M. catarrhalis</i>                                                                                                                                                                                                                                                                                                                                                                       | <i>N. meningitidis</i><br><i>N. gonorrhoeae</i>                                                                                                                                                                                                         | Gram-negative anaerobes<br>Gram-positive anaerobes      |
| Agents in EUCAST tables but not available in the system               | Azithromycin<br>Roxithromycin<br>Amoxicillin-clavulanic acid with fixed 2 mg/L clavulanic acid (in development)<br>Ampicillin-sulbactam with fixed 4 mg/L sulbactam (Will be available for gram negative AST in V2S 7.01 s/w, due in Q1 2014)<br>Cefadroxil<br>Ceftibuten                                                                                                                                           | Ceftaroline<br>Cefepime ( <i>S. pneumoniae</i> )<br>Cefpodoxime ( <i>S. pneumoniae</i> )<br>Cefuroxime ( <i>S. pneumoniae</i> )<br>Teicoplanin ( <i>S. pneumoniae</i> )<br>Doxycycline ( <i>S. pneumoniae</i> )<br>Minocycline ( <i>S. pneumoniae</i> ) |                                                         |
| Agents available but EUCAST breakpoints not implemented in the system | Rifampicin ( <i>Strep</i> spp.) Will be in V2S 7.01 s/w, due in Q1 2014<br>Trimethoprim ( <i>Enterococcus</i> spp. & <i>Gr. B strep</i> )<br>Vancomycin (CNS) Will be in V2S 7.01 s/w due in Q1 2014<br>Linezolid ( <i>S. pneumoniae</i> ) Will be in V2S 7.01 s/w due in Q1 2014<br>Gentamicin ( <i>Enterococcus</i> spp.) in development<br>Mupirocin ( <i>S. aureus</i> ) Will be in V2S 7.01 s/w due in Q1 2014 | Netilmicin ( <i>Staphylococcus</i> spp.)<br>Tri-sulfa ( <i>Enterococcus</i> spp.)<br>Ofloxacin ( <i>S. pneumoniae</i> )<br>Septomycin ( <i>Enterococcus</i> spp.)<br>Antifungals<br>All agents with <i>P. multocida</i>                                 |                                                         |

The accuracy of data in these tables is not verified by EUCAST and the inclusion of any materials or devices does not indicate endorsement by EUCAST

## Phoenix/EpiCenter automated system (BD)

|                                                                       |                                                                                                                                                                                                                                |                                                 |                                                           |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------|
| EUCAST terminology implemented                                        | In computer database                                                                                                                                                                                                           | S ≤                                             | Yes                                                       |
|                                                                       |                                                                                                                                                                                                                                | R >                                             | No (R ≥)                                                  |
|                                                                       |                                                                                                                                                                                                                                | -                                               | Yes                                                       |
|                                                                       |                                                                                                                                                                                                                                | IE                                              | Yes                                                       |
|                                                                       | In reports                                                                                                                                                                                                                     | S ≤                                             | Yes                                                       |
|                                                                       |                                                                                                                                                                                                                                | R >                                             | Yes (≥ converted to R >)                                  |
|                                                                       |                                                                                                                                                                                                                                | -                                               | Yes (MICs reported for agents with no EUCAST breakpoints) |
|                                                                       |                                                                                                                                                                                                                                | IE                                              | Yes (MICs reported for agents with no EUCAST breakpoints) |
| EUCAST Expert Rules implemented                                       | All rules incorporated. There are additional rules but EUCAST rules have priority.                                                                                                                                             |                                                 |                                                           |
| EUCAST organism groups with no test in the system                     | <i>H. influenzae</i><br><i>M. catarrhalis</i>                                                                                                                                                                                  | <i>N. meningitidis</i><br><i>N. gonorrhoeae</i> | Gram-negative anaerobes<br>Gram-positive anaerobes        |
| Agents in EUCAST tables but not available in the system               | Ampicillin-sulbactam with fixed 4 mg/l sulbactam                                                                                                                                                                               |                                                 |                                                           |
| Agents available but EUCAST breakpoints not implemented in the system | Rifampicin ( <i>Staphylococcus</i> spp. cannot be reported susceptible)<br>Trimethoprim ( <i>Enterococcus</i> spp. cannot be reported susceptible)<br>Cotrimoxazole ( <i>Enterococcus</i> spp. cannot be reported susceptible) |                                                 |                                                           |

The accuracy of data in these tables is not verified by EUCAST and the inclusion of any materials or devices does not indicate endorsement by EUCAST

# Assessment of the Phoenix<sup>TM</sup> automated system and EUCAST breakpoints for antimicrobial susceptibility testing against isolates expressing clinically relevant resistance mechanisms

T. Giani<sup>1</sup>, M. I. Morosini<sup>2</sup>, M. M. D'Andrea<sup>1</sup>, M. García-Castillo<sup>2</sup>, G. M. Rossolini<sup>1</sup> and R. Cantón<sup>2</sup>

1) Dipartimento di Biotecnologie, Sezione di Microbiologia, Siena University Hospital, 53100-Siena, Italy and 2) Servicio de Microbiología, Hospital Universitario Ramón y Cajal and Instituto Ramón y Cajal de Investigación Sanitaria (IRYCIS), 28034-Madrid, Spain

- **Valoran 697 aislados (España e Italia) con mecanismos de resistencias bien caracterizados .La concordancia total > 95%**
- **Las discrepancias en BGN fueron mayores que en CGP, y la mayoría de las falsas resistencia y de las falsas sensibilidades eran del AMC.**
- **Las carbapenemas no mostraron falsas resistencia ni falsas sensibilidades.**
- **Excelente precisión en CGP, detectando SARM y sensibilidad disminuida a glucopéptidos de *S. aureus* y *Enterococcus sp.***

## Comparison of disk diffusion, Etest and VITEK2 for detection of carbapenemase-producing *Klebsiella pneumoniae* with the EUCAST and CLSI breakpoint systems

M. Vading<sup>1</sup>, Ø. Samuelsen<sup>2</sup>, B. Haldorsen<sup>2</sup>, A. S. Sundsfjord<sup>2,3</sup> and C. G. Giske<sup>1</sup>

1) Clinical Microbiology, MTC, Karolinska Institutet, Karolinska University Hospital, Stockholm, Sweden, 2) Reference Centre for Detection of Antimicrobial Resistance, Department of Microbiology and Infection Control, University Hospital of North Norway and 3) Research Group for Host-Microbe Interactions, Department of Medical Biology, Faculty of Health Sciences, University of Tromsø, Tromsø, Norway

- Ven que el punto de corte del ertapenem  $> 0.5$  es más sensible para detectar carbapenemasas y que es un buen predictor si la prevalencia de carbapenemasas es alta.
- El punto ECOFF del meropenem predice mejor la sensibilidad disminuida por otros mecanismos si la prevalencia es baja.
- En las tarjeta viteK-2 el meropenem detecta mejor las carbapenemasas en *K.pneumoniae* que el imipenem

## EUCAST expert rules in antimicrobial susceptibility testing

R. Leclercq<sup>1,2</sup>, R. Cantón<sup>2,3,4</sup>, D. F. J. Brown<sup>4</sup>, C. G. Giske<sup>2,4,5</sup>, P. Heisig<sup>2,6</sup>, A. P. MacGowan<sup>4,7</sup>, J. W. Mouton<sup>4,8</sup>, P. Nordmann<sup>2,9</sup>, A. C. Rodloff<sup>4,10</sup>, G. M. Rossolini<sup>2,11</sup>, C.-J. Soussy<sup>4,12</sup>, M. Steinbakk<sup>4,13</sup>, T. G. Winstanley<sup>2,14</sup> and G. Kahlmeter<sup>4,15</sup>

1) Laboratoire de Microbiologie, CHU Côte de Nacre, Caen, France, 2) EUCAST Subcommittee on Expert Rules, 3) Servicio de Microbiología and CIBER en Epidemiología y Salud Pública (CIBERESP), Hospital Universitario Ramón y Cajal, Instituto Ramón y Cajal de Investigación Sanitaria (IRYCIS), Madrid, Spain, 4) EUCAST Steering Committee, 5) Clinical Microbiology, MTC-Karolinska Institutet, Karolinska University Hospital, Solna, Sweden, 6) Department of Pharmacy, Biology & Microbiology, University of Hamburg, Hamburg, Germany, 7) Department of Medical Microbiology, Southmead Hospital, Bristol, UK, 8) Department of Medical Microbiology, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands, 9) Service de Bactériologie-Virologie, Hôpital de Bicêtre, Le Kremlin-Bicêtre, France, 10) Institut für Medizinische Mikrobiologie der Universität Leipzig, Leipzig, Germany, 11) Dipartimento di Biotecnologie, Sezione di Microbiologia, Siena, Italy, 12) Hôpital Henri Mondor, Service de Bactériologie, Creteil, France, 13) Department of Bacteriology and Immunology, Division of Infectious Disease Control, Norwegian Institute of Public Health, Oslo, Norway, 14) Department of Microbiology, Royal Hallamshire Hospital, Sheffield, UK and 15) Clinical Microbiology, Central Hospital, Växjö, Sweden

# REGLAS DEL EXPERTO

- **Nos ayudan a interpretar los antibiogramas.**
- **Definen las resistencias intrínsecas, los fenotipos excepcionales y las reglas interpretativas para los microorganismos y los diferentes grupos de antimicrobianos .**
- **Estas reglas se aplican una vez que se ha identificado el aislado.**



**TABLE 5. Exceptional phenotypes of Gram-negative bacteria**

| Rule no. | Organisms                                                   | Exceptional phenotypes                                                             |
|----------|-------------------------------------------------------------|------------------------------------------------------------------------------------|
| 5.1      | Any <i>Enterobacteriaceae</i> (except <i>Proteae</i> )      | Resistant to meropenem and/or imipenem <sup>a</sup>                                |
| 5.2      | <i>Serratia marcescens</i> and <i>Proteae</i>               | Susceptible to colistin                                                            |
| 5.3      | <i>Pseudomonas aeruginosa</i> and <i>Acinetobacter</i> spp. | Resistant to colistin                                                              |
| 5.4      | <i>Haemophilus influenzae</i>                               | Resistant to any third-generation cephalosporin, carbapenems, and fluoroquinolones |
| 5.5      | <i>Moraxella catarrhalis</i>                                | Resistant to ciprofloxacin and any third-generation cephalosporin                  |
| 5.6      | <i>Neisseria meningitidis</i>                               | Resistant to any third-generation cephalosporin and fluoroquinolones               |
| 5.7      | <i>Neisseria gonorrhoeae</i>                                | Resistant to third-generation cephalosporin and spectinomycin                      |

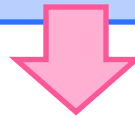
<sup>a</sup>Except in countries in which carbapenemase-producing *Enterobacteriaceae* are not rare.

-Hay que estar muy pendiente cuando aparezcan estos fenotipos.  
 - Se tienen que comprobar, porque si no estaremos informando errores

***Streptococcus pyogenes* R a penicilina**  
***Staphylococcus aureus* R a vancomicina**  
***Enterococcus faecium* S a ampicilina**  
***Enterobacteriaceae* resistente a carbapenems (raro pero en aumento),**  
**Anaerobios R a metronidazol.**

## NOTA :

-Si son S a CTX, CFX o CAZ informar: No usarlas en monoterapia por el riesgo de seleccionar resistencias (mutantes AmpC desreprimidas).



**TABLE 9.** Interpretive rules for  $\beta$ -lactam agents and *Enterobacteriaceae*, *Pseudomonas* spp., and *Acinetobacter* spp.

| Rule no. | Organisms                                                                                                    | Agents tested                                                                                                              | Agents affected                                                            | Rule                                                                                                                                                                                                                                                                                                                                                                             | Exceptions, scientific basis, and comments                                                                                                                                                                                                                                                                                                                                                                                | Evidence grade                           | References |
|----------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------|
| 9.1      | <i>Enterobacteriaceae</i>                                                                                    | Cefotaxime, ceftriaxone, ceftazidime, cefepime, amoxycillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam | Amoxycillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam | IF intermediate or resistant to any third-generation (cefotaxime, ceftriaxone, ceftazidime) or fourth-generation (cefepime) oxyimino-cephalosporin, AND susceptible to amoxycillin-clavulanate, ampicillin-sulbactam or piperacillin-tazobactam, THEN report as tested and enclose a warning on uncertain therapeutic outcome for infections other than urinary tract infections | ESBL producers are often categorized as susceptible to combinations of a penicillin and a $\beta$ -lactamase inhibitor. With the exception of urinary tract infections and bloodstream infections secondary to this origin, the use of these combinations in infections caused by ESBL producers remains controversial, and should be approached with caution. No evidence for ticarcillin-clavulanate has been published | B                                        | [44,45]    |
| 9.2      | <i>Enterobacter</i> spp., <i>Citrobacter freundii</i> , <i>Serratia</i> spp., and <i>Morganella morganii</i> | Cefotaxime, ceftriaxone, and ceftazidime                                                                                   | Cefotaxime, ceftriaxone, and ceftazidime                                   | IF susceptible <i>in vitro</i> to cefotaxime, ceftriaxone or ceftazidime, THEN note that the use in monotherapy of cefotaxime, ceftriaxone or ceftazidime should be discouraged, owing to the risk of selecting resistance, or suppress the susceptibility testing results for these agents                                                                                      | Selection of AmpC-derepressed cephalosporin-resistant mutants may occur during therapy. The use of a third-generation cephalosporin in combination with an aminoglycoside may also lead to failure by selection of resistant mutants. Combination with quinolones has, however, been found to be protective. The selection risk is absent or much diminished for cefepime and ceftipime                                   | A ( <i>Enterobacter</i> ),<br>B (others) | [46,47]    |
| 9.3      | <i>Enterobacteriaceae</i> (mostly <i>Klebsiella</i> spp. and <i>Escherichia coli</i> )                       | Ticarcillin, piperacillin                                                                                                  | Piperacillin                                                               | IF resistant to ticarcillin but susceptible to piperacillin, THEN edit piperacillin to resistant                                                                                                                                                                                                                                                                                 | Ticarcillin-hydrolyzing $\beta$ -lactamases also attack piperacillin, but resistance may be less obvious if expression is low-level. Does not apply to inhibitor combinations involving these penicillins                                                                                                                                                                                                                 | C                                        | [23,105]   |

ESBL, extended-spectrum  $\beta$ -lactamase.

# The role of pharmacokinetics/pharmacodynamics in setting clinical MIC breakpoints: the EUCAST approach

J. W. Mouton<sup>1</sup>, D. F. J. Brown<sup>2</sup>, P. Apfalter<sup>3</sup>, R. Cantón<sup>4</sup>, C. G. Giske<sup>5</sup>, M. Ivanova<sup>6</sup>, A. P. MacGowan<sup>7</sup>, A. Rodloff<sup>8</sup>, C.-J. Soussy<sup>9</sup>, M. Steinbakk<sup>10</sup> and G. Kahlmeter<sup>11</sup>

1) Department of Medical Microbiology, Radboud University Nijmegen Medical Centre, Nijmegen, the Netherlands, 2) European Committee on Antimicrobial Susceptibility Testing (EUCAST) Steering Committee, Linz, Austria, 3) Institute of Hygiene, Microbiology and Tropical Medicine, Elisabethinen Hospital Linz, Linz, Austria, 4) Servicio de Microbiología and CIBER en Epidemiología y Salud Pública (CIBERESP), Hospital Universitario Ramón y Cajal, Instituto Ramón y Cajal de Investigación Sanitaria (IRYCIS), Madrid, Spain, 5) Clinical Microbiology, MTC-Karolinska Institutet, Karolinska University Hospital, Solna, Sweden, 6) East Tallinn Central Hospital Laboratory, Tallinn, Estonia, 7) Department of Medical Microbiology, Southmead Hospital, Bristol, UK, 8) Institut für Medizinische Mikrobiologie der Universität Leipzig, Germany, 9) Hôpital Henri Mondor, Service de Bactériologie, Creteil, France, 10) Division of Infectious Disease Control, Department of Bacteriology and Immunology, Norwegian Institute of Public Health, Oslo, Norway and 11) Clinical Microbiology, Central Hospital, Växjö, Sweden



El Dr Andrés Canut estaba pensando, en Vitoria, como enseñarnos tantos parámetros raros como los que hoy tenemos que manejar

## **P**rocedimientos en Microbiología Clínica

Recomendaciones de la Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica

Editores: Emilia Cercenado y Rafael Cantón

**46.**

**Análisis farmacocinético-farmacodinámico en Microbiología: herramienta para evaluar el tratamiento antimicrobiano**

**2 0 1 3**



# ESPERO QUE OS HAYA GUSTADO

