EUCAST – what is new?

A summary of activities over the past 12 months and of planned activities over the next year.

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EUCAST General Committee
All European Countries + Countries from outside

EUCAST Steering Committee
BSAC, CA-SFM, CRG, NWGA, SRGA
And 3 reps from the General Committee

Subcommittees
Antifungals
Expert-Rules
Anaerobes
Resistance mechanisms

National Breakpoint Committees
F, N, NL, S, UK

Experts (ECDC Networks, ESCMID Study Groups)

Contract 2012 - 14
EUCAST

The European Committee on Antimicrobial Susceptibility Testing

- **ECDC**
  - New contract for the period 2012 – 14

- **EMA**
  - SOP for the determination of breakpoints as part of the process for registration of new compounds.
  - Currently new antibacterial including antimycobacterial agents

- **National breakpoint committees** continue provide expertise for breakpoint setting.

- **ESCMID**
  - Commitment to the development and upkeep of the European disk diffusion test.
  - ESCMID Study Groups and ECDC networks provide expertise in special areas (C. difficile, H. pylori, Legionella, Neisseria, etc)
Summary of activities completed 2011 - 2012

• “Breakpoint table v 2.0” released 1 Jan 2012 (see website).
• “Expert Rules v 2.0” published in CMI (see website).
• “Pk/Pd as used by EUCAST” published in CMI (see website).
• New subcommittee “on detection of resistance mechanisms of clinical and/or epidemiological importance”.
• Several guidance and position documents, SOPs and RDs published.
• EUCAST AFST - breakpoints and RDs for antifungal agents published (Candida and Aspergillus).
• New agents with EMA including telavancin, a betalactam with anti-MRSA activity and anti-mycobacterial agents.
• EUCAST website – several new developments and functions.
• MIC/Zone diameter distribution website moved and secured.
• Validation of zone diameter breakpoints – files available on website.
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. Subcommittees on expert rules for antimicrobial susceptibility testing and antifungal susceptibility testing of anaerobes have completed their tasks and have been disbanded.

Most antimicrobial MIC breakpoints in Europe have been harmonised by EUCAST. Breakpoints for new agents are set as part of the licensing process for new agents through EMA. EUCAST breakpoints are available in devices for automated susceptibility testing but with some limitations, depending on the system. A disk diffusion susceptibility test method calibrated to EUCAST MIC breakpoints is also available.

EUCAST invites anyone with an interest in antimicrobial agents in general and antimicrobial breakpoints in particular to contact EUCAST, ESCMID or one of the National Breakpoint Committees.

Chairman:
Development and validation of EUCAST Disk Diffusion breakpoints

The EUCAST Disk Diffusion test was developed by EUCAST during 2009 - 2011 under the auspices of ESCMID and with the help of many laboratories. The help of these laboratories is gratefully acknowledged.

For each of the species listed below projects are either ongoing or have been concluded. The material for each of these is now being summarized and will be made available during the second half of 2011 (Example 1). All MIC and zone diameter data are entered in the EUCAST MIC- and Zone diameter distribution program (Example 2).

- Enterobacteriaceae
- Pseudomonas aeruginosa
- Salmonella spp.
- Acinetobacter spp.
- Staphylococcus aureus (updated 2011-12-12)
- Staphylococcus, coagulase-negative
- Streptococcus pyogenes (group A)
- Streptococcus pneumoniae
- Enterococcus spp.
- Viridans Group Streptococci
- Haemophilus influenzae - general breakpoints
- Haemophilus influenzae - screening for betalactam resistance
- Moraxella catarrhalis (update 2011-12-12)
- Pasteurella multocida
- Listeria monocytogenes
- Corynebacterium spp.
- Campylobacter spp.
Tetracycline 30 μg vs. MIC
S. aureus, 172 clinical isolates

Breakpoints
- **MIC**: S≤1, R>2 mg/L
- **Zone diameter**: S≥22, R<19 mm

**ECOFF**
- WT≤1 mg/L

**MIC** (mg/L)
- >8
- 8
- 4
- 2
- 1
- 0.5
- 0.25
- 0.12
Stenotrophomonas maltophilia

The organism
Stenotrophomonas maltophilia is a ubiquitous environmental organism. In patients it is most often associated with colonization, but is an occasional cause of infection, particularly in immunocompromised patients and patients with cystic fibrosis.

Antimicrobial resistance
Intrinsic antimicrobial resistance of this organism is a major problem, particularly to aminoglycosides and carbapenems. Multiple efflux pumps and modifications to outer membrane proteins confer variable resistance to a wide range of agents. Chromosomal genes for beta-lactamases affect all beta-lactams including carbapenems. Aminoglycoside acetyl transferase and SmQnr genes (confering reduced susceptibility to fluoroquinolones) are almost always present (3). In addition, acquired genes may be present conferring resistance to a wide range of agents, including trimethoprim-sulfamethoxazole (cotrimoxazole) (17). Moreover, the formation of biofilms reduces antimicrobial effectiveness.
Why do EUCAST have no systemic breakpoints for Enterobacteriaceae with oral cephalosporins?

There have been multiple questions from clinicians, particularly those working in orthopaedics, who have “successfully used oral cephalosporins for prophylaxis and to treat Enterobacteriaceae infections for many years”. They ask what has changed and why these agents are now considered inappropriate.

In EUCAST rationale documents it is stated that Enterobacteriaceae are inappropriate targets in sites other than uncomplicated urinary tract infection, but there is no further explanation. In early EUCAST discussions oral cephalosporins were originally considered inappropriate for treatment of infections in other sites than the urinary tract infection for several reasons:

1. Comparison of free drug pharmacokinetics with MICs alone indicates that inadequate concentrations are achieved for most agents and are borderline at best (see table).

2. The relevant pharmacodynamic relationship indicative of activity of cephalosporins is $T>MIC$ and the target $%T>MIC$ is 40-50%. Approximate calculations based on common dosages indicate that activity is inadequate for all agents (see table). It should be emphasized that the figures in the table are based on pharmacokinetic parameter values for the mean of the population. Monte Carlo simulations would show that the $%T>MIC$ values are even less than those in the table for half the population treated.
Direct antimicrobial susceptibility testing

In direct antimicrobial susceptibility testing the specimen (commonly urines) is used as the source of the inoculum. Tests where positive blood cultures are used as the source of the inoculum are also included as direct tests, although they do not use the specimen directly.

The advantage of direct testing is that results may be available earlier than when the organism is isolated in pure culture before testing and this may have direct patient benefit in terms of early appropriate chemotherapy. There may be additional benefits from the ability to narrow the spectrum of therapy at an early stage.

The main disadvantage is that the inoculum cannot be effectively controlled. Also there may be mixed cultures and there may be pH variations or substances in the specimens that affect results (e.g. antimicrobial agents in urine, antimicrobial absorption materials in blood cultures). These problems may result in less reliable results than with pure cultures. EUCAST does not recommend primary susceptibility testing and any laboratory using this approach must take responsibility for ensuring that results are reliable. The following should be noted:

1. There are currently no validated methods for processing specimens to ensure that the correct inoculum is achieved.
2. Tests should be repeated on pure cultures as needed and the correlation of direct and secondary tests should be monitored so that the reliability of direct tests can be assessed.
3. In disk diffusion tests, if the inoculum is visibly light, do not report susceptible results as zone diameters may be increased leading to resistant isolates appearing susceptible.
EUCAST breakpoint decisions 2011/12

- *Moraxella catarrhalis* breakpoints for all relevant agents.
- *C. difficile* breakpoints for metronidazole (2/2 mg/L) and vancomycin (2/2 mg/L).
- *H. pylori* breakpoints (based on ECOFFs) for several agents.
- *L. monocytogenes* breakpoints removed for several agents.
- Fosfomycin breakpoints removed from Pseudomonas.
- Nitrofurantoin breakpoints removed from *E. fecium*.
- Vancomycin breakpoints for Coag neg staphs increased from 2/2 to 4/4 mg/L.
- Trimethoprim breakpoints 2/2 mg/L included for *S. agalactiae* in UTI.
- Amoxicillin & amox/clav breakpoints in *H. influenzae increased* to 2/2 mg/L.
- Chloramphenicol breakpoint in *H. influenzae increased* to 2/2 mg/L.
- Rifampicin breakpoint in *H. influenzae increased* to 1/1 mg/L.
- Ceftibuten – removed ”uncomplicated” in the caveat ”uncomplicated UTI”.
- Replace ”IE” with ”dash” for ceftibuten for *S. pneumoniae*.
- *Stenotrophomonas maltophilia* – guidance document.
Fosfomycin MICs for *P. aeruginosa* high, clinical efficacy data doubtful and breakpoints divide wild type distribution

**Decision:** fosfomycin breakpoints for *Ps. aeruginosa* removed
Enterococci and nitrofurantoin: MICs for *E. fecium* high, clinical efficacy data doubtful and distribution divided by current breakpoint.

Decision: nitrofurantoin breakpoints are only valid for *E. faecalis*
Decision: To increase the vancomycin breakpoint for coagulase negative staphylococci from 2/2 to 4/4 mg/L.

...to avoid categorising CoNS resistant to vancomycin due to breakpoint cutting into wild type distribution.
EUCAST had not determined breakpoints for *S. agalactiae* and trimethoprim.

Decision: to set breakpoints 2/2 mg/L for trimethoprim and *S. agalactiae*.
...and a corresponding zone diameter breakpoint (IP).
Proposal 5: Replace the “IE” designation with “—” for ceftibuten with *S. pneumoniae*

The use of "IE" suggests that there is a reasonable possibility that ceftibuten might be useful for treating pneumococcal infection. However, ceftibuten MICs for *S. pneumoniae* for the wild type are 1-16 mg/L.

The current EUCAST MIC distribution for *S. pneumoniae* is as follows:

<table>
<thead>
<tr>
<th>Agent</th>
<th>MIC (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.015</td>
</tr>
<tr>
<td>Ceftibuten</td>
<td>0</td>
</tr>
</tbody>
</table>

It is unlikely that with wild type MICs up to 16 mg/L there will ever be clinical data supporting the use of ceftibuten.

It is proposed that for *S. pneumoniae* the designation “IE” is replaced with “—”.

Decision: For *S. pneumoniae* - replace ”IE” in breakpoint table with ”—” for ceftibuten.
Haemophilus influenzae vs. ampicillin and amoxicillin
“There is no difference in clinical outcome for ampicillin and amoxicillin so the reported susceptibility for a given isolate should be the same”.

Proposal 9: Change breakpoints for amoxicillin and amoxicillin-clavulanate with *Haemophilus influenzae* to S ≤2 mg/L, R >2 mg/L
Ampicillin MICs are generally one dilution lower than amoxicillin but ampicillin is used to report susceptibility to both agents. With current breakpoints (ampicillin, amoxicillin and amoxicillin-clavulanic acid all S ≤1 mg/L, R >1 mg/L) some isolates with no resistance mechanism appear amoxicillin susceptible, ampicillin resistant when tested separately. There is no difference in clinical outcome for ampicillin and amoxicillin so the reported susceptibility should be the same. Currently the listed ECOFFs are 1 mg/L for ampicillin, amoxicillin and amoxicillin-clavulanic acid whereas the median MICs are 0.25, 0.5 and 0.5 mg/L respectively, and the ECOFFs should be 1mg/L, 2mg/L and 2 mg/L respectively.
**Decision:** to increase the clinical breakpoint for amoxicillin and amoxicillin-clavulanic acid from 1/1 to 2/2 mg/L to ensure a match between ampicillin and amoxicillin susceptibility categorisation.
Proposal 10: Change breakpoints for chloramphenicol with *Haemophilus influenzae* to \( S \leq 2 \text{ mg/L}, R > 2 \text{ mg/L} \)

The current breakpoints are \( S \leq 1 \text{ mg/L}, R > 2 \text{ mg/L} \). The intention of the susceptible breakpoint was to distinguish the wild type whereas the resistant breakpoint was set to distinguish chloramphenicol acetyl transferase-producers from isolates that do not produce the enzyme. The current EUCAST MIC distribution with additional data shows that 1 mg/L cuts the shoulder of the wild type and that the ECOFF should be 2 mg/L.

The current EUCAST MIC distribution for *H. influenzae* is as follows:

<table>
<thead>
<tr>
<th>Agent</th>
<th>MIC (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.015</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>0</td>
</tr>
</tbody>
</table>

Decision: to change breakpoints from 1/2 mg/L to 2/2 mg/L to avoid dividing the wild type distribution.
EUCAST projects in the near future

- Breakpoints, with EMA, for several new agents.
- Breakpoints and methods for several organisms and agents (see next slide).
- Review colistin breakpoints when new data come in (possibly together with CLSI).
- Continue facilitating implementation of breakpoints and methods in Europe through country visits, workshops and lectures.
- Organise meeting(s) with NACs.
- Expert advisory committee to ECDC and EMA and EFSA.
- Publish a EUCAST position paper on wild type MIC distributions and the use of ECOFFs.
- Publish remaining RDs (currently 45 published).
- New subcommittee on the detection of antimicrobial resistance mechanisms of clinical and/or epidemiological (public health) importance.
- Continue development and upkeep of the disk diffusion method.
Miscellaneous organisms
Breakpoints and/or Methods

• Neisseria meningitidis (review of brpts) - 2012
• Campylobacter (B/M) - 2012
• Pasteurella multocida (B/M) - 2012
• Corynebacteria (B/M) - 2012
• Yersinia (B/M) - 2012
• Pseudomonas non-aeruginosa (B/M) - 2012
• FQ resistance in Salmonellae (screen test) (M) - 2012
• Betalactam resistance in viridans group strepts (screen-M) - 2012
• Breakpoints for topicals based on ECOFFs (B) - 2012

• Burkholderia cepacia (B/M) - 2013
• Legionella (B/M) - 2013
• Neisseria gonorrhoeae (M) - 2013
• Actinomyces, Nocardia (B/M) - 2013
• Anaerobe bacteria (M) - 2013/4
A summary of the Questionnaire will be presented
Compliance of manufacturers
see www.eucast.org for comprehensive review

• Almost all manufacturers of disks can now provide all "EUCAST strength disks":
  – Abtek
  – BD
  – Bio-Rad
  – I2A
  – Liofilchem
  – Mast group
  – Thermo Fisher Scientific (Oxoid)
  – Rosco (tablets)

Each manufacturer is responsible for the quality of their products used for AST.

EUCAST will not be able to provide comprehensive QC on all disks from all manufacturers but will on the EUCAST website, on initiative from EUCAST, users or manufacturers, provide important information on products used for AST.
Compliance of manufacturers
see www.eucast.org for comprehensive review

• Manufacturers with commercial MH-F plates:
  – Thermo Fisher Scientific (Oxoid)
  – bioMérieux
  – Bio-Rad
  – Liofilchem

• Manufacturers not yet ready to supply MH-F plates:
  – BD

Each manufacturer is responsible for the quality of their products used for AST.

EUCAST will not be able to provide comprehensive QC on all disks from all manufacturers but will on the EUCAST website, on initiative from EUCAST, users or manufacturers, provide important information on products used for AST.
**3. Automated systems (I)**

<table>
<thead>
<tr>
<th>Phoenix/EpiCenter (BD)</th>
<th>S ≤</th>
<th>R &gt;</th>
<th>-</th>
<th>IE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EUCAST terminology</strong></td>
<td>Yes</td>
<td>No (R ≥)</td>
<td>Yes (converted to R &gt;)</td>
<td>Yes</td>
</tr>
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<td><strong>Computer Report</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes*</td>
<td>Yes*</td>
</tr>
<tr>
<td><strong>EUCAST Expert Rules</strong></td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Organisms with no EUCAST test**
- *H. influenzae*
- *M. catarrhalis*
- *N. gonorrhoeae*
- *N. meningitidis*
- Gram-positive anaerobes
- Gram-negative anaerobes

**Antibiotics with no EUCAST test**
- **Breakpoints Not Available**
  - Rifampicin (Staphylococci)
  - Trimethoprim (Enterococci)
  - Cotrimoxazole (Enterococci)
- **Antibiotics Not Available**
  - None

* Only MIC values are reported for drugs with no EUCAST breakpoints.
### Automated systems (II)

**Microscan (Siemens Healthcare Diagnostics)**

<table>
<thead>
<tr>
<th>EUCAST terminology</th>
<th>S ≤</th>
<th>R &gt;</th>
<th>-</th>
<th>IE</th>
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</thead>
<tbody>
<tr>
<td>Computer Report</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Most &quot;-&quot; do not have interpretations reported</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EUCAST Expert Rules**

- Yes

**Organisms with no EUCAST test**

- Streptococcus A, C and G
- *S. pneumoniae*
- *S. viridans* (test available only for *S. bovis*)
- *H. influenzae*
- *M. catarrhalis*
- *N. gonorrhoeae*
- *N. meningitidis*
- Gram-positive anaerobes
- Gram-negative anaerobes

**Antibiotics with no EUCAST test**

<table>
<thead>
<tr>
<th>Breakpoints Not Available</th>
<th>Antibiotics Not Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimethoprim</td>
<td>Tigecycline/Gram-positive organisms</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>Roxithromycin</td>
</tr>
<tr>
<td>Fusidic acid</td>
<td>Telithromycin</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>Doxycycline</td>
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### ATB Expression mini API (bioMérieux)

<table>
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<tr>
<th>EUCAST terminology</th>
<th>$S \leq$</th>
<th>$R &gt;$</th>
<th>-</th>
<th>IE</th>
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<tr>
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<td>Yes</td>
<td>No*</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>No*</td>
<td>No</td>
</tr>
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</table>

| EUCAST Expert Rules         | Yes      |       |         |       |

| Organisms with no EUCAST test | $N. gonorrhoeae$ | $N. meningitidis$ |

<table>
<thead>
<tr>
<th>Antibiotics with no EUCAST test</th>
<th>Breakpoints Not Available</th>
<th>Antibiotics Not Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefotaxime ($M. catarrhalis$)</td>
<td>Ampicillin-sulbactam</td>
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</tr>
<tr>
<td>Cefuroxime axetil</td>
<td>Cefadroxil</td>
<td></td>
</tr>
<tr>
<td>Metronidazole ($C. difficile$)</td>
<td>Cefalexin</td>
<td></td>
</tr>
<tr>
<td>Rifampicin</td>
<td>Cefpodoxime</td>
<td></td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>Ceftibuten</td>
<td></td>
</tr>
<tr>
<td>Trimethoprim-sulfa (Enterococi)</td>
<td>Doripenem</td>
<td></td>
</tr>
<tr>
<td>Vancomycin</td>
<td>Ertapenem</td>
<td></td>
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<tr>
<td></td>
<td>Aztreonam</td>
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</tr>
<tr>
<td></td>
<td>Netilmicin</td>
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</tr>
<tr>
<td></td>
<td>Tigecycline</td>
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<tr>
<td></td>
<td>Trimethoprim</td>
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<tr>
<td></td>
<td>Azithromycin</td>
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<tr>
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<td>Clarithromycin</td>
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<tr>
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<td>Roxithromycin</td>
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<td>Doxycycline</td>
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<td></td>
<td>Daptomycin</td>
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<td></td>
<td>Cefaclor</td>
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<tr>
<td></td>
<td>Cefazolin</td>
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</table>
### Automated systems (IV)

#### Vitek 2 (bioMérieux)

<table>
<thead>
<tr>
<th>EUCAST terminology</th>
<th>S ≤</th>
<th>R &gt;</th>
<th>-</th>
<th>IE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computer Report</strong></td>
<td>Yes</td>
<td>No</td>
<td>No*</td>
<td>No**</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>No* * not reported or reported R</td>
<td>No** ** not reported</td>
</tr>
</tbody>
</table>

**EUCAST Expert Rules**

- Yes

**Organisms with no EUCAST test**

- *H. influenzae*
- *N. gonorrhoeae*
- Gram-positive anaerobes
- *M. catarrhalis*
- *N. meningitidis*
- Gram-negative anaerobes

**Antibiotics with no EUCAST test**

<table>
<thead>
<tr>
<th>Breakpoints Not Available</th>
<th>Antibiotics Not Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin-sulbactam</td>
<td>Cefadroxil</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>Cefituben</td>
</tr>
<tr>
<td>Netilmicin (Staphylococci)</td>
<td>Azithromycin</td>
</tr>
<tr>
<td>Trimethoprim (Enterococci)</td>
<td>Roxithromycin</td>
</tr>
<tr>
<td>Trimethoprim-sulfa (Enterococci)</td>
<td>Ampicillin (Pneumococci)</td>
</tr>
<tr>
<td>Gentamicin (Enterococci)</td>
<td>Cefepime (Pneumococci)</td>
</tr>
<tr>
<td>Ofloxacin (Pneumococci)</td>
<td>Cefpodoxime (Pneumococci)</td>
</tr>
<tr>
<td></td>
<td>Cefuroxime (Pneumococci)</td>
</tr>
<tr>
<td></td>
<td>Teicoplanin (Pneumococci)</td>
</tr>
<tr>
<td></td>
<td>Doxycycline (Pneumococci)</td>
</tr>
<tr>
<td></td>
<td>Minocycline (Pneumococci)</td>
</tr>
</tbody>
</table>
The last slides are just to remind all about the terminology used in EUCAST breakpoint tables.
Terminology in EUCAST tables

- dash

Susceptibility testing not recommended – do not report or report “R” without testing.
Intrinsic resistance (or intrinsic insufficient activity).
Terminology in EUCAST tables

IE
(insufficient evidence)

The susceptibility category (S, I or R) of organisms without resistance mechanisms cannot be determined.

Do not report or report “IE with an MIC” - categorical interpretation not possible.
Links in EUCAST breakpoint table

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MIC Breakpoint</th>
<th>Disk Content</th>
<th>Zone Diameter</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>S ≤ 0.25 R &gt; 1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Meropenem</td>
<td>2 8 10 22 16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monobactams</td>
<td>S ≤ R &gt; 1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Aztreonam</td>
<td>1 0 30 25 21</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>S ≤ R &gt; 1</td>
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<td></td>
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<tr>
<td>Ciprofloxacin</td>
<td>0.5 1 2</td>
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<tr>
<td>Levofloxacin</td>
<td>1 2</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Moxifloxacin</td>
<td>0.5 1</td>
<td></td>
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</tr>
<tr>
<td>Halidic acid</td>
<td>Note 4</td>
<td></td>
<td>Note 4</td>
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<tr>
<td>Ertapenem</td>
<td>0.5 1</td>
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<tr>
<td>Tobramycin</td>
<td>2</td>
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<td></td>
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</tr>
</tbody>
</table>

Click on antibiotic for Rationale Document

Click on MIC breakpoint for MIC distributions

Click on zone breakpoint for zone diameter distributions
Announcements

- Erika Matuschek, Jenny Åhman, Anna Persson and Stina Bengtsson for always providing fantastic lab.work and superb support.
  Jenny will be tending the EUCAST booth during ECCMID. Erika unfortunately took ill just before ECCMID.

- EUCAST Posters – many today between 15.30 – 16.30
- Meet the Expert Session Sunday 7.45 – 8.45: Q & A on EUCAST