Antimicrobial Resistance in the Baltic Region
Thursday 16 March 14.30 – 16.00

Chair: Barbro Olsson-Liljequist
WG1 members: Paul Naaber (EE), Arta Balode (LV), Edvins Miklasevīds (LV), Jolanta Miciuleviciene (LT)
Peet Tull (ECDC)
Surveillance of antibiotic resistance – why, how, when and by whom?

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ANTIBIOTIC RESISTANCE

- **Problem statement**
  Infectious diseases do not recognize geographical borders. Microbial antibiotic resistance is increasing worldwide and lack of effective treatment has resulted in increased morbidity and mortality of infectious diseases.

- **Overall objective**
  Correct antibiotic policy saves lives and money. Therefore there is a need to make a strategy for the prudent use of antibiotics to ensure that we also in the future will be able to cure infections.

- **Recommendations**
  Every country should develop a national policy programme for the correct use of antibiotics. Important elements of a programme are:
Sigtuna conference 2000 (2)

A. National antibiotic resistance surveillance
   – standardization and quality assurance of laboratory monitoring of antibiotic resistance
   – means for data collection, analysis and report procedures

B. Guidelines for the prudent use of antibiotics in humans and animals
   – availability of essential drugs
   – treatment recommendations for important bacterial diseases

C. Hospital infection control
   – antibiotic and infection control teams consisting of infectious disease specialists, microbiologists and pharmacists at local hospitals
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Antibiotic Susceptibility Testing, AST
What is it?

- Methods for *in vitro* testing of the antibacterial activity of an antibiotic against clinical isolates of bacteria

- Indicate success (S) or failure (R) of antibiotic treatment based on microbiological findings!
AST - How to perform it?

- **Quantitative methods (MIC, mg/L)**
  - Agar dilution
  - Broth dilution
  - Etest

- **Qualitative method (S I R)**
  - Disk diffusion
  - Breakpoint methods

Must always be standardised!
AST - Why performing it?

- Guidance for treatment of the individual patient
- Background information for empirical treatment
- Means of detecting new resistance
  - For epidemiological investigations
  - Accumulated data might lead to changes in empiric treatment

Clinicians should request it!
AST - Who should perform it?

- All clinical microbiology laboratories
  - As an important part in the care of patients
- Microbiological reference/referral laboratories
  - Confirming susceptibility / resistance in clinical isolates using reference and genetic methods
  - Quality assessment and assurance
  - National surveillance of AMR
  - Education

Agreement on a national basis!
Surveillance systems

- **EARSS**: European Antimicrobial Resistance Surveillance System
- **ResNet**: Swedish national surveillance and quality assurance
- **Notifiable diseases** (MRSA, VRE, PRP)
EARSS: invasive isolates of 5 bacterial species from consecutive clinical samples

- **Representative data:** Clinical laboratories serving at least 20% of national population

- **Bias:** When comparing data between countries some bias may be present. Bias can be due to differences in case mix and hospital specialities or may be introduced as a result of different routines between countries
Proportion of bacterial species among invasive isolates reported to EARSS 2004

- Finland (n=3475)
- Sweden (n=7088)
- Croatia (n=1144)
- Norway (n=1940)
- Estonia (n=373)
- Poland (n=509)

Legend:
- E.coli
- S.aureus
- S.pneum
- Enterococci
E. coli with ESBL in Europe 2004

Proportion of 3rd gen. ceph. resistant E. coli isolates in participating countries in 2004

(c) BARSS

Legend:
- No Data
- < 1%
- 1 - 5%
- 5 - 10%
- 10 - 25%
- 25 - 50%
- > 50%
E. coli with ESBL in blood and urine samples, Sweden 2004

**Blood (EARSS):** E. coli from 21 labs, n = 3372
- Cefotaxime-R, n = 33 (1.0%)
- 16 ESBL; 15 CTX-M-type, 1 SHV-type (0.5%)

**Urine (ResNet):** E. coli from 29 labs, n = 3135
- Cephalosporin-R, n = 33 (1.1%)
- only 3 ESBL, all CTX-M-type (0.1%)
### Andel resistenta - Sverige

<table>
<thead>
<tr>
<th>Län</th>
<th>Andel resistenta</th>
<th>Län</th>
<th>Andel resistenta</th>
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**Sverige: 1.1**

Art: Escherichia coli

Antibiotikum: Coladroxol

År: 2004

Visa: 1 antal år framåt
E. coli in urine samples 2004 (ResNet)
## Percentage resistant - Sweden

<table>
<thead>
<tr>
<th>County</th>
<th>Percentage resistant</th>
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<td><strong>Sweden</strong></td>
<td><strong>13.8</strong></td>
<td>Västerbotten</td>
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### 2003, Streptococcus pyogenes / Tetracyclin

**Sverige - Kronoberg**

ResNet – övervakning av antibiotikaresistens i Sverige

<table>
<thead>
<tr>
<th>Species</th>
<th>Streptococcus pyogenes</th>
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<td>Antibiotic</td>
<td>Tetracyclin</td>
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<td>Year</td>
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</table>

Data kollektion: 100-stams – Zone distribution

Metod: Lapddiffusion - Oxoid-material (RAF)

258 observationer

5 ± 25 mm R ≤ 21 mm
EUCAST – wildtype distributions of MICs
(www.srga.org/eucastwt/WT_EUCAST.htm)

Ciprofloxacin / Acinetobacter spp
Antimicrobial wild type distributions of microorganisms – reference database
EUCAST

MIC
Epidemiological cut-off: WT ≤ 1 mg/L

Clinical breakpoints: S ≤ 1 mg/L, R > 1 mg/L

2253 observations (7 data sources)
# Antibiotics to test on invasive isolates (Swe)

<table>
<thead>
<tr>
<th></th>
<th>Gram-neg</th>
<th>Pseudomonas</th>
<th>Staph</th>
<th>Enterococci</th>
<th>Strept / Spn</th>
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<tr>
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<td>Oxa/Cfx</td>
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<td>Pen (oxa)</td>
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<td>Ceph iv</td>
<td>Ctx, Caz</td>
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<td>Carbapenem</td>
<td>Imi, Mer</td>
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<td>Aminoglyco</td>
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<td></td>
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<td>Ery, Cli, Tet</td>
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</table>
Conclusions about Surveillance of Antibiotic Resistance

- The tools are there: methods for routine susceptibility testing, databases, laboratory information systems (Whonet)
- More frequent sampling would provide more comprehensive data for empiric treatment (feedback from laboratories)
- More frequent sampling would provide more reliable data for comparison between laboratories / countries