

Rapid ID and AST in septicemia.

Gunnar Kahlmeter

Clinical microbiology

Centrsal Hospital

Växjö

Sweden

Gunnar.kahlmeter@kronoberg.org

RAPID management of Blood Cultures (BC).

- Generous indications for BC.
- Immediate BC on triaging.
- Delegate to first line nurse to order BC; avoid doctor's delay.
- BC prior to IV antibiotics.

- Immediate transport of BC bottles to incubator 24/7.
- Incubator available for loading 24/7.
- Immediate species ID (<60 min from signal) - Masspec; genotypic methods; microscopy
- Immediate setting up of AST (within 60 min)

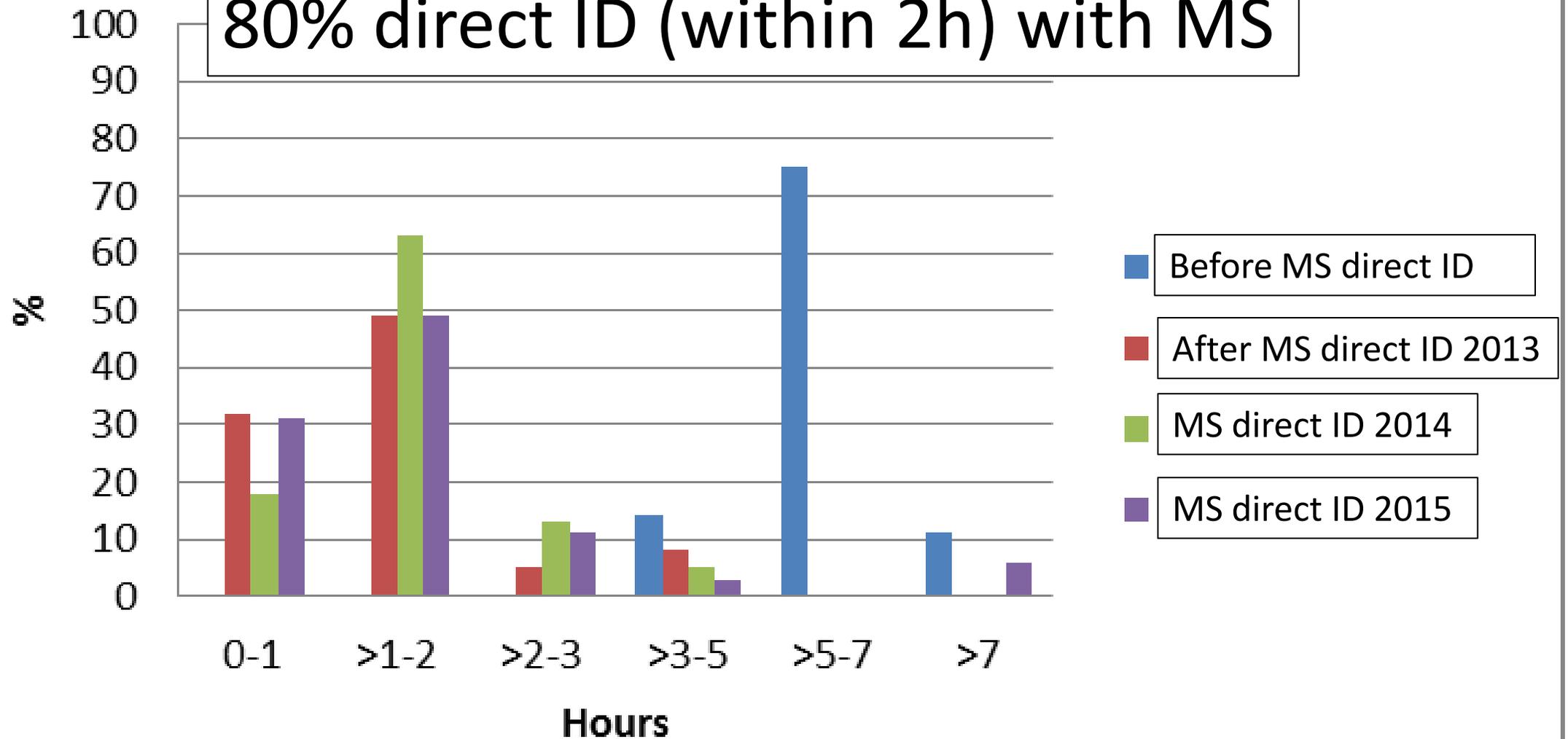
Solve the boring logistics!

Rapid direct ID

- **Rapid ID**
 - Masspec – a variety of protocols
 - Directly from the BC (via a centrifugation step and a simple protocol)
 - Short plate incubation (harvesting at 2-4h)
 - Semiautomated devices (Vitek2, Phoenix) 6 – 8h
 - Microscopy (Grampositive, Gramnegative)

Time to species ID

80% direct ID (within 2h) with MS



Kronoberg and Blekinge data

Rapid AST

- **Rapid AST (1h, 2h, 4h, 8h directly from positive BC bottles)**
 - Direct phenotypic AST with reading after 16 – 20 h.
 - Short time culture on solid medium subculture followed by
 - regular AST 16 – 20 h (disk, gradient test).
 - shortened AST 6 – 12 h with a regular method (Semiautomated device, disk diffusion, etc)
 - A variety of alternative methods (MS, FC, Colorometric/immuno-chromatographic methods, time lapse microscopy) directed at one or twospecies and antibiotics only.
 - Accelerate, Astrego, Qlinea, Quantamatrix, ... 1h – 8h. Proof of concept studies on few species/agents.
- **Rapid AST directly from blood**
 - ?

Why is EUCAST involved?

- **Direct phenotypic AST from positive blood culture bottles with shortened incubation time will need**
 - either validation of existing breakpoints (if possible)
 - or alternative breakpoints adapted to short time incubation
 - different breakpoints for 4h, 6h and 8h incubation may be required.

EUCAST was tasked with speeding up phenotypic AST...

- developing a method based on standard methodology and equipment and material and...
 - available to all microbiological laboratories.
 - valid for the most important septicemia pathogens
 - for agents commonly used in septicemia
 - with as few complicated steps as possible
 - where breakpoints were calibrated to each of the short reading times
 - available on the EUCAST website.

Later 2018, Rapid AST will be available on website!

20 October 2017

Organization

EUCAST News

Clinical breakpoints

 Rapid AST in blood cultures

Expert rules and intrinsic resistance

Resistance mechanisms

Guidance documents

Consultations

MIC and zone distributions and ECOFFs

AST of bacteria

AST of mycobacteria

AST of fungi

The European Committee on Antimicrobial Susceptibility Testing - EUCAST

EUCAST is a standing committee jointly organized by ESCMID, ECDC and European national breakpoint committees. EUCAST was formed in 1997. It has been chaired by Ian Phillips (1997 - 2001), Gunnar Kahlmeter (2001 - 2012), Rafael Canton 2012 - 2016) and Christian Giske (2016 -). Its scientific secretary is Derek Brown (1997 - 2016) and John Turnidge (2016 -). Its webmaster is Gunnar Kahlmeter (2001 -). From 2016, Rafael Canton is the Clinical Data Co-ordinator and Gunnar Kahlmeter the Technical Data Co-ordinator.

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.

Organization

EUCAST News

Clinical breakpoints

Rapid AST in blood cultures

Methods

Breakpoints for short incubation

Expert rules and intrinsic resistance

Resistance mechanisms

Guidance documents

Consultations

MIC and zone distributions and ECOFFs

Rapid disk diffusion, directly from positive blood culture bottles

EUCAST has validated a method for direct plating of disk diffusion MH agar plates for reading after 4, 6 and 8 hour of incubation. The inoculum should be taken "warm" from the positive blood culture bottle (bottles from BD (Bactec), bioMerieux (Bact Alert) and Thermofisher (iXXXX) have been validated) 0 - 14 hours after a positive signal. The inoculum (X microliter) should be plated directly without prior centrifugation. Disks are immediately distributed (maximum 4 to a 90 mm plate) and the plate incubated at 35 C.

Plates are read after 4h, 6 h and 8h. Incubation can not be prolonged - the method is only validated for short incubation time.

Following the reading of zone diameters, go to the appropriate table - these are specific to species and reading time.

Results which in the area of technical uncertainty (the ATU) should not be reported to the clinician. The ATUs have been defined to minimize false susceptibility (VME).



Rapid AST in bloodcultures

Organization

EUCAST News

Clinical breakpoints

Rapid AST in blood cultures

Methods

Breakpoints for short incubation

E. coli

Expert rules and intrinsic resistance

Resistance mechanisms

Guidance documents

Consultations

MIC and zone distributions and ECOFFs

AST of bacteria

AST of mycobacteria

AST of fungi

AST of veterinary pathogens

Escherichia coli

**Breakpoints not for use.
Page not yet activated.**

Escherichia coli

Antimicrobial agent and disk content	4h incubation		
	S≥	ATU*	R<
Piperacillin-tazobactam 30-6 µg	-	≥12	12
Cefotaxime 5 µg	15	13-14	13
Ceftazidime 10 µg	15	12-14	12
Meropenem 10 µg	17	12-16	12
Ciprofloxacin 5 µg	16	13-15	13
Gentamicin 10 µg	14	12-13	12
Tobramycin 10 µg	14	12-13	12
Amikacin 30 µg	15	13-14	13

Expected number of readable zones: 91%

Direct MIC with short incubation?

- Do not trust gradient tests without validation and QC
- Short incubation MICs will be different from full incubation MICs for many species/agent combinations – you can not automatically trust clinical 16 – 20 h breakpoints