



**Karolinska
Institutet**

NordicASTs VRE-studie – slutsatser

Christian G. Giske, MD, PhD

Docent/Överläkare

Klinisk mikrobiologi

Karolinska Universitetssjukhuset, Solna

NordicAST Göteborg 28 maj 2014

Den första officiella NordicAST publikationen



Performance of the EUCAST Disk Diffusion Method, the CLSI Agar Screen Method, and the Vitek 2 Automated Antimicrobial Susceptibility Testing System for Detection of Clinical Isolates of Enterococci with Low- and Medium-Level VanB-Type Vancomycin Resistance: a Multicenter Study

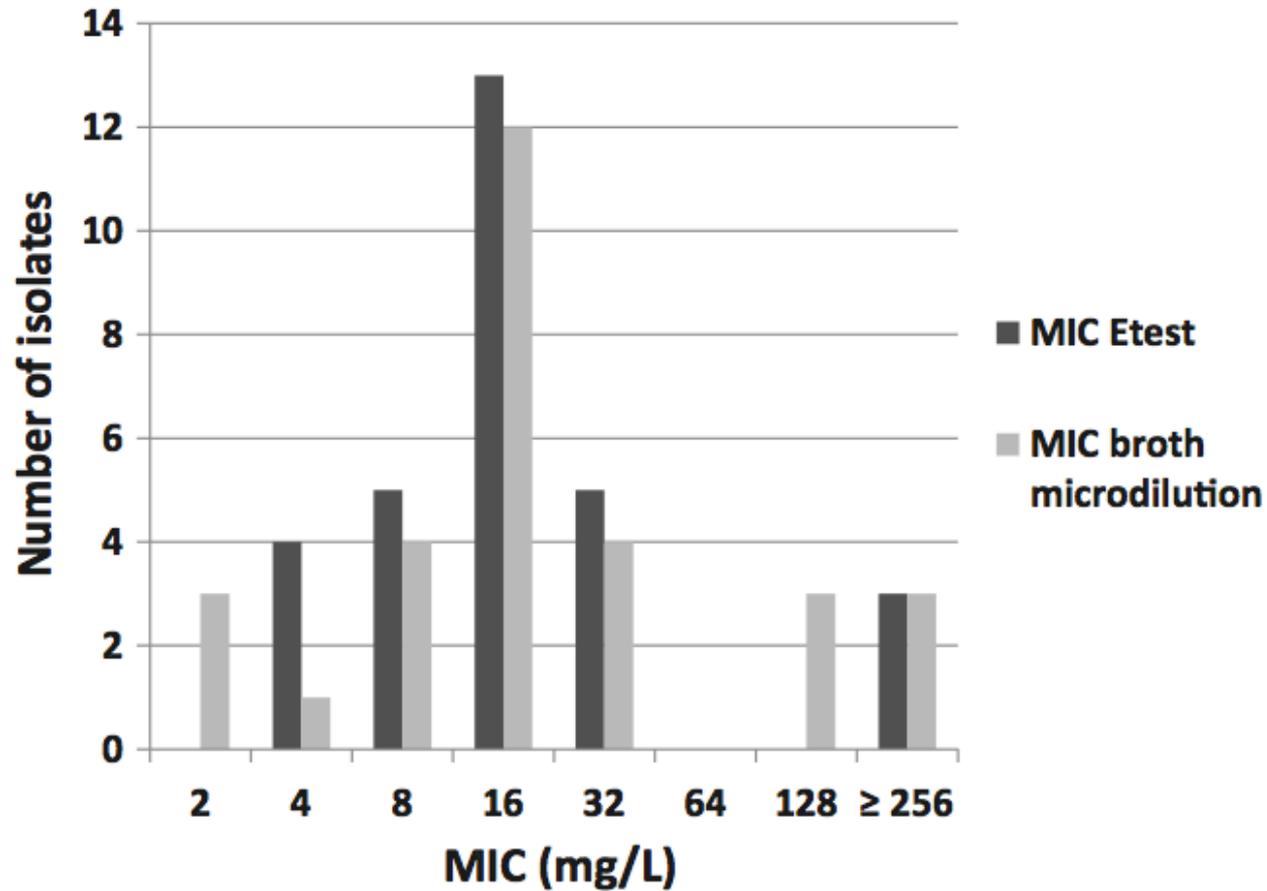
Kristin Hegstad,^{a,b} Christian G. Giske,^c Bjørg Haldorsen,^a Erika Matuschek,^d Kristian Schønning,^e Truls M. Leegaard,^f Gunnar Kahlmeter,^d Arnfinn Sundsfjord,^{a,b} on behalf of the NordicAST VRE Detection Study Group

Reference Centre for Detection of Antimicrobial Resistance, Department of Microbiology and Infection Control, University Hospital of North Norway, Tromsø, Norway^a; Research Group for Host-Microbe Interactions, Faculty of Health Sciences, University of Tromsø-The Arctic University of Norway, Tromsø, Norway^b; Department of Clinical Microbiology, MTC, Karolinska Institutet, Karolinska University Hospital, Stockholm, Sweden^c; EUCAST Laboratory for Antimicrobial Susceptibility Testing, Växjö, Sweden^d; Department of Clinical Microbiology, Hvidovre Hospital, Hvidovre, Denmark^e; Department of Microbiology, Akershus University Hospital, Oslo, Norway^f

J. Clin. Microbiol. 2014, 52(5):1582.

Isolate no.	Identification	Species	Origin	van subtype	Vancomycin MIC (mg/liter)	
					Etest	BMD ^a
1	K09-03/V1-38	<i>E. faecium</i>	Norway	B2	16	16
2	K25-21	<i>E. faecium</i>	Norway	B2	16	8
3	K26-39	<i>E. faecium</i>	Norway	B2	16	8
4	K30-42	<i>E. faecium</i>	Norway	B2	8	4
5	K33-53	<i>E. faecium</i>	Norway	B2	32	32
6	K46-59	<i>E. faecium</i>	Norway	B2	8	8
7	ATCC 29212	<i>E. faecalis</i>		Negative	4	2
8	ATCC 51299	<i>E. faecalis</i>		B	16	128
9	K53-60	<i>E. faecalis</i>	Norway	B1	8	16
10	K57-77	<i>E. faecium</i>	Norway	B2	16	16
11	K61-59	<i>E. faecium</i>	Norway	B2	8	8
12	K55-34 (VRE0683)	<i>E. faecium</i>	Stockholm, Sweden	B2	8	32
13	K55-41 (VRE0881)	<i>E. faecium</i>	Västerås, Sweden	B2	16	16
14	A2-46 (BM4518)	<i>E. faecalis</i>	Australia	G	16	16
15	K55-41 (VRE0881)	<i>E. faecium</i>	Västerås, Sweden	B2	16	16
16	ATCC 29212	<i>E. faecalis</i>		Negative	4	2
17	ATCC 51299	<i>E. faecalis</i>		B	16	128
18	A2-48 (BM4405)	<i>E. faecalis</i>	USA	E	16	16
19	TUH 12-1 (C68)	<i>E. faecium</i>	USA	B2	≥256	≥256
20	K55-41 (VRE0881)	<i>E. faecium</i>	Västerås, Sweden	B2	16	16
21	K45-3 (03T468)	<i>E. faecium</i>	Örebro, Sweden	B2	≥256	≥256
22	K45-12 (02T895)	<i>E. faecium</i>	Örebro, Sweden	B2	32	16
23	TUH 1-3 (V583)	<i>E. faecalis</i>	USA	B1	32	
24	TUH 1-79	<i>E. faecium</i>	Norway	B2	16	16
25	TUH 2-18	<i>E. faecium</i>	Bergen, Norway	B2	32	
26	TUH 4-65	<i>E. faecium</i>	USA	B1	≥256	≥256
27	TUH 7-13	<i>E. faecalis</i>	USA	B1	32	16
28	ATCC 29212	<i>E. faecalis</i>		Negative	4	2
29	ATCC 51299	<i>E. faecalis</i>		B	16	128
30	50577479KRE	<i>E. faecalis</i>	Norway	B2	4	8

MIC-fördelning av isolaten (n=30)

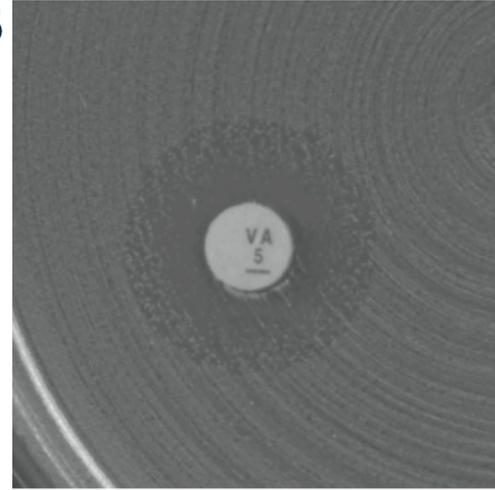


EUCAST lappdiffusion – instruktioner

A



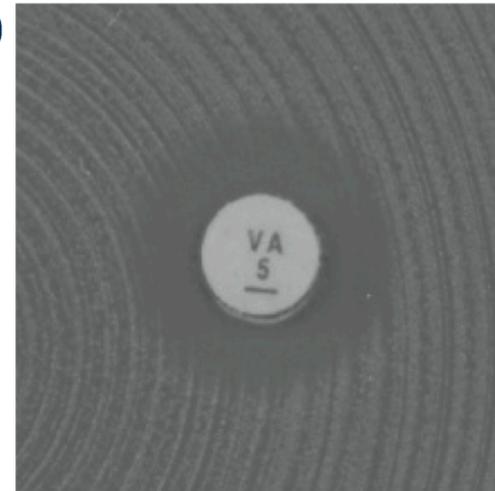
B



C



D



Prestanda av de olika metoderna

TABLE 2 Numbers of very major and major errors, sensitivity, and specificity calculated for each detection method and for each type of agar used (for $n \geq 5$)^a

Method (no. of laboratories)	No. of VMEs/total no. of isolates with <i>van</i> genotype (%)	Sensitivity (95% CI)	No. of MEs/total no. of susceptible isolates (%)	Specificity (95% CI)
EUCAST disk diffusion (28)	53/756 (7.0)	0.93 (0.91–0.95)	2/84 (2.4)	0.98 (0.91–1)
Oxoid MH agar (16)	14/432 (3.2)	0.97 (0.94–0.98)	0/48	1 (0.91–1)
BBL MH II agar (10)	37/270 (14)	0.86 (0.81–0.90)	2/30 (6.7)	0.93 (0.76–0.99)
CLSI agar screen (18)	32/486 (6.6)	0.93 (0.91–0.95)	3/54 (5.6)	0.94 (0.84–0.99)
Difco BHI agar (8)	9/216 (4.2)	0.96 (0.92–0.98)	0/24	1 (0.83–1)
Oxoid BHI agar (5)	15/135 (11)	0.89 (0.82–0.93)	0/15	1 (0.75–1)
Chromogenic agar screen (12)	7/324 (2.2)	0.98 (0.95–0.99)	4/36 (11)	0.89 (0.73–0.96)
chromID VRE agar (7)	3/189 (1.6)	0.98 (0.95–1)	1/21 (4.8)	0.95 (0.74–1)
VRE CHROMagar (5)	4/135 (3.0)	0.97 (0.92–0.99)	3/15 (20)	0.8 (0.51–0.95)
Vitek 2 system (5)	18/135 (13)	0.87 (0.79–0.92)	0/15 (0)	1 (0.75–1)

^a In VMEs, strains were classified as susceptible when containing the *van* genotype. In MEs, strains were classified as resistant when containing no *van* genotype. According to EUCAST rules for the disk diffusion assay with vancomycin, samples were considered resistant, although the zone size suggested susceptibility, if the zone edge was fuzzy or colonies were growing within the zone.

Betydelsen av erfarenhet med metoderna

TABLE 4 Numbers of very major and major errors, sensitivity, and specificity calculated for EUCAST disk diffusion and CLSI agar screen methods, according to the country of the laboratories or their experience in using the detection methods^a

Method	Country and experience (no. of laboratories)	VME rate (% [no. of VMEs/total no. resistant])	Sensitivity (95% CI)	ME rate (% [no. of MEs/total no. susceptible])	Specificity (95% CI)
Disk diffusion	Sweden (10)	1.9 (5/270)	0.98 (0.95–0.99)	0 (0/30)	1 (0.86–1)
	Norway (13)	10 (36/351)	0.90 (0.86–0.93)	2.6 (1/39)	0.97 (0.85–1)
	Denmark (5)	8.9 (12/135)	0.91 (0.85–0.95)	6.7 (1/15)	0.93 (0.66–1)
	Experienced (13)	2.6 (9/351)	0.97 (0.95–0.99)	0 (0/39)	1 (0.89–1)
	Inexperienced (15)	11 (44/405)	0.89 (0.86–0.92)	4.4 (2/45)	0.96 (0.84–0.99)
Agar screen	Sweden (1)	3.7 (1/27)	0.9 (0.79–1)	0 (0/3)	1 (0.31–1)
	Norway (13)	6.8 (24/351)	0.93 (0.90–0.95)	0 (0/39)	1 (0.89–1)
	Denmark (4)	6.5 (7/108)	0.94 (0.87–0.97)	25 (3/12)	0.75 (0.43–0.93)
	Experienced (13)	6.8 (24/351)	0.93 (0.90–0.95)	0 (0/39)	1 (0.89–1)
	Inexperienced (5)	5.9 (8/135)	0.94 (0.88–0.97)	20 (3/15)	0.8 (0.51–0.95)

^a In VMEs, strains were classified as susceptible when containing the *van* genotype. In MEs, strains were classified as resistant when containing no *van* genotype.

Större zondiametrar med BBL MH II

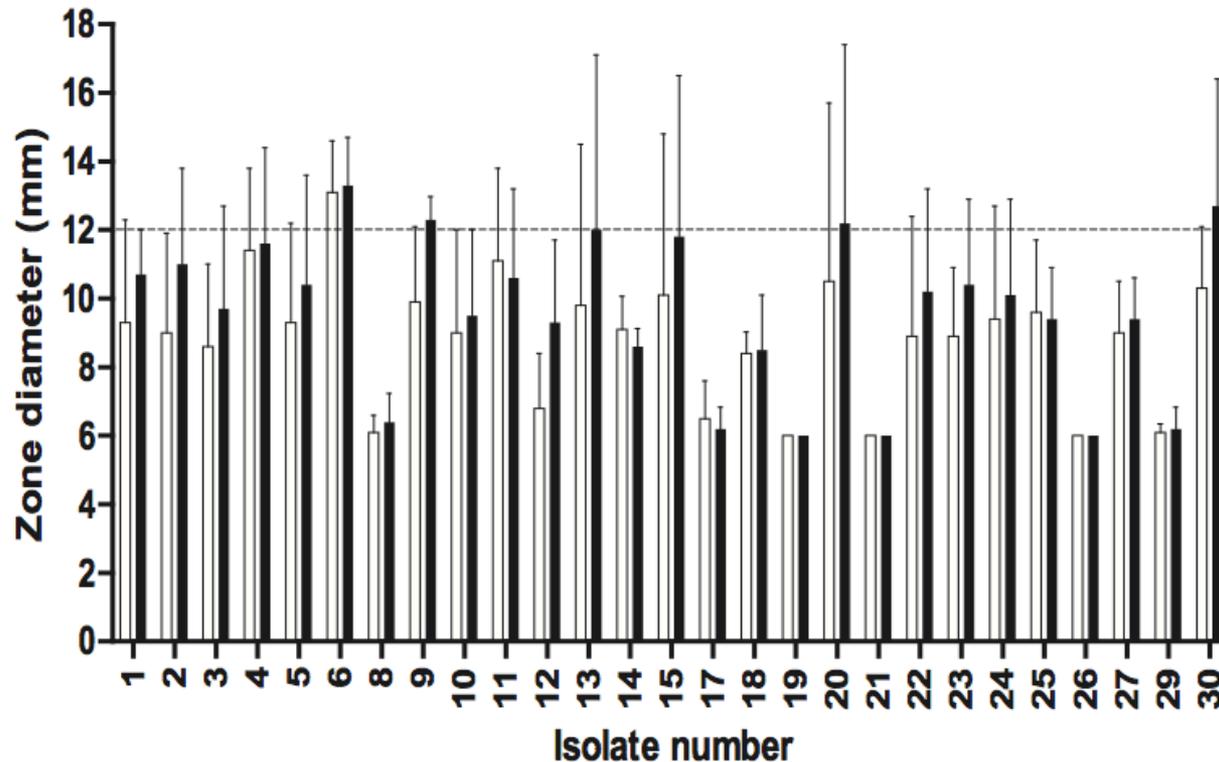


FIG 3 Average zone diameters and standard deviations calculated for each isolate from recorded results from laboratories using either Oxoid MH agar (□) or BBL MH II agar (■).

Slutsatser

- Acceptabla resultat både med diskdiffusion och agarscreen
- Diskdiffusion kräver träning och agarscreen kräver korrekt preparation av screening
- VITEK 2 hade sämre prestanda än diskdiffusion och agarscreen
- AST-P592 (VME 7.4%; sensitivitet 0.93) var bättre än AST-P586 och AST-P594
- Problem med diskdiffusion och agarscreen sågs vid MIC 4-8 mg/L
- Oftare större zoner med BBL MH II agar
- NordicAST nätverket utgör en mycket bra infrastruktur för liknande studier av metoders robusthet

Tack till

- Bettina Aasnæs och Tracy Munthali Lunde
- Laboratorierna i Aalborg, Aarhus, Akershus, Aleris, EUCAST/
Växjö, Karlstad, Førde, Lund, Malmö, Halmstad, Haukeland,
Herlev, Hillerød, Hvidovre, Kalmar, Karolinska Huddinge,
Karolinska Solna, Linköping, Molde, Bodø, Odense,
Rikshospitalet Oslo, Sahlgrenska, Slagelse, Stavanger, St Olav,
Vestfold, Østfold, Sørlandet, Ullevål, Tromsø, Uppsala, Vejle