

Vancomycin MICs compared between MRSA and MSSA in 9 countries

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Background

- Raised vancomycin (VAN) MICs for nominally susceptible *S. aureus* have been linked with poorer clinical outcomes.
- MRSA are highly clonal; EMRSA-15 predominates in the UK.
- Our report of slightly, but significantly and consistently, lower VAN MICs for MRSA than MSSA in the UK and Ireland caused surprise. (ICAAC 2010, C2-1487, BSAC Resistance Surveillance Project)
- We therefore tested the generality of this result using data from eight other countries.

Methods

- The SENTRY, CANWARD and BSAC resistance surveillance programmes contributed data on 33,978 *Staphylococcus aureus* (31,181 from blood) collected between 2001 and 2010.
- MICs were measured by the CLSI broth microdilution or BSAC agar dilution* method. (*BSAC study only, UK/Ireland.)
- Distributions were compared by interval regression of log₂ MIC.

Abbreviations

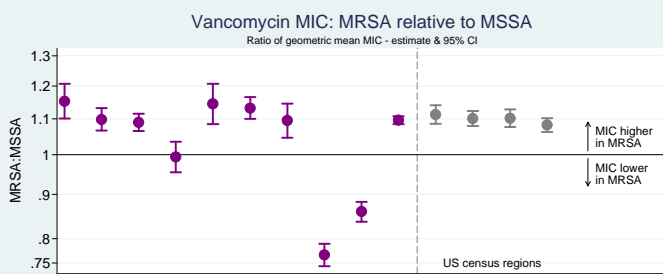
AUS Australia; BRA Brazil; CAN Canada; DEU Germany; ESP Spain; FRA France; ITA Italy; UK/IE UK & Ireland; USA United States. *BSAC method

Results

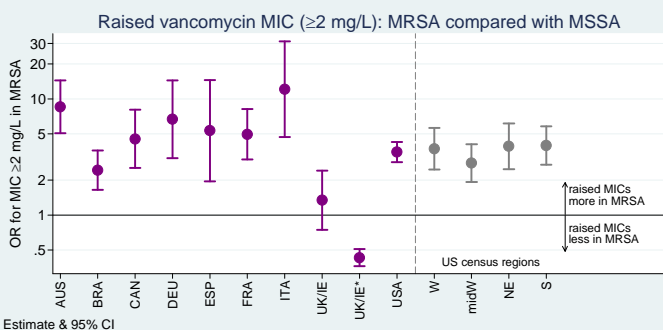
Country	Number of isolates		Geometric mean MIC, mg/L			% with MIC >2mg/L		
	MSSA	MRSA	MSSA	MRSA	P	MSSA	MRSA	P
Australia ^{1A}	739	206	1	1.12	0.002	3	22	<0.001
Brazil ¹	1354	730	0.93	1	<0.001	4	8	<0.001
Canada ²	3518	1110	0.87	0.94	<0.001	1	3	<0.001
France ¹	1797	658	0.89	0.99	<0.001	1	7	<0.001
Germany ¹	1390	273	0.86	0.85	0.88	1	5	<0.001
Italy ¹	556	343	0.87	0.94	0.16	1	10	<0.001
Spain ¹	675	170	0.88	0.98	0.011	1	5	<0.001
UK & Ireland ³	1263	866	0.88	0.66	<0.001	2	3	0.17
UK & Ireland ³	2094	1027	1.32	1.13	<0.001	42	23	<0.001
USA ¹	8086	7123	0.89	0.96	<0.001	2	6	<0.001

¹SENTRY (2001-2010, blood; ^Anot 2005); ²CANWARD (2007-2010, blood & other sources); ³BSAC (2001-2010, blood, BSAC agar dilution).

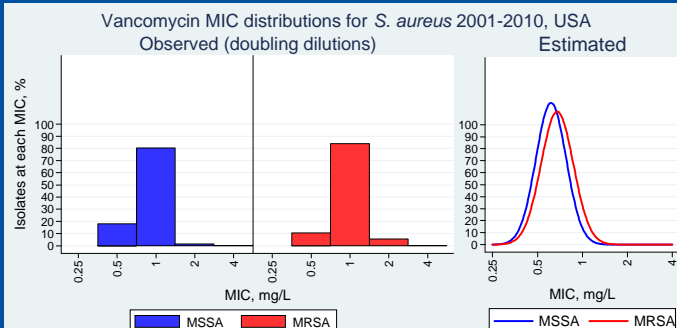
- Geometric mean MICs measured 1.6-fold higher by agar method (BSAC) than by CLSI broth method (SENTRY) in UK/Ireland.



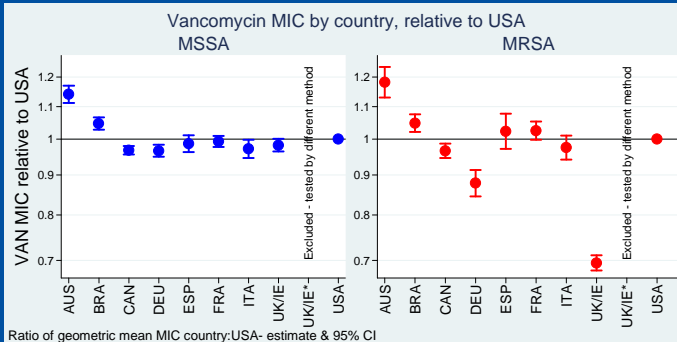
- SENTRY data for the UK & Ireland confirmed the BSAC report of slightly but significantly lower VAN MICs for MRSA.
- No other country showed this pattern: MICs were higher for MRSA than MSSA in 7 of the 8 countries, significantly so in 6.
- The differences in geometric mean MIC were small (up to 1.15-fold, i.e. 0.2 doubling dilutions), but generally consistent across years and, in the US, across census regions.



- Raised but susceptible VAN MICs (2mg/L) were significantly more common in MRSA than MSSA, except in the UK & Ireland.



- Only 16 of 33,978 isolates (0.05%) were nominally non-susceptible to VAN, all with MIC of 4 mg/L.



Ratio of geometric mean MIC country:USA - estimate & 95% CI

- MICs for MSSA varied little between most of these countries.
- MICs for MRSA varied more, with the UK/Ireland a clear outlier.

Conclusions

- Subtle differences in MICs between MRSA and MSSA exist.
- These differences vary between countries, probably reflecting clonal composition of local *S. aureus* populations.
- Their clinical significance remains uncertain.

CANWARD (www.can-r.ca) – assesses antimicrobial resistance in Canadian hospitals, 2007-present.

SENTRY Antimicrobial Surveillance Program (www.jmilabs.com) - worldwide antimicrobial resistance program, active since 1997.

BSAC Resistance Surveillance Project (www.bsacsurv.org) - monitors antimicrobial resistance in the UK and Ireland 1999 - present.

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