Mupirocin resistance in staphylococci from blood in the UK and Ireland 2006-2007

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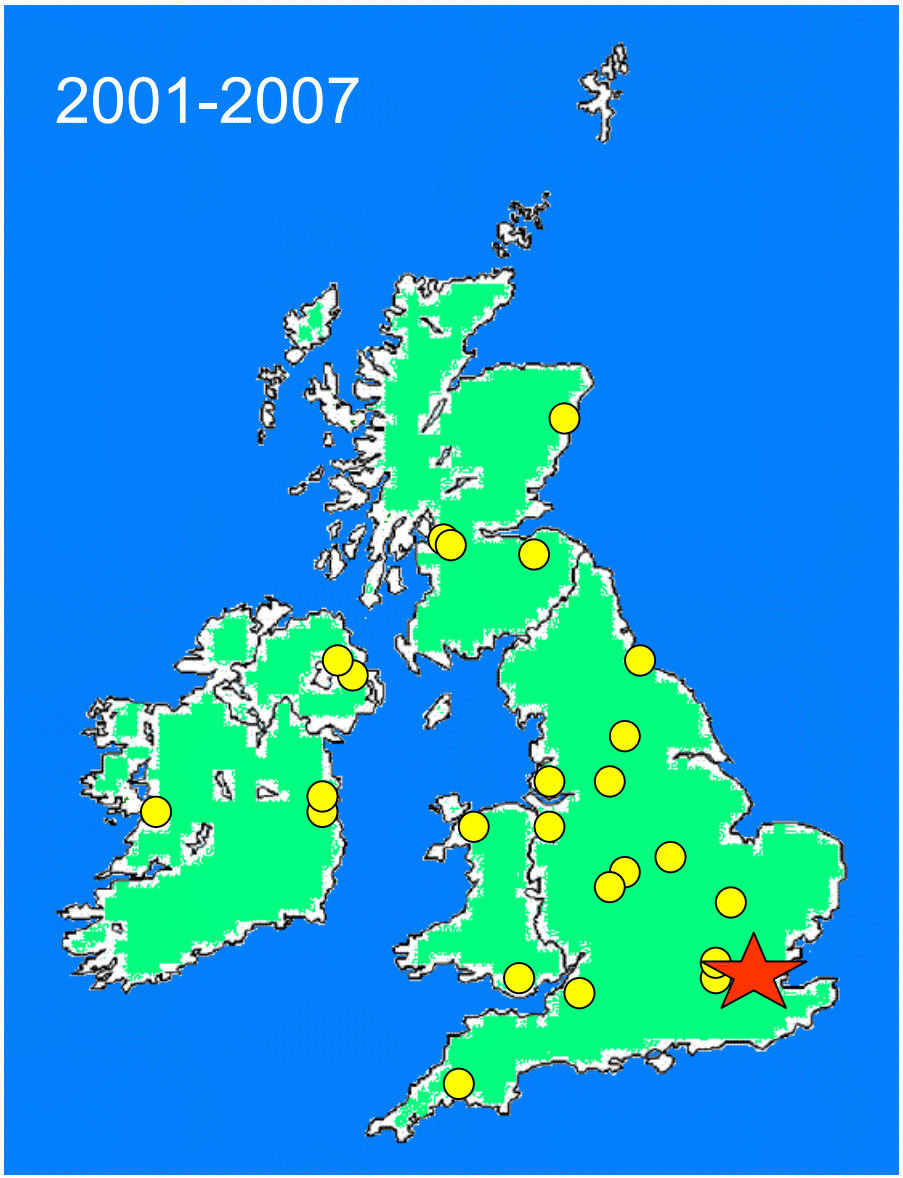
on behalf of
the BSAC Working Party on Resistance Surveillance

O40, 19th ECCMID, Helsinki, 16 - 19 May 2009 **rreynolds@bsac.org.uk**

BSAC Bacteraemia Resistance Surveillance



- 25 laboratories / year (30 in total)
- 10 *S. aureus*, 10 CoNS per laboratory per year
- Central testing - HPA Centre for Infections, London
- BSAC agar dilution MICs
- Multiplex PCR for *mecA*, *mupA*
- Data on website: **www.bsacsurv.org**

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Bacteraemia Resistance Surveillance Programme 2006-2007

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Sponsors

- Astellas
- AstraZeneca
- MSD
- Johnson & Johnson
- Novartis (Chiron)
- Pfizer
- Theravance
- Wyeth

Collecting Laboratories

England - MRSA screening and decolonisation

"From April 2009, all elective admissions must be screened for MRSA in line with Department of Health guidance. This should be extended to cover emergency admissions as soon as possible and definitely no later than 2011."

Operational Guidance 2, Department of Health, December 2008

and 2009/10 Operating Framework

"We expect all patients who test positive for MRSA on screening prior to admission to be effectively decolonised, as indicated in previous guidance."

Operational Guidance 2, Department of Health, December 2008

Mandatory screening for MRSA

ALL elective NHS patients in England except:

- day case opthalmology, dental & endoscopy;
- minor dermatology e.g. warts;
- children & maternity/obstetrics (except high risk groups and elective caesarean).

from Operational Guidance 2, DoH, December 2008

Monthly reporting to Department of Health:

- number of admissions and attendances of elective patients who should be screened;
- number of tests done on these patients.

from Operational Guidance 1, DoH, July 2008

Isolate numbers and tests

Year	CoNS	*S. aureus*	oxacillin MIC	*mecA*	*mupA*	mupirocin MIC
2001	209	238	✓✓			
2002	200	245	✓✓			
2003	212	235	✓✓			
2004	187	244	✓✓			
2005	203	244	✓✓	- ✓		
2006	**203**	**242**	✓✓	✓✓	✓✓	
2007	**181**	**245**	✓✓	✓✓	✓✓	✓✓

Prevalence of *mecA* and *mupA*

	S. aureus	CoNS
N	487	384
% *mecA* +	39%	78%
% *mupA* +	2%	20%

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mupA is geographically widespread

487 *S. aureus* - 10 *mupA*-positive, from

7/26 centres

3/5 countries

70% hospital >48 hours

384 CoNS - 77 *mupA*-positive, from

24/26 centres

5/5 countries

73% hospital >48 hours

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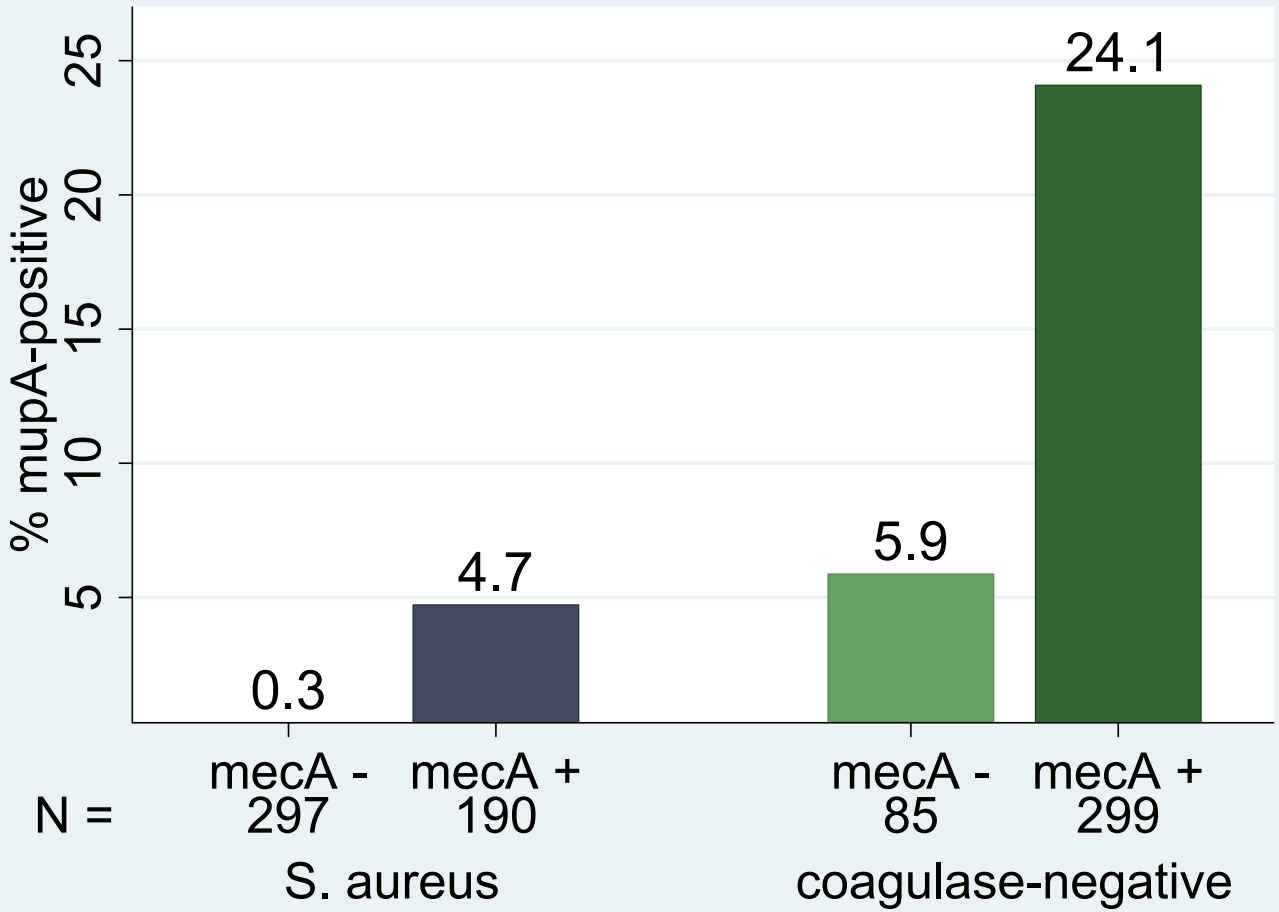
Association of *mecA* and *mupA*

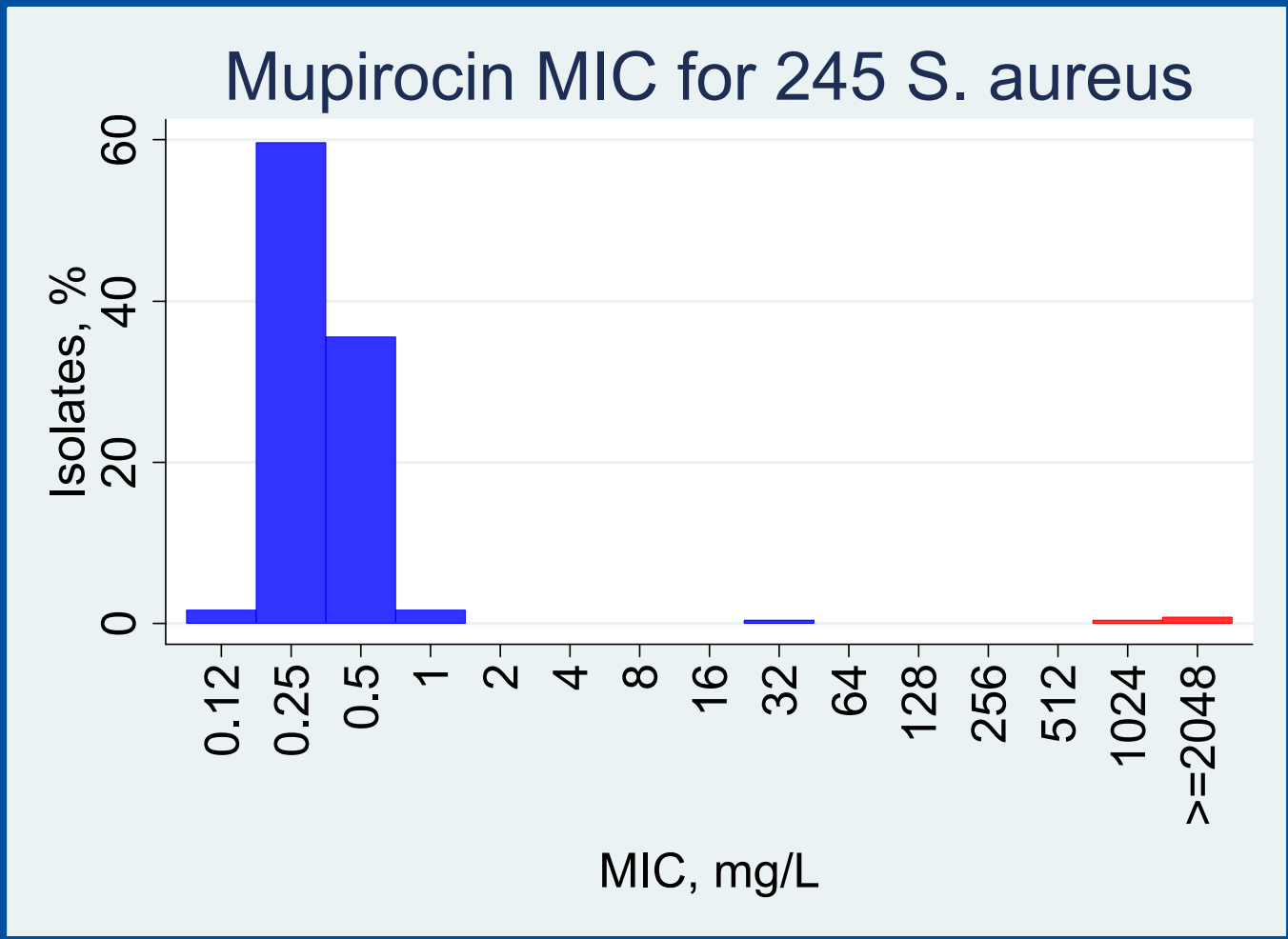


mecA as a predictor of *mupA*

S. aureus:
OR = 19
p = 0.007

CoNS:
OR = 5
p = 0.001

mupA and phenotypic mupirocin resistance 1



mupA -

mupA +

≤4 mg/L susceptible

8-256 mg/L low-level R

>256 mg/L high-level R

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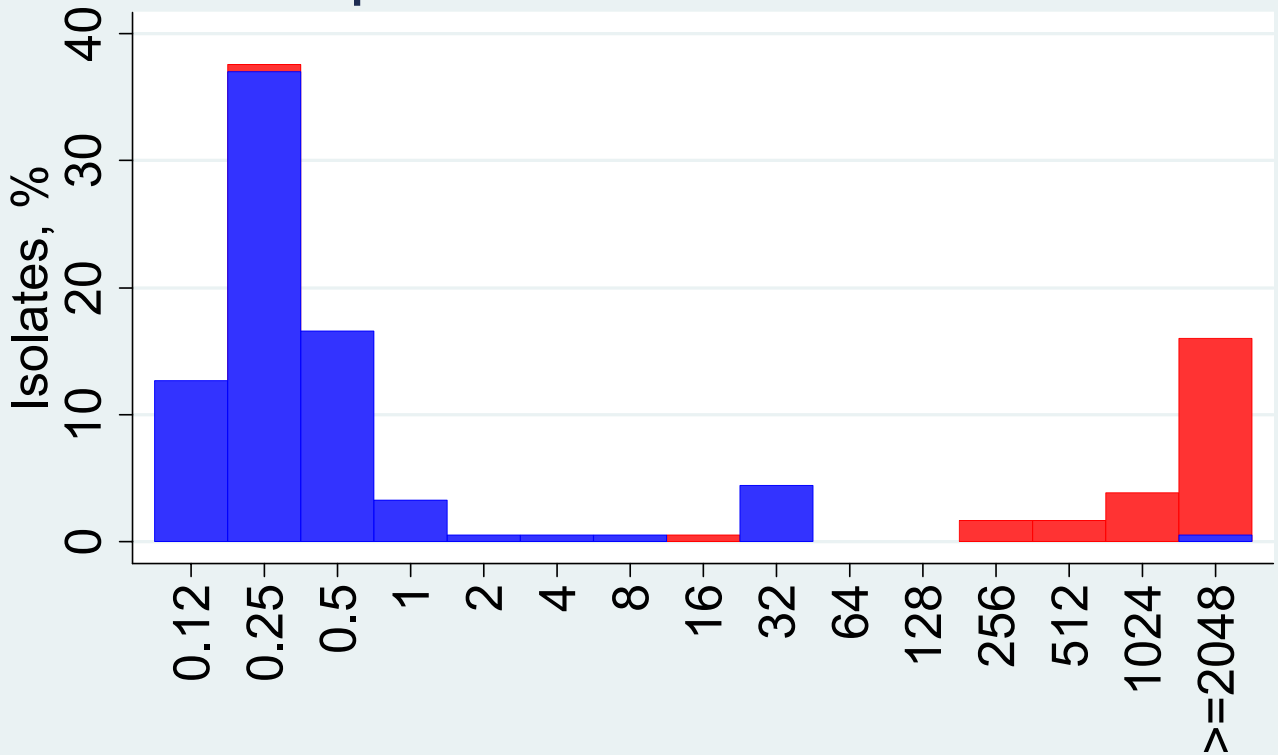
mupA and phenotypic mupirocin resistance 2



mupA -

mupA +

≤4 mg/L susceptible

8-256 mg/L low-level R

>256 mg/L high-level R

BSAC Bacteraemia Resistance Surveillance Programme - 2007 only

An unusual mechanism?

One coagulase-negative isolate under investigation:

- Highly resistant: MIC >1024 mg/L;
- *mupA* negative by at least two tests with different primers;
- Hospital inpatient >48 hours, line-associated.

Four others resolved on re-testing:

- 1 mupirocin-susceptible
- 3 *mupA*-positive when tested with different primers.

Conclusions

mupA, encoding high-level mupirocin resistance, is:

- currently rare in *S. aureus* from bacteraemia (2%);
- widespread in coagulase-negative staphylococci (20%);
- more common in *mecA*-positive (methicillin-resistant) isolates.

mupA-encoded mupirocin resistance could:

- spread from coagulase-negative staphylococci to *S. aureus;*
- rapidly become more prevalent under increased selective pressure.