



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

EARSS in Ireland, 2005

Results of
invasive *Staphylococcus aureus* infection (blood)
surveillance

Antibiotic codes and abbreviations: *Staphylococcus aureus*

CIP	Ciprofloxacin	OXA	Oxacillin
ERY	Erythromycin	PEN	Penicillin
FUS	Fusidic acid	RIF	Rifampicin
GEN	Gentamicin	TCY	Tetracycline
LIN	Lincomycin	TEC	Teicoplanin
LNZ	Linezolid	TMP	Trimethoprim
MET	Methicillin	VAN	Vancomycin
MUP	Mupirocin		

MSSA Methicillin-susceptible *S. aureus*

MRSA Methicillin-resistant *S. aureus*

EARSS *S. aureus*:

Objective and case definition

Objective:

To determine the proportions of *S. aureus* isolates from blood that are resistant to methicillin

Case definition:

EARSS collects data on the first invasive isolate of *S. aureus* per patient per quarter

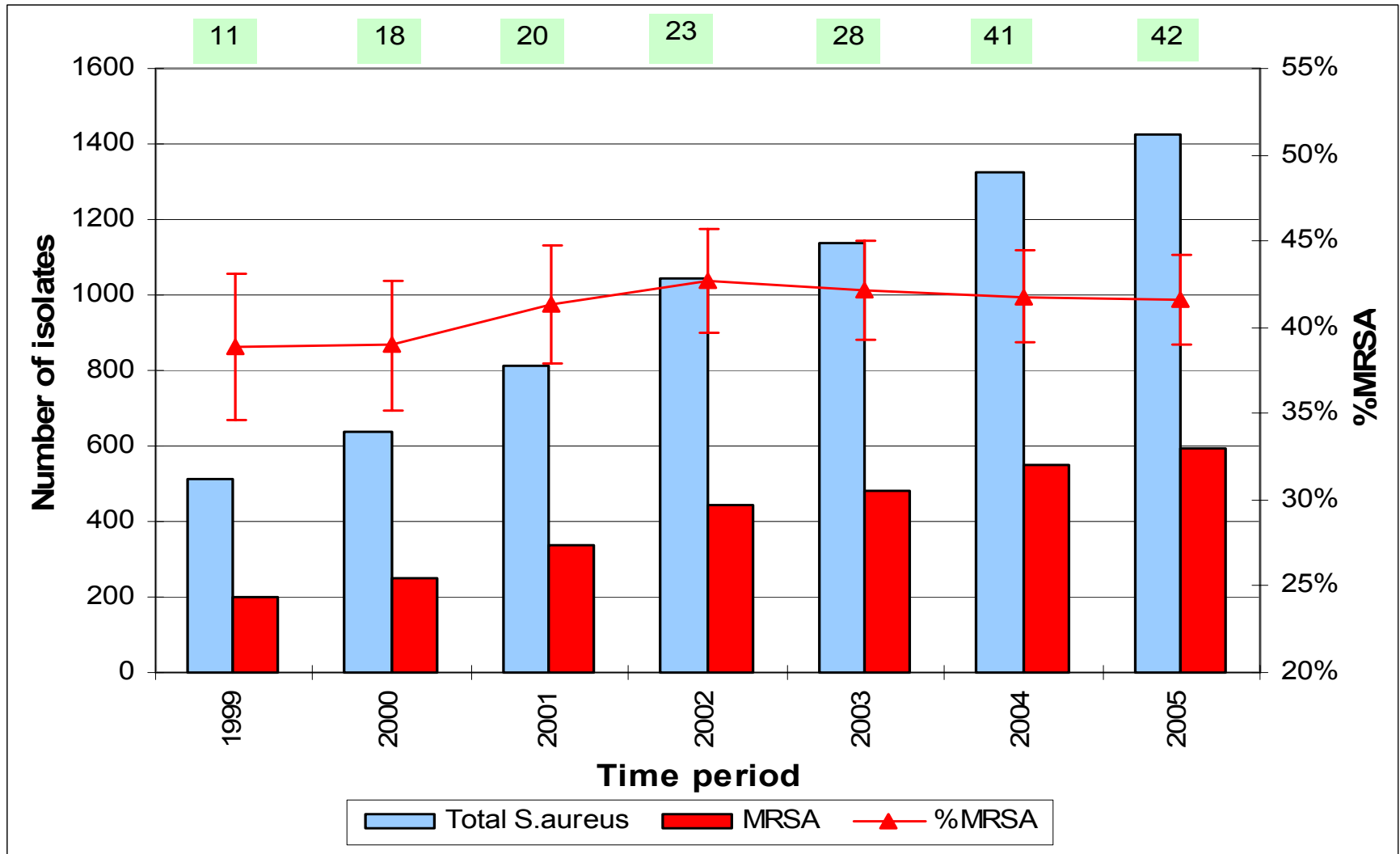
Caveats in interpreting EARSS data

- Care must be exercised when interpreting the raw figures, i.e. increases in numbers of isolates, as the numbers of laboratories reporting to EARSS has increased over the years
- EARSS data does not distinguish clinically significant isolates from contaminants

Annual proportions of MRSA bacteraemia, 1999-2005, with 95% Confidence Intervals (CI)

Year	No. labs	No. isolates	No. MRSA	%MRSA	Lower 95% CI	Upper 95% CI
1999	11	510	198	38.8	34.6	43.1
2000	18	639	249	39.0	35.2	42.7
2001	20	816	337	41.3	37.9	44.7
2002	23	1042	445	42.7	39.7	45.7
2003	28	1140	480	42.1	39.2	45.0
2004	41	1323	553	41.8	39.1	44.5
2005	42	1424	592	41.6	39.0	44.1

EARSS in Ireland – *S. aureus* trends



Changes in the numbers of participating laboratories (by year end for annual data) are indicated above the bars

MRSA trends, 1999-2005

Between 1999 and 2002, the proportion of MRSA increased from 38.8% to 42.7%. This rising trend was at best borderline insignificant ($\text{Chi}^2_{\text{trend}}=3.14$; $P=0.08$)

Between 2002 and 2005, the proportion of MRSA decreased marginally from 42.7% to 41.6%. This trend was not statistically significant ($\text{Chi}^2_{\text{trend}}=0.33$; $P=0.57$)

These findings are confirmed by the overlapping confidence intervals

Comparison of 2005 data with 2004

- There was no obvious difference in the proportion of MRSA from 2004 to 2005
- This is confirmed by the overlapping 95% confidence intervals

Conclusion:

The proportion of *S. aureus* isolates that are methicillin-resistant (MRSA) has levelled off at approx. 42% over the past 3 years

Rates of *S. aureus* (SAU) and MRSA bacteraemia in Ireland

Year	No. labs (No. hospitals)	No. SAU reports*	No. MRSA reports* %MRSA	No. bed days used** (% of total)	SAU rate*** (95%CI)	MRSA rate*** (95%CI)
2003	28 (49)	1122	474 42.2%	3,360,837 (89)	0.33 (0.31-0.35)	0.14 (0.13-0.15)
2004	34 (57)	1290	547 42.4%	3,711,157 (98)	0.35 (0.33-0.37)	0.15 (0.14-0.16)
2005	34 (57)	1373	580 42.2%	3,808,937 (98)	0.36 (0.34-0.38)	0.15 (0.14-0.17)

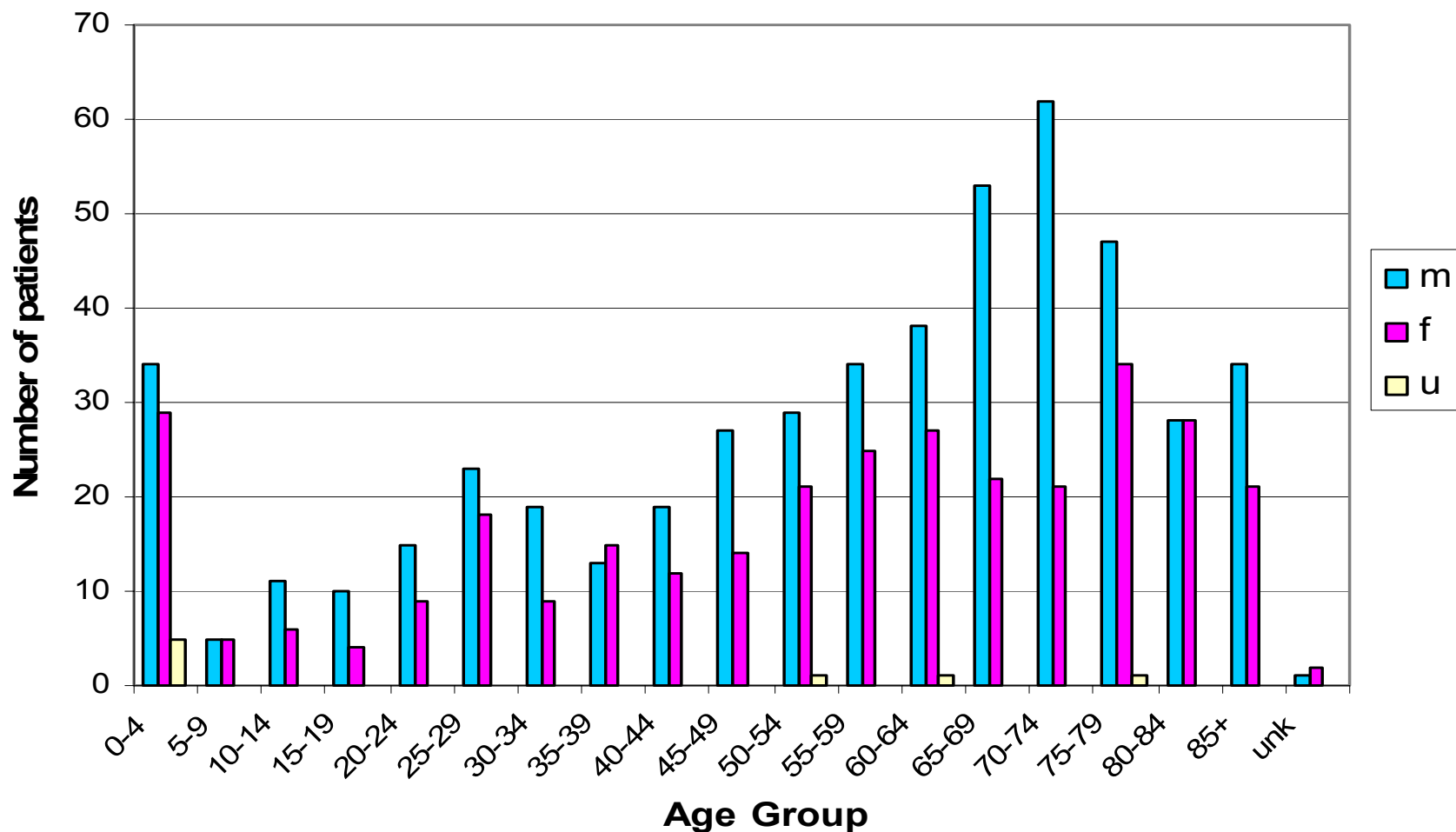
* From acute public hospitals only

** Bed days used calculated from Acute Public Hospital Activity (APHA) data for acute public hospitals participating in EARSS

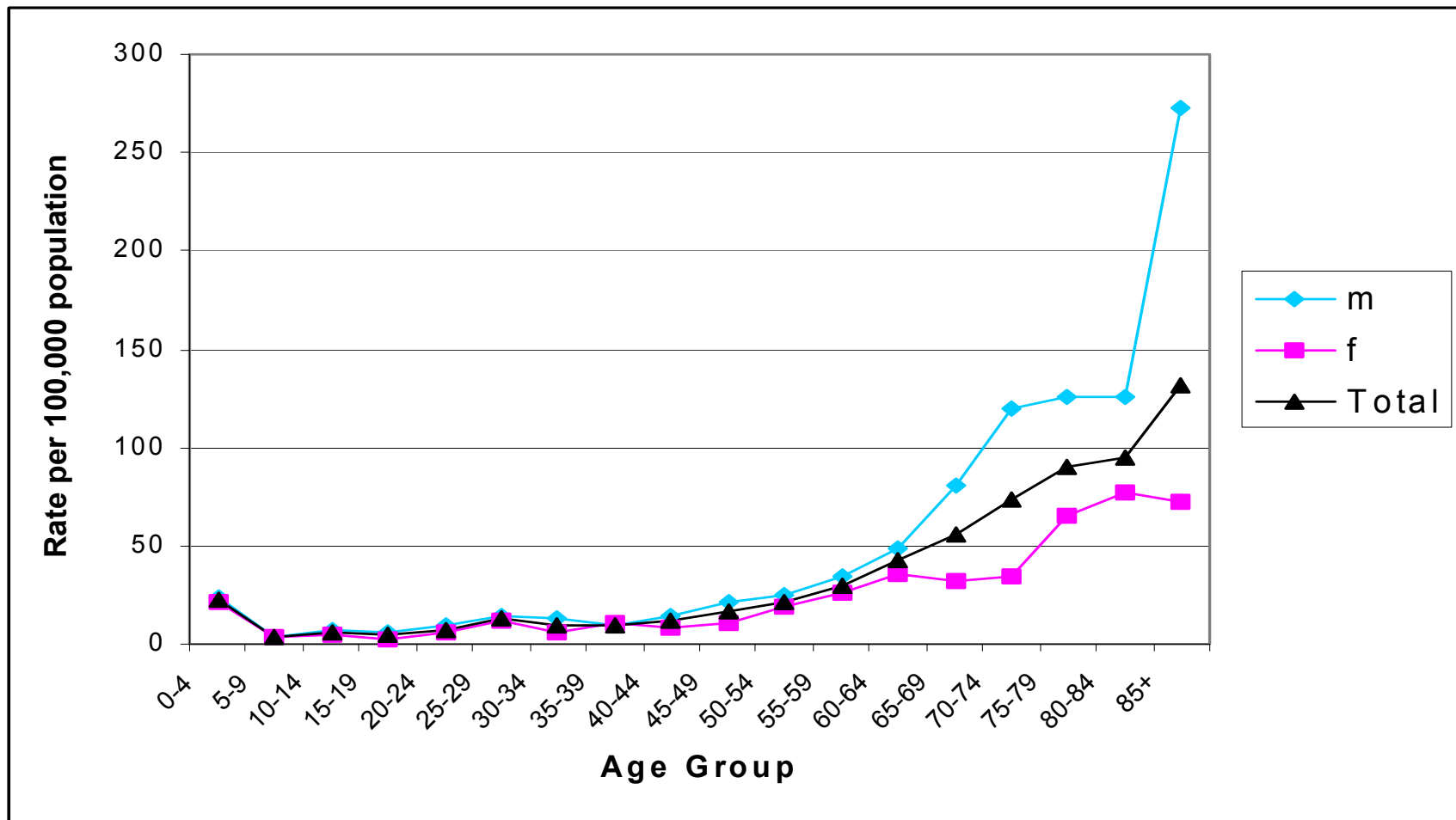
*** Per 1,000 bed days used
95%CI, 95% confidence interval

Rates provide a better indication of the burden of disease/infection on the population

Age and sex distribution of MSSA isolates in Ireland in 2005



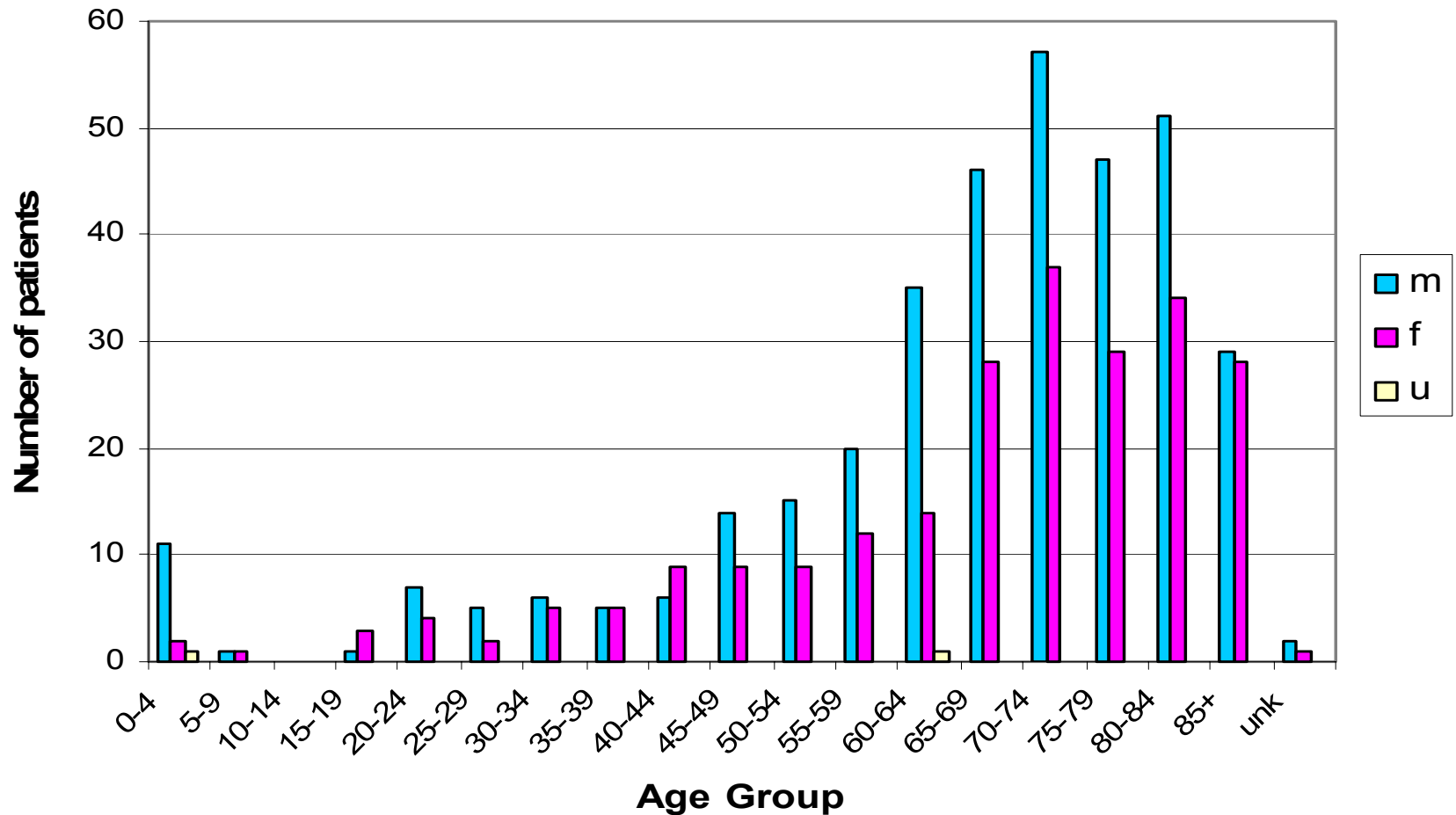
Age and sex-specific incidence rates of invasive MSSA infection in Ireland in 2005



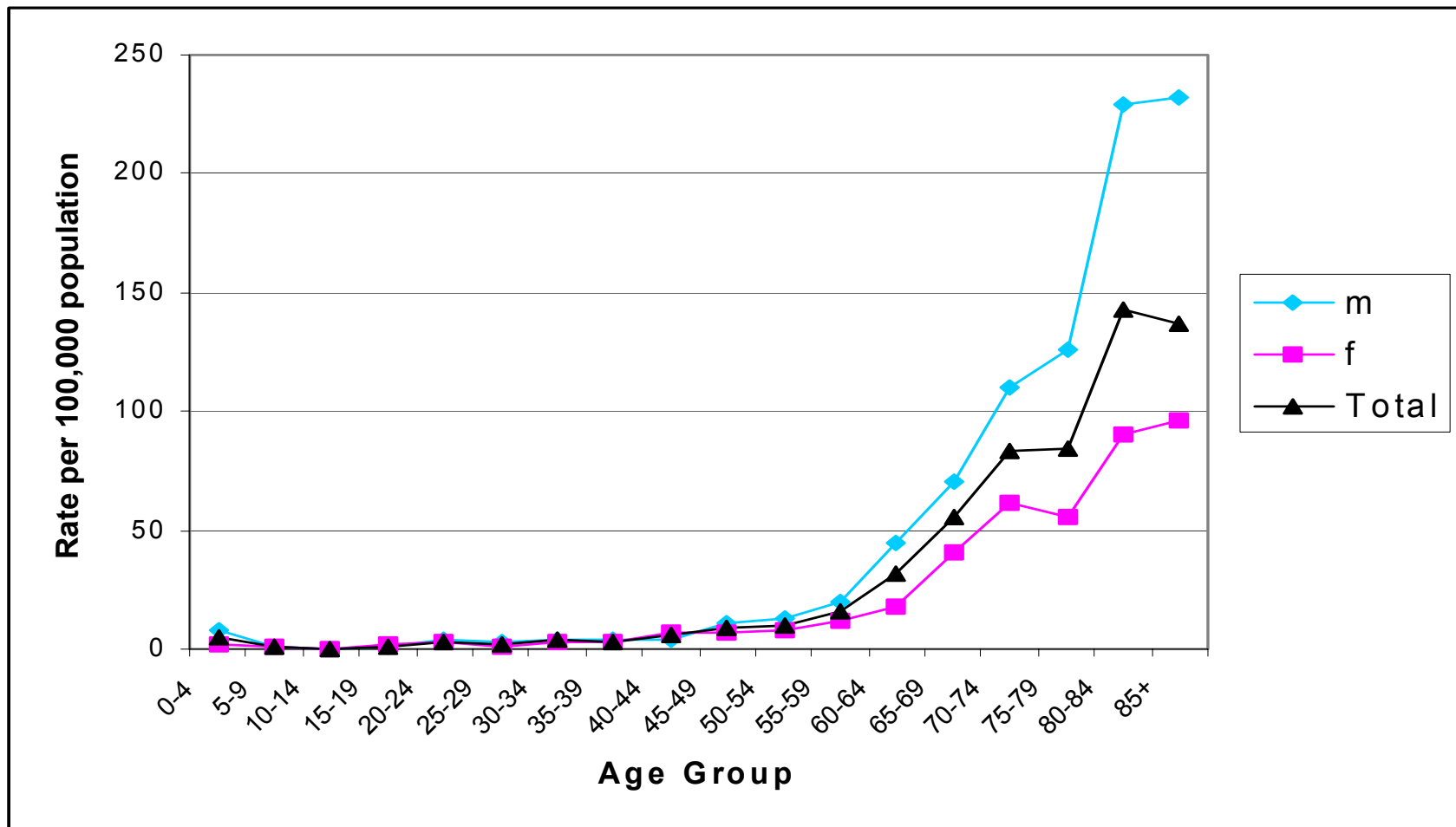
Using the 2002 census as the denominator

(NB. the estimated coverage of the Irish population by EARSS is approx. 98%)

Age and sex distribution of MRSA isolates in Ireland in 2005



Age and sex-specific incidence rates of invasive MRSA infection in Ireland in 2005



Using the 2002 census as the denominator

(NB. the estimated coverage of the Irish population by EARSS is approx. 98%)

Median ages in years (with 95% confidence intervals)

MRSA bacteraemia	70y (69-71y)
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MSSA bacteraemia	60y (58-62y)
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<i>S. aureus</i> bacteraemia	65y (64-66y)
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The difference in median ages for patients with MRSA and MSSA bacteraemia is significant as the confidence intervals do not overlap

Mean/median/mode ages

	n	mean	median	mode
MRSA	592	65.6	70	80
MSSA	832	53.3	60	0
SAU	1424	58.4	65	0

Relative risk of developing MRSA bacteraemia associated with age

	MRSA	MSSA	Total
$\geq 65y$	385	351	736
$< 65y$	204	478	682
Total	589	829	1418

Relative risk (RR) = $(385/736)/(204/682)$
= 1.75 (95% CI: 1.53-2.00)

Chi-squared = 73.13

P-value < 0.001

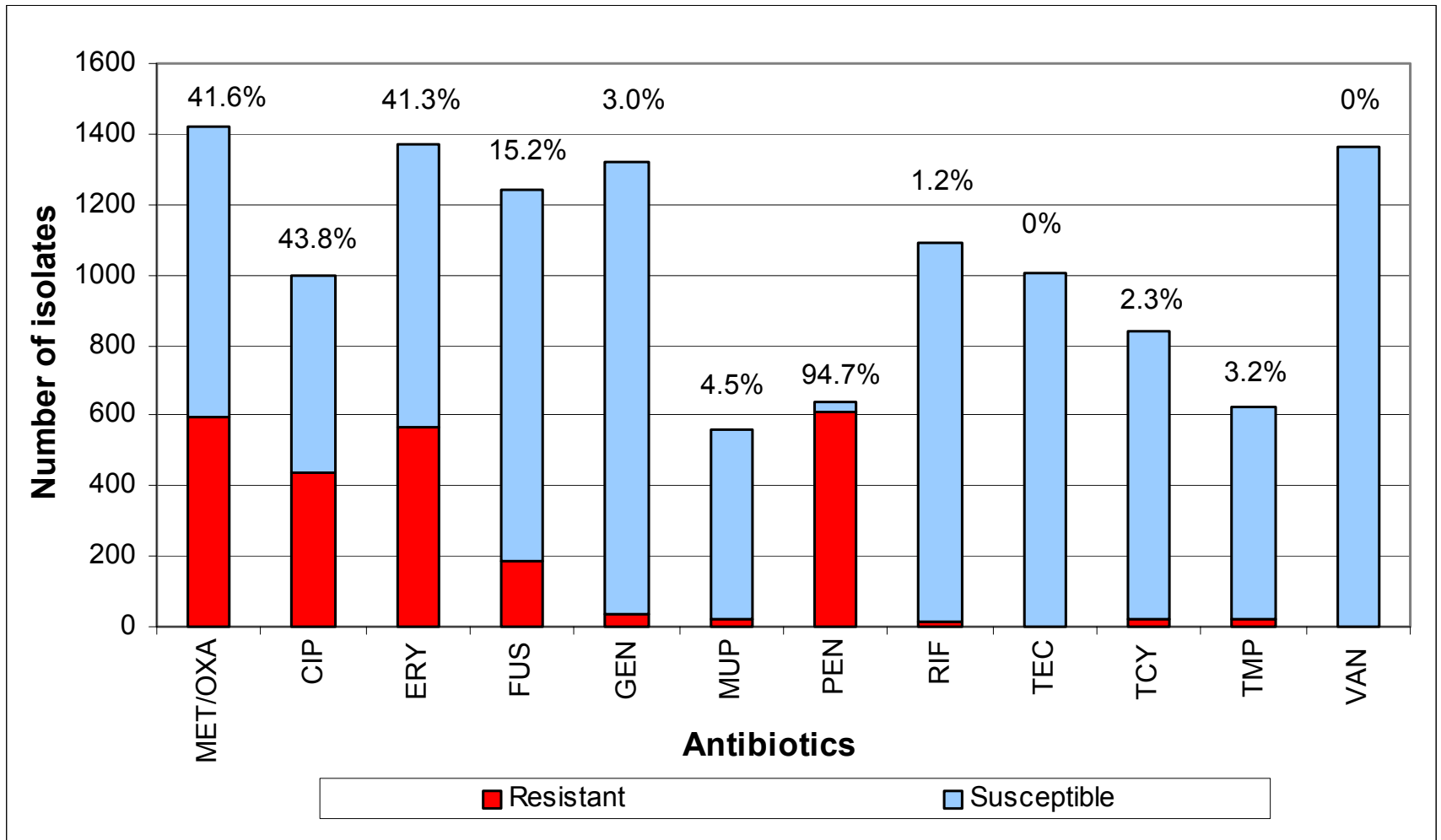
In patients with laboratory-confirmed *S. aureus* bacteraemia, the probability that the infecting organism will be MRSA as compared to MSSA is 1.75 greater in patients aged ≥ 65 years than in those aged < 65 years

Sex distribution

	No. male	%male	No. female	%female	m/f ratio	z-test	P-value
MRSA	358	60.5%	232	39.2%	1.543	5.31	<0.001
MSSA	502	60.3%	322	38.7%	1.559	6.426	<0.001
<i>S. aureus</i>	860	60.4%	554	38.9%	1.552	8.335	<0.001

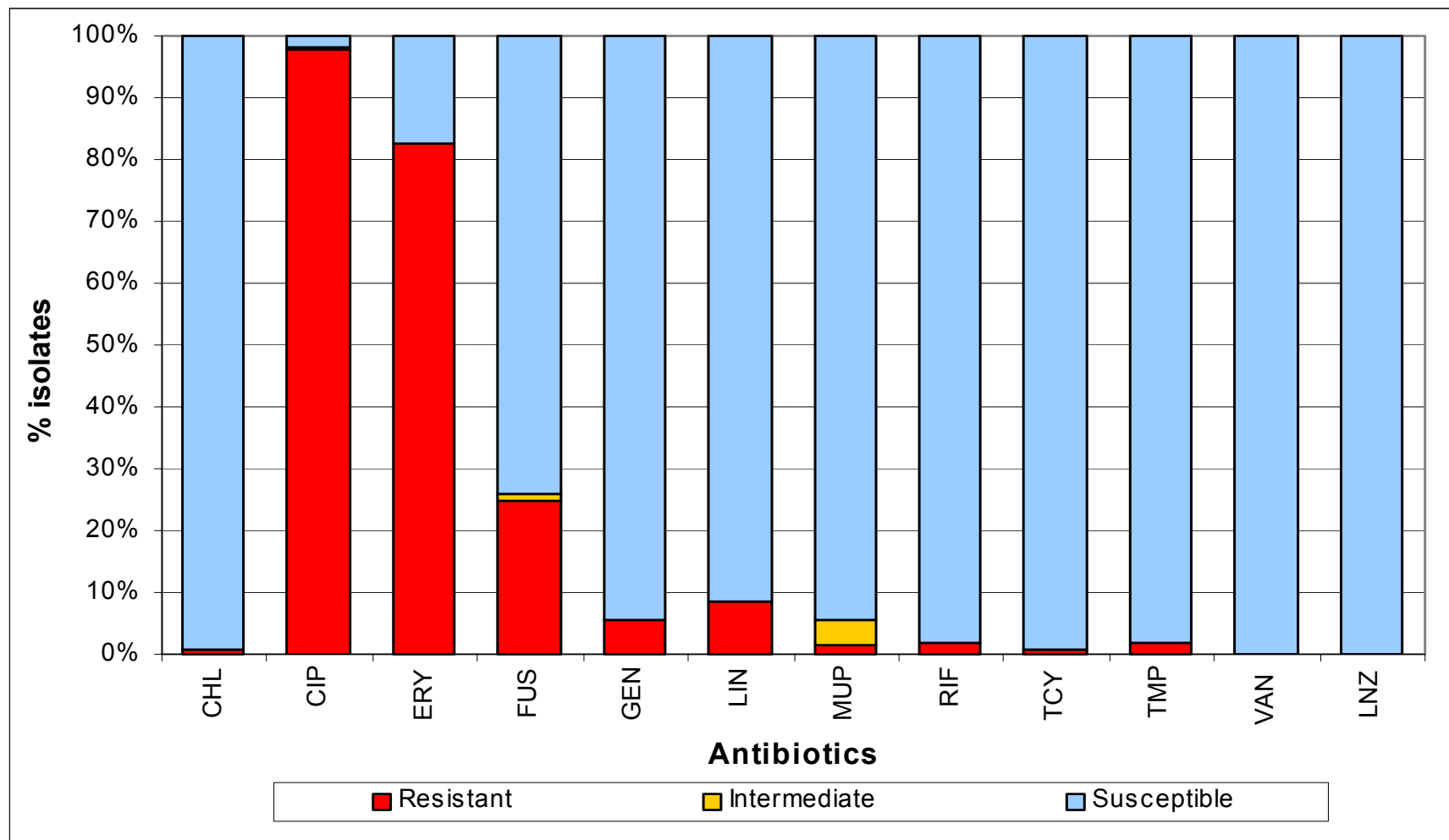
Males are 1.5-times more likely to get an invasive *S. aureus* infection (either MRSA or MSSA) than females ($P<0.001$)

Susceptibility data, based on participant returns, for all invasive *S. aureus* isolates reported in 2005



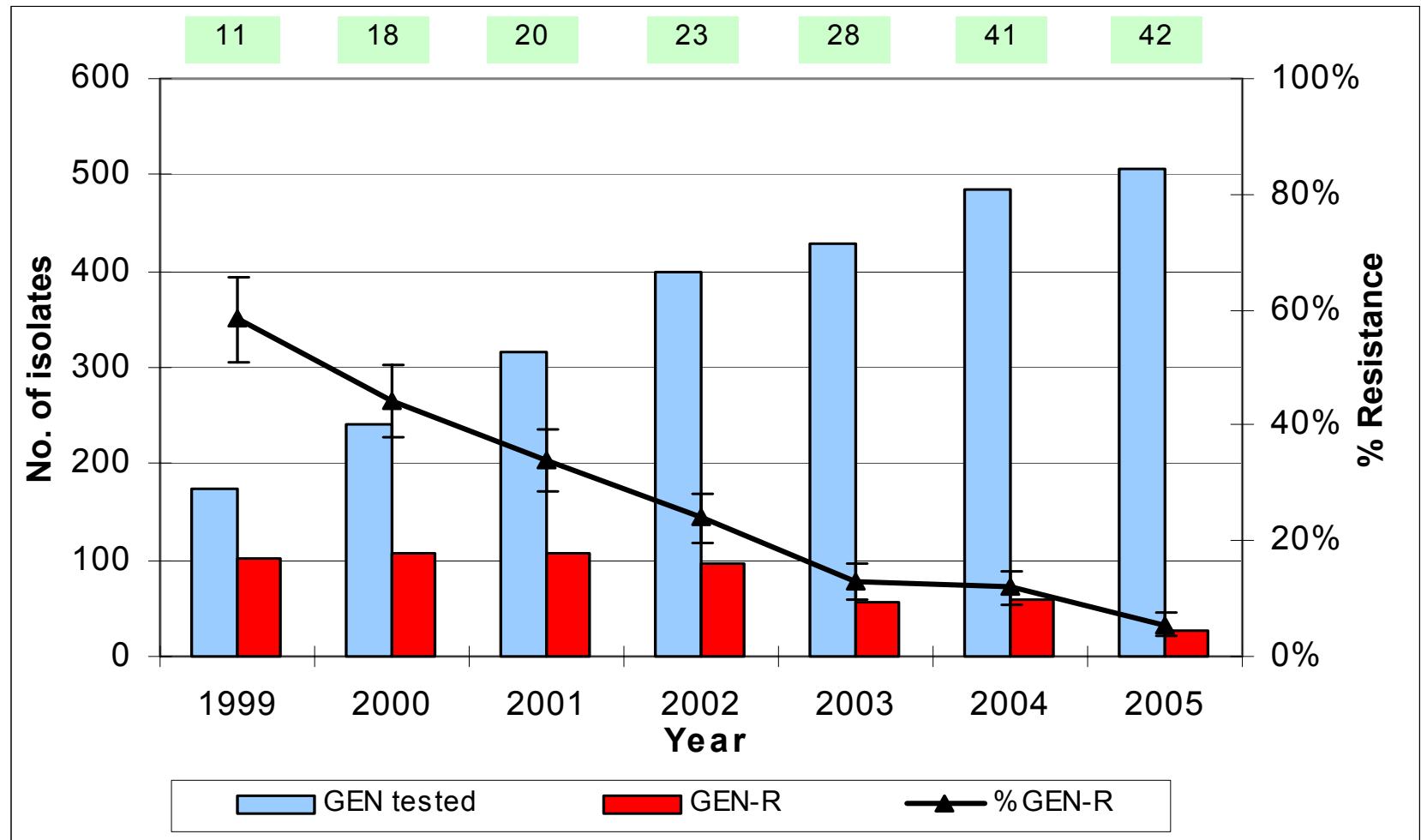
Percentage resistance is indicated above the bar

Antibiogram results for MRSA isolates referred to NMRSARL (n=507) in 2005



Change in proportion of gentamicin resistance among MRSA isolates, 1999-2005

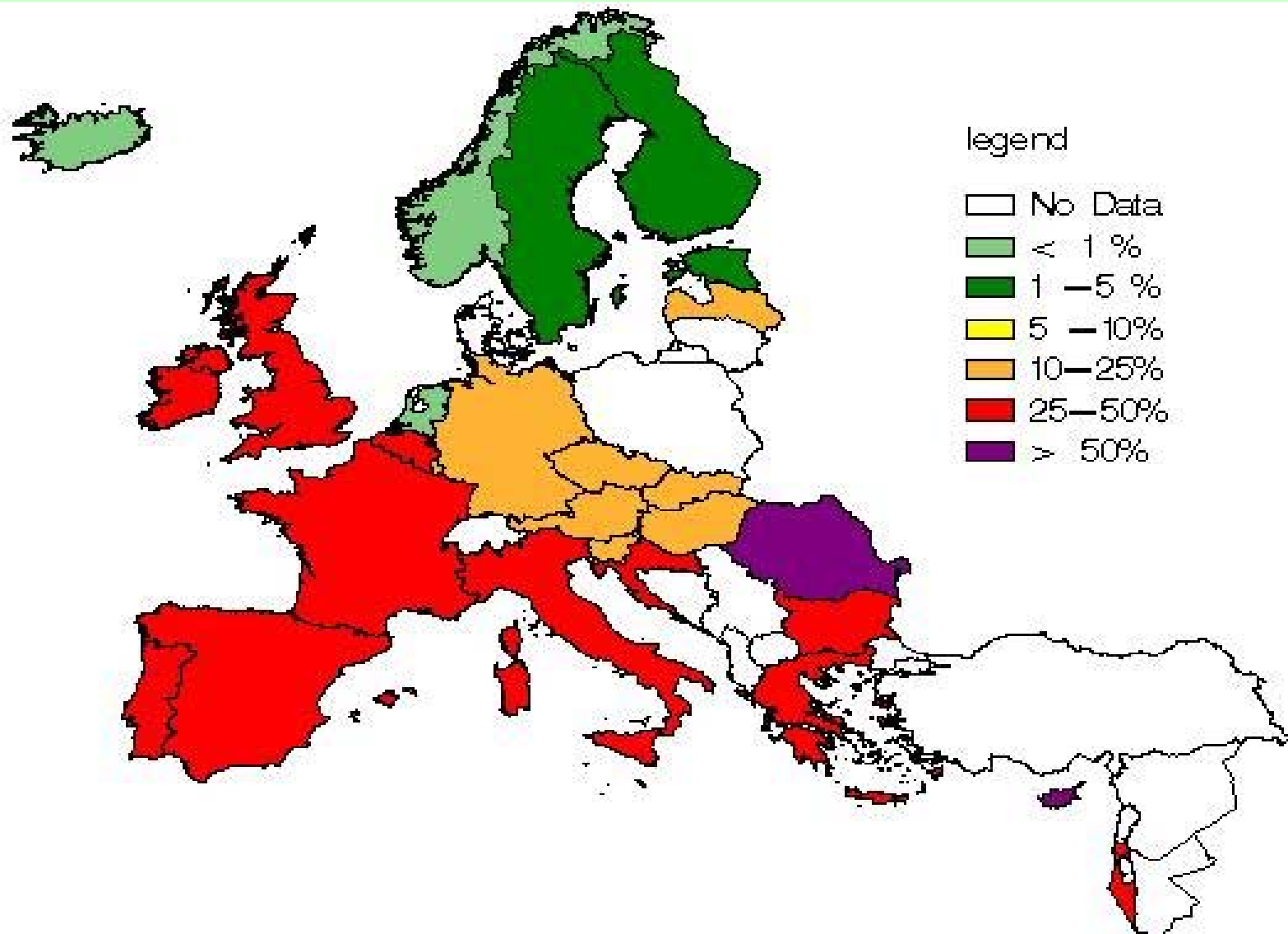
(reflecting change in profile of circulating epidemic strains of MRSA)



Data from NMRSARL

Changes in the numbers of participating laboratories are indicated above the bars

Distribution of MRSA in EARSS countries in 2005



Distribution of MRSA in EARSS countries in 2004

