



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

EARSS in Ireland, 2006

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	Meticillin	VAN	Vancomycin
MUP	Mupirocin		

MSSA Meticillin-susceptible *S. aureus*

MRSA Meticillin-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 meticillin

Case definition:

EARSS collects data on the first invasive isolate (from blood only) of *S. aureus* per patient per quarter

Caveats in interpreting EARSS data

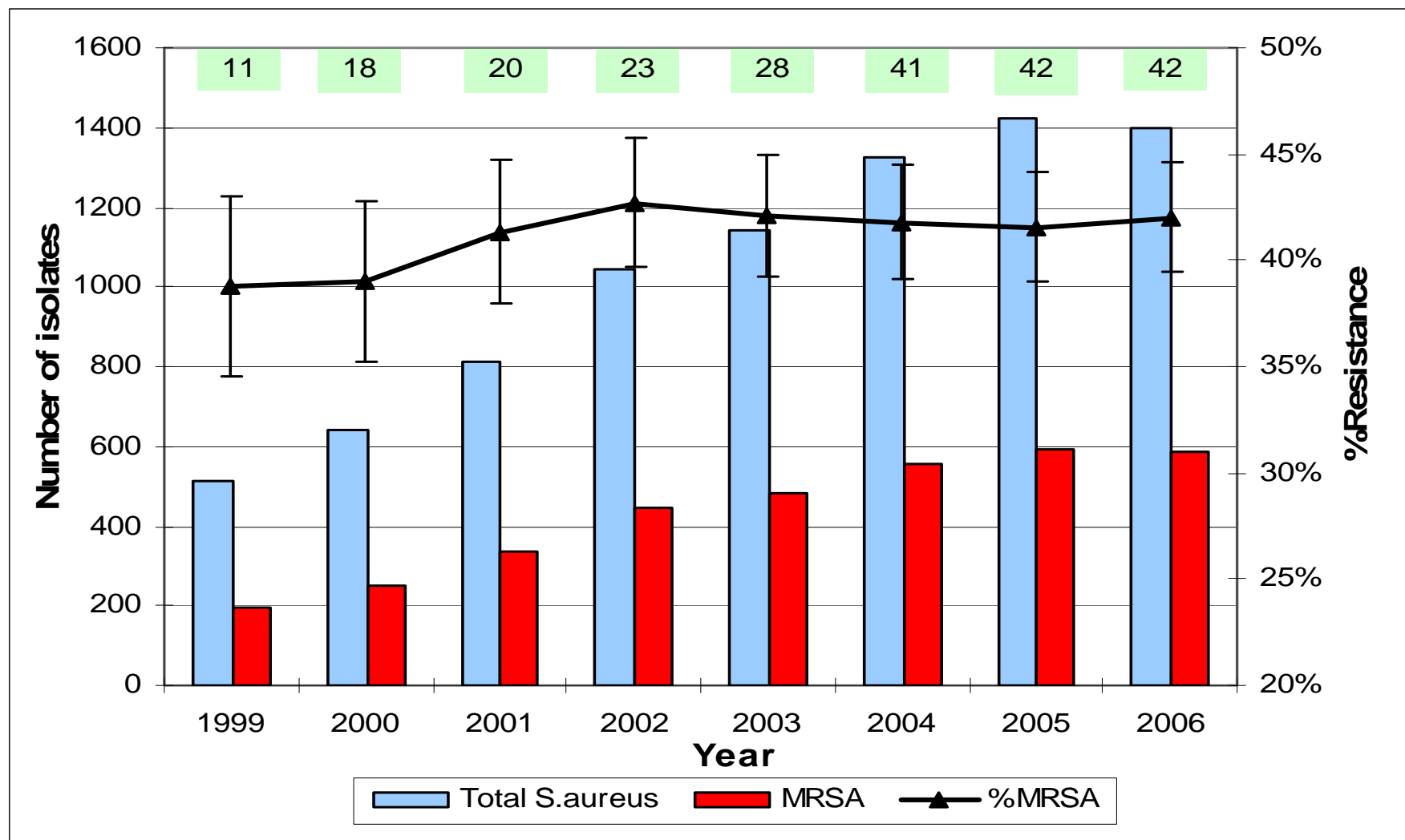
- Care must be exercised when interpreting the raw figures, i.e. increases in numbers of isolates, as the numbers of laboratories reporting to EARSS has increased over the years
- EARSS data does not distinguish clinically significant isolates from contaminants
- If MRSA is isolated subsequent to MSSA within the same quarter, then that isolate is not counted (and similarly if MSSA is isolated subsequent to MRSA)

Annual proportions of MRSA bacteraemia, 1999-2006, 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
2006	42	1399	588	42.0	39.4	44.6

EARSS in Ireland:

S. aureus bacteraemia trends, 1999-2006



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 2006 data with 2005

There was no obvious difference in the proportion of MRSA from 2005 to 2006

This is confirmed by the overlapping 95% confidence intervals

MRSA trends – conclusion:

**The proportion of *S. aureus* isolates that are
meticillin-resistant (MRSA) has levelled off at
approximately 42% over the past 4 years**

Rates of *S. aureus* (SAU) and MRSA bacteraemia in Ireland, 2003-2006

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)
2006	34 (53)	1345	571	42.5%	3,689,450 (98)	0.36 (0.35-0.38)	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

Note: The overall number of acute public hospitals decreased by 4 from 2005 to 2006 - 2 closed/2 no longer deemed acute!!!

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

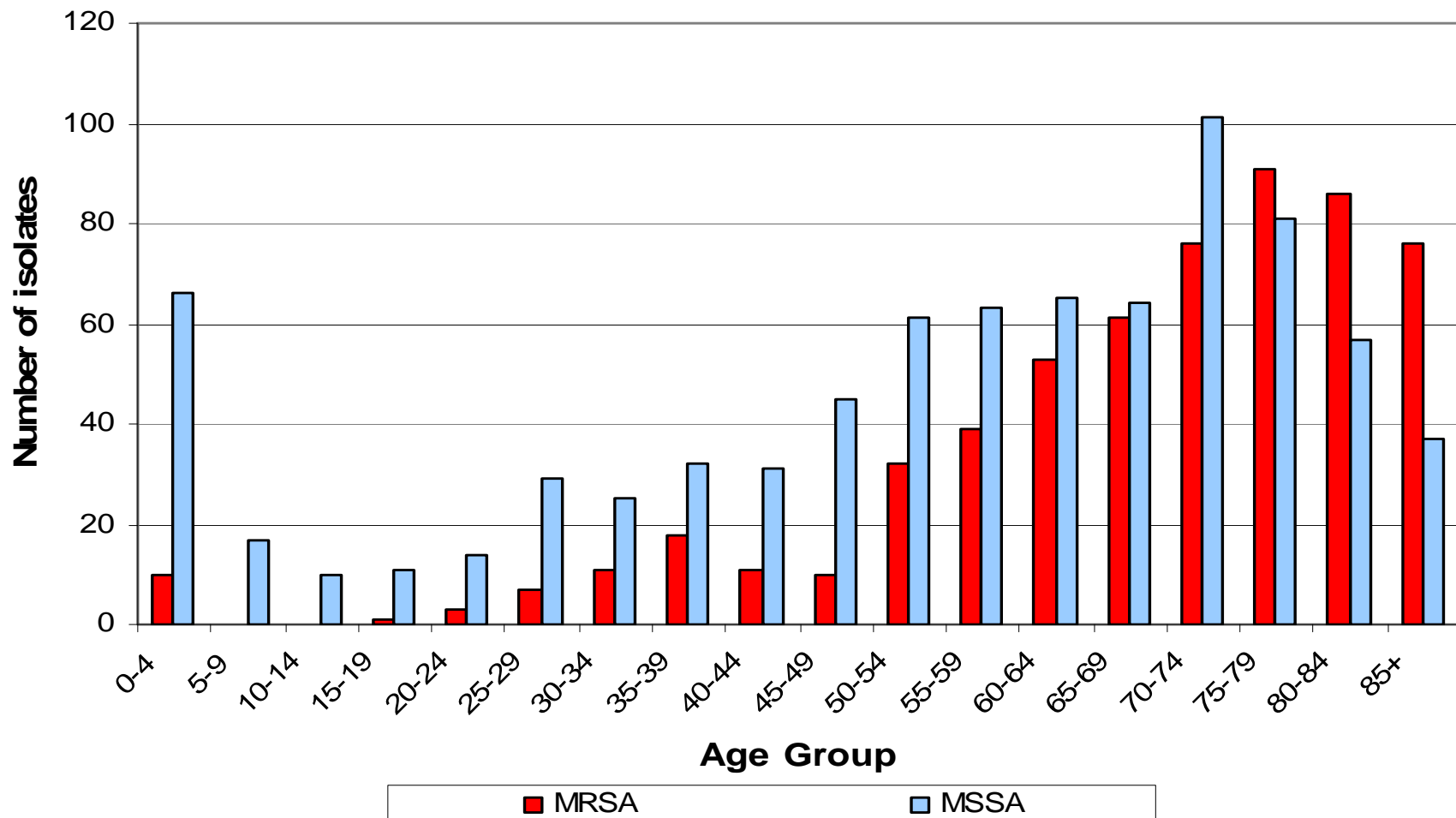
Vancomycin-intermediate S. aureus (VISA) reports from EARSS in Ireland in 2006

In Q3 2006:

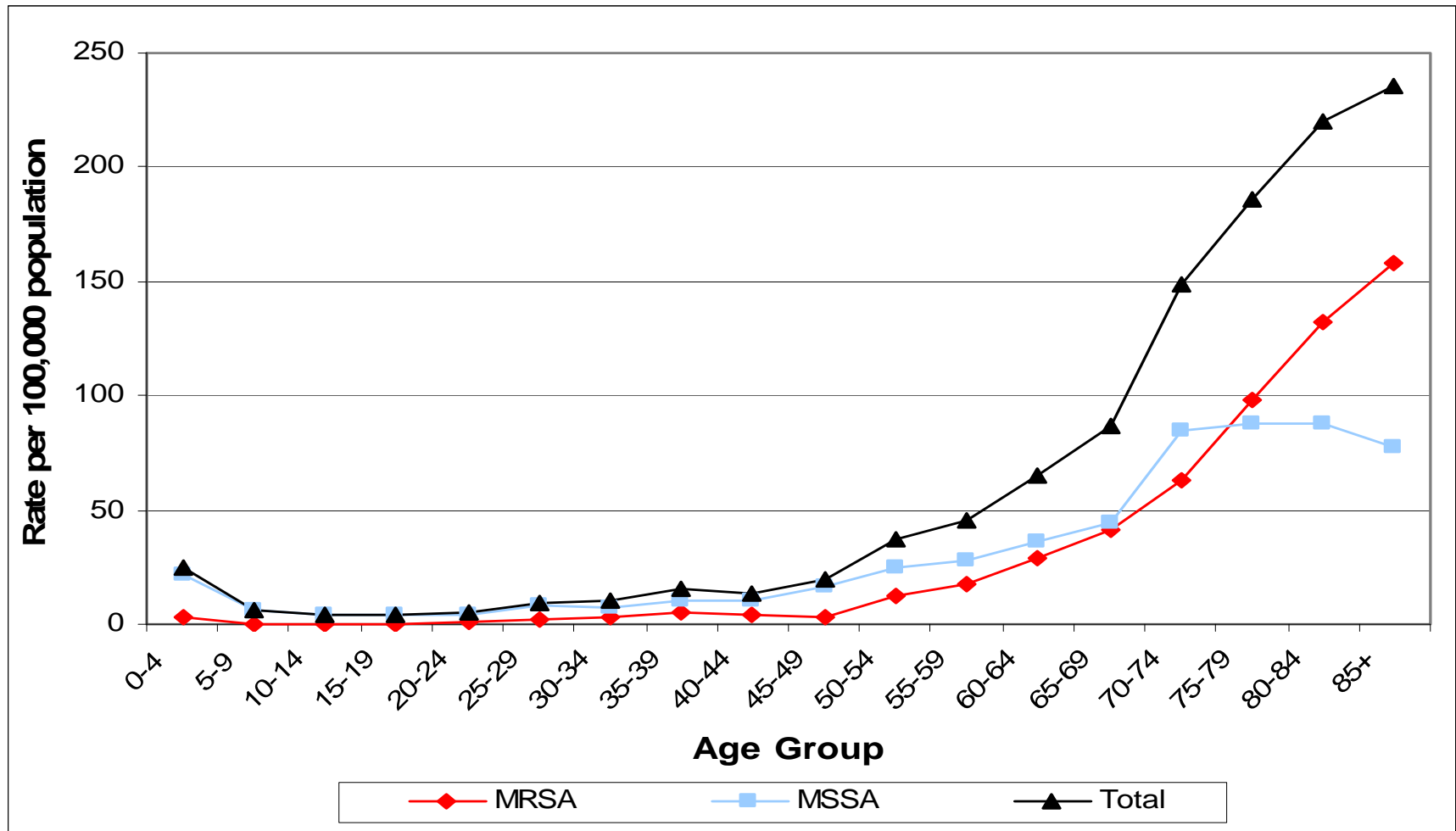
- Two MRSA isolates with reduced susceptibility to vancomycin were detected by the Etest macromethod with values of 12mg/L
- Both had vancomycin MICs of 4mg/L, by which they are classified as VISA according to the latest CLSI guidelines
- Both were confirmed as VISA by the Centers for Disease Control (CDC), Atlanta

These are the first reports of VISA from EARSS in Ireland

Age distribution of patients with MRSA and MSSA bacteraemia in Ireland in 2006



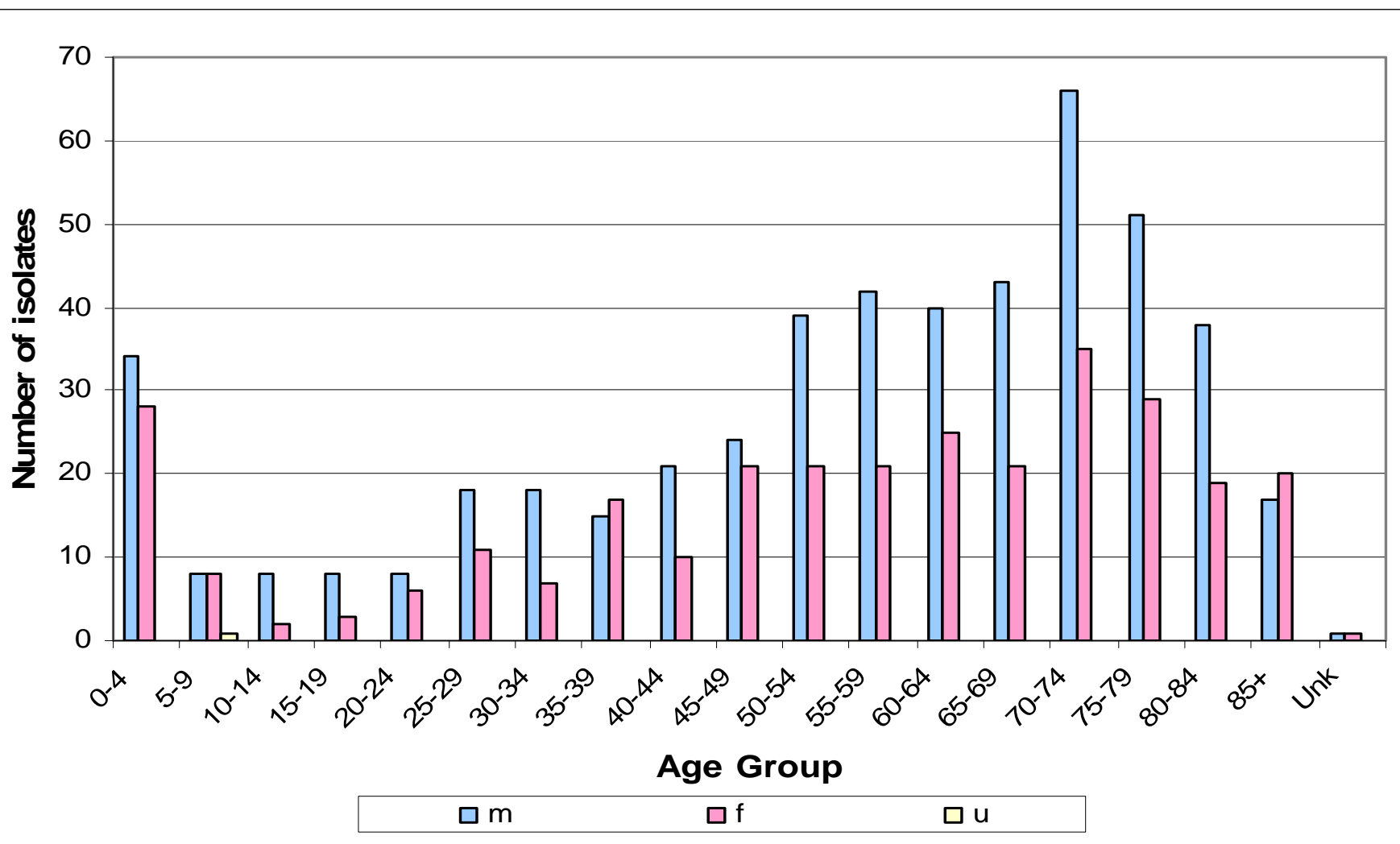
Age-specific incidence rates of MRSA and MSSA bacteraemia in Ireland in 2006



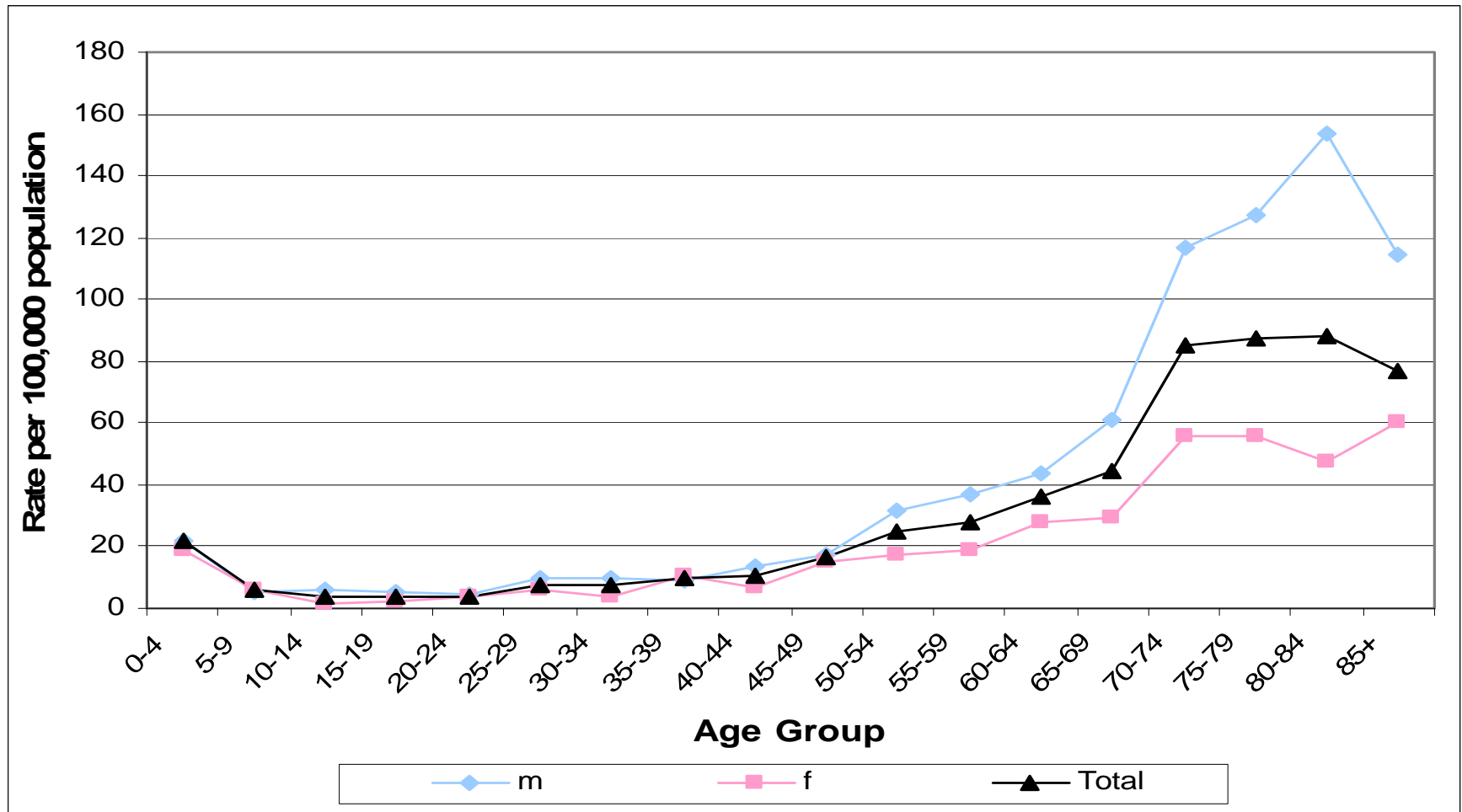
Using the 2006 census as the denominator

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

Age and sex distribution of patients with MSSA bacteraemia in Ireland in 2006



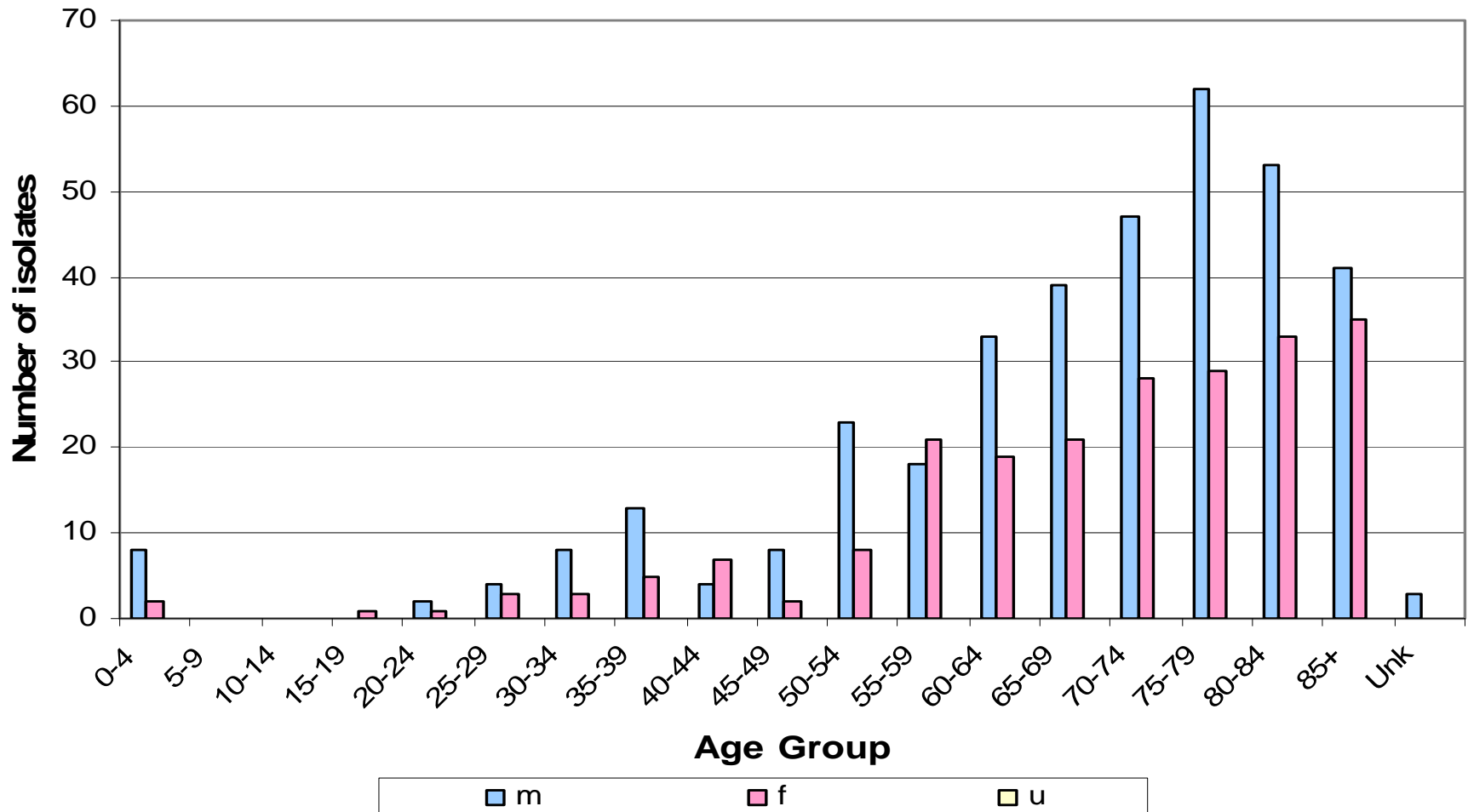
Age and sex-specific incidence rates of MSSA bacteraemia in Ireland in 2006



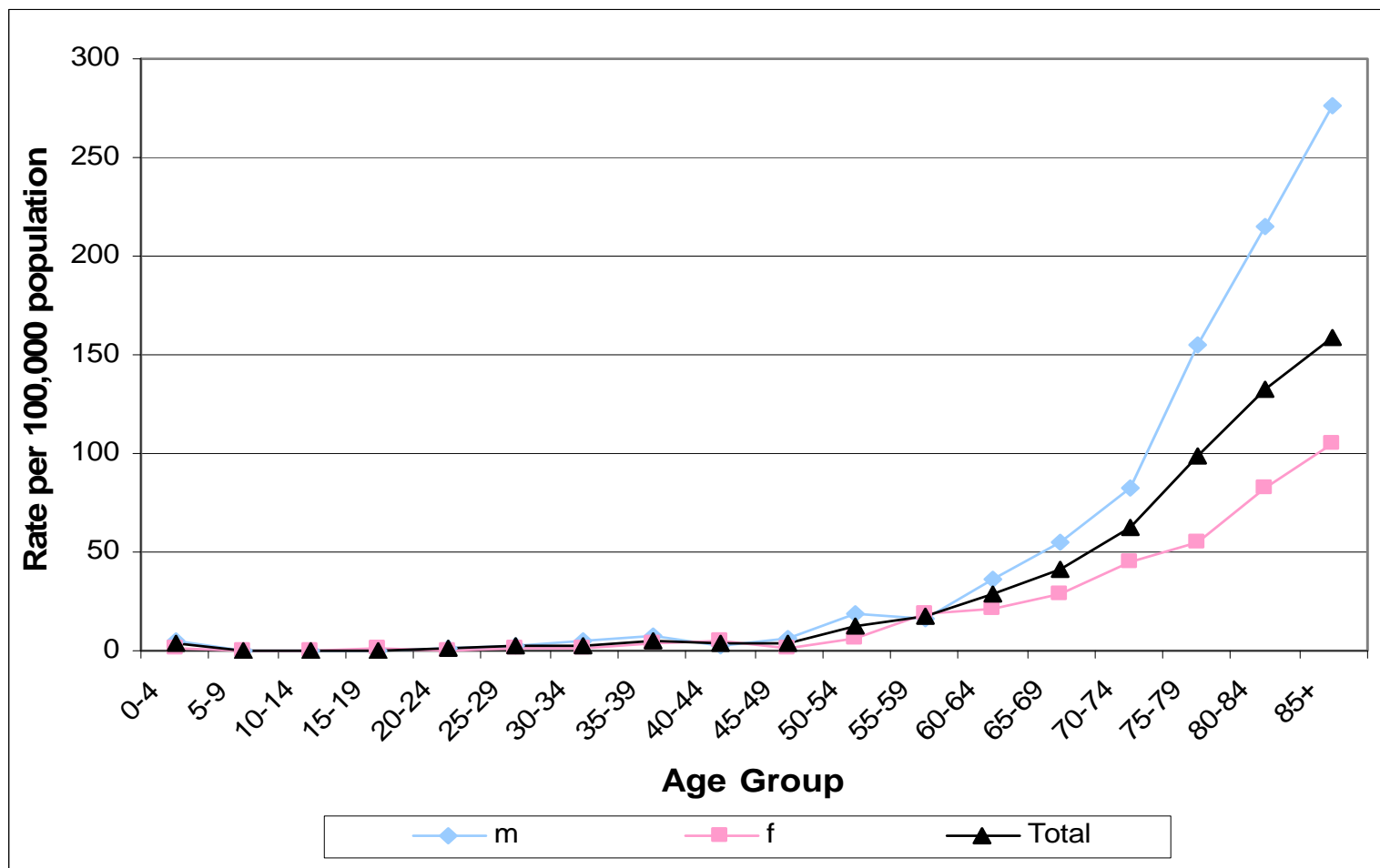
Using the 2006 census as the denominator

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

Age and sex distribution of patients with MRSA bacteraemia in Ireland in 2006



Age and sex-specific incidence rates of MRSA bacteraemia in Ireland in 2006



Using the 2006 census as the denominator

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

Mean, median, mode and range of ages of patients with *S. aureus* (MRSA and MSSA) bacteraemia in Ireland in 2006

	No.	No. with age	mean	median (95%CI)	mode	range
MRSA	588	585	68y	73y (71-74y)	76y	4d - 99y
MSSA	811	809	54y	60y (58-62y)	0y	0d - 94y
<i>S. aureus</i>	1399	1394	60y	66y (65-68y)	76y	0d - 99y

The difference in median ages for patients with MRSA and MSSA bacteraemia is significant as the confidence intervals do not overlap

Relative risk of developing MRSA bacteraemia associated with age

	MRSA	MSSA	Total
$\geq 65y$	390	340	730
$< 65y$	195	469	664
Total	585	809	1394

Relative risk (RR) = $(390/730)/(195/664)$
= 1.82 (95% CI: 1.59-2.08)

Chi-squared = 82.63

P-value < 0.001

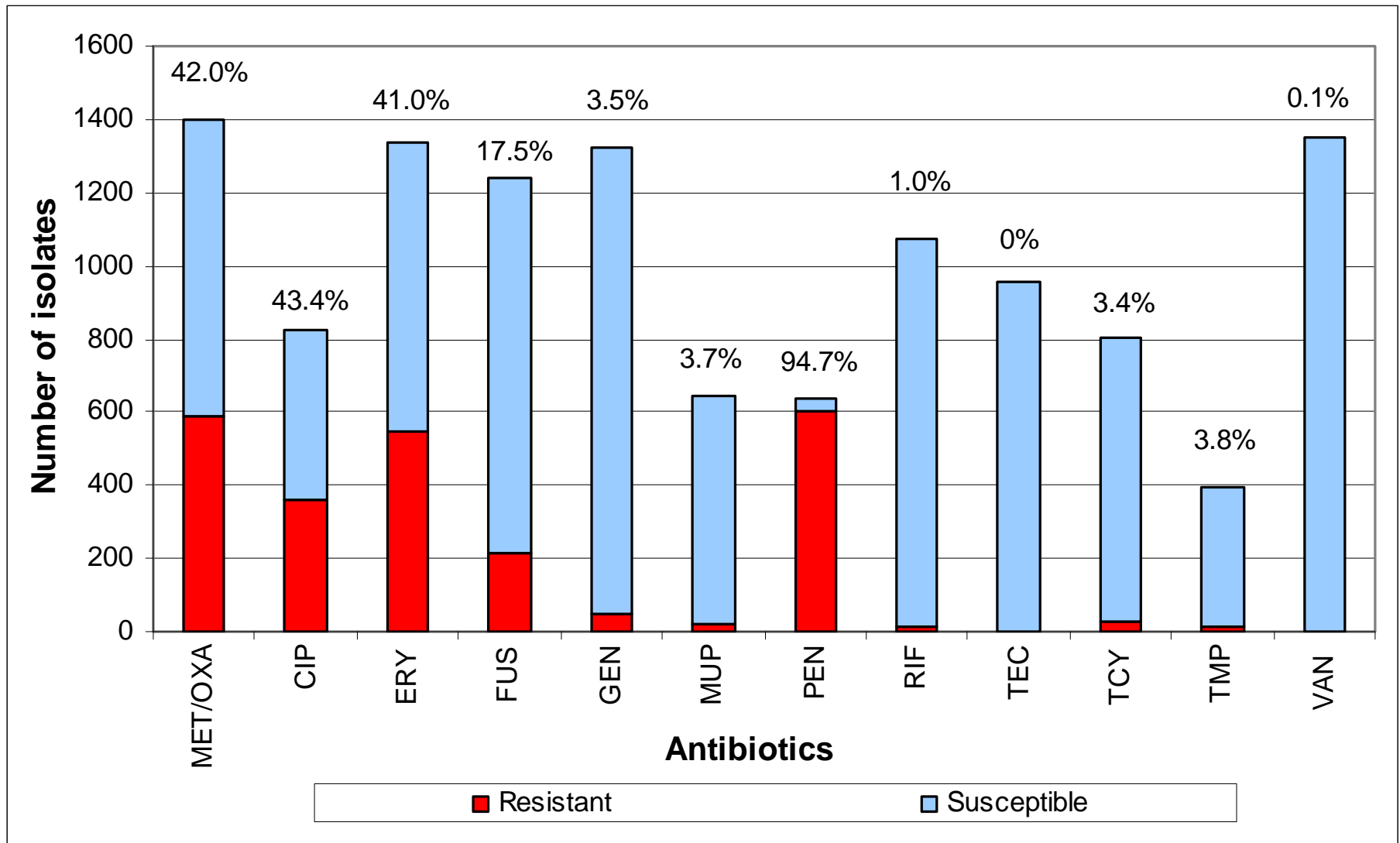
In patients with laboratory-confirmed *S. aureus* bacteraemia in Ireland in 2006, the probability that the infecting organism was MRSA as compared to MSSA was 1.82 greater in patients aged ≥ 65 years than in those aged < 65 years

Sex distribution of patients with *S. aureus* (MRSA and MSSA) bacteraemia in Ireland in 2006

	No. male	%male	No. female	%female	m/f ratio	z-test	P-value
MRSA	366	62.7%	218	37.3%	1.68:1	6.331	<0.001
MSSA	499	62.1%	305	37.9%	1.64:1	7.050	<0.001
<i>S. aureus</i>	865	62.3%	523	37.7%	1.65:1	9.472	<0.001

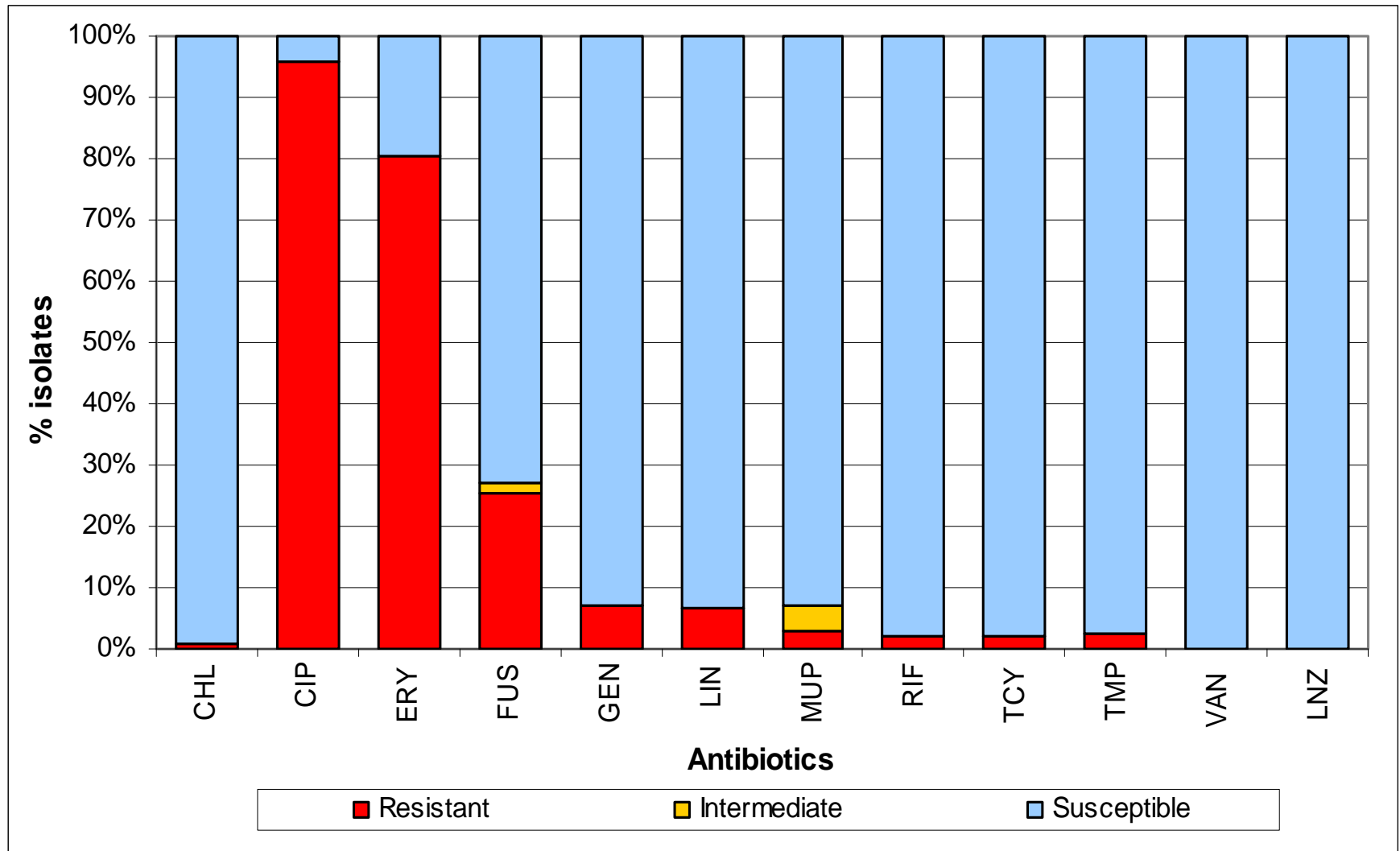
In patients with laboratory-confirmed *S. aureus* bacteraemia in Ireland in 2006, males were approximately 1.6 to 1.7-times more likely to get an infection (either MRSA, MSSA or total *S. aureus*) than females. These findings were significant ($P<0.001$)

Susceptibility data for *S. aureus* bacteraemia isolates reported in Ireland in 2006



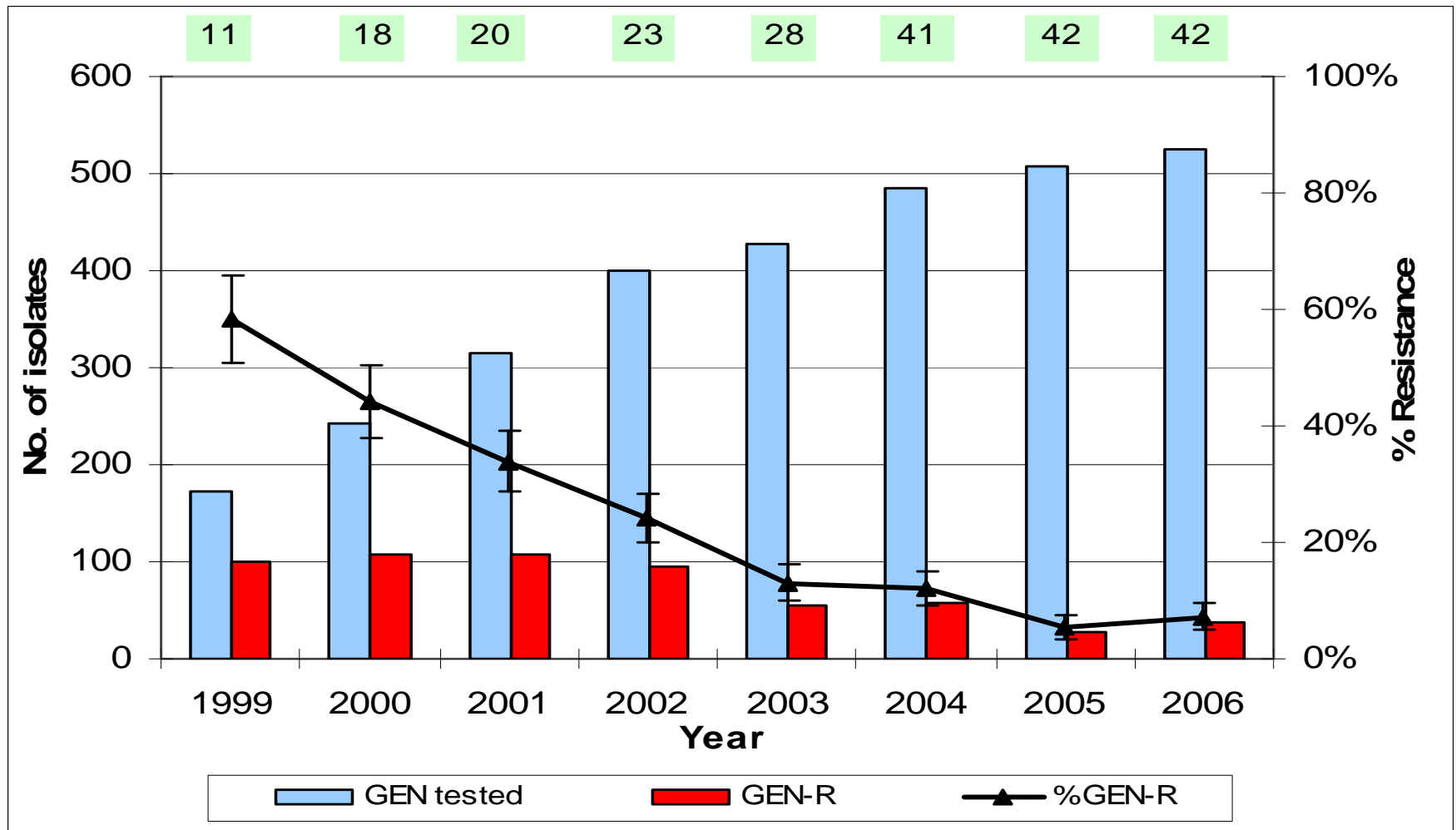
Percentage resistance is indicated above the bar

Antibiogram results for MRSA isolates referred to NMRSARL (n=526) in 2006



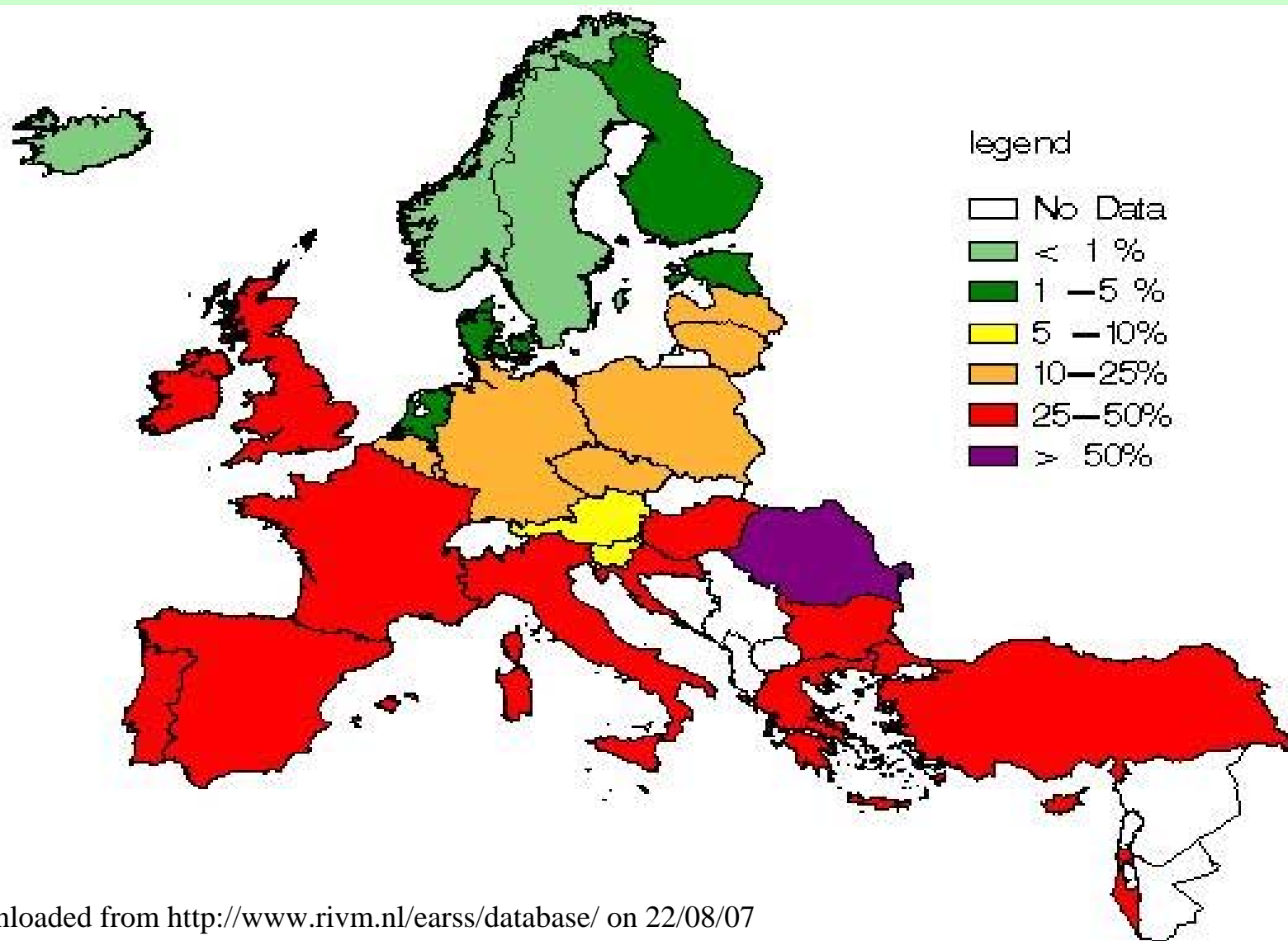
Trends in proportion* of gentamicin resistance among MRSA isolates, 1999-2006

(reflecting changes in the profile of circulating epidemic strains of MRSA)



* Data from National MRSA Reference Laboratory; Changes in the numbers of participating laboratories are indicated above the bars

Distribution of MRSA in EARSS countries in 2006



Distribution of MRSA in EARSS countries in 2005

