



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

EARSS in Ireland, 2007

Results of invasive
Staphylococcus aureus infection
(blood) surveillance

Antibiotic codes and abbreviations:

CIP, Ciprofloxacin

FUS, Fusidic Acid

LIN, Lincomycin

MET, Meticillin

OXA, Oxacillin

RIF, Rifampicin

TEI, Teicoplanin

ERY, Erythromycin

GEN, Gentamicin

LNZ, Linezolid

MUP, Mupirocin

PEN, Penicillin

TCY, Tetracycline

VAN, Vancomycin

SAU, *Staphylococcus aureus*

MRSA, Meticillin-Resistant *S. aureus*

MSSA, Meticillin-Susceptible *S. aureus*

VISA, Vancomycin-Intermediate *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

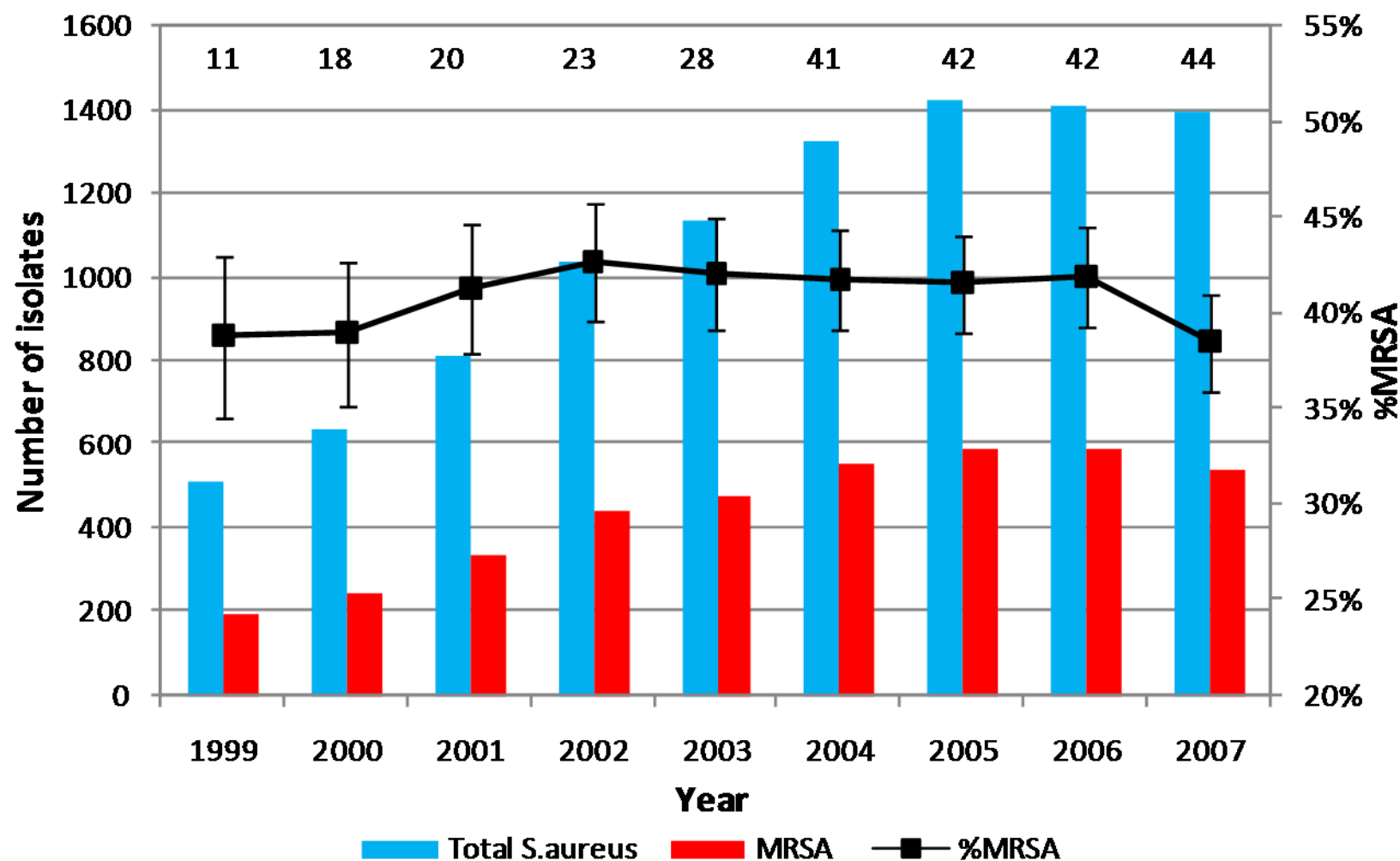
Caveats in interpreting EARSS data

- 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 from bacteraemia with 95% confidence Intervals (CI), 1999-2007

Year	Number of labs	Number of isolates	Number of MRSA	%MRSA (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	1412	592	41.9 (39.4-44.5)
2007	44	1394	537	38.5 (26.6-36.2)

EARSS in Ireland: *S. aureus* bacteraemia trends, 1999-2007



Number of laboratories participating by year-end indicated above the bars

Rates of *S. aureus* and MRSA bacteraemia, 2003-2007

Year	No. labs (No. hospitals)	No. SAU reports*	No. MRSA reports*	% MRSA	No. bed days used** (% 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)
2007	34 (51)	1340	527	39.3%	3,717,474 (99)	0.30 (0.34-0.38)	0.14 (0.13-0.15)

* From acute public hospitals only

** Bed days used calculated from Acute Public Hospital Activity 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 acute;
In 2007, acute services at other 2 hospitals transferred to a new campus at a nearby tertiary centre

Vancomycin-Intermediate S. aureus (VISA) reports from EARSS in 2007*

In Q2 2007, one MRSA isolate with reduced susceptibility to vancomycin was detected by the Etest macromethod with a value of 12mg/L

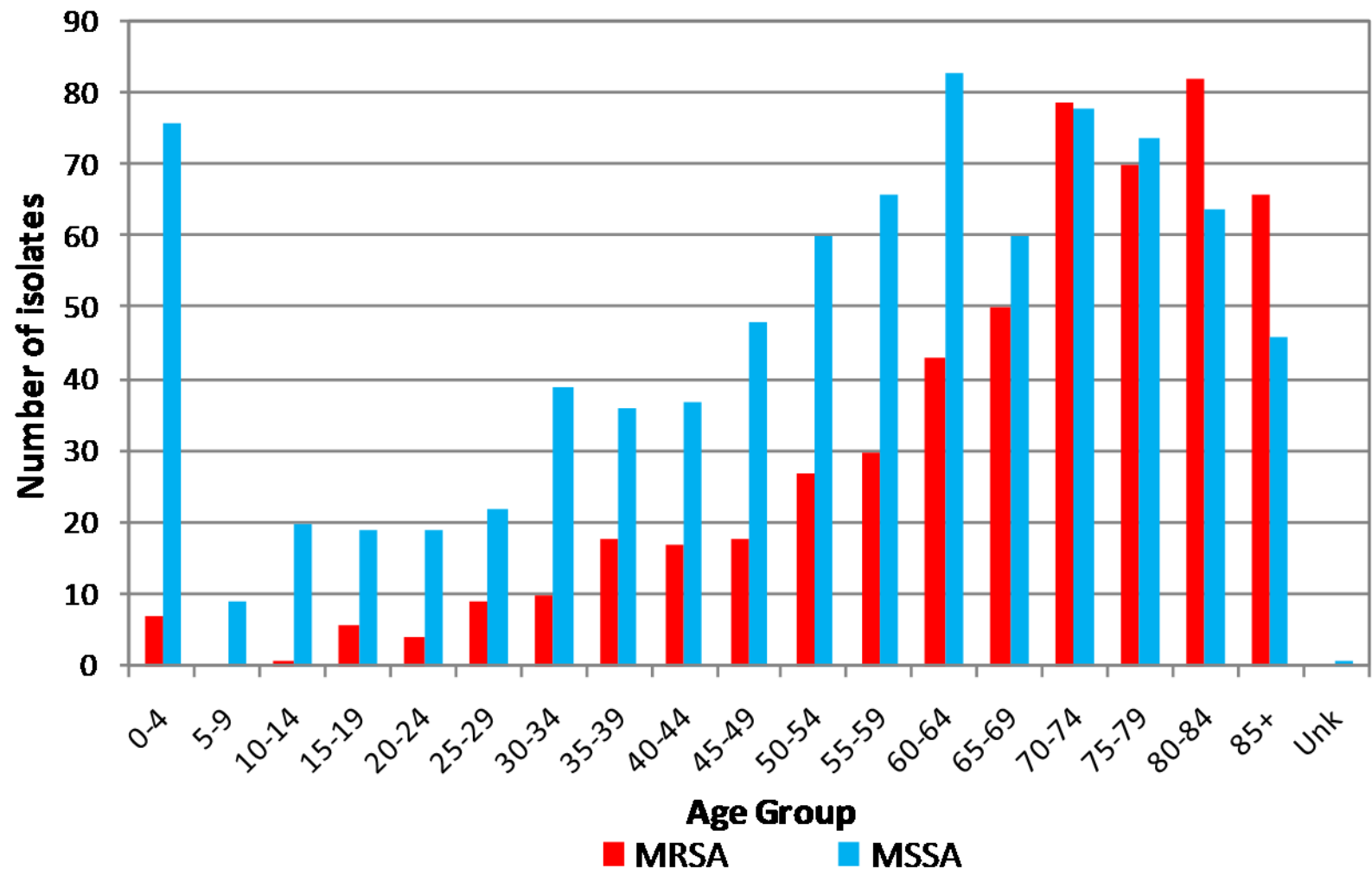
The vancomycin MIC for this isolate was 4mg/L, by which it is classified as VISA according to the latest CLSI guidelines. The isolate was shown to be hetero-VISA (or h-VISA) by Population Analysis Profiling (PAP)

In 2006, two VISA isolates were detected, which were the first reports of VISA from EARSS in Ireland:

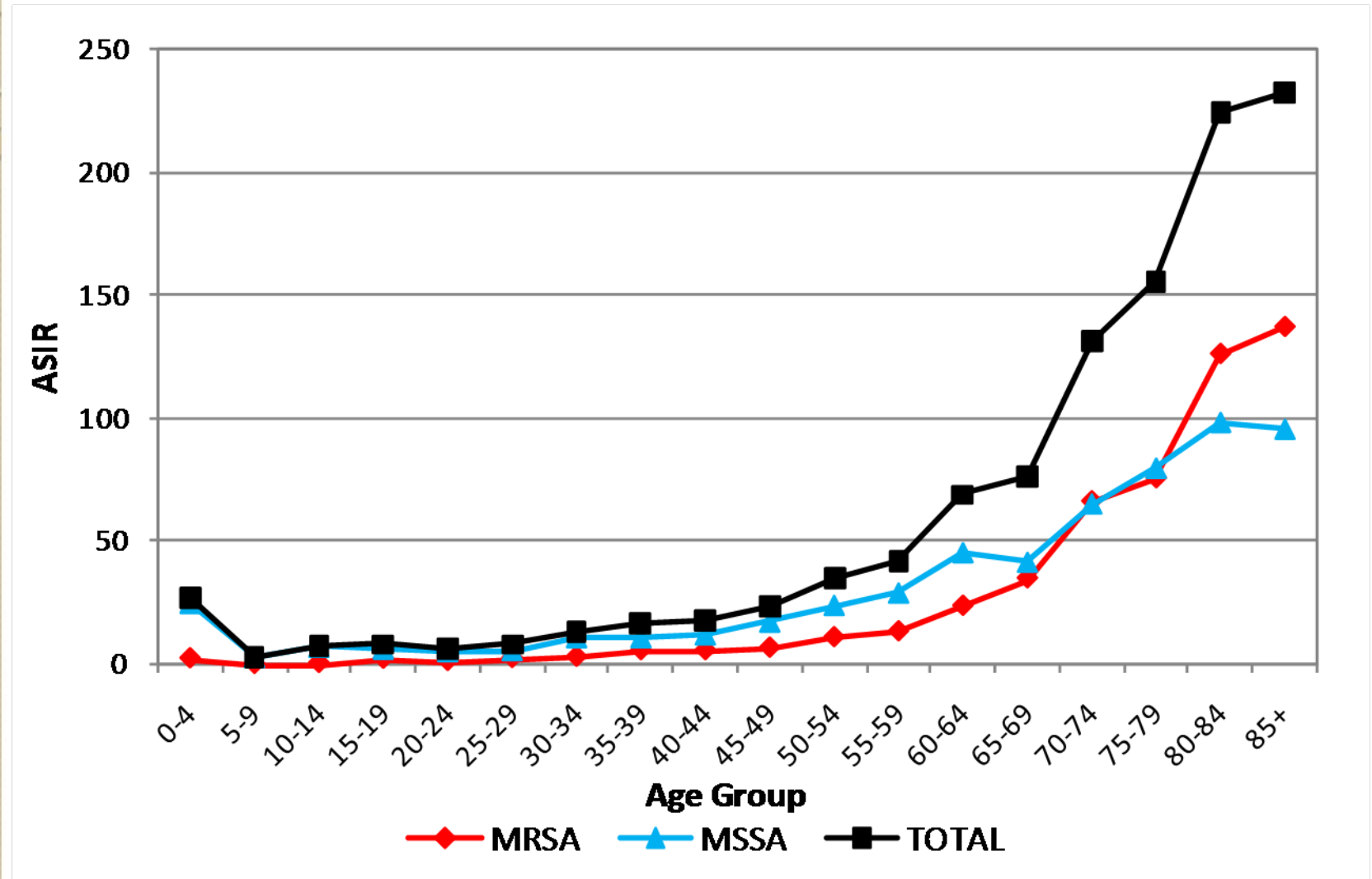
- both were confirmed as VISA by CDC
- one was shown to be VISA and the other to be h-VISA by PAP

*Data from the National MRSA Reference Laboratory, where all EARSS MRSA isolates submitted by participating laboratories are tested for reduced susceptibility to vancomycin

Age distribution of patients with MRSA and MSSA bacteraemia in 2007

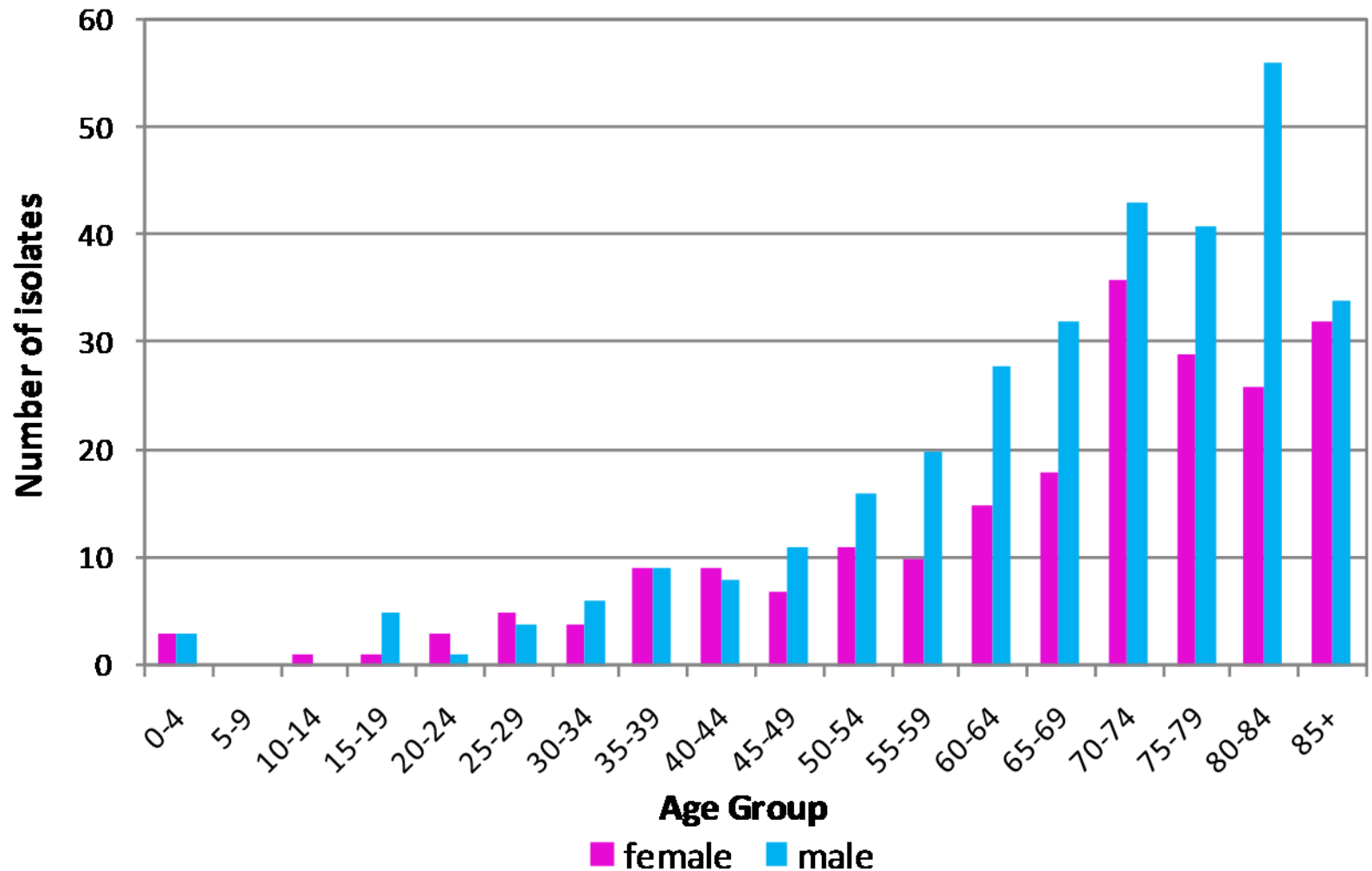


Age-specific incidence rates of MRSA and MSSA bacteraemia in 2007

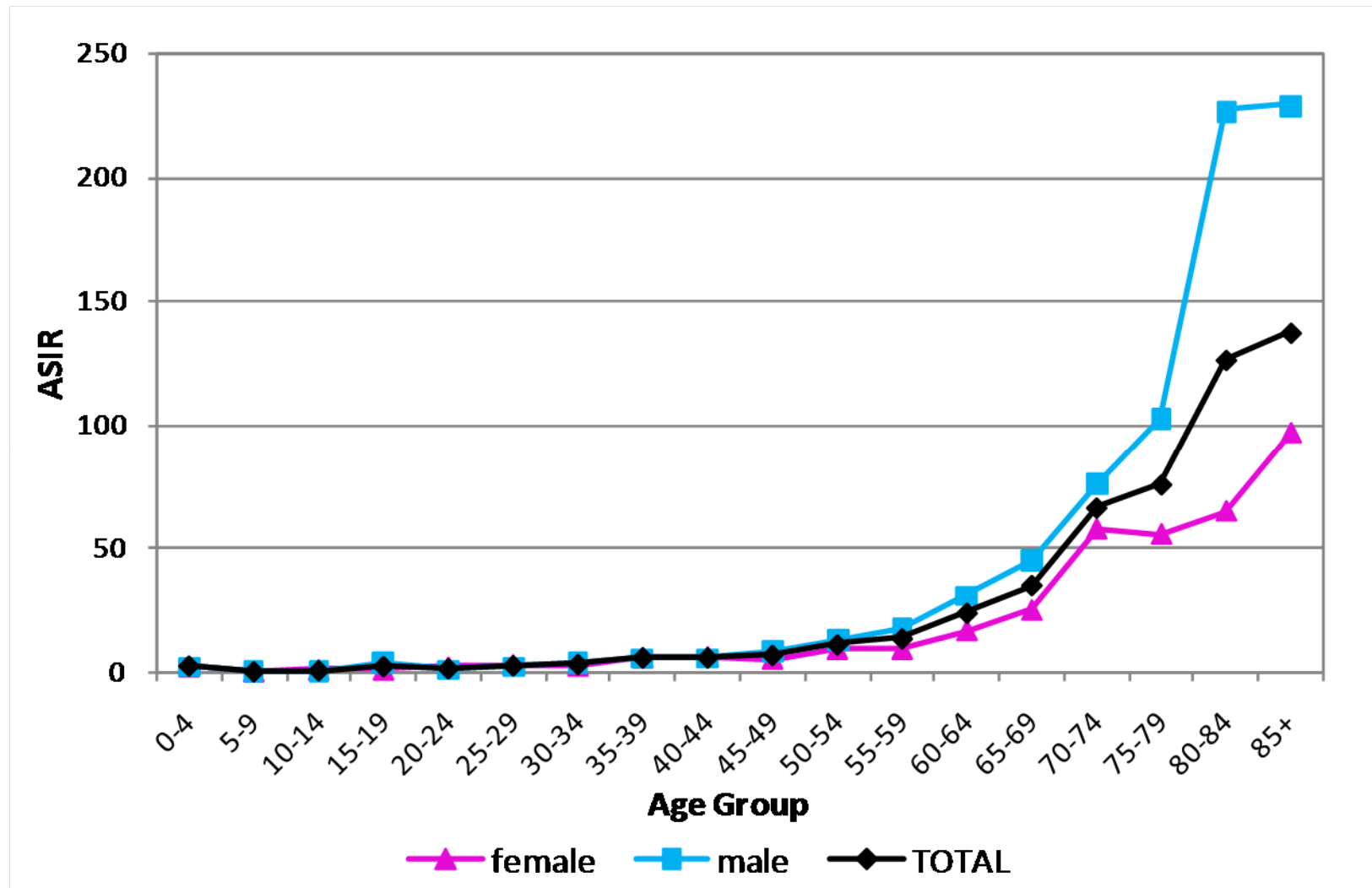


ASIR, Age-Specific Incidence Rate (per 100,000 population)

Age and sex distribution of patients with MRSA bacteraemia in 2007

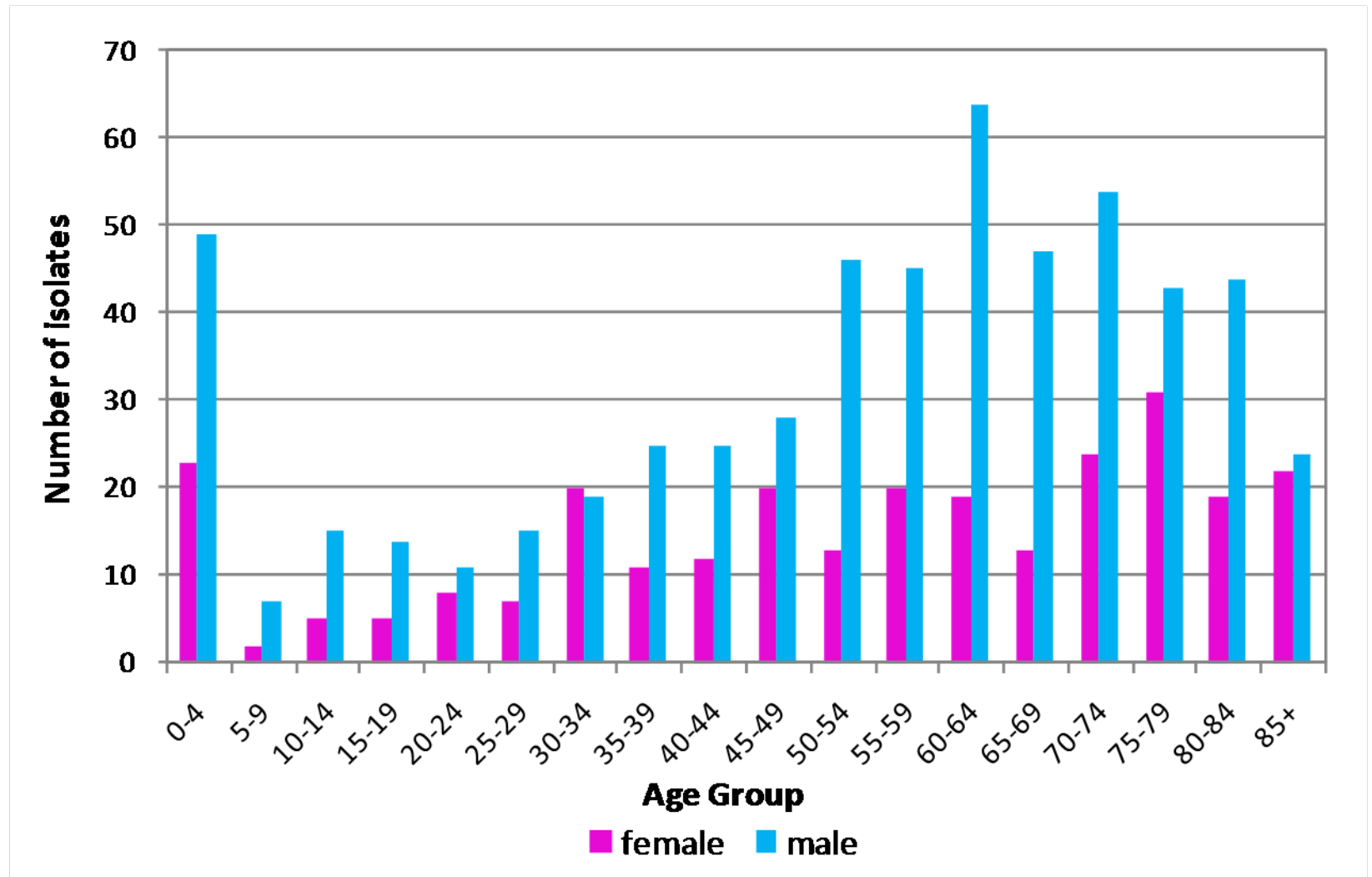


Age and sex-specific incidence rates of MRSA bacteraemia in 2007

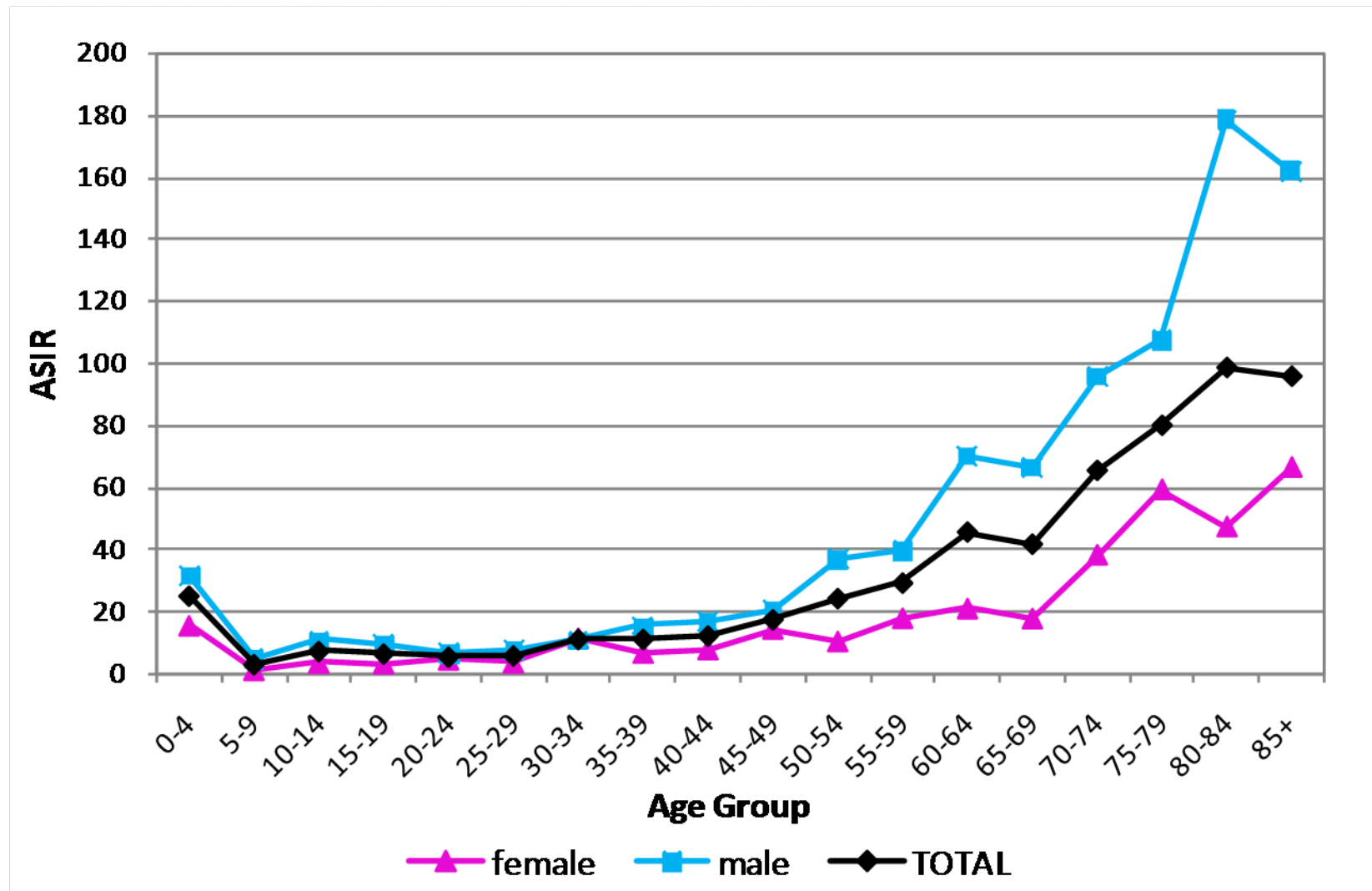


ASIR, Age-Specific Incidence Rate (per 100,000 population)

Age and sex distribution of patients with MSSA bacteraemia in 2007



Age and sex-specific incidence rates of MSSA bacteraemia in 2007



ASIR, Age-Specific Incidence Rate (per 100,000 population)

Mean, median, mode and range of ages of patients with *S. aureus* (MRSA and MSSA) bacteraemia in 2007

	MRSA	MSSA	SAU
n	537	858	1394
n with age	537	857	1393
Mean	66.3y	52.1y	57.6y
Median	71y (70-72y)	58y (56-60y)	63y (62-65y)
Mode	76y	0y	0y
Range	0-94y	0-97y	0-97y

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 in 2007

	MRSA	MSSA	Total
>=65y	347	322	669
<65y	190	534	724
Total	537	856	1393

$$\begin{aligned}\text{Relative risk (RR)} &= (347/669)/(190/724) \\ &= 1.98 \text{ (95\% CI: 1.71-2.28)}\end{aligned}$$

Chi-squared 96.4
P-value <0.0001

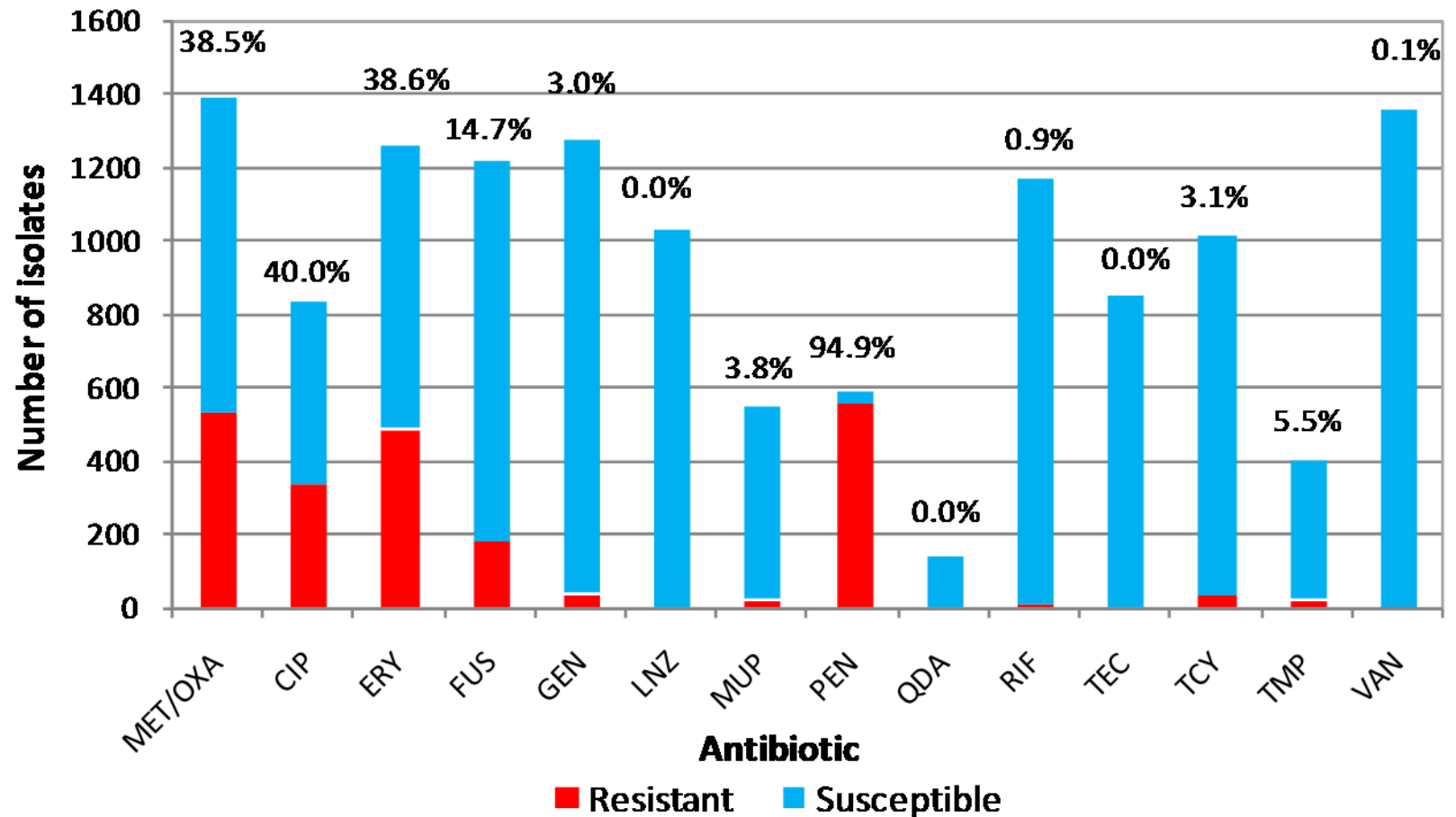
In patients with laboratory-confirmed *S. aureus* bacteraemia in 2007, the probability that the infecting organism was MRSA as compared to MSSA was almost 2-times greater in patients aged ≥ 65 years than in those aged < 65 years

Sex distribution of patients with *S. aureus* (MRSA and MSSA) bacteraemia in 2007

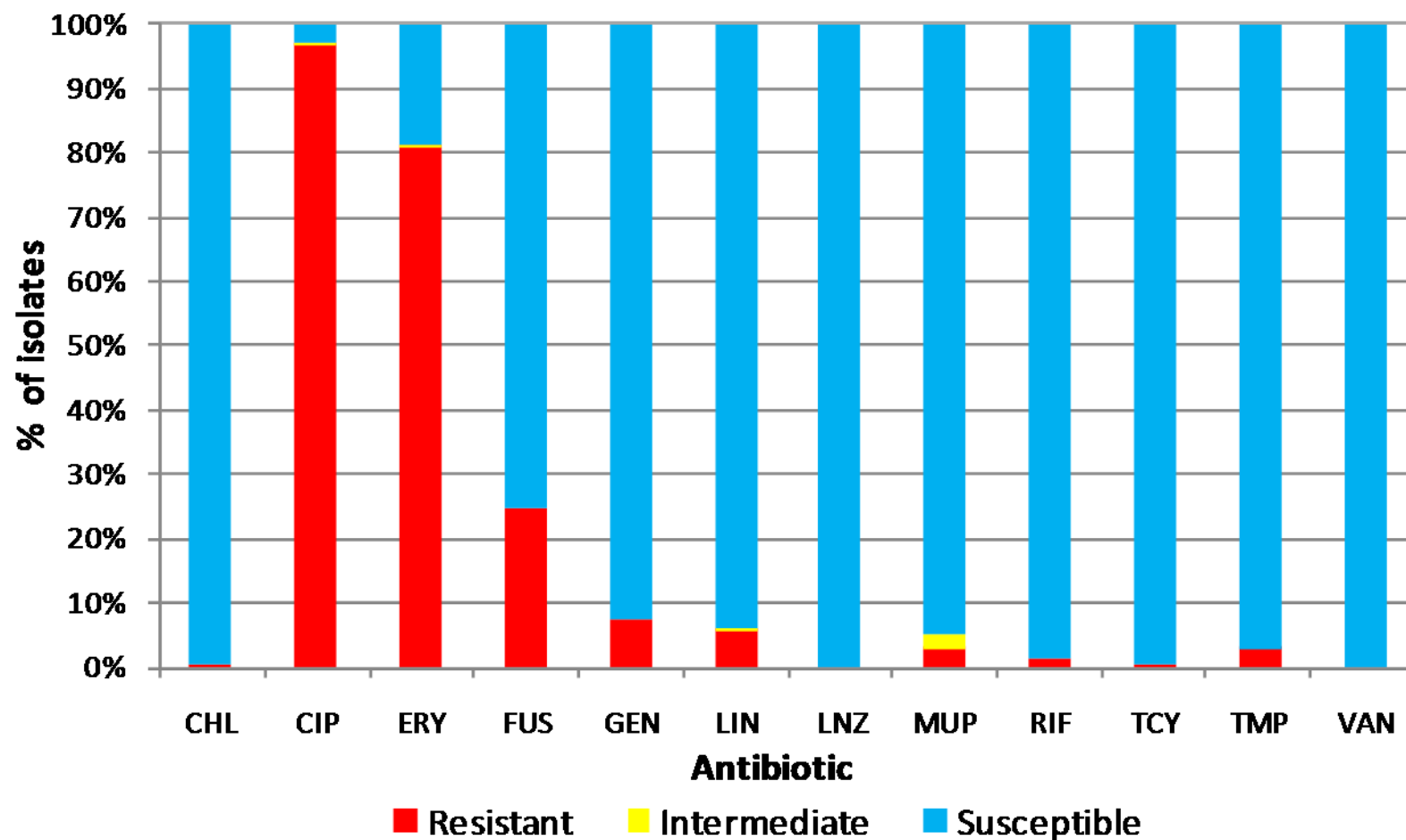
	MRSA	MSSA	SAU
No. male	319	575	894
%male	59.3	67.7	64.5
No. female	219	274	493
%female	40.7	32.3	35.5
m/f ratio	1.45:1	2.1:1	1.81:1
z-test	4.31	11.05	11.20
P-value	<0.0001	<0.0001	<0.0001

In patients with laboratory-confirmed *S. aureus* bacteraemia in 2007, males were approximately 1.8-times more likely to get an infection (1.45-times for MRSA; 2.1-times for MSSA) than females. These findings were significant ($P<0.0001$)

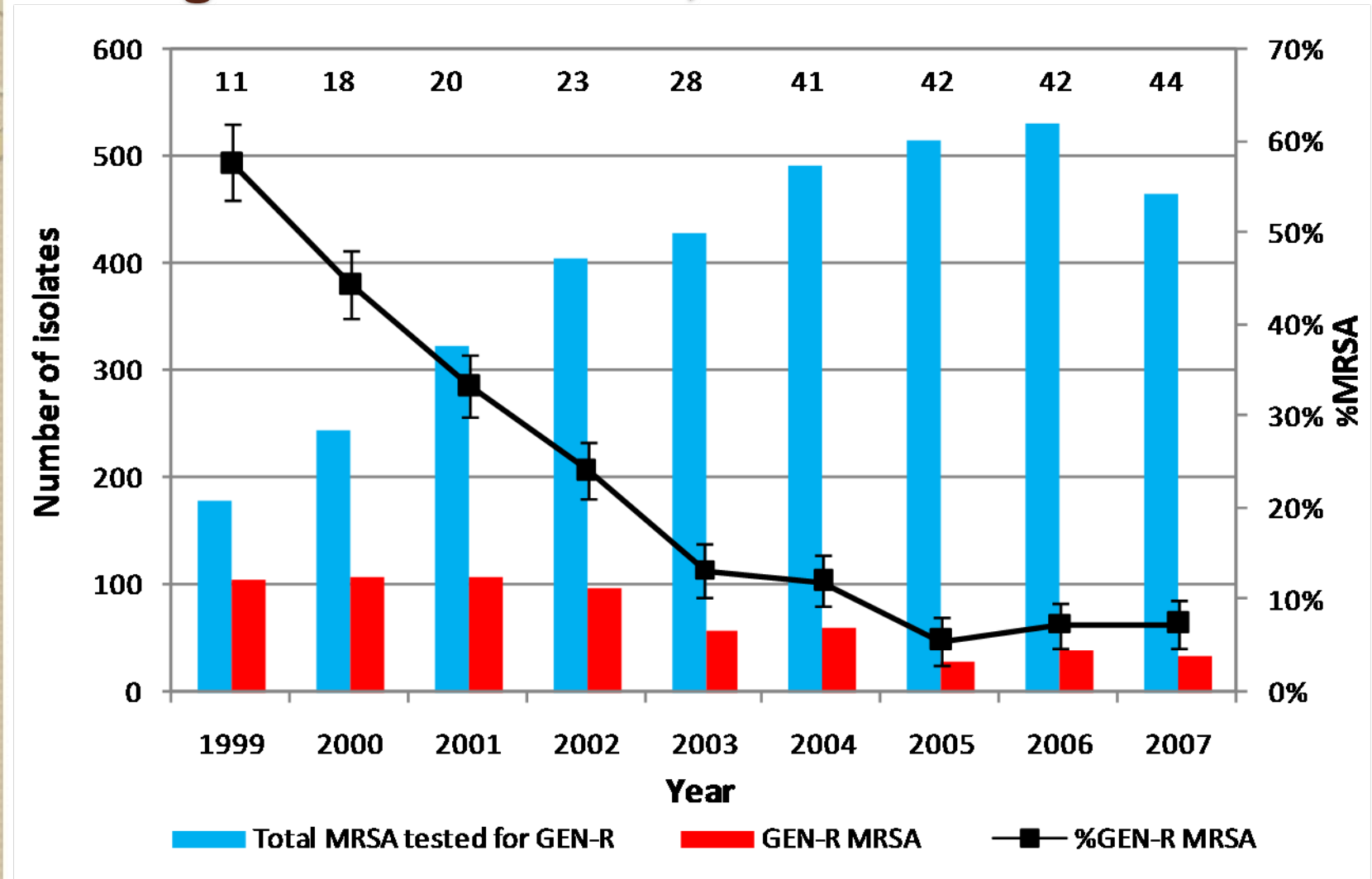
Susceptibility data for *S. aureus* bacteraemia isolates reported in 2007



Antibiogram results for MRSA isolates referred to NMRSARL (n=466) in 2007

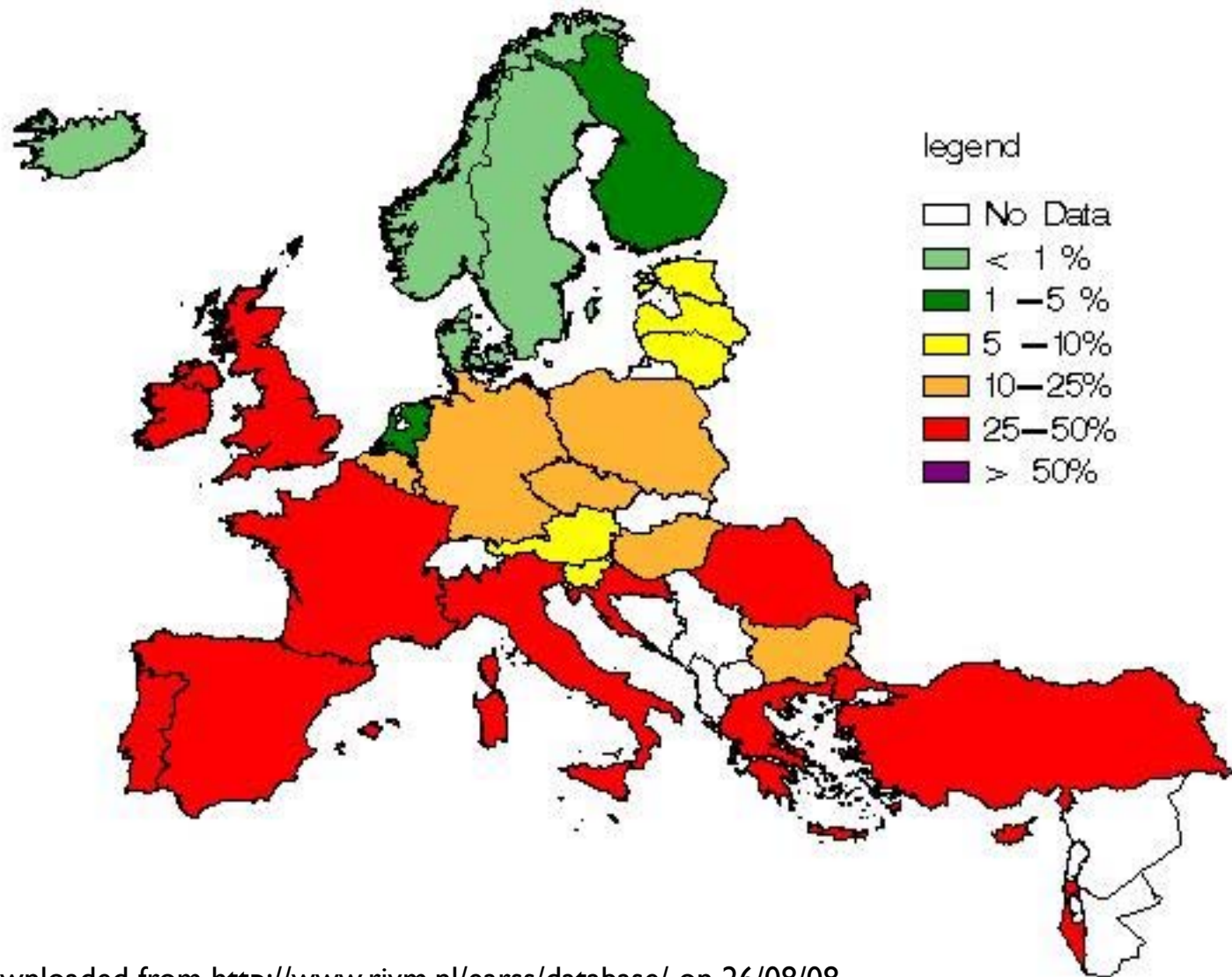


Trends in proportion of gentamicin resistance among MRSA isolates*, 1999-2007



* 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 2007



Distribution of MRSA in EARSS countries in 2006

