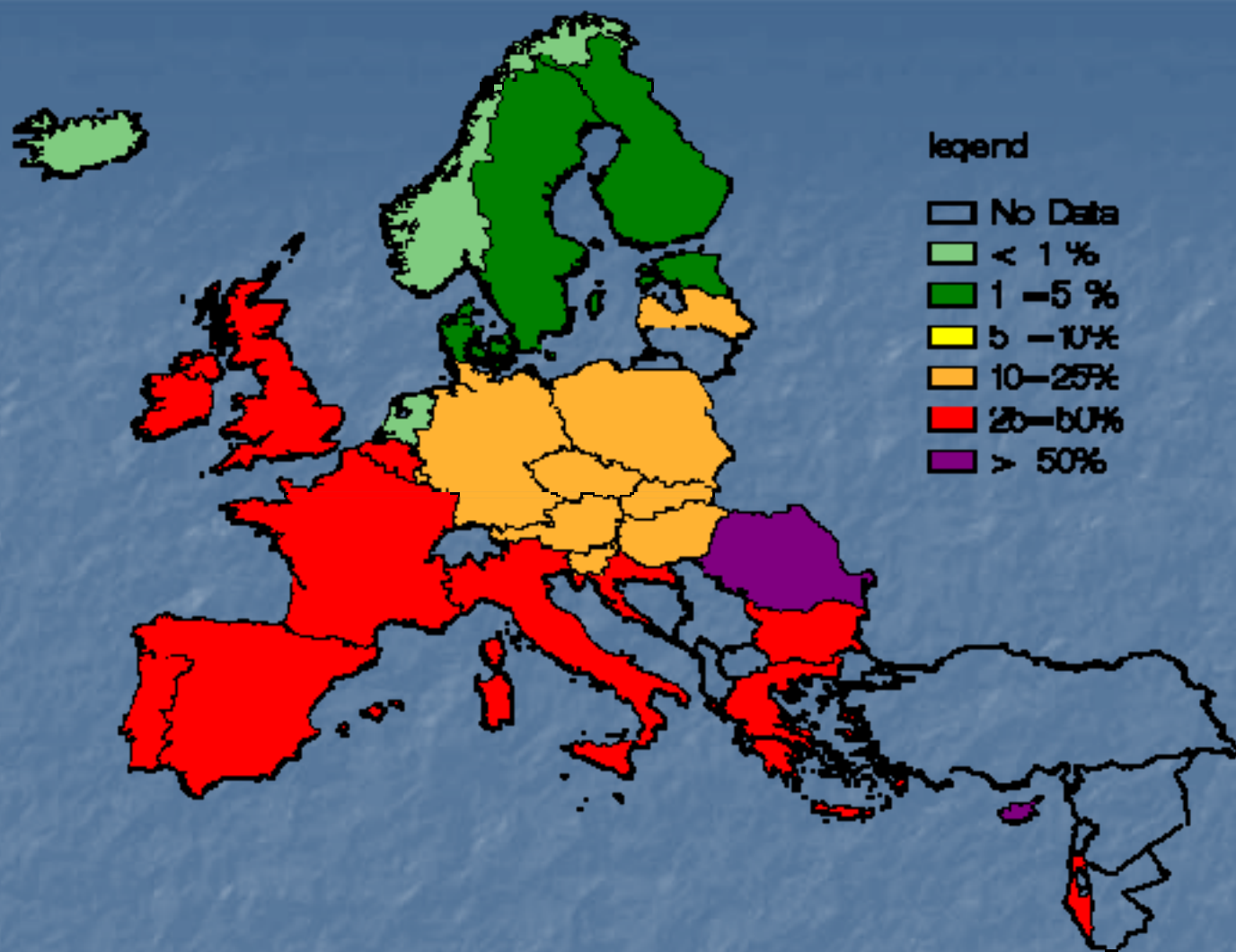


# MRSA in Mediterranean countries



A. Pascual MD, PhD. University of Sevilla. Spain

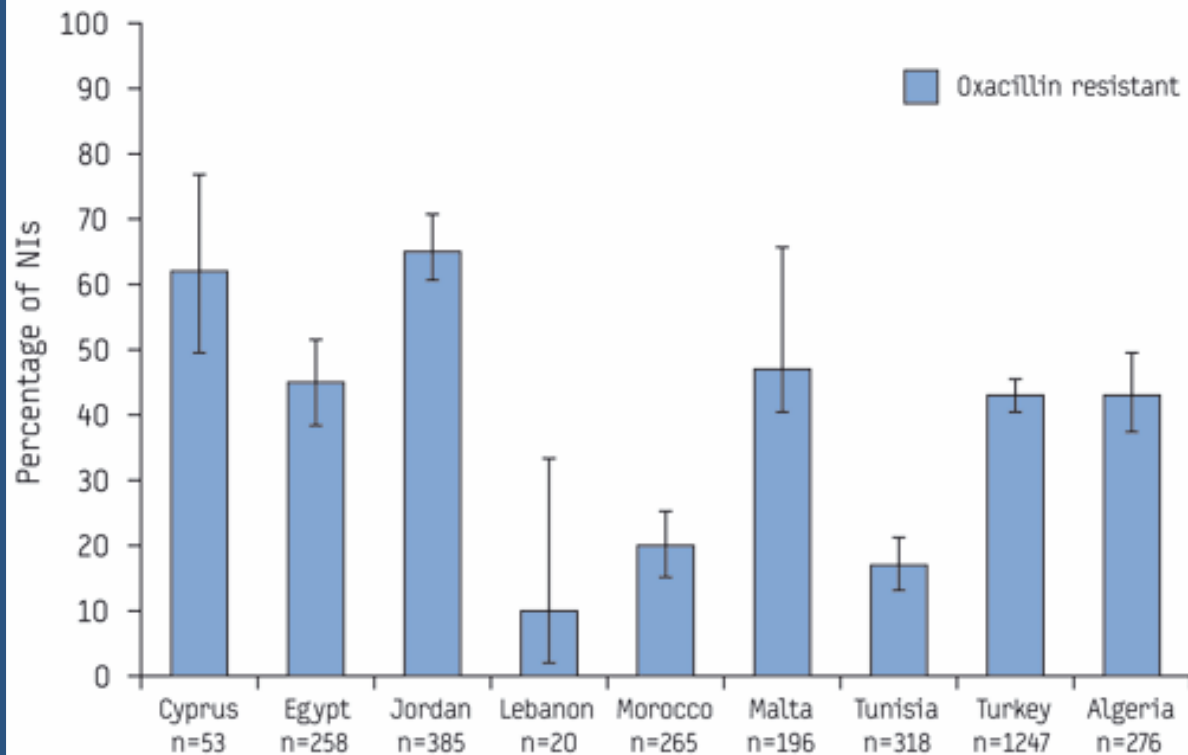


Proportion of MRSA in participating countries  
in 2005. EARSS

# Antibiotic Resistance Surveillance and Control in the Mediterranean Region (ARMed Project)

**FIGURE 2**

**Percentage of non-susceptibility to oxacillin (methicillin) in *Staphylococcus aureus* isolates reported by participating ARMed centres**



I: 95% confidence interval

Note: ARMed centres are grouped by country and reported number of isolates

# Potential repercussions of high levels of Methicillin resistance in southern and eastern mediterranean countries

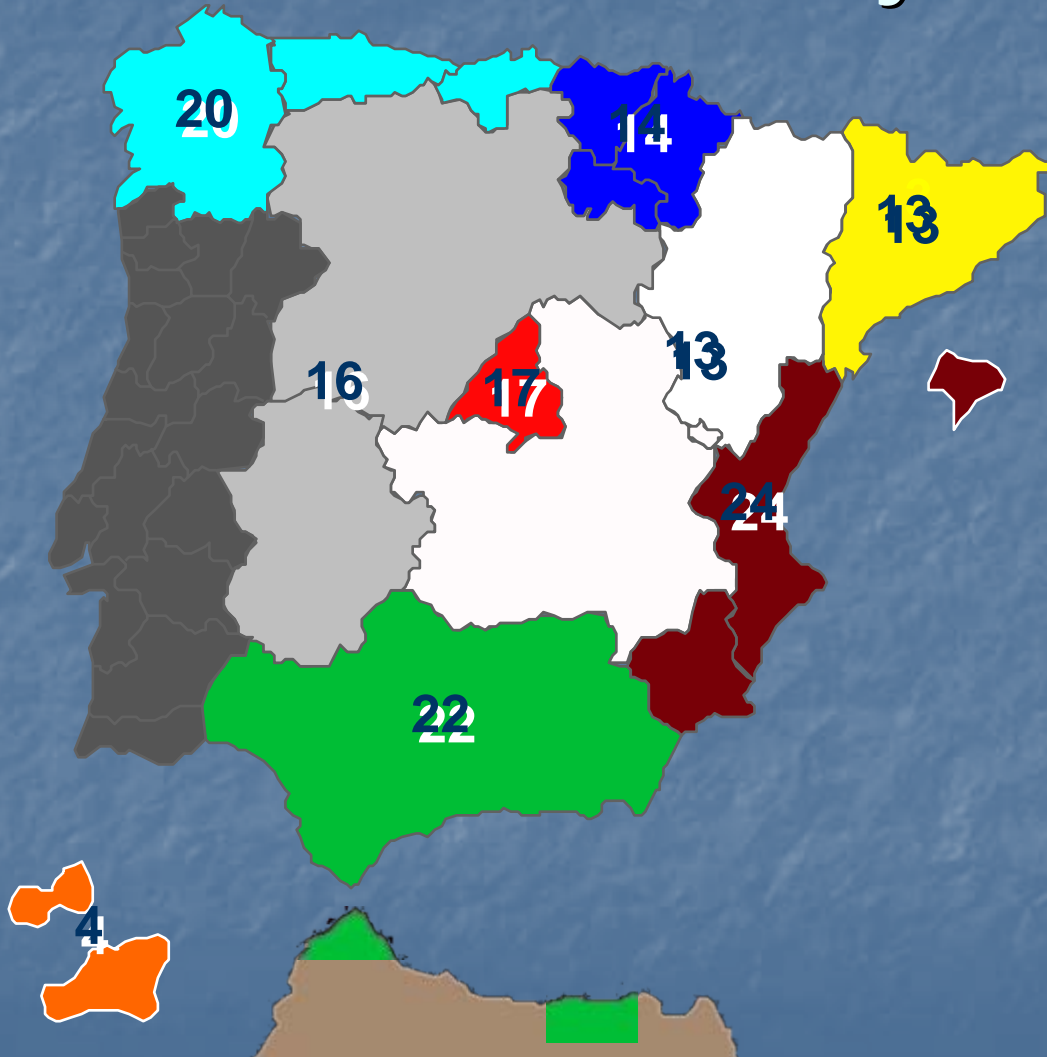
- Direct repercussions for the mediterranean countries.
- Importation (and spread?) of multiresistant microorganisms to european hospitals:
  - Tourism
  - Migration



# Prevalence of MRSA in Spain. 1986-2006

## Participating centers.

### 1-day study

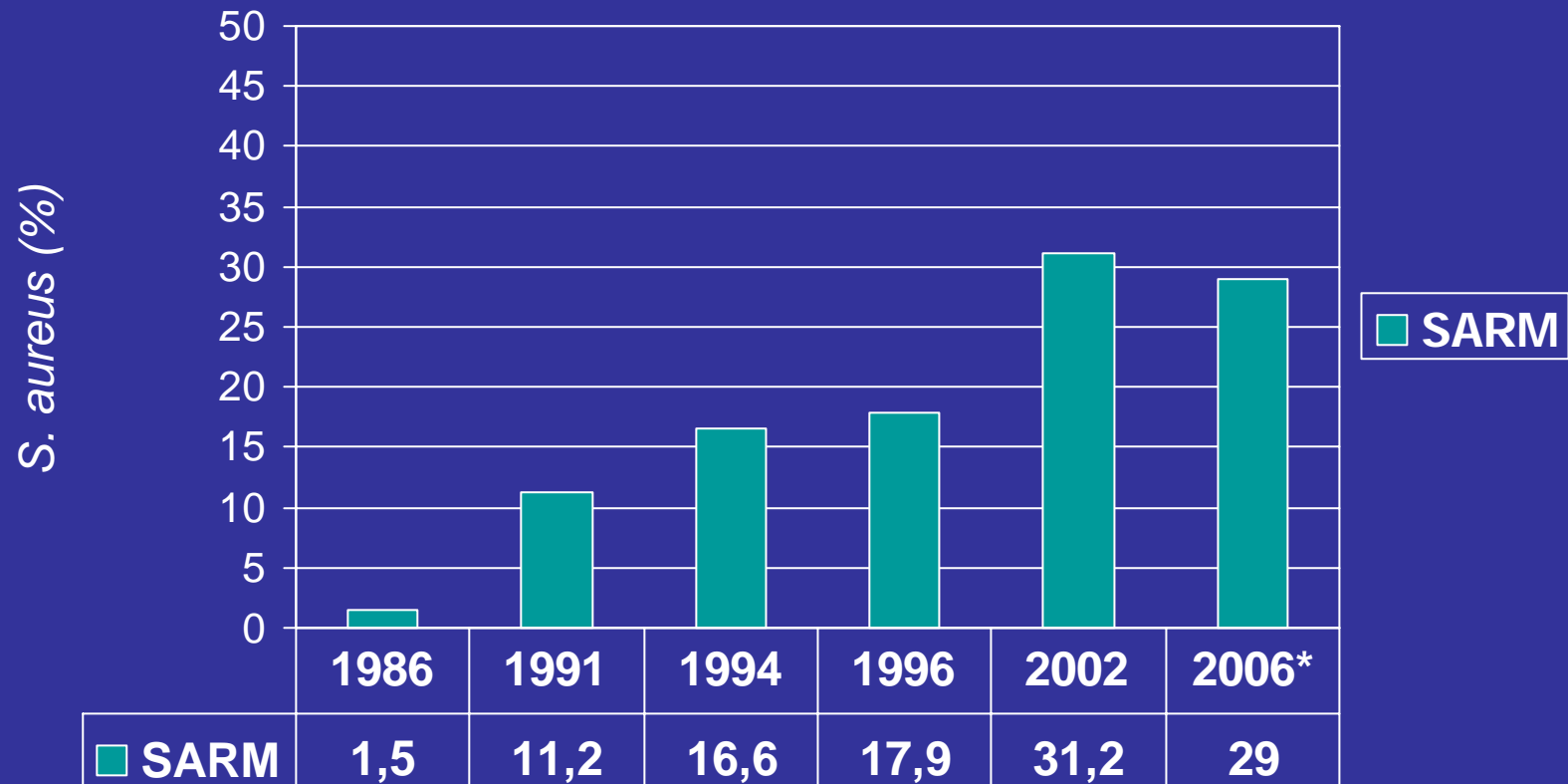


**143 Hospitals**

- 1.- Galicia, Asturias, Cantabria
- 2.- P. Vasco, Navarra, Rioja
- 3.- Cataluña
- 4.- Valencia, Murcia, Baleares
- 5.- Madrid
- 6.- Aragón, Castilla - La Mancha
- 7.- Castilla - León, Extremadura
- 8.- Andalucía, Ceuta, Melilla
- 9.- Canarias

## Evolution of the Antimicrobial Resistance of *Staphylococcus* spp. in Spain: Five Nationwide Prevalence Studies, 1986 to 2002

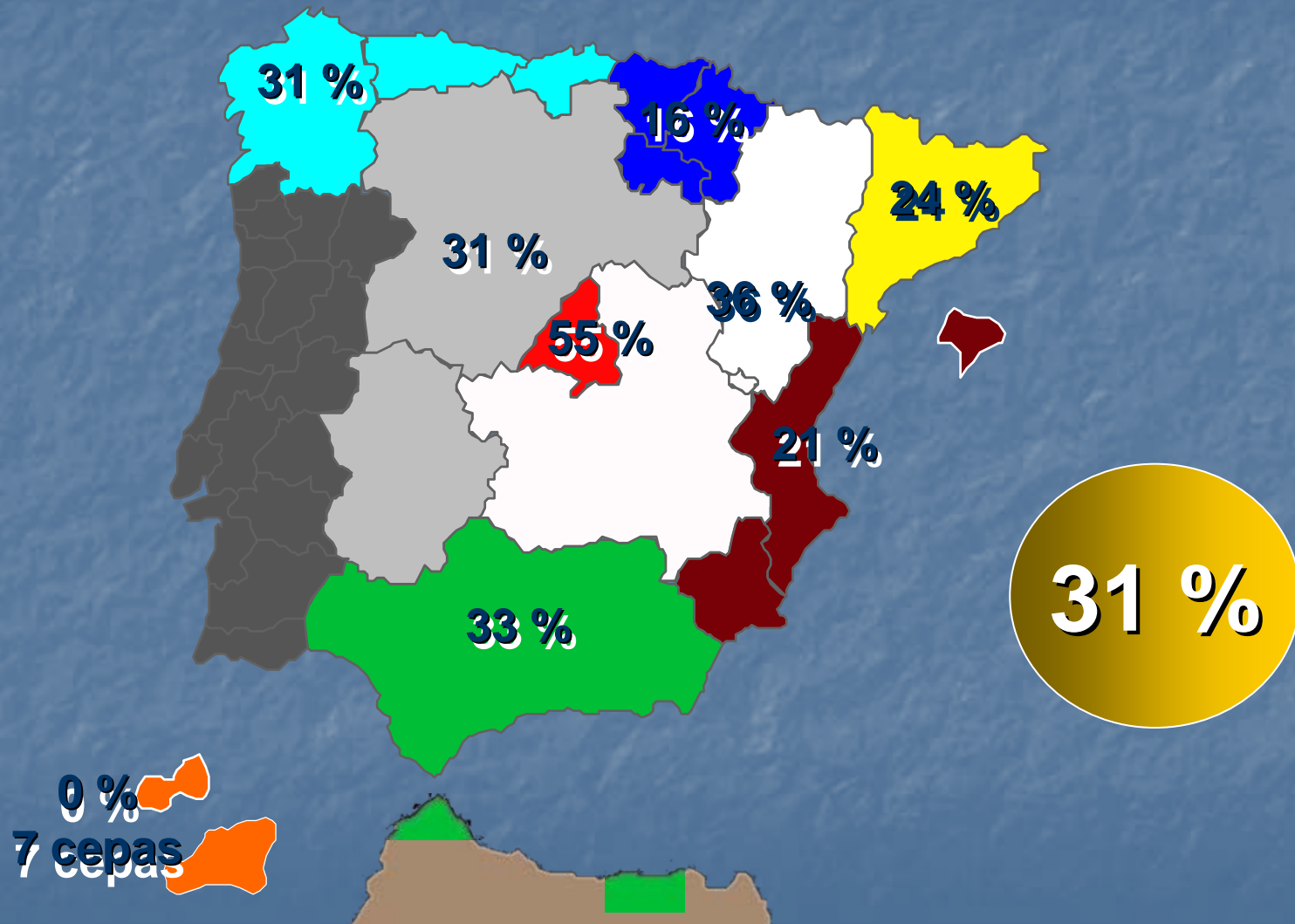
Oscar Cuevas, Emilia Cercenado,\* Ana Vindel, Jesús Guirao, Matilde Sánchez-Conde, Mar Sánchez-Somolinos, Emilio Bouza, and the Spanish Group for the Study of *Staphylococcus*†  
 Department of Clinical Microbiology and Infectious Diseases, Hospital General Universitario "Gregorio Marañón," Madrid, Spain



Cercenado E. et al. Rev Clin Esp 1997  
 Cuevas O. et al AAC 2004

\*Preliminar data (E. Cercenado)

# Prevalence of MRSA by Regions. Spain. 2002



Cercenado E. et al. Rev Clin Esp 1997  
Cuevas O. et al. AAC 2004

# MRSA control measures in Spain. Project SARM 2003 GEIH/GEMARA/REIPI

- Survey to 61 hospitals (16 million inhabitants)
- 81.7% had an specific MRSA control program.
- Infection control practitioners
  - $\geq 1$  nurse/250 beds: 46%.
- Isolation precautions with all MRSA patients: 95%
- Use of mupirocin to descolonize all patients: 54%
- High variability in measures and interpretation of the epidemiological situation.



**Control of endemic nosocomial  
methicillin-resistant *S. aureus*:  
relevance of active surveillance and  
colonized health care workers.**

**J. Rodríguez-Baño and A. Pascual.**

**University Hospital Virgen  
Macarena. Sevilla. Spain.**

# Hospital characteristics



- Regional University hospital: 1000 beds.
- Medical and surgical acute patients
- ICUs
  - General: 30 beds
  - Heart surgery: 15 beds
  - Surgical: 6 beds
  - Neonatal unit and paediatric ICU

# MRSA: background

- *Endemic* from 1990.
- 1995-1997: 45-50% of *S. aureus* were MRSA.
- Cases in all services.
- → A control program was designed

# Epidemiological investigation and pre-intervention situation.

- January 1998.
- Epidemiological investigation
- Implementation of contact precautions:
  - Reinforcement of hand hygiene.
  - Patients in individual rooms or in cohorts (open structure).
  - Contact precautions reinforced by infection control practitioner.
  - Strict cleaning policy and disinfection of devices.



# Active surveillance period (Period A)

- January 1999 (no changes). All previous plus:
- Units > 1 attributable case from the previous period:
  - *Screening* of patients admitted to these wards.
  - *Screening* of HCW of these units.
  - *Screening* of roommates of patients with MRSA in wards not subject to active surveillance.
- Treatment of colonized patients (nasal mupirocin) except: open wounds, respiratory tract colonization, mechanical ventilation, nasogastric tube, urinary colonization (catheterized patients), invasive MRSA infection and high level mupirocin resistance.

# Extended control period (Period B)

- January 2000. All previous plus:
- *Screening* patients admitted from other health care facilities and readmitted colonized patients.
- Re-evaluation of patients that had not been candidates for decolonization during hospitalization.
- Follow up of colonized patients after discharge.
- Alcohol solution dispensers in all rooms.

# Patients (1997-2003)

- MRSA isolated in 523 patients:
  - 29%: medical service
  - 33%: surgical service
  - 37%: ICUs
- MRSA infections in 390 patients (75%):
  - 38%: SSTI
  - 26%: RTI
  - 26%: Primary bacteremia
  - 14%: Vascular catheter infection
  - 10%: Other infections
- Crude mortality rate: 41%

# Evolution of MRSA during the 3 periods.

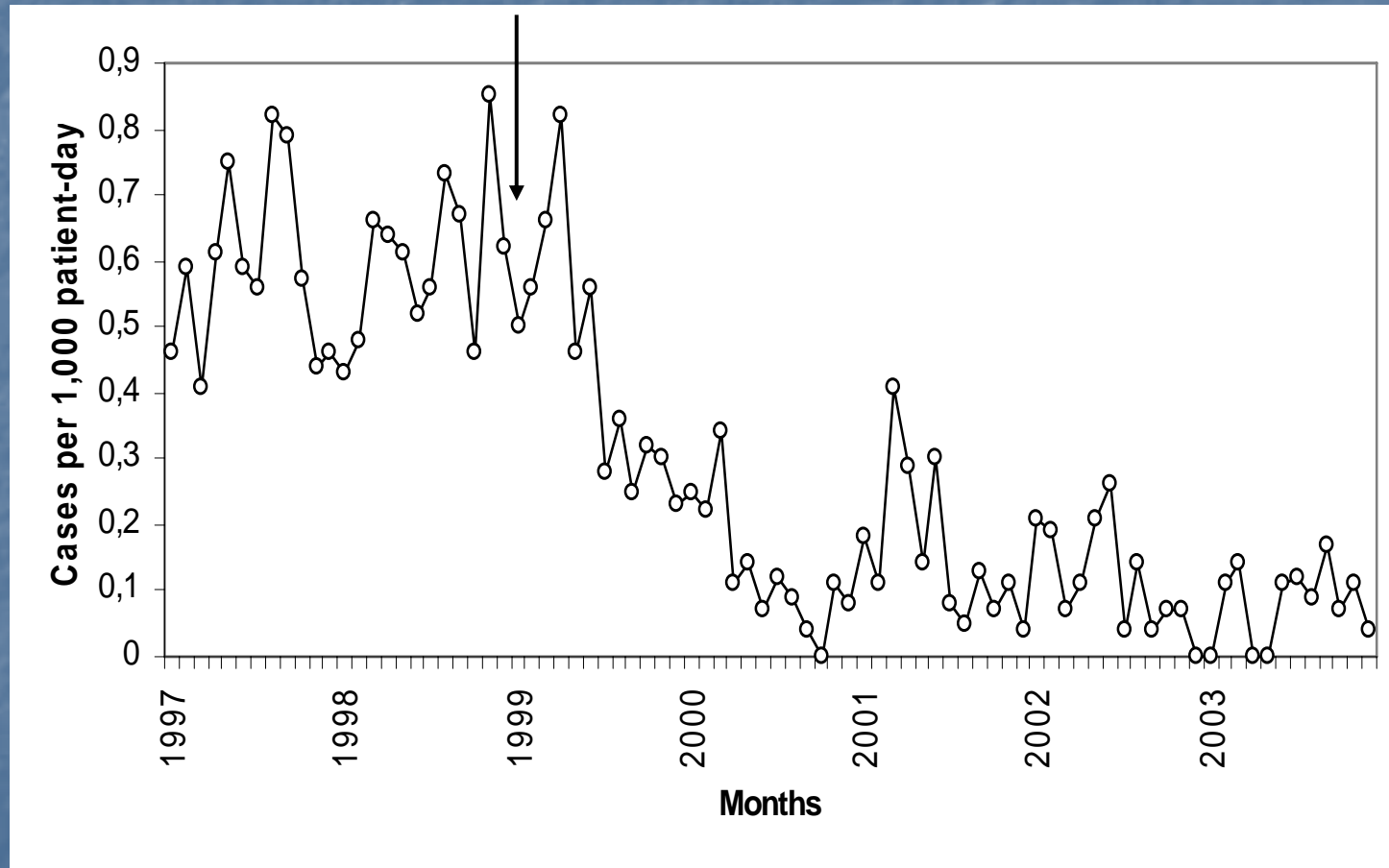
	Pre-intervention period (1997-1998)	Post-intervention period A (1999)	Post-intervention period B (2000-2003)
Incidence rate of colonization or infection due to MRSA	<b>0.59</b>	<b>0.46<sup>a</sup></b>	<b>0.12<sup>a</sup></b>
Percentage of methicillin resistance among <i>S. aureus</i> (range)	<b>47 (46-48)</b>	<b>35<sup>a</sup></b>	<b>11.5 (8-15)<sup>a</sup></b>
Incidence rate of bacteremia due to MRSA	<b>0.10</b>	<b>0.06<sup>b</sup></b>	<b>0.02<sup>a</sup></b>
Percentage of colonized patients detected by active surveillance	<b>3.1</b>	<b>5.9<sup>b</sup></b>	<b>13.5<sup>c</sup></b>
No. of health care workers colonized by MRSA	<b>0</b>	<b>10</b>	<b>12</b>
No. of detected MRSA-colonized patients admitted from other hospitals	<b>0</b>	<b>2</b>	<b>13</b>

P values with respect to period A: <sup>a</sup>P <0.0001; <sup>b</sup>P =0.2; <sup>c</sup>P =0.01

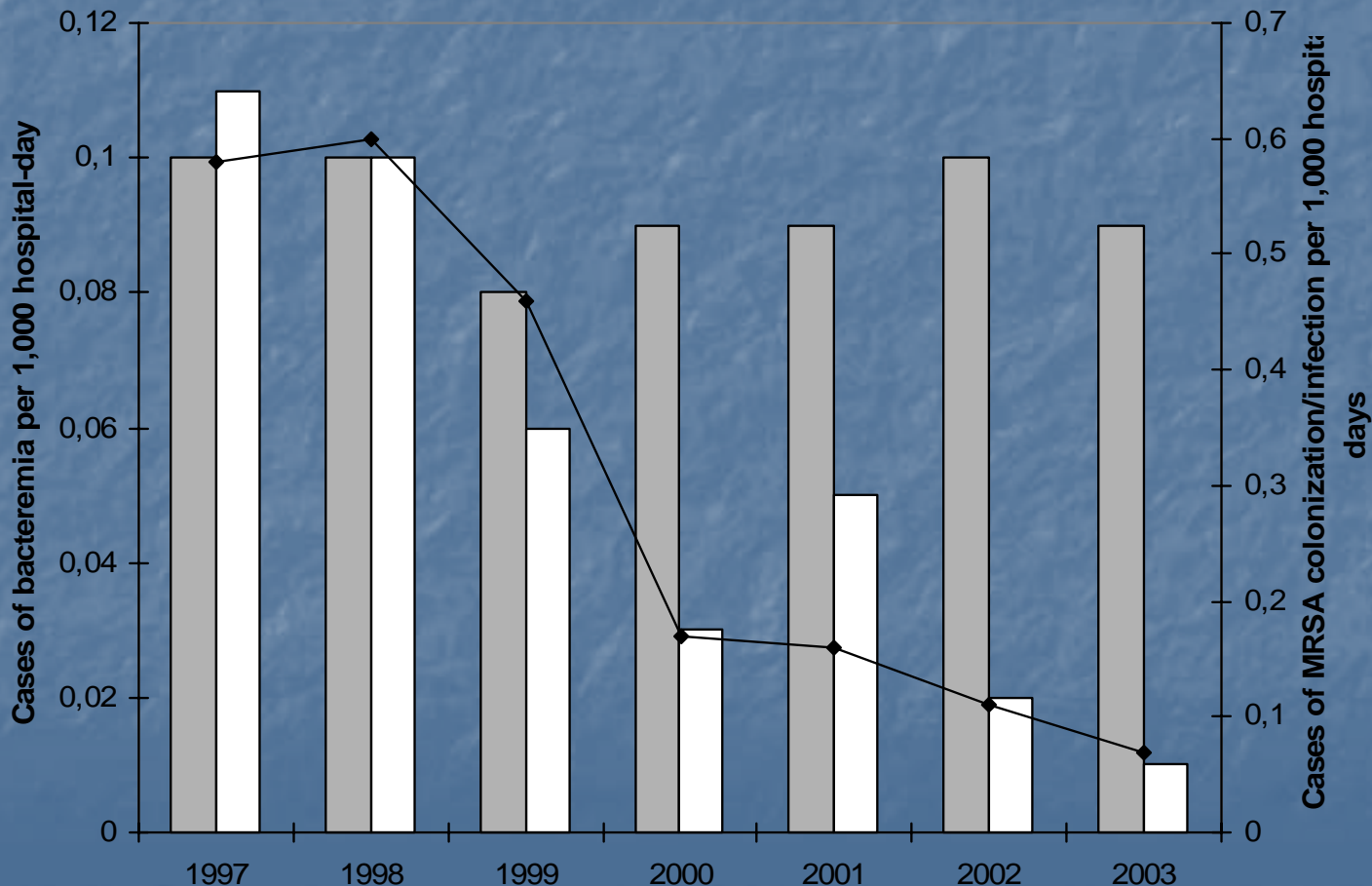
Incidence rates expressed as new cases per 1.000 patient-day



Monthly rates of methicillin-resistant *Staphylococcus aureus* colonization or infection. The arrow indicates the implementation of the intervention.



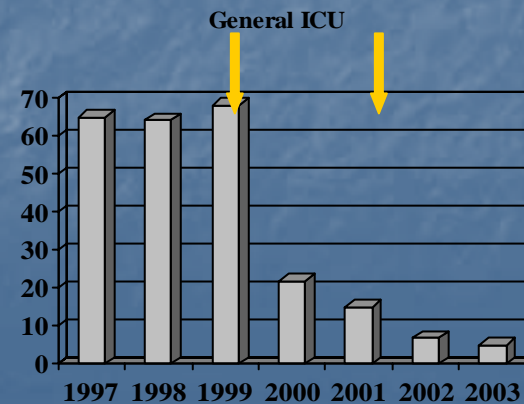
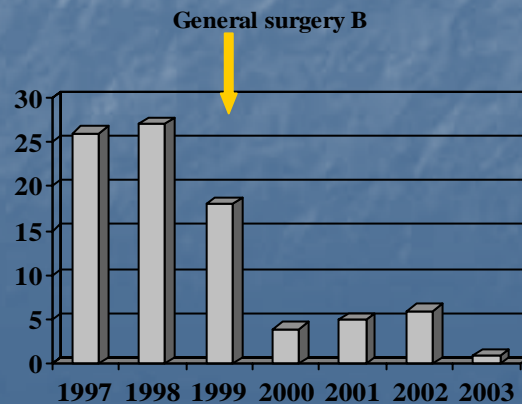
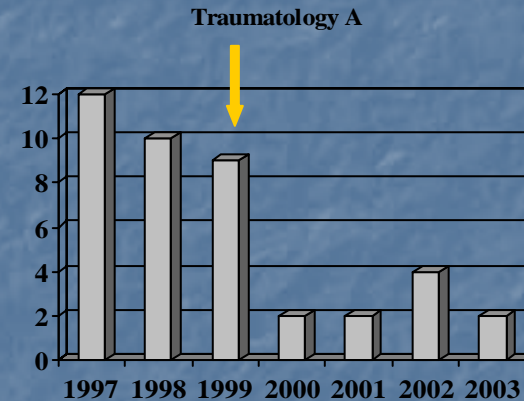
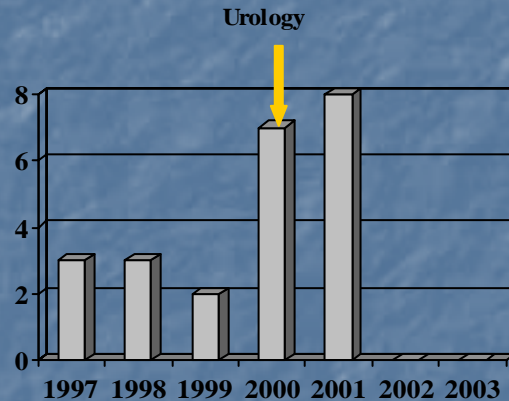
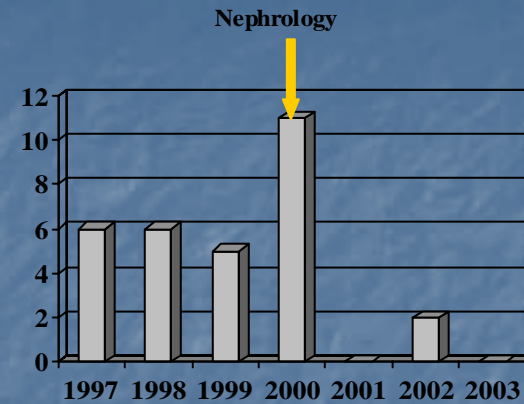
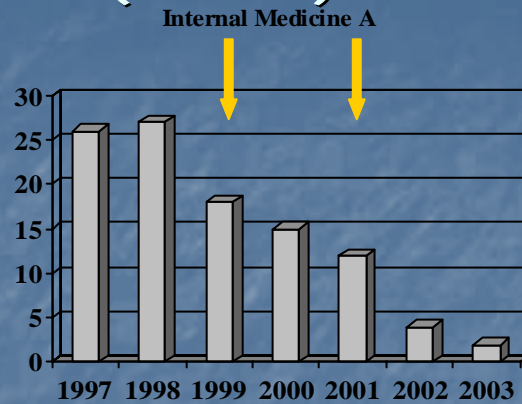
# Yearly evolution of the incidence rates of bacteremia due to MSSA (grey column), MRSA (white column) and colonization/infection due to MRSA (line)



# Microbiological Results

- PFGE was performed in 138 isolates:
  - 91 from blood cultures (86% of bloodstream infections).
  - 31 from screening (62% of all patients in active surveillance)
  - 16 from HCW (73% of colonized HCW).
- 13 clonal groups:
  - Clon A: 109 isolates; 79% (12 subtypes)
  - All isolates from HCW same clonal group than one or several patients admitted in their wards.
- 12 Resistance profiles (RP)
  - RP2 (R only to Ciprofloxacin): 35%
  - RP8 (R to ciprofloxacin, erythromycin and clindamycin): 37%

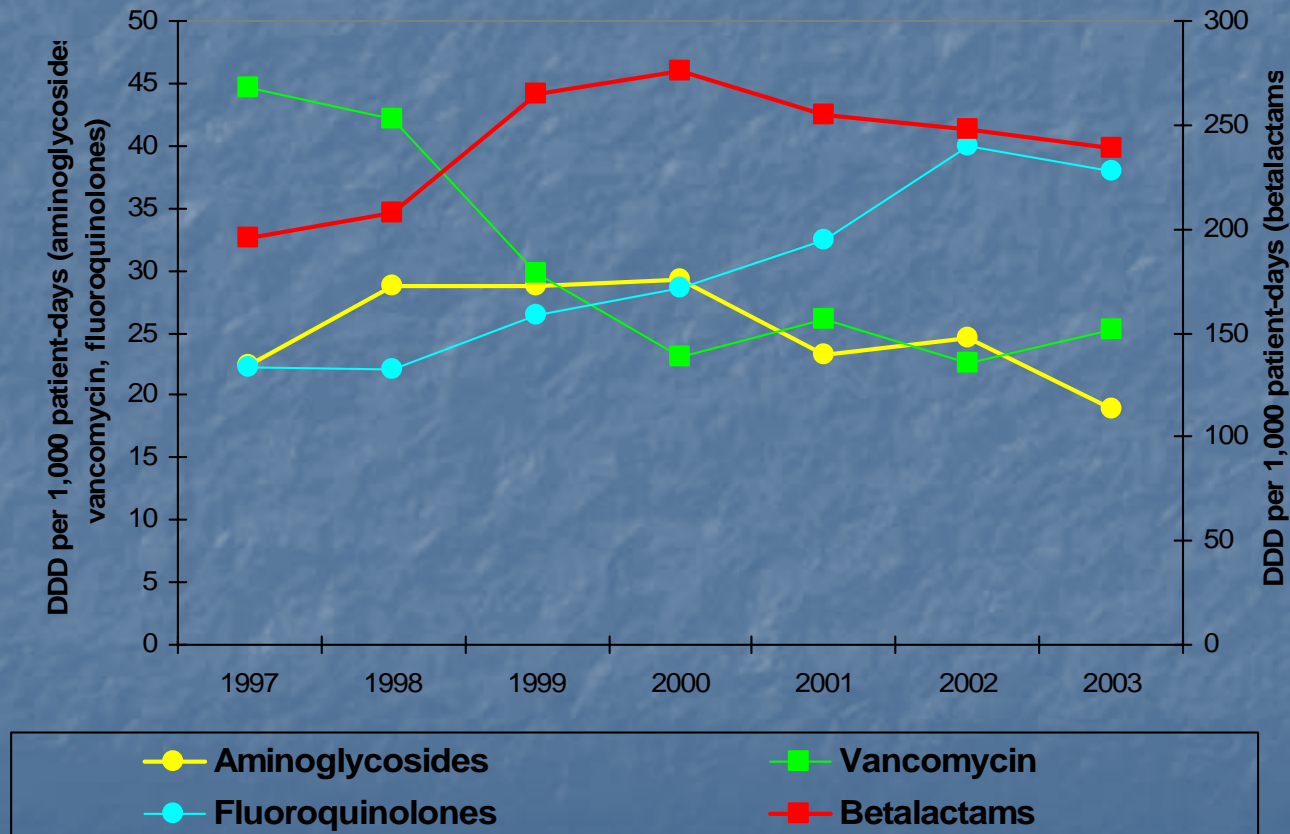
# Evolution of MRSA cases after detection and decolonization (arrows) of HCW in some wards.





# Antimicrobial consumption during the study period.

Data for betalactams are on a different scale.



# Limitations of the study

- Limitations of quasi experimental studies.
- We could not investigate the specific effects of all the control measures implemented (all were complementary).
- Our results might not be applicable to different epidemiological situations.

# Conclusions

- MRSA rates are very high in most of Mediterranean countries with important differences among them.
- Control of endemic MRSA is possible even in big hospitals by implementation of comprehensive control programs including active surveillance of patients and.....HCW!

# Another conclusion....

- MRSA is not transmitted by sea water (so far). It means that this problem is not due to Mediterranean Sea but to the people who live in countries around it!!!!