



# **Il problema delle infezioni dei CIED: incidenza, mortalità, costi**

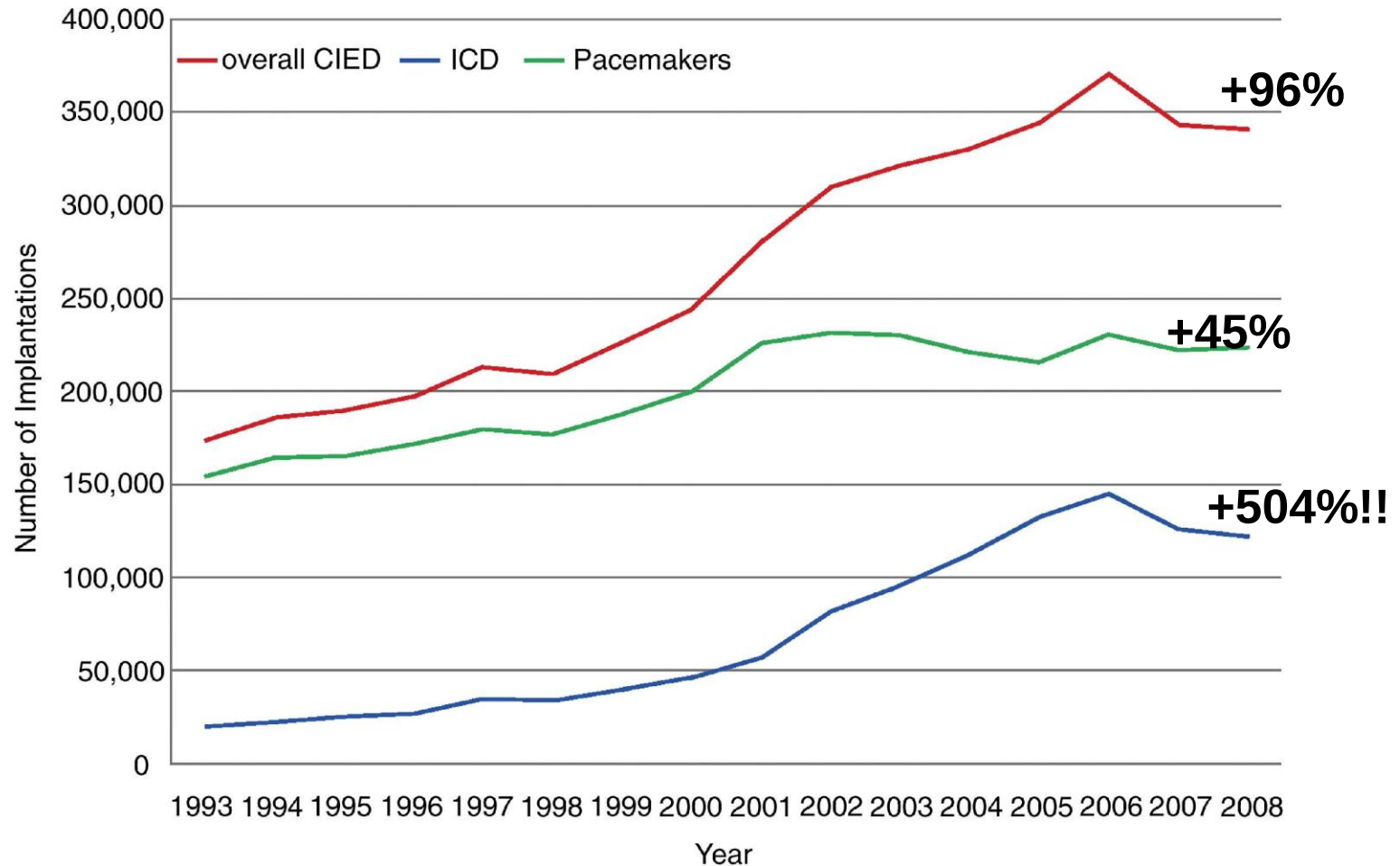
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U.O. Cardiologia

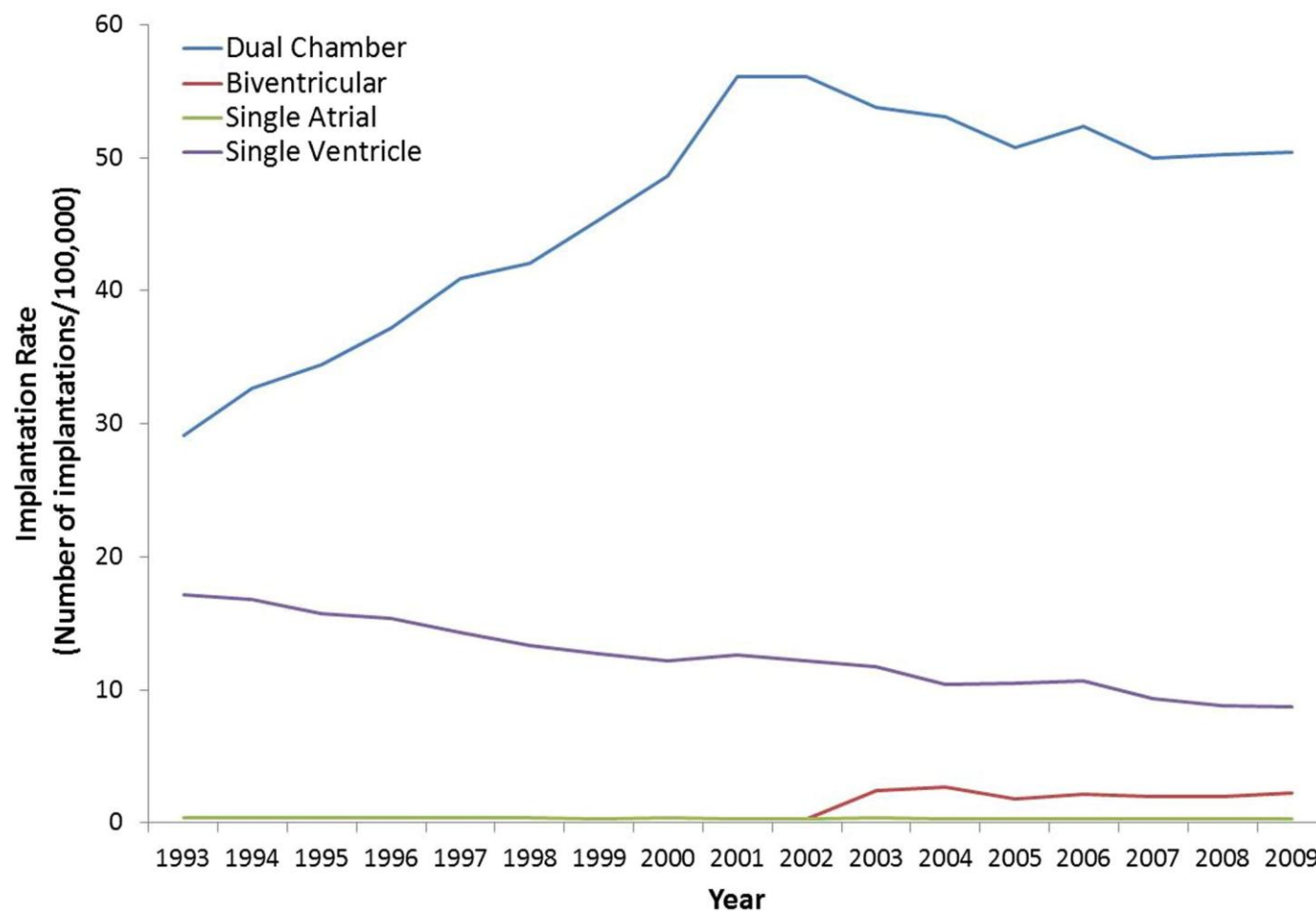
Ferrara

# Quali devices impiantiamo?



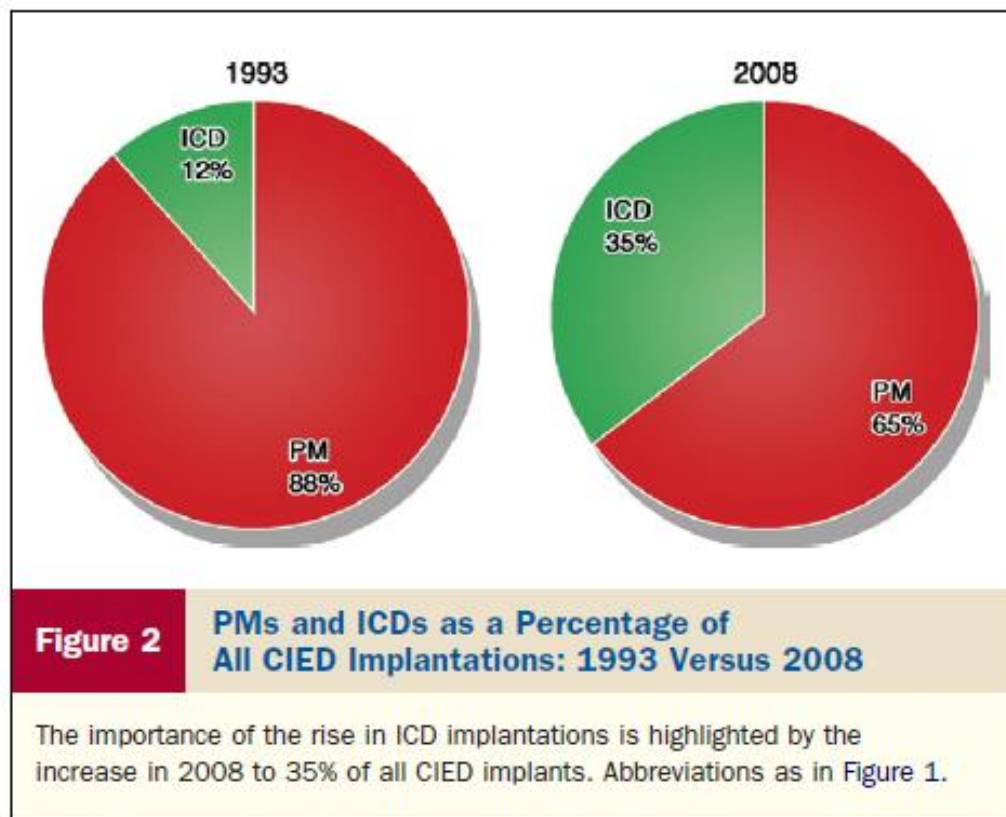
USA Nationwide Inpatient Sample discharge records

# Quali devices impiantiamo?

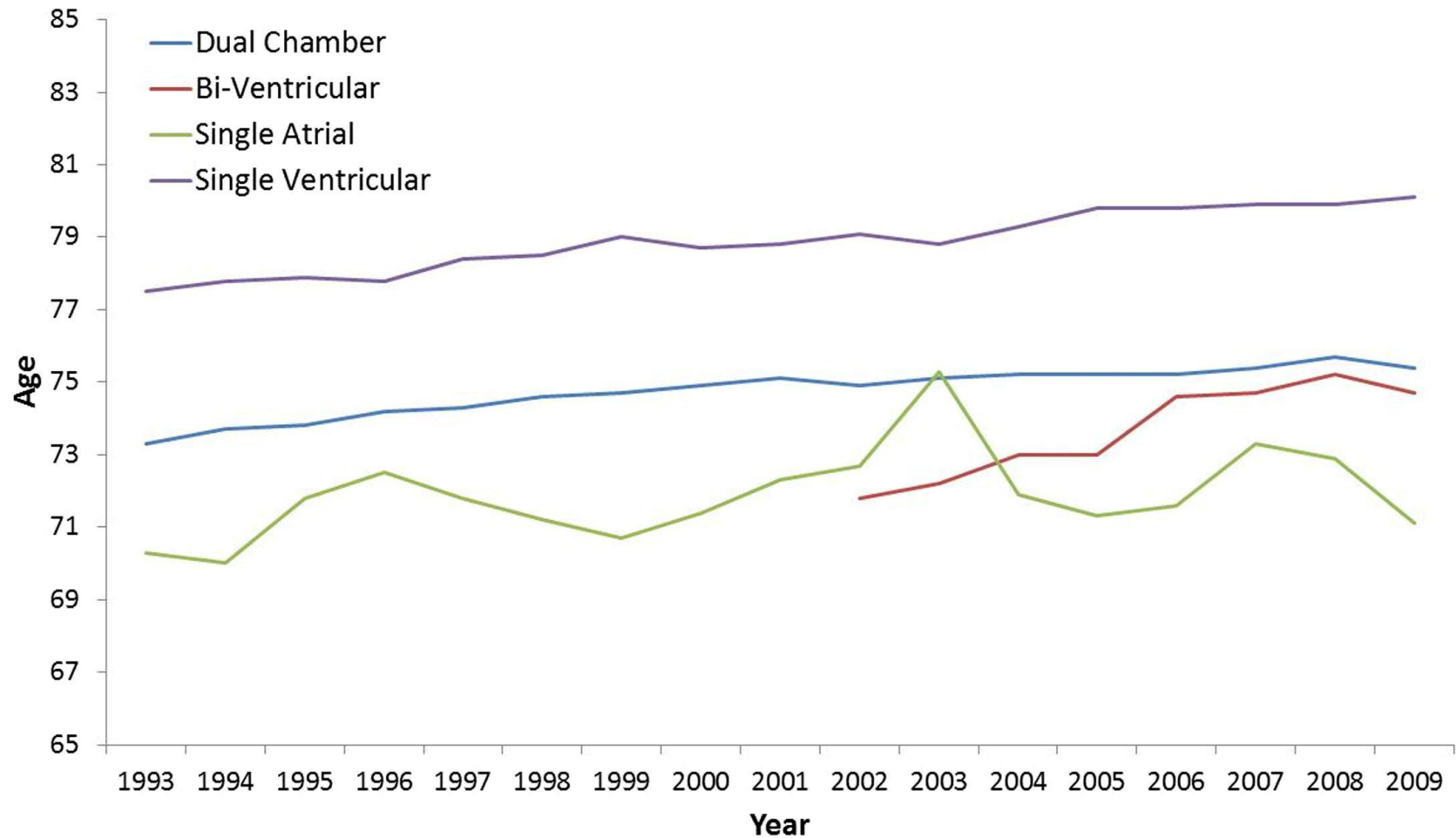


# Quali devices impiantiamo?

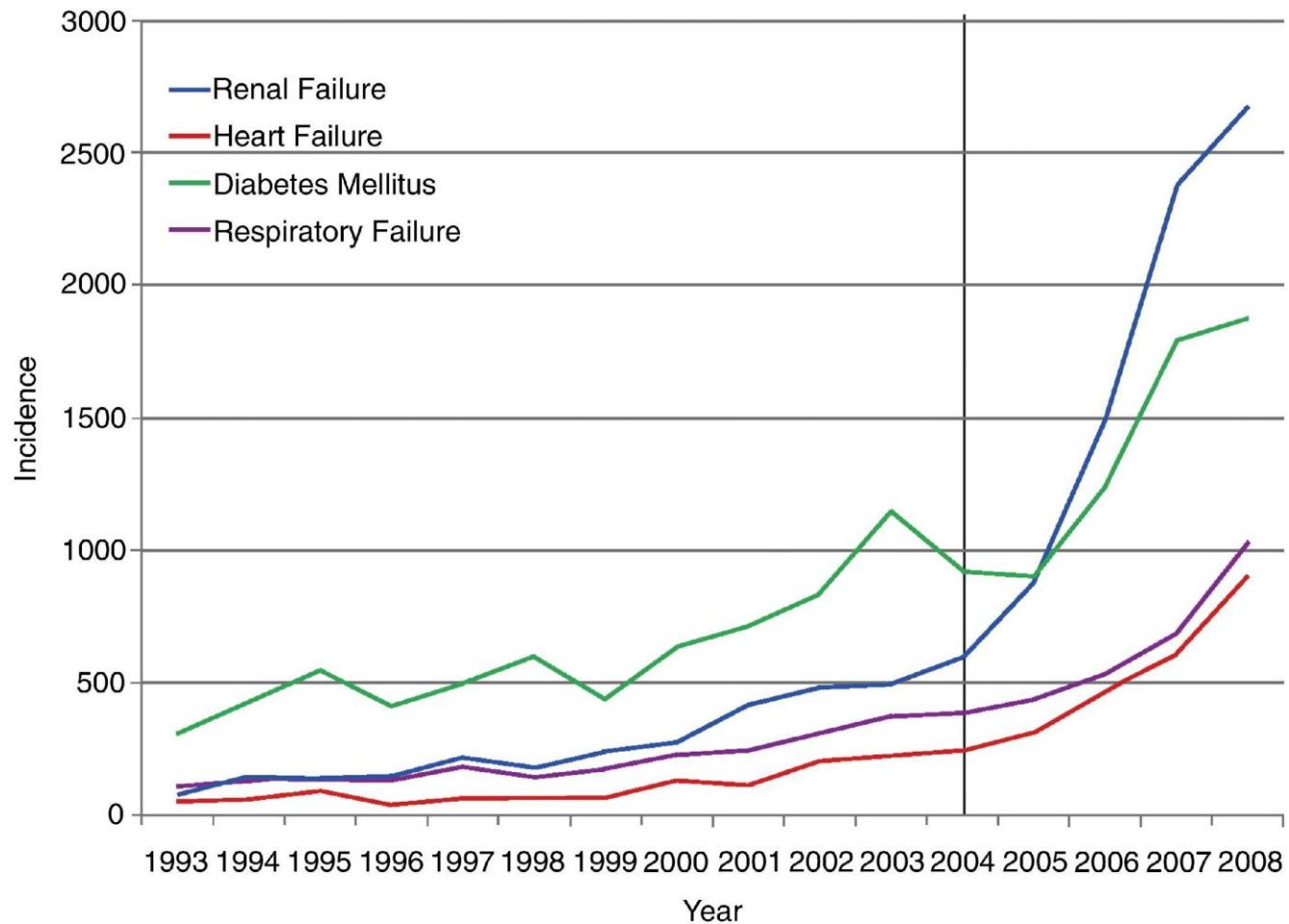
JACC Vol. 58, No. 10, 2011  
August 30, 2011:1001-6



# A chi impiantiamo?

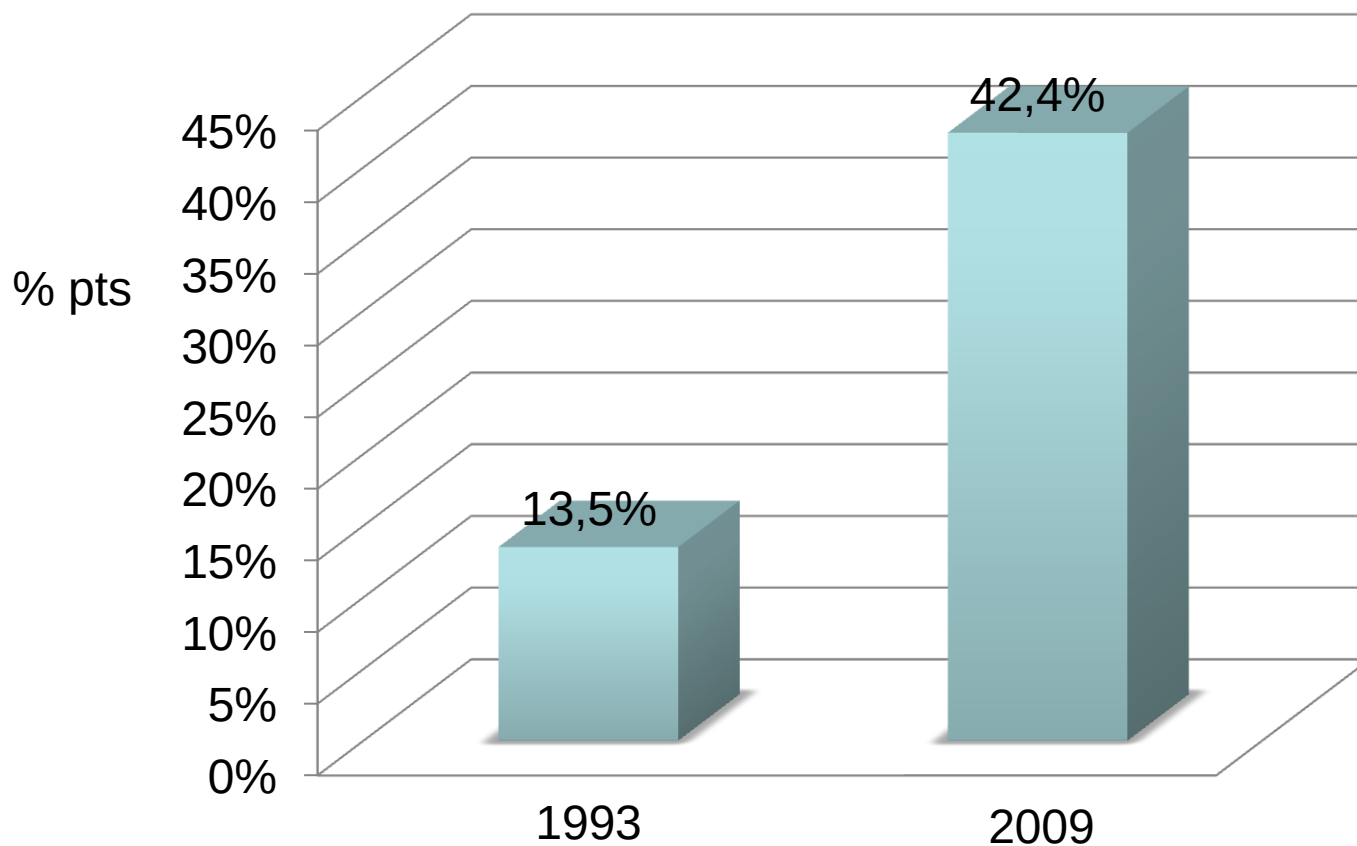


# A chi impiantiamo?



# A chi impiantiamo?

Charlson Comorbidity Index  $>2$



# Ricapitolando

- Più indicazioni (bradiaritmie, SCD, CHF), più pazienti
- Device sempre più complessi (ICD, CRT)
- Pazienti più anziani e fragili



Maggior rischio di infezioni



# Infezioni dei CIED

- Ospedalizzazione prolungata
- Rischi legati all'estrazione
- Terapia antibiotica prolungata
- Necessità di re-impianto

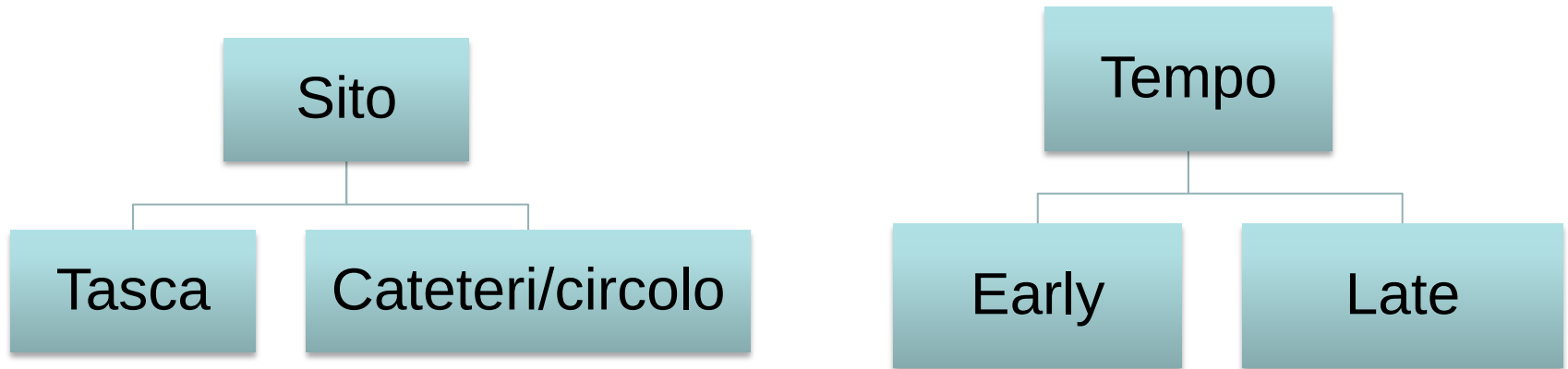


Elevata mortalità



Elevati costi sanitari

# Infezioni dei CIED



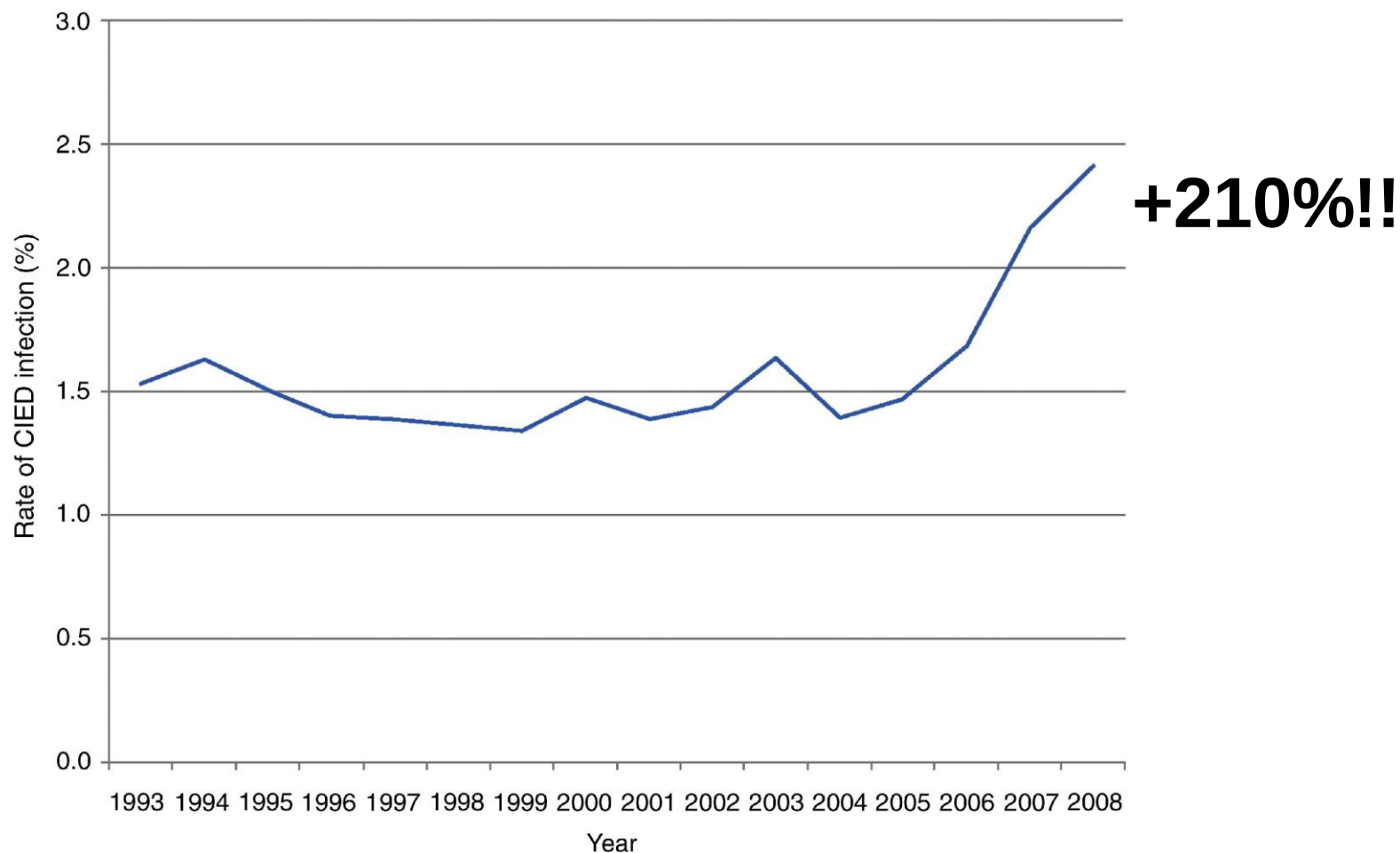
| <b>Batteri</b>                          |
|-----------------------------------------|
| <b>S.Aureus</b>                         |
| <b>Stafilococchi coagulasi-negativi</b> |
| Streptococchi viridanti                 |
| Enterococchi                            |

# Infezioni dei CIED

## Incidenza in letteratura

0,13 - 12,6%  
(generalmente fra 1 e 2%)

# Infezioni dei CIED



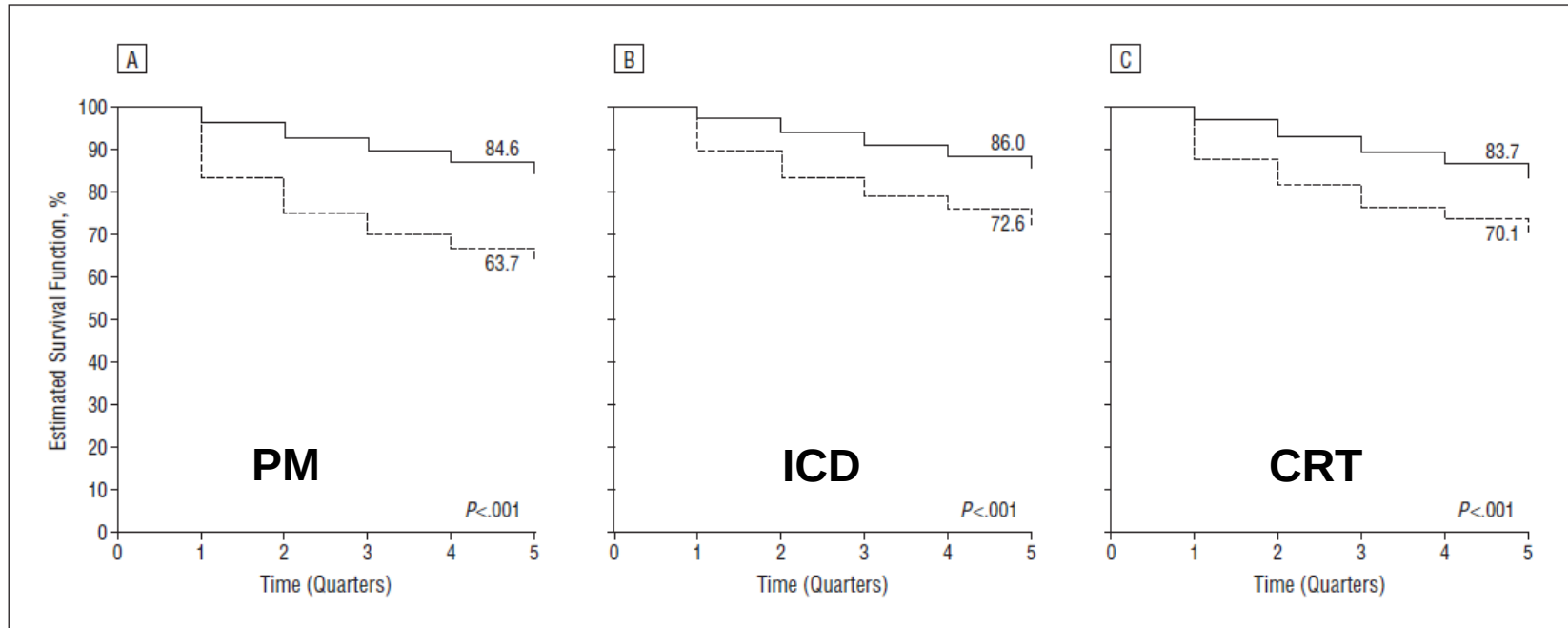
# Mortalità

## Incidenza in letteratura

2,6 - 18%

(endocardite senza estrazione: 31-66%)

# Mortalità



**Figure 1.** Survival following 200 219 Medicare beneficiary admissions for CIED procedures (PM [A]; ICD [B], and CRT-D [C]), with and without infection. Kaplan-Meier estimates of survival during the quarter of the index admission (0-1) and the following 4 quarters (1-5), without (solid line) and with (dashed line) infection, following 200 219 CIED generator implantation, replacement, or revision procedures in Medicare beneficiaries during the 2007 calendar year. Estimated survival (percentage) at end of fourth quarter following the index admission quarter, right. Comparisons were made by log-rank test. CIED indicates cardiovascular implantable electronic device; CRT-D, cardiac resynchronization therapy device with defibrillator; ICD, implantable cardioverter/defibrillator; and PM, pacemaker.



# Quanto costano?

Hannover (2006): 462 impianti, tasso infezioni CIED 1.1%

7 interventi CCH

Durata ricovero:  $10 \pm 5$  giorni

Costo (ricovero, intervento, anestesia, lab): €  $7.091 \pm 3.180$

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## Infection of cardiac pacemakers/defibrillators

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|                                             |                               |
|---------------------------------------------|-------------------------------|
| Total operations (non-infected/year)        | 95 000 (in tutta la Germania) |
| Estimated costs (€/case)                    | 7091                          |
| Estimated incidence (lowest in literature)  | 1%                            |
| Estimated cases (per year)                  | 950                           |
| Estimated costs (€/year)                    | <u>6 736 450</u>              |
| Estimated incidence (highest in literature) | 12%                           |
| Estimated cases (per year)                  | 11 400                        |
| Estimated costs (€/year)                    | <u>80 905 800</u>             |

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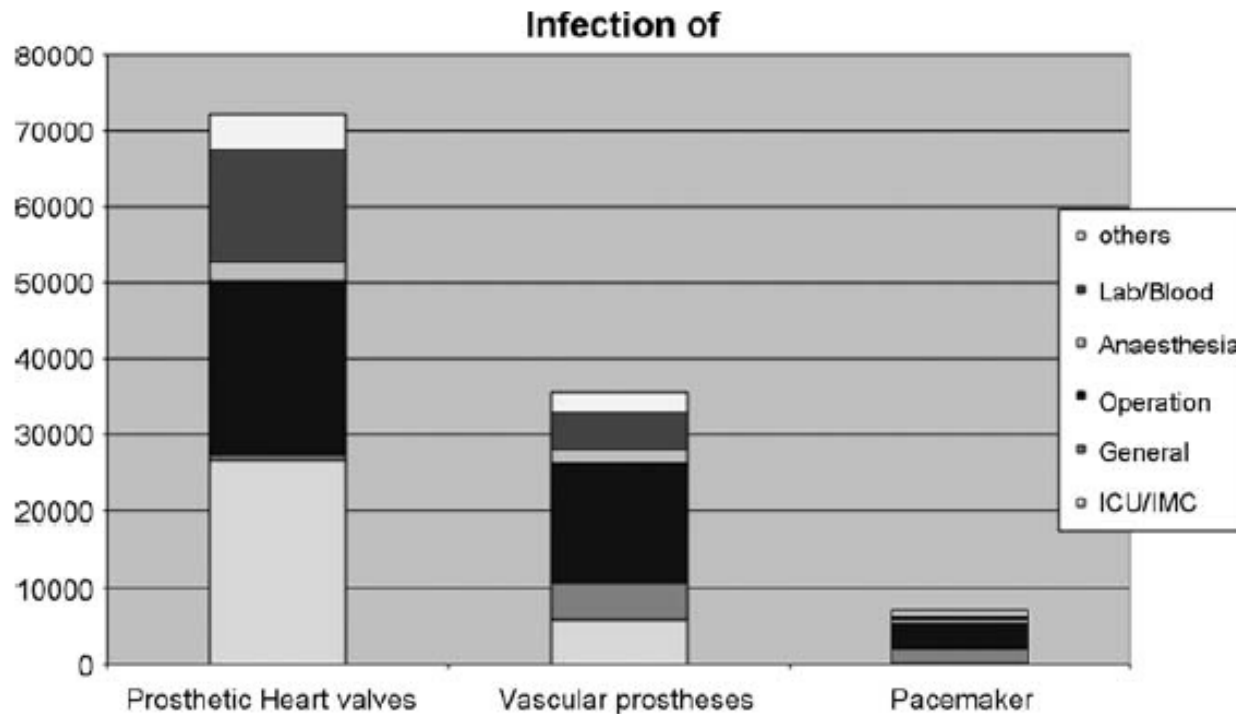


Fig. 1. Average health-care costs in Euro of different treatment units for the therapy of cardiac device infections.



# Quanto costano?

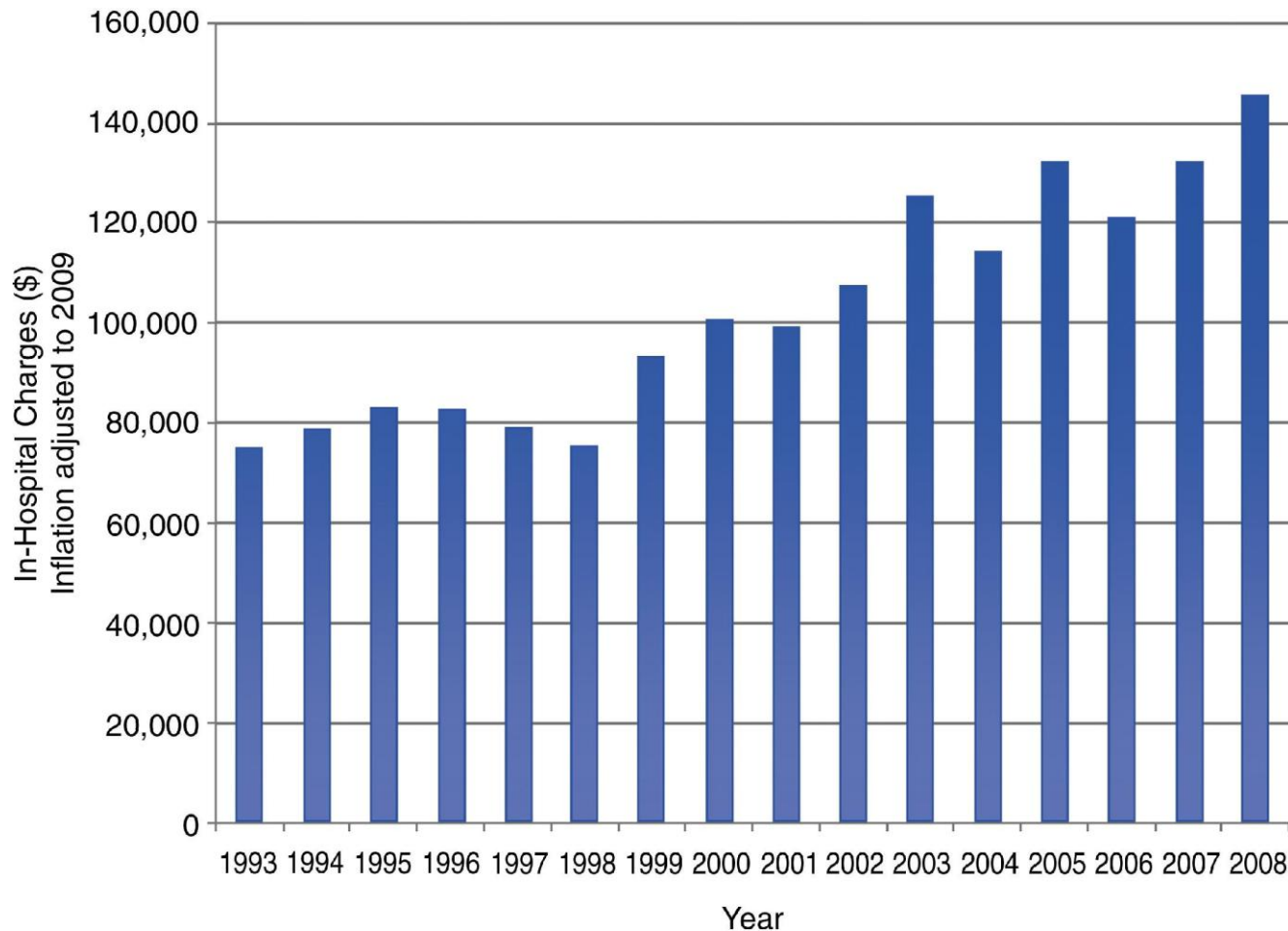
## Mortality and Cost Associated With Cardiovascular Implantable Electronic Device Infections

*Muhammad R. Sohail, MD; Charles A. Henrikson, MD; Mary Jo Braid-Forbes, MPH;  
Kevin F. Forbes, PhD; Daniel J. Lerner, MD*

Analisi retrospettiva 200.219 procedure Medicare (anno 2007)

- 5817 ricoveri per infezione
- Mortalità intraricovero: 4,6-11,3%
- Mortalità a lungo termine: 26,5-35,1%
- Durata ricovero: 15,5-24,3 giorni
- Costi aggiuntivi: \$14.360-16.498

# Quanto costano?



**146.000\$**

**+47% per decade**

# **Prevenire è meglio che curare...**

# Risk score by Shariff *et al* <sup>(1)</sup>

1 point each:

- Diabetes Mellitus
- Congestive heart failure
- Renal impairment
- Oral anticoagulation use
- Corticosteroid use
- Generator change/upgrade
- Prior CIED infection
- More than 2 leads
- Epicardial lead
- Temporary pacer placement

Rischio a 6 mesi:

Score < 3: 1%

Score  $\geq$  3: 2,4%

# Lo score nei nostri pazienti

Osservazione retrospettiva nei 1035 primi-impianti tra il 2010 e il 2014

| Shariff <i>et al</i><br>score | Patients | %  |
|-------------------------------|----------|----|
| < 3                           | 908      | 88 |
| ≥ 3                           | 127      | 12 |

# Nuovo protocollo di profilassi antibiotica

## Dal 01 Gennaio 2017

| score    | profilassi                                                  |
|----------|-------------------------------------------------------------|
| < 3      | 1fl ev 60 minuti prima della procedura<br>1fl ev 8 ore dopo |
| $\geq 3$ | 48h ev + 7 gg per os                                        |