



**Heart Rhythm Devices:
National Clinical Audit 2009**

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2007

2007

2007

- **Headline Rates**
- **National Trends**
- **Local equity**
- **Data Quality**
- **The Role of CRT**
- **The Ageing Population**
- **Closing the Gap**

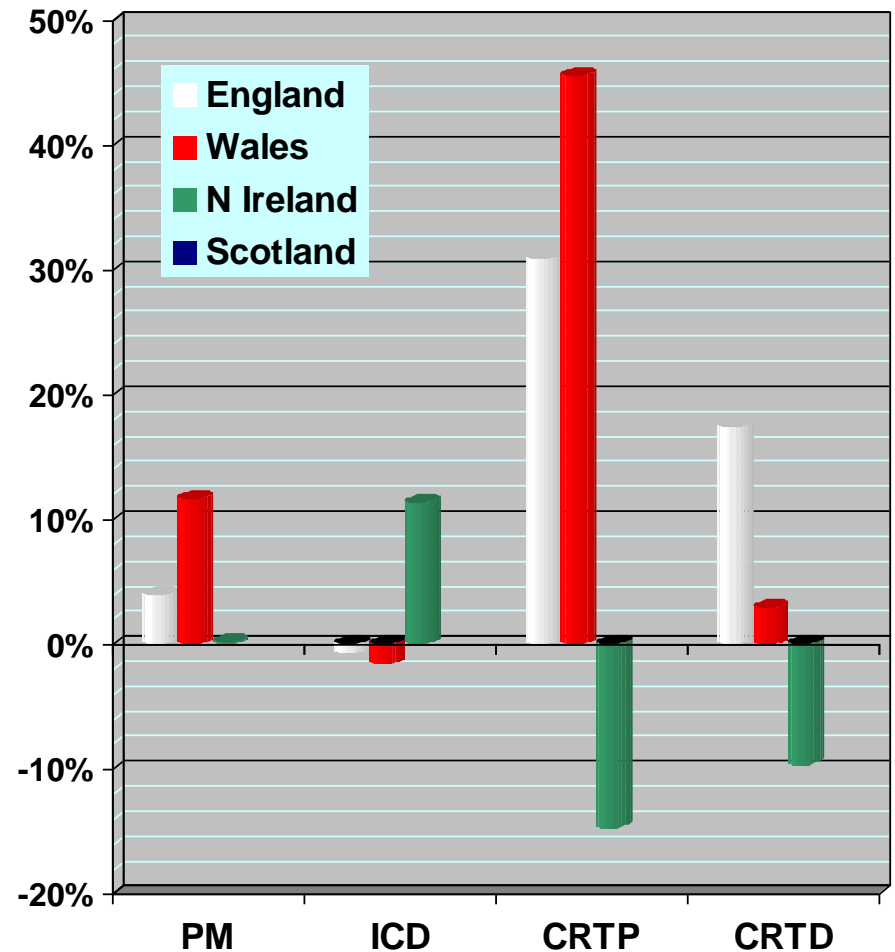
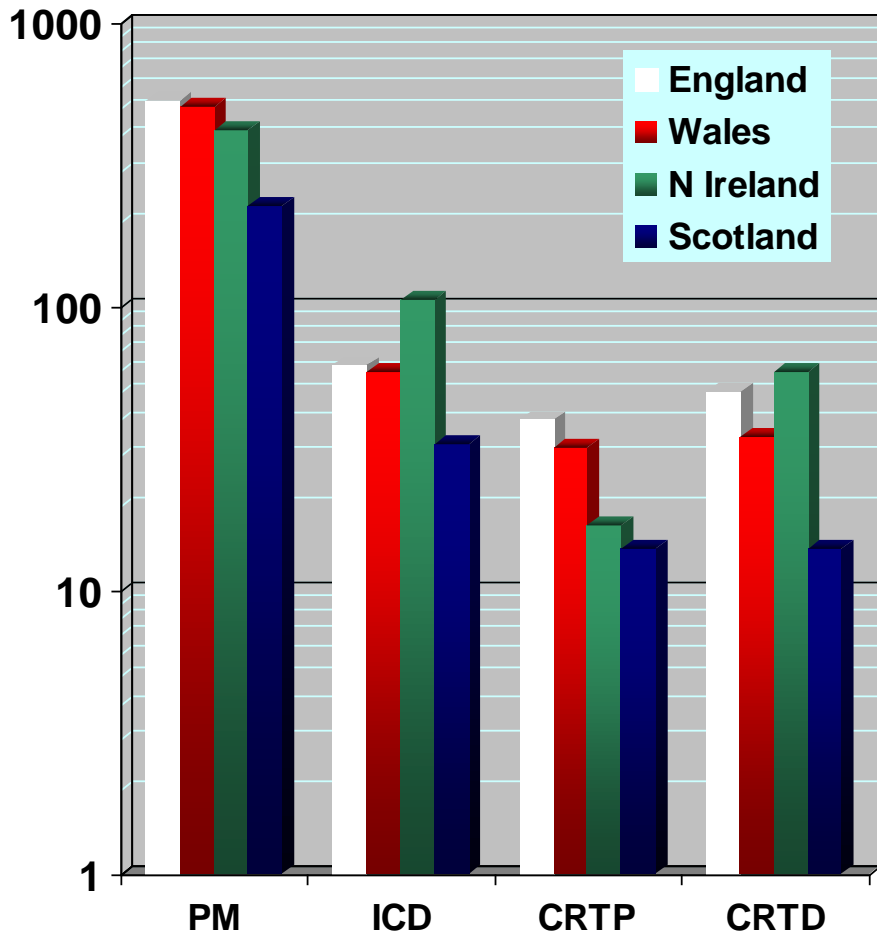
2008

2008

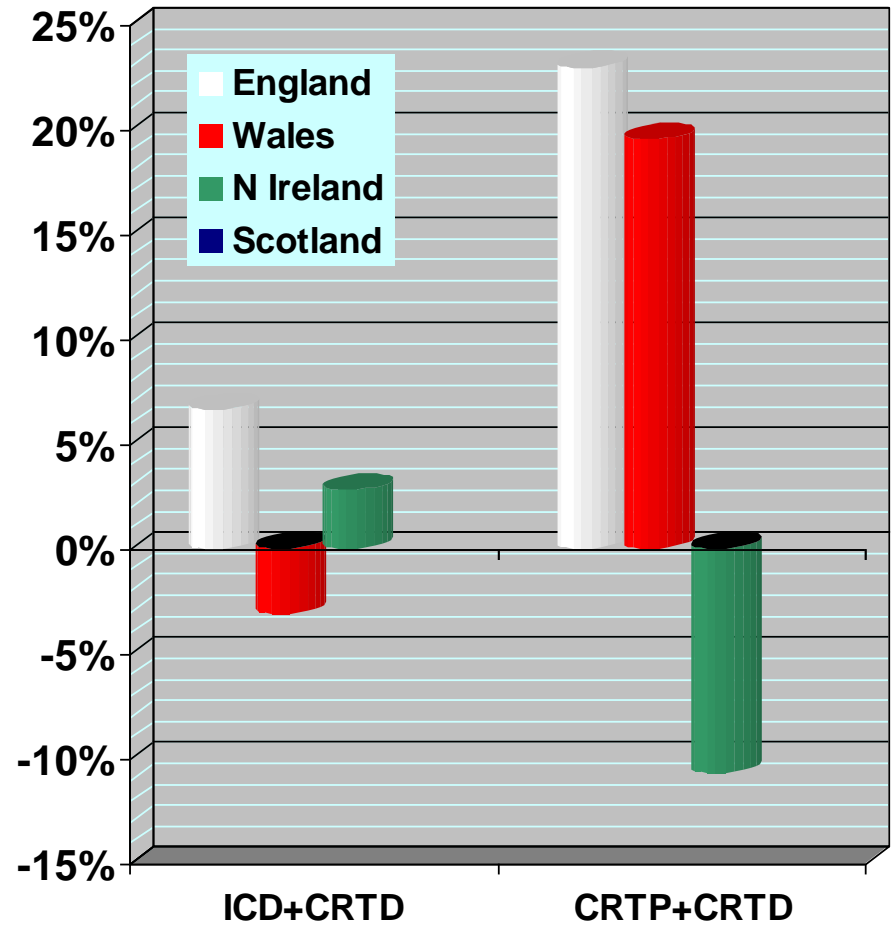
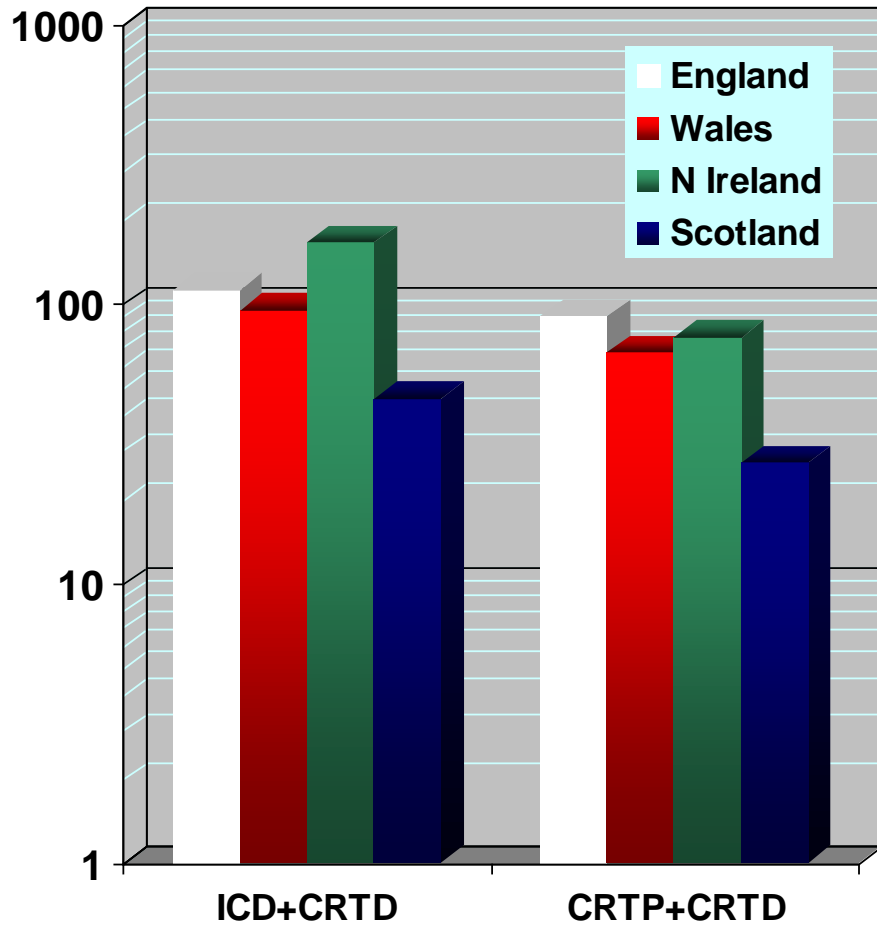
2008

2009

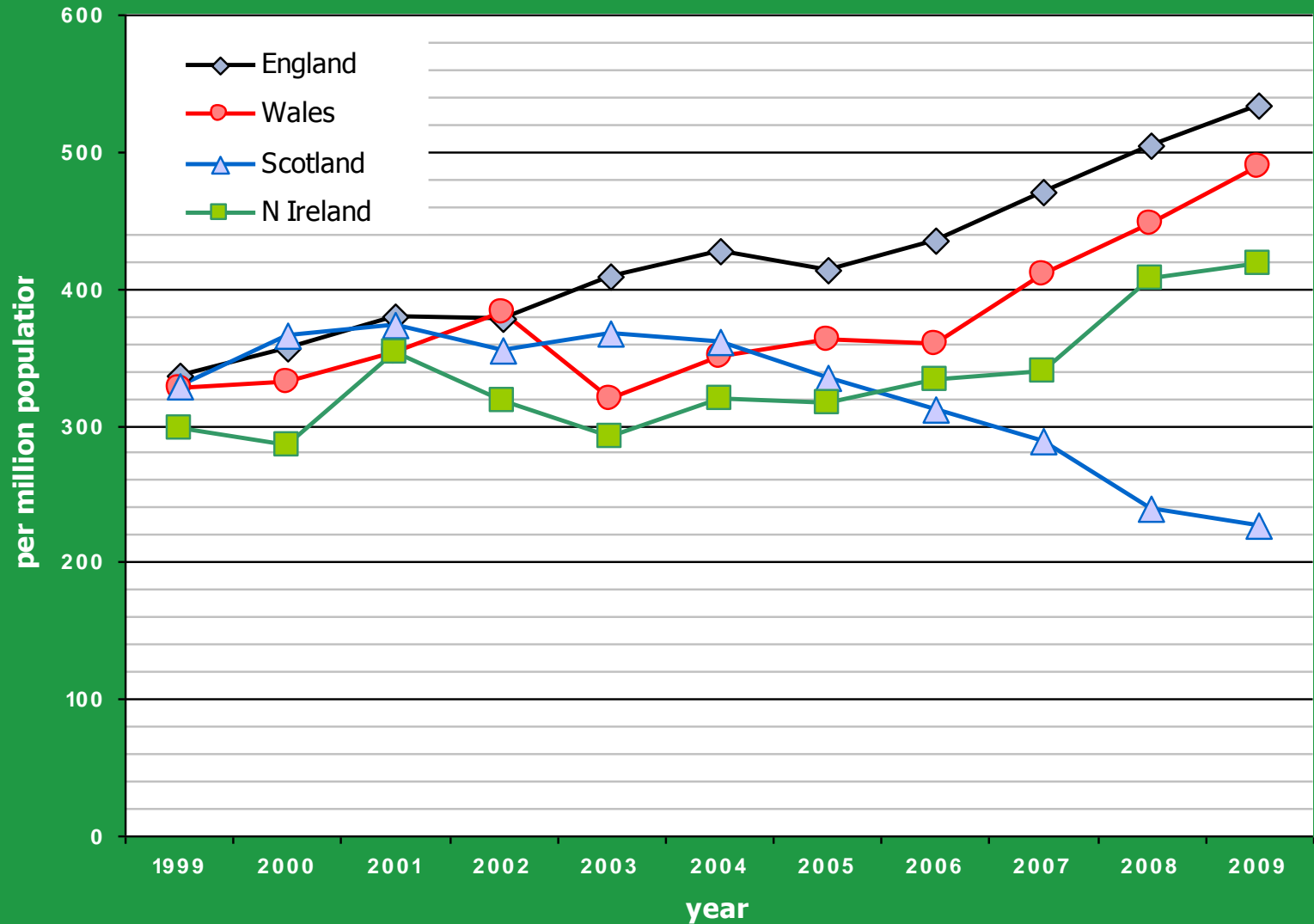
2009 Headline New Implant Rates



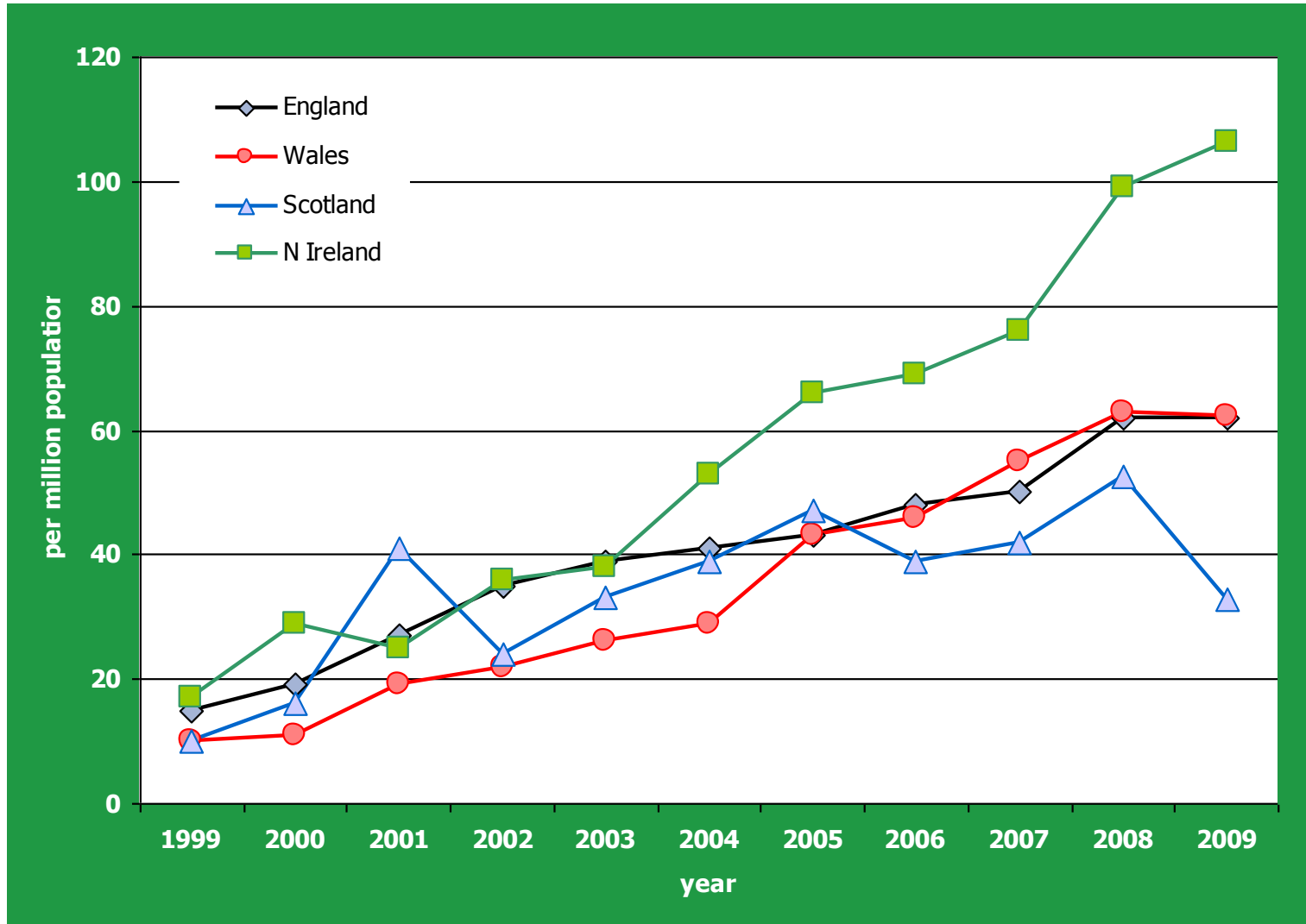
2009 Headline New Implant Rates



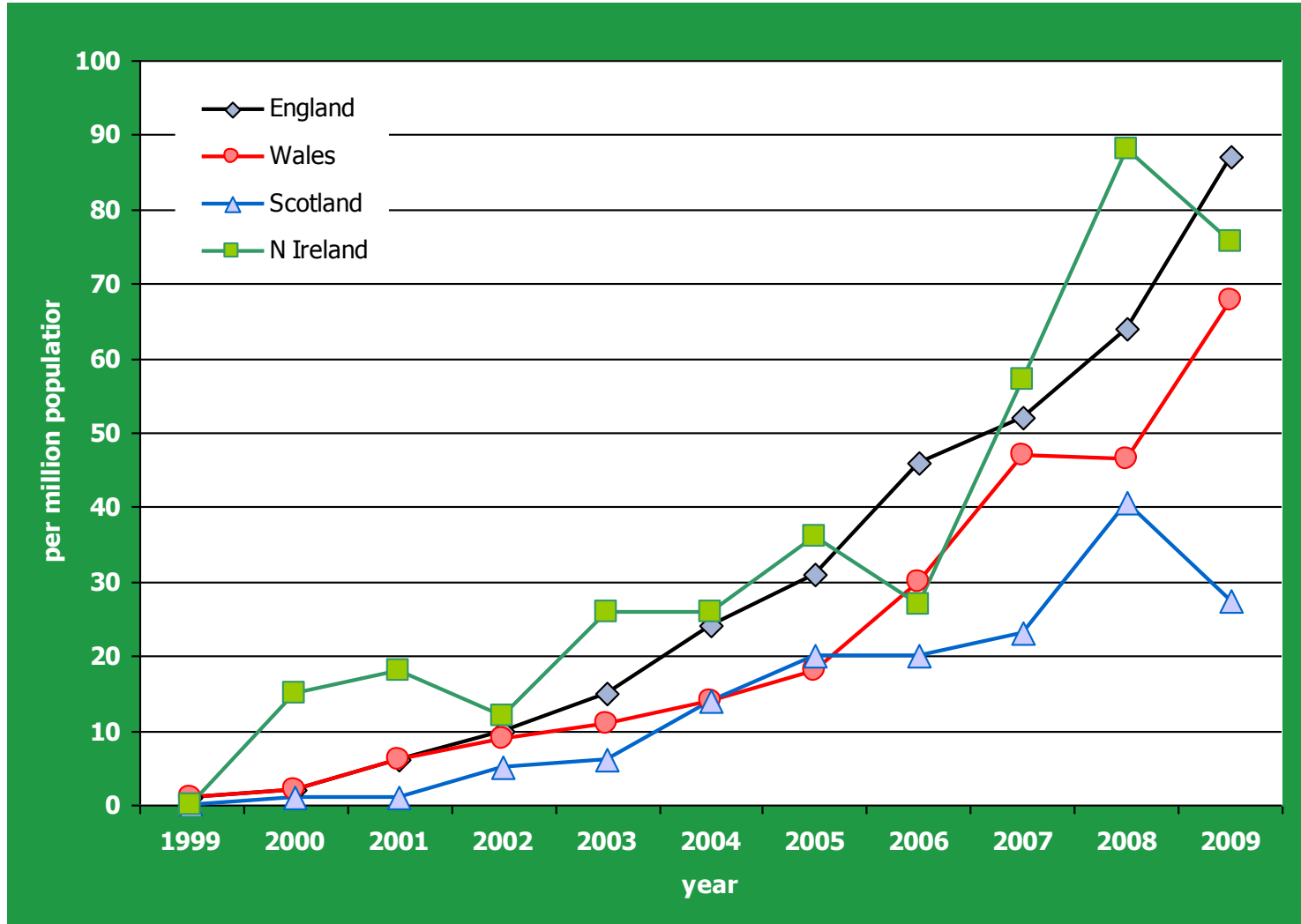
New Pacemakers



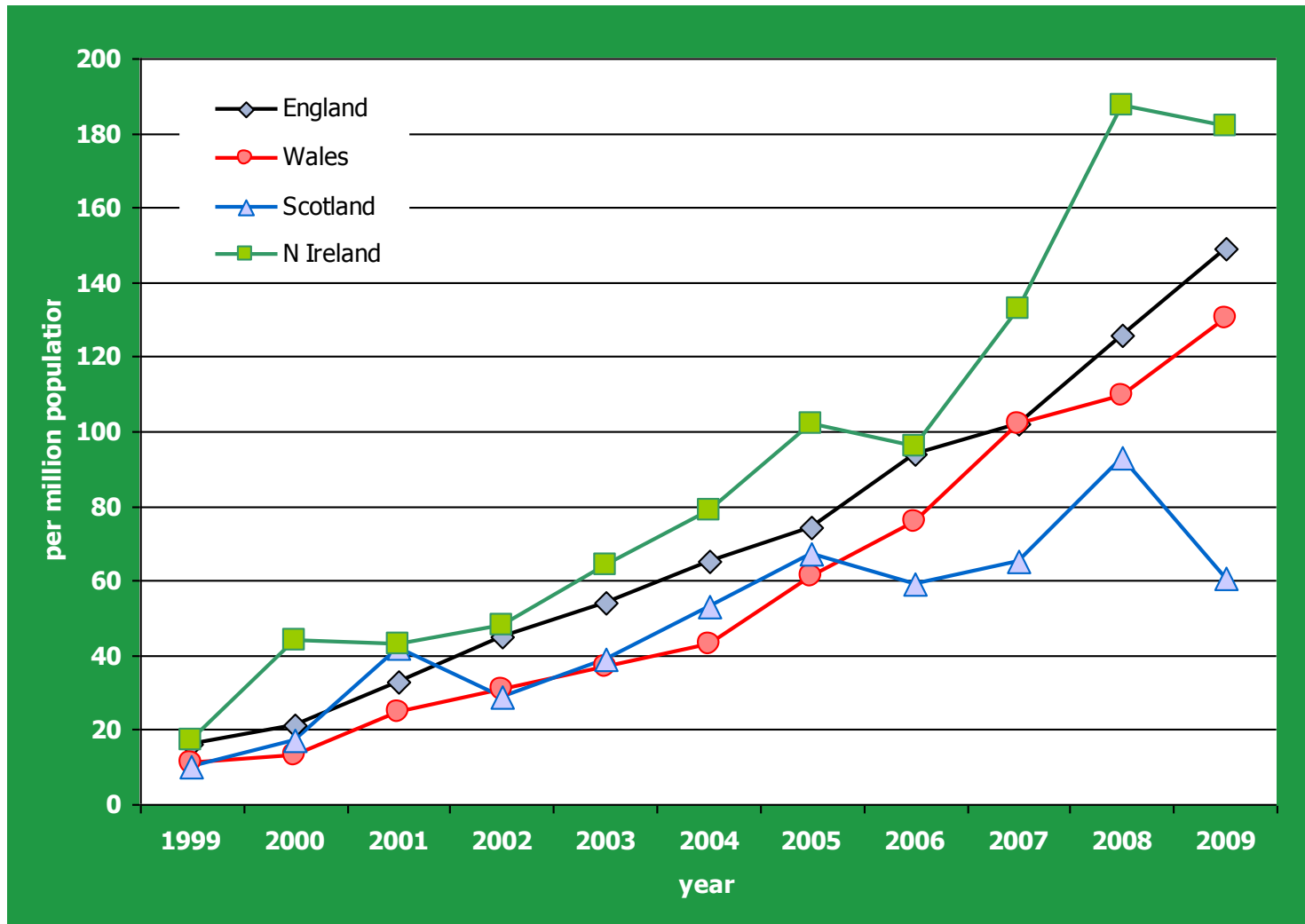
New ICDs



New CRT Implants

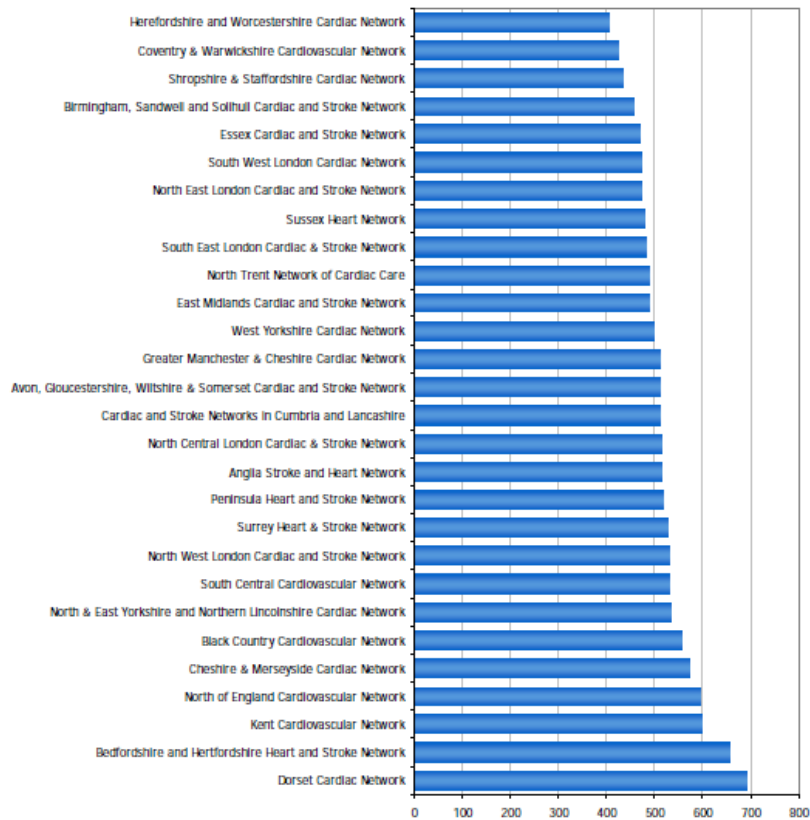


New High-Energy Implants ICD + CRT-D



New PM implant rate by Network

Pacemaker New Implant rate 2009
adjusted for age and sex

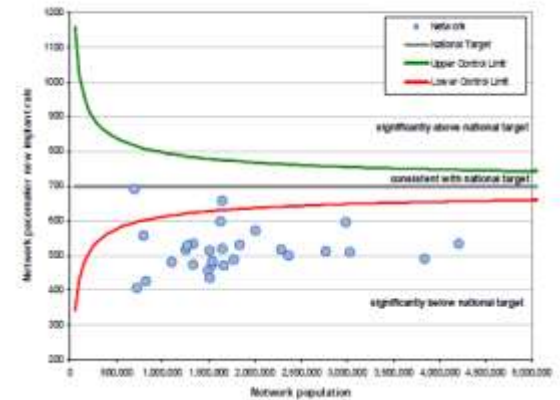


Average: 534

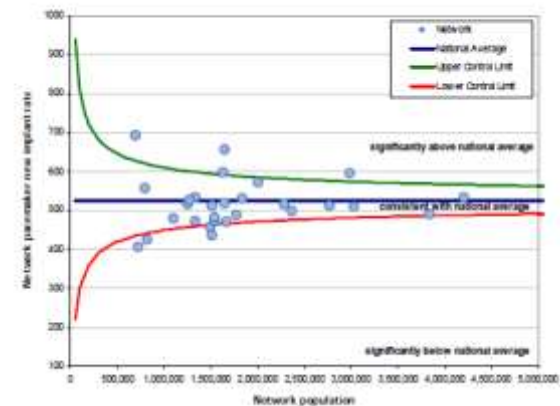
Highest: 691 Dorset Cardiac Network

Lowest: 399 Cardiac and Stroke Networks in Cumbria and Lancashire

Network pacemaker new implant rate compared to the national target

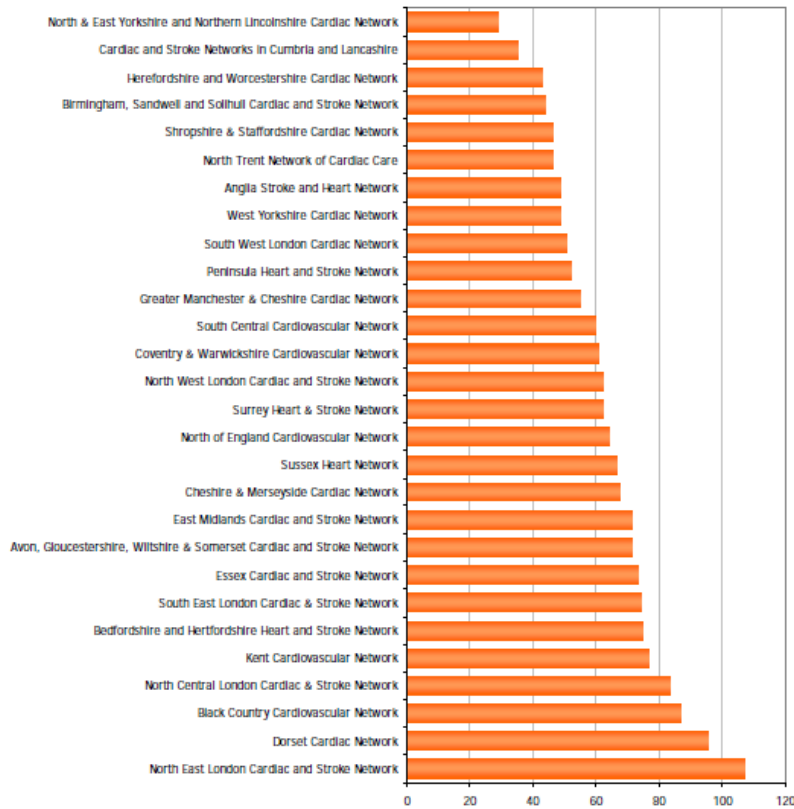


Network pacemaker new implant rate compared to the national average



New ICD rate by Network

ICD New Implant rate 2009
adjusted for age and sex

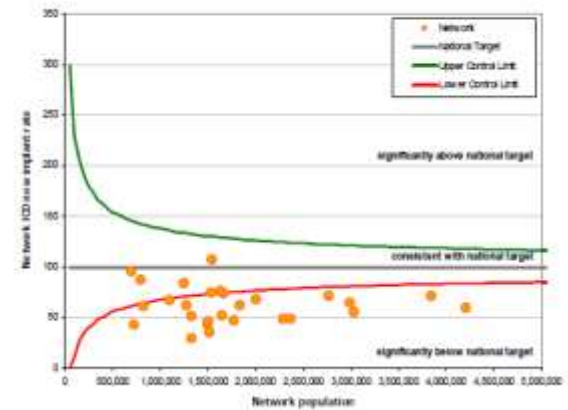


Average: 62

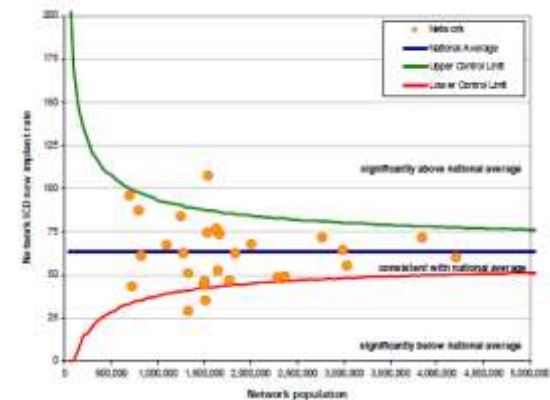
Highest: 107 North East London Cardiac and Stroke Network

Lowest: 28 Cardiac and Stroke Networks in Cumbria and Lancashire

Network ICD new implant rate compared to the national target

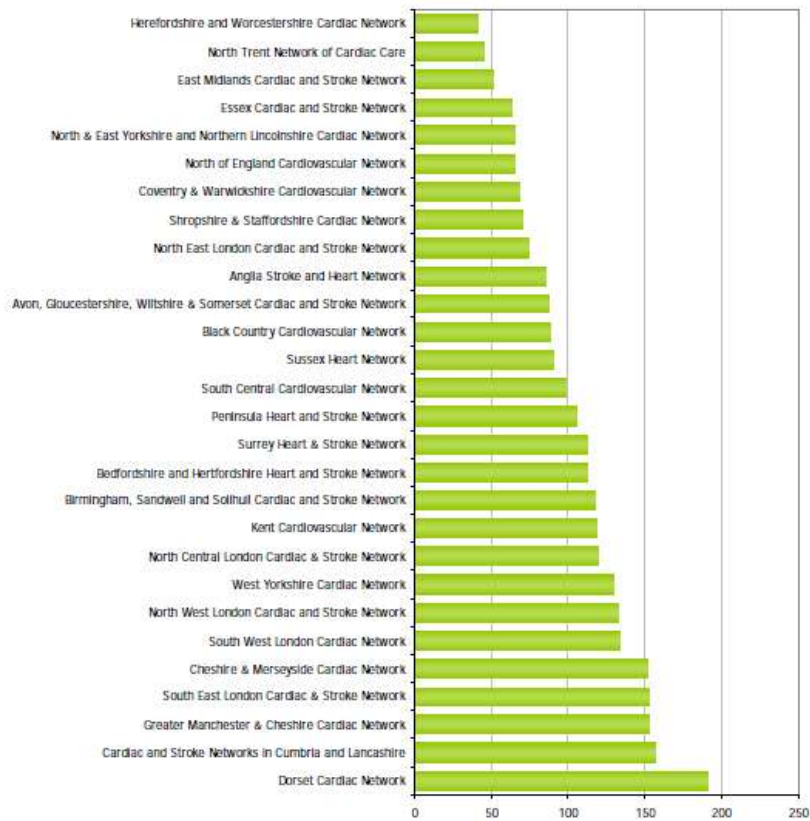


Network ICD new implant rate compared to the national average



Total CRT-D+P by Network

All CRT Total Implant rate 2009
adjusted for age and sex

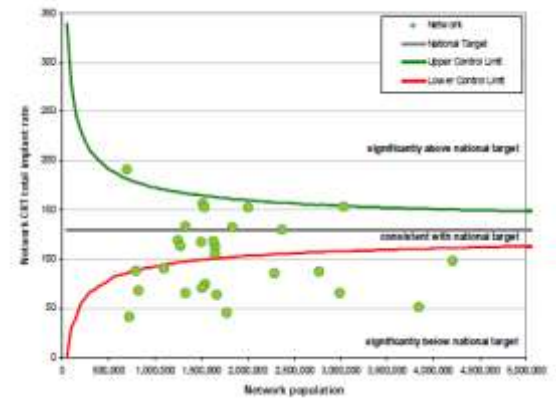


Average: 101

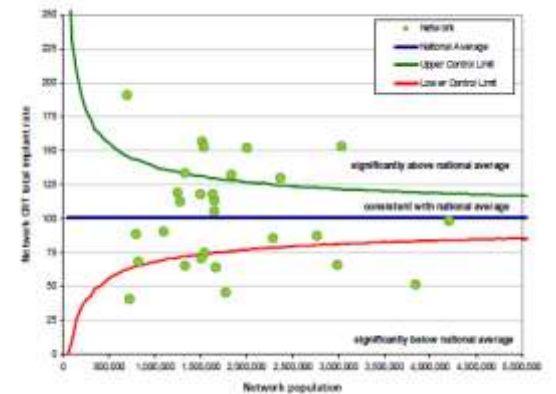
Highest: 191 Dorset Cardiac Network

Lowest: 40 Herefordshire and Worcestershire Cardiac Network

Network CRT total implant rate compared to the national target



Network CRT total implant rate compared to the national average



Data Quality

- **Essential for clinical audit**
 - Administrative
 - Adequate/good
 - Casemix/clinical
 - Historically poor for ‘paper based’ audits

Data Quality - Pacemakers

Parameter	Data completeness threshold	Actual Valid Data Completeness
NHS Number	98%	72.3%
Age	98%	99.5%
Sex	98%	99.5%
Postcode	98%	99.3%
ECG indication	90%	86.3%
Pre-implant symptoms	90%	90.5%

Data Quality - ICDs

Parameter	Data completeness threshold	Actual Valid Data Completeness
NHS Number	98%	75.9%
Age	98%	99.5%
Sex	98%	99.6%
Postcode	98%	98.9%
ECG indication	90%	68.4%
Pre-implant symptoms	90%	92.9%
Aetiology	90%	83.0%
NYHA Dyspnoea status	90%	32.8%
LV Function	90%	42.9%
ICD Indication	90%	33.3%

Data Quality - CRT-D

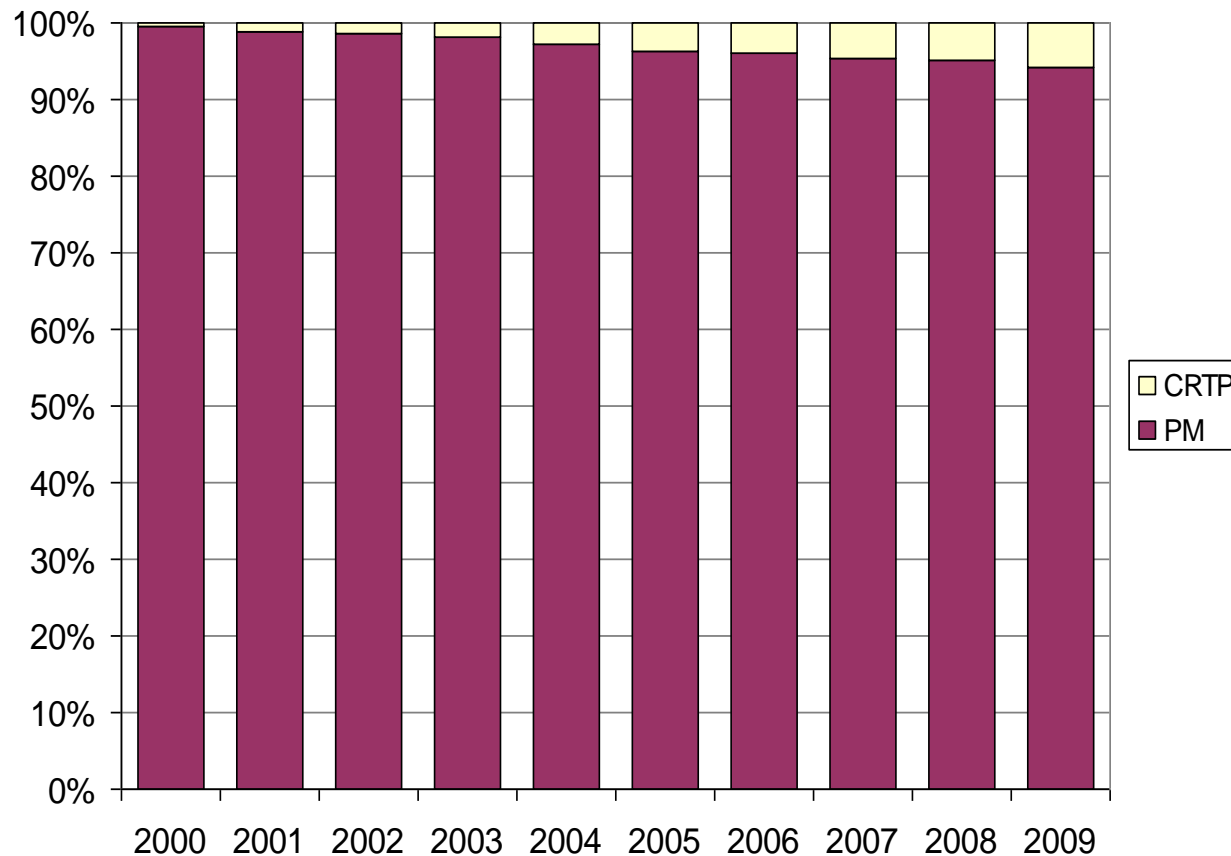
Parameter	Data completeness threshold	Actual Valid Data Completeness
NHS Number	98%	77.6%
Age	98%	99.7%
Sex	98%	99.8%
Postcode	98%	99.1%
ECG indication	90%	73.9%
Pre-implant symptoms	90%	91.3%
Aetiology	90%	86.7%
NYHA Dyspnoea status	90%	39.8%
LV Function	90%	49.9%
ICD Indication	90%	34.6%
QRS Duration	90%	13.3%

Data Quality

- **Has improved a lot**
- **Needs to improve a lot more**

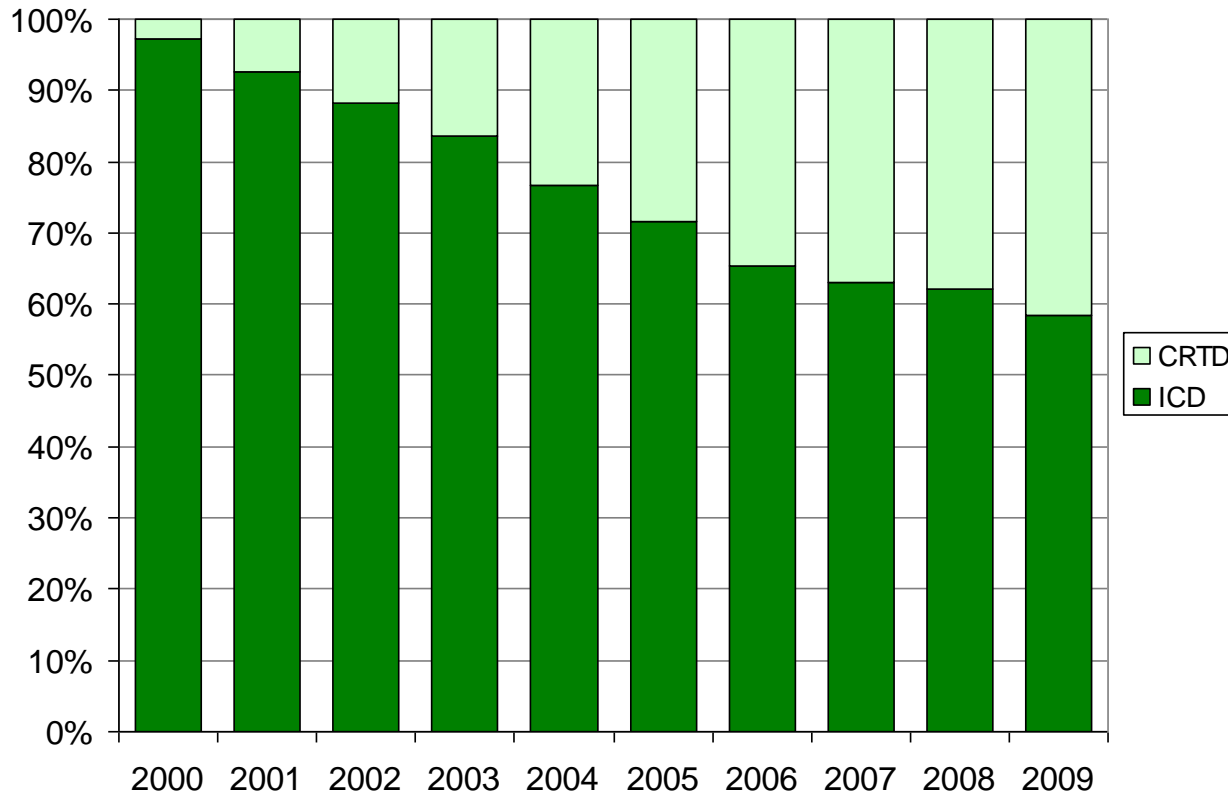
Increasing role of CRT devices

Low Energy Implants 2000-2009 (England)



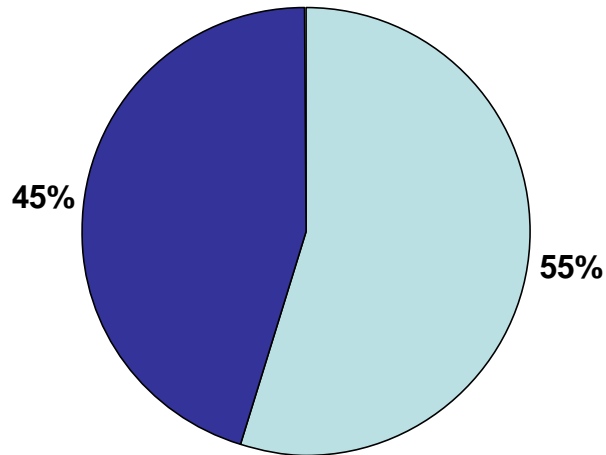
Increasing role of CRT devices

High Energy Implants 2000-2009 (England)

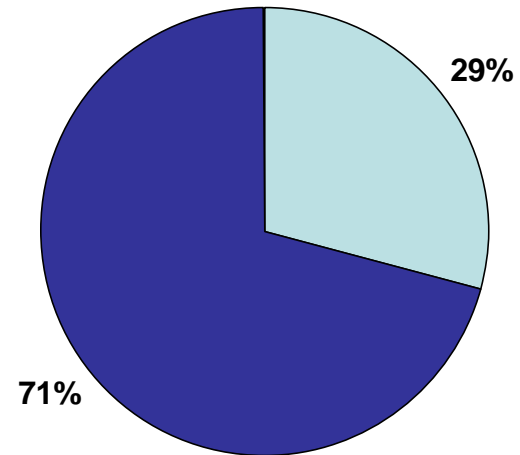


High energy implants 2009

Primary Prevention

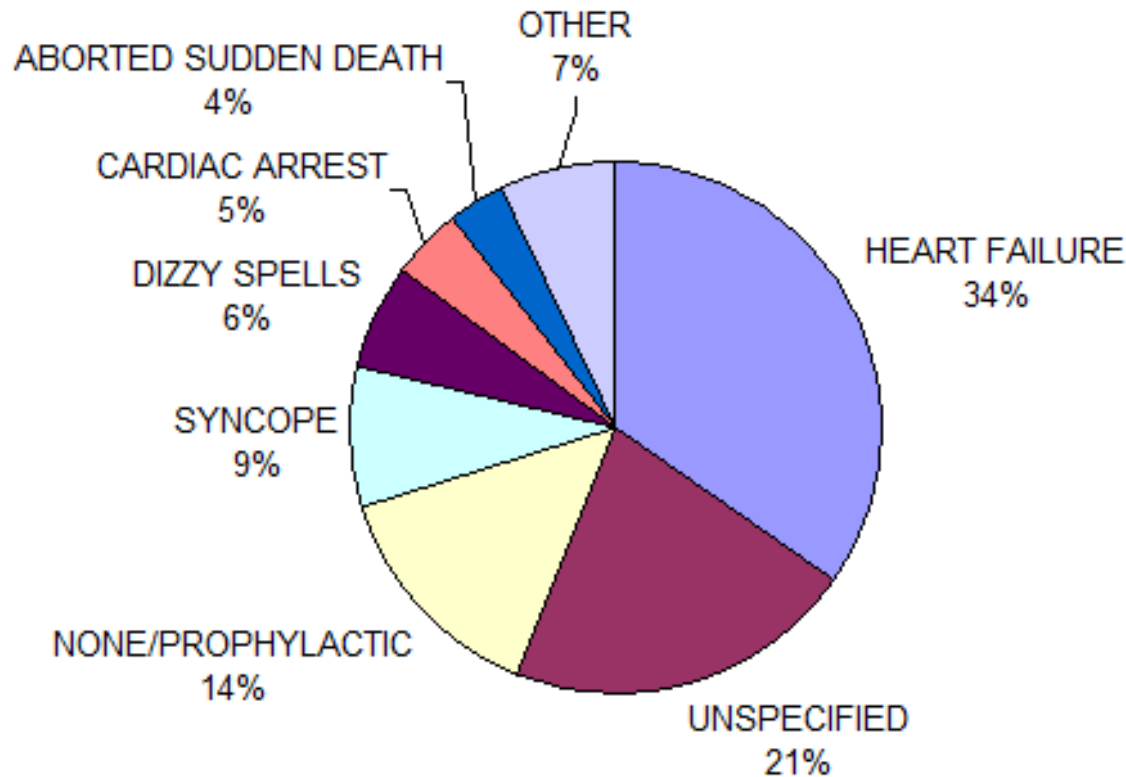


Secondary Prevention

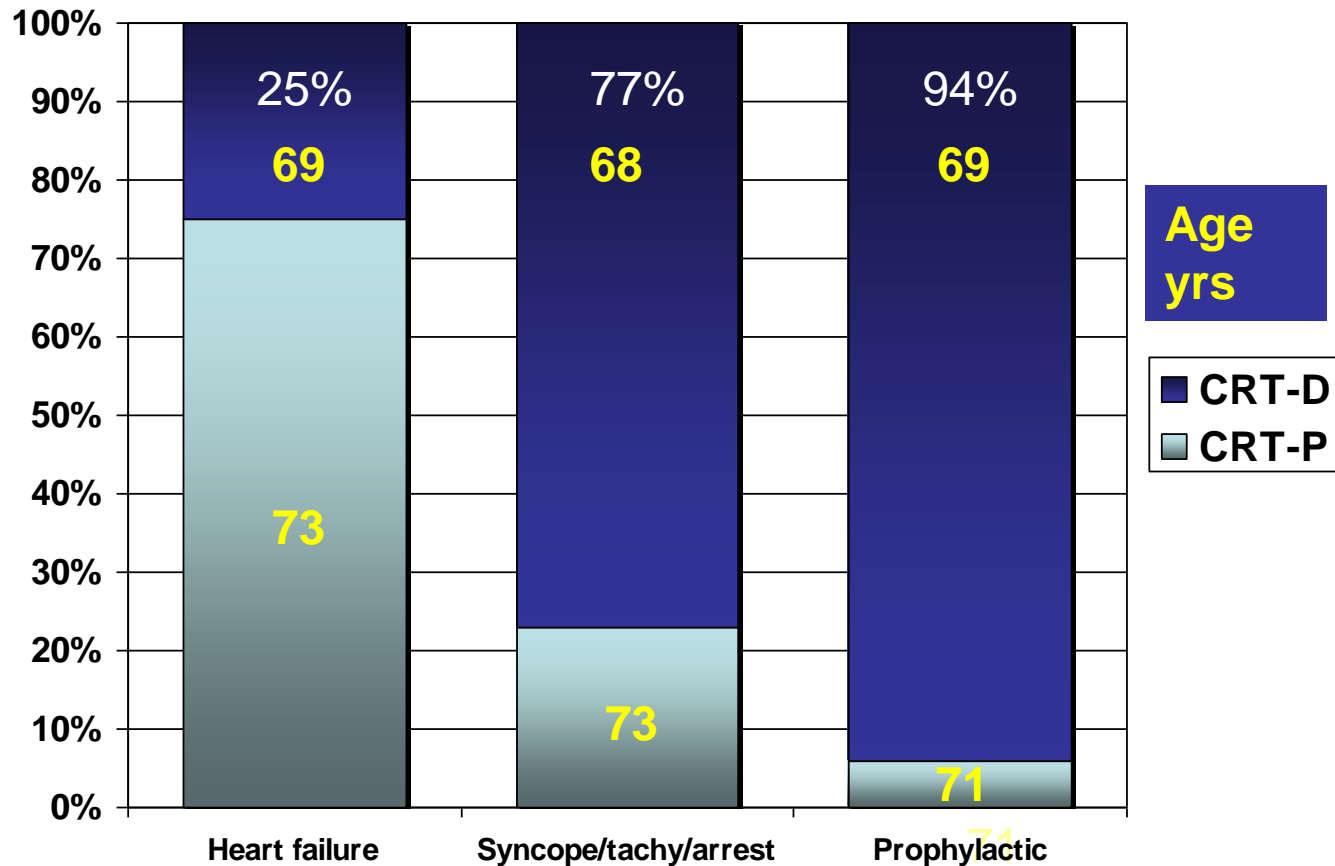


Increasing role of CRT devices

- All CRT: Indications (2009, new implants)

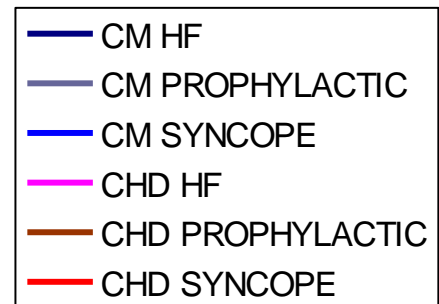
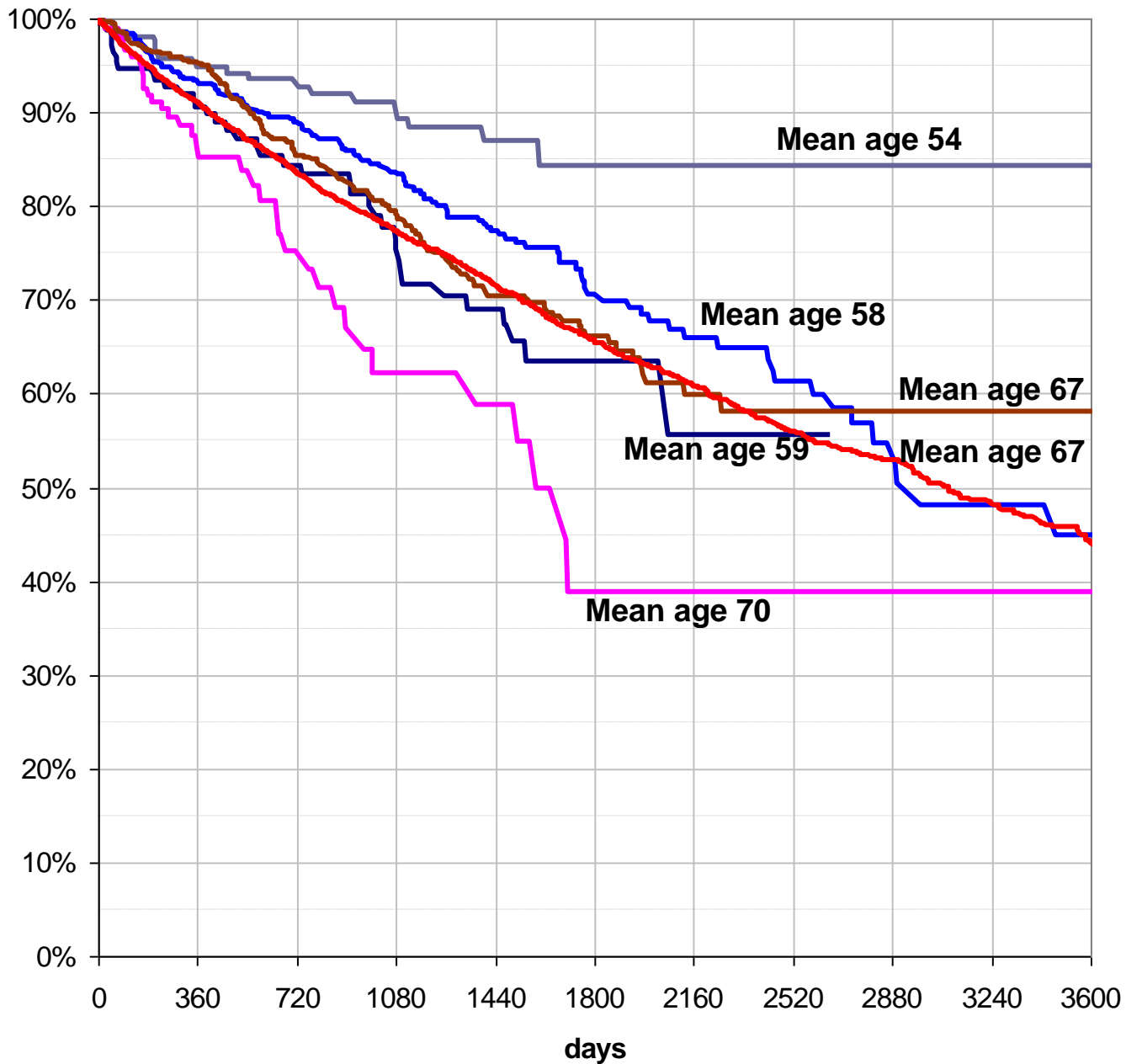


CRT type and patient age by symptom indication



Survival after High-Energy Implant

Indication (all years)	Implants	% ICD	% CRT-D
CHD and Syncope/tachy/arrest	7,589	86.0%	14.0%
CHD prophylactic	2,466	54.7%	45.3%
CHD and heart failure	742	16.3%	83.8%
Cardiomyopathy and Syncope/tachy/arrest	1,245	72.7%	27.3%
Cardiomyopathy prophylactic	886	64.9%	35.1%
Cardiomyopathy and heart failure	474	17.8%	82.2%



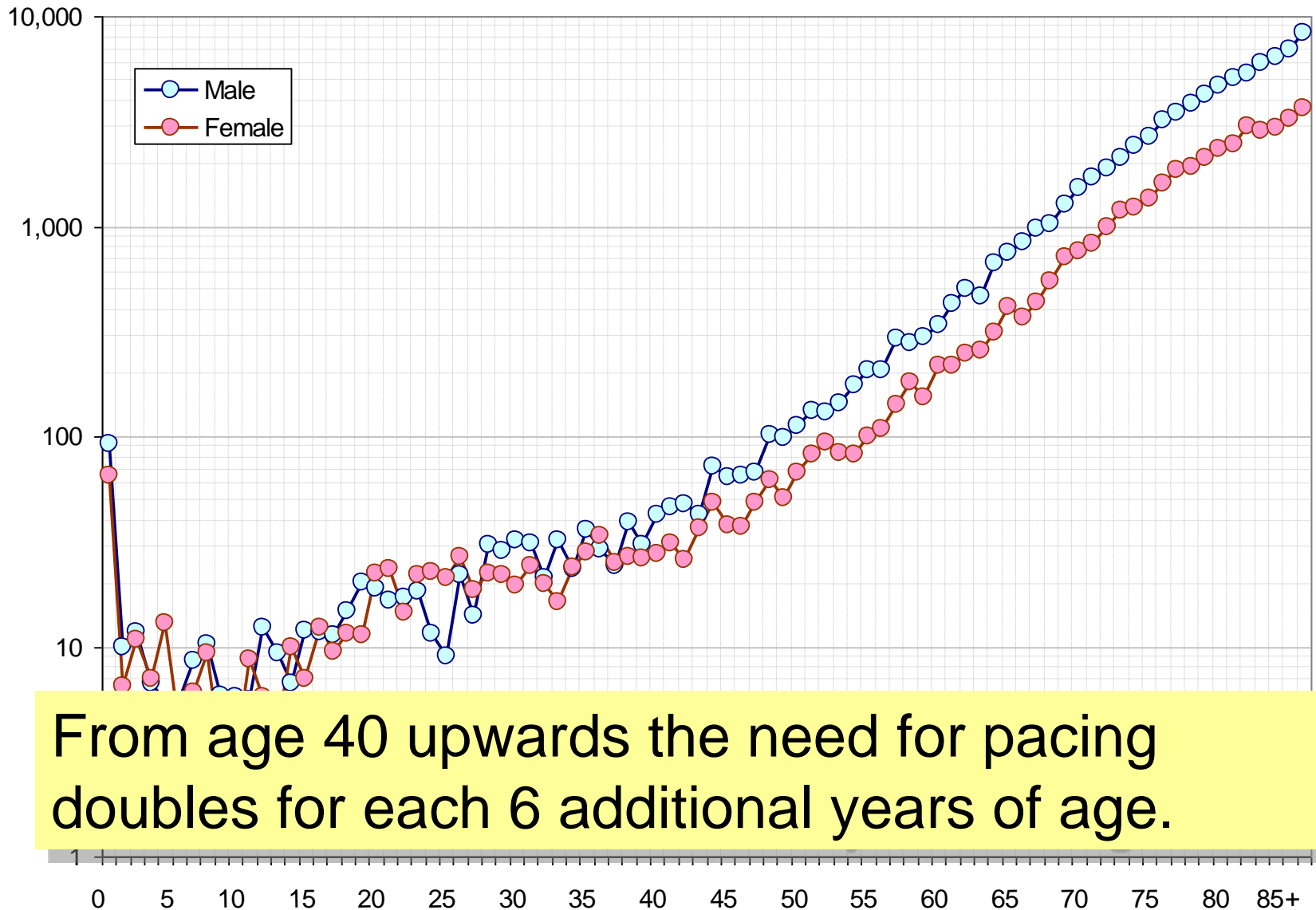
An ageing population....

- In 1971,
 - There were 480,000 people in the UK aged 85 or more.
- Today,
 - There are 1.4 million
- By 2083,
 - Current estimate is 7.3 million



New Pacemaker Implant Rate UK

2008 and 2009 - by age and sex



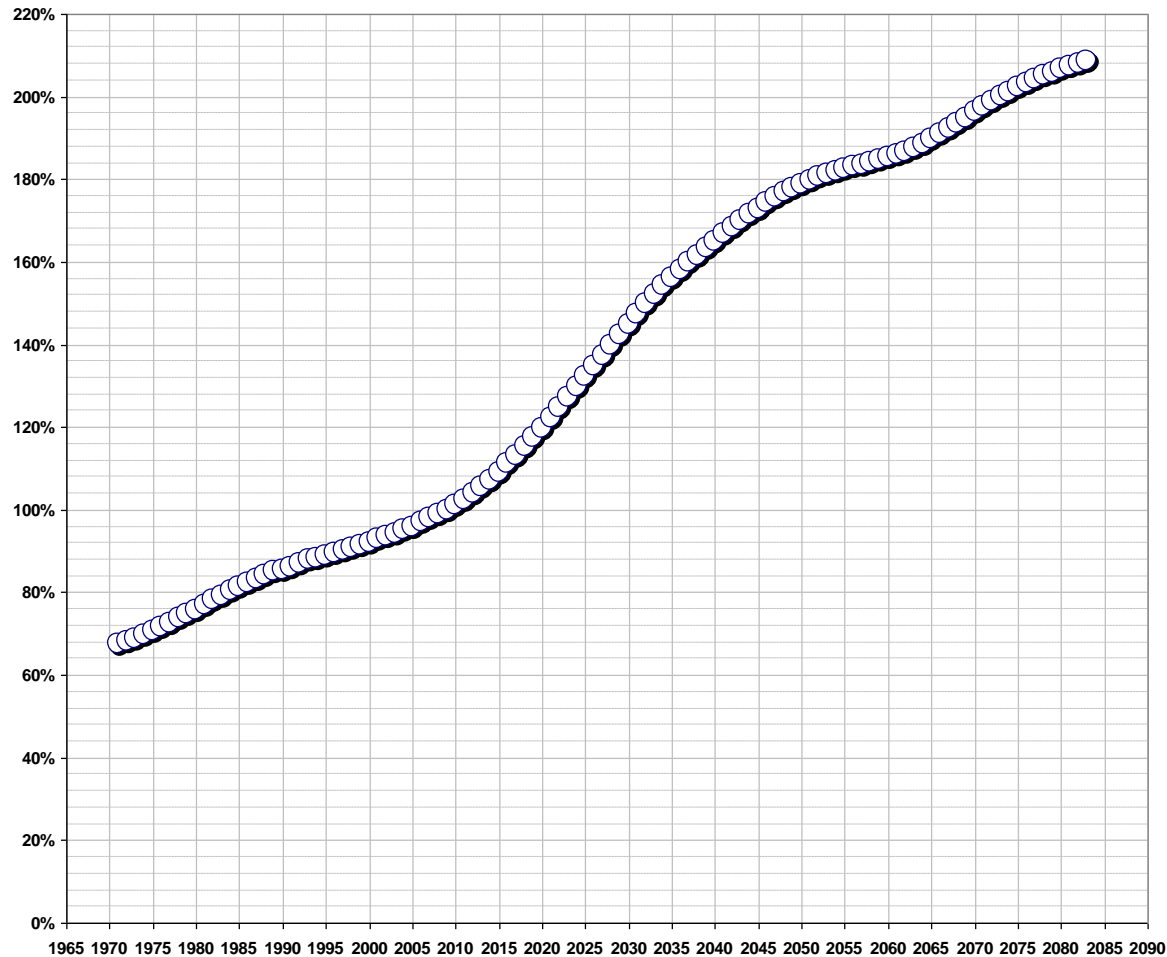
Why does the new implant rate keep rising?

- **We would like it to be due to improved clinical practice.**
 - But it may also be due to increased incidence
 - The population is getting older
- **Age/sex structure from 1971-2010**
 - With forecasts to 2083
- **Apply current implant rate**

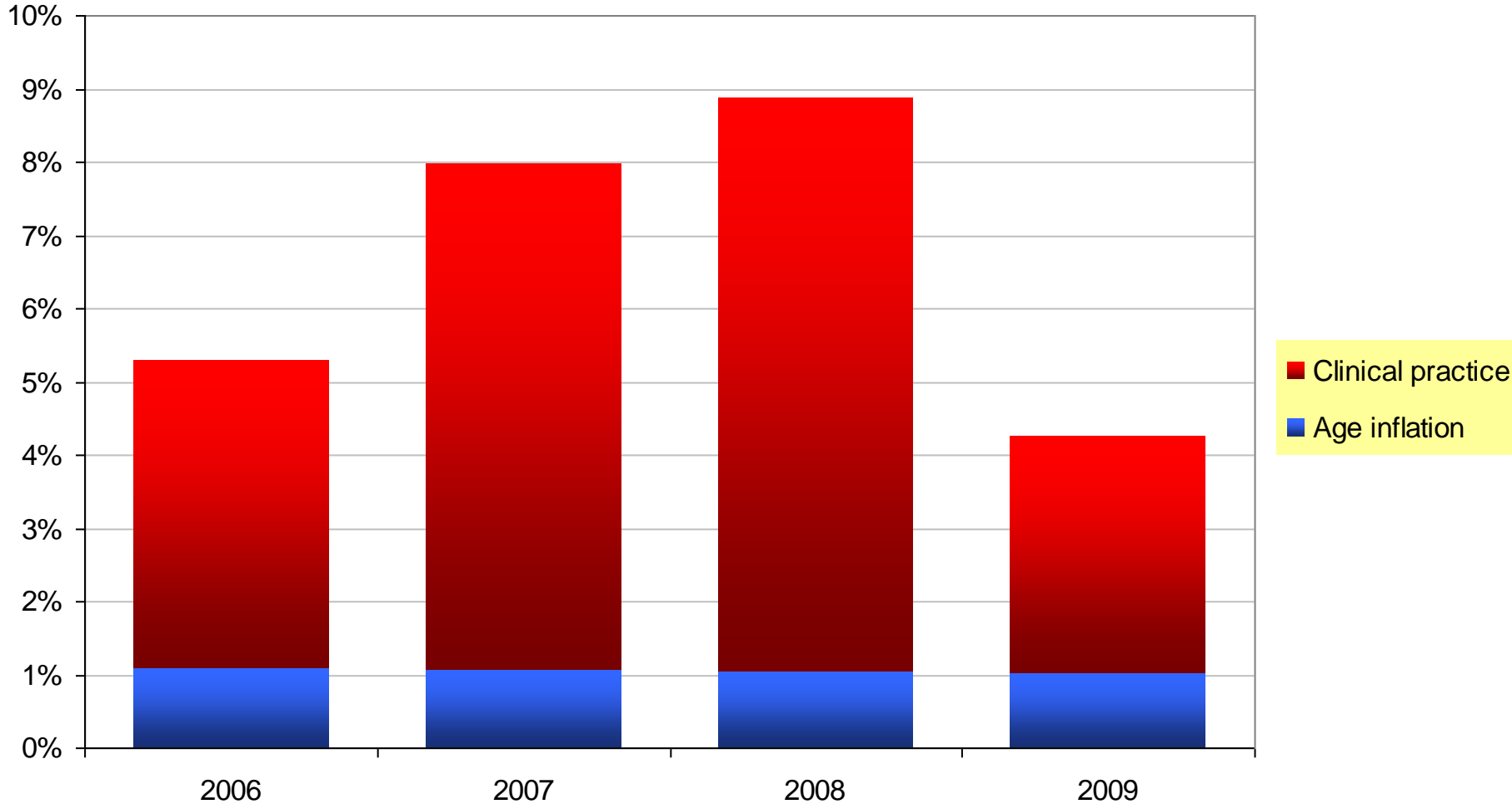
Age Inflation

The natural rise in implant rate due to population ageing

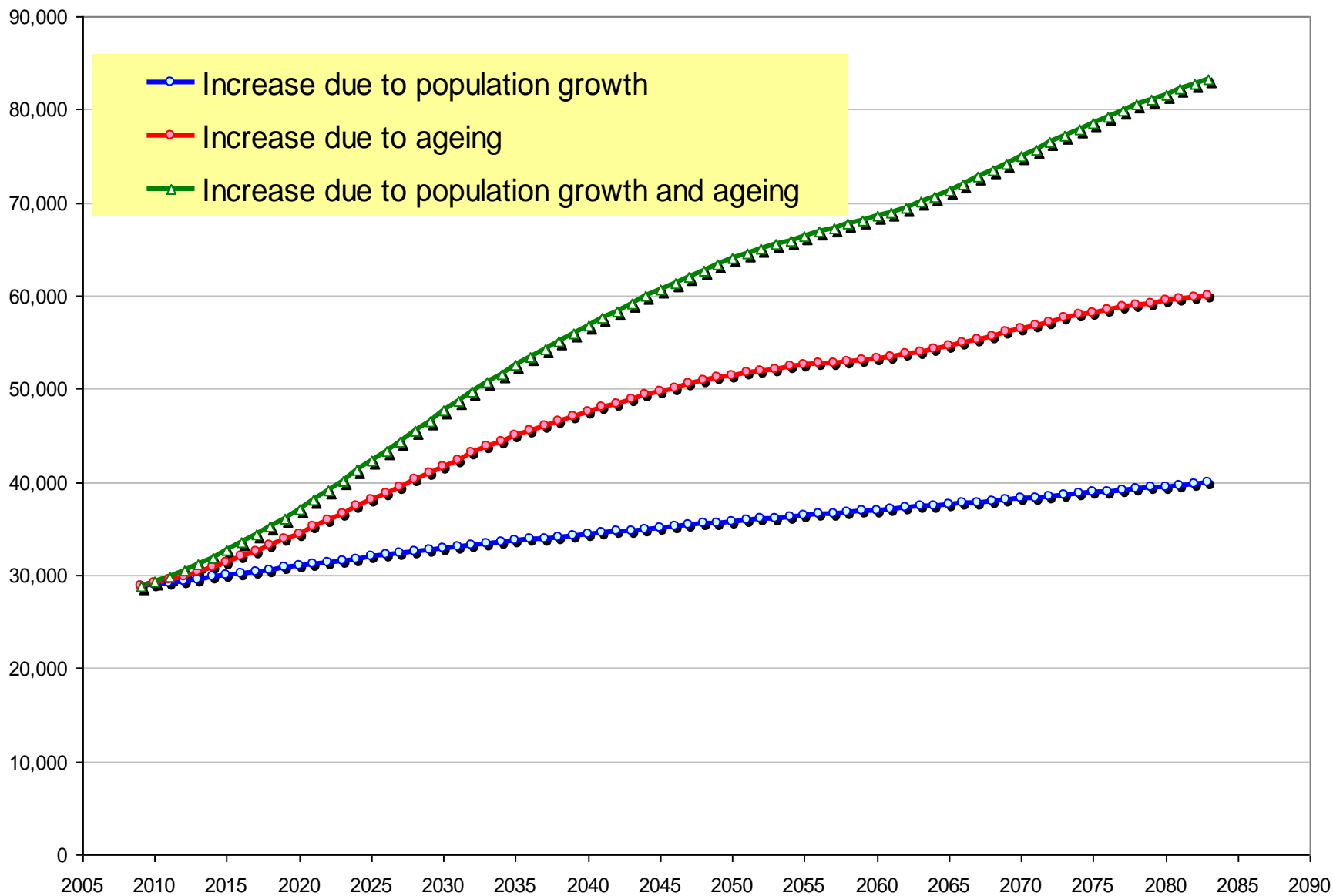
Adjustment to observed pacing rate to correct
for age structure of population



Components of recent pacemaker implant rate increase



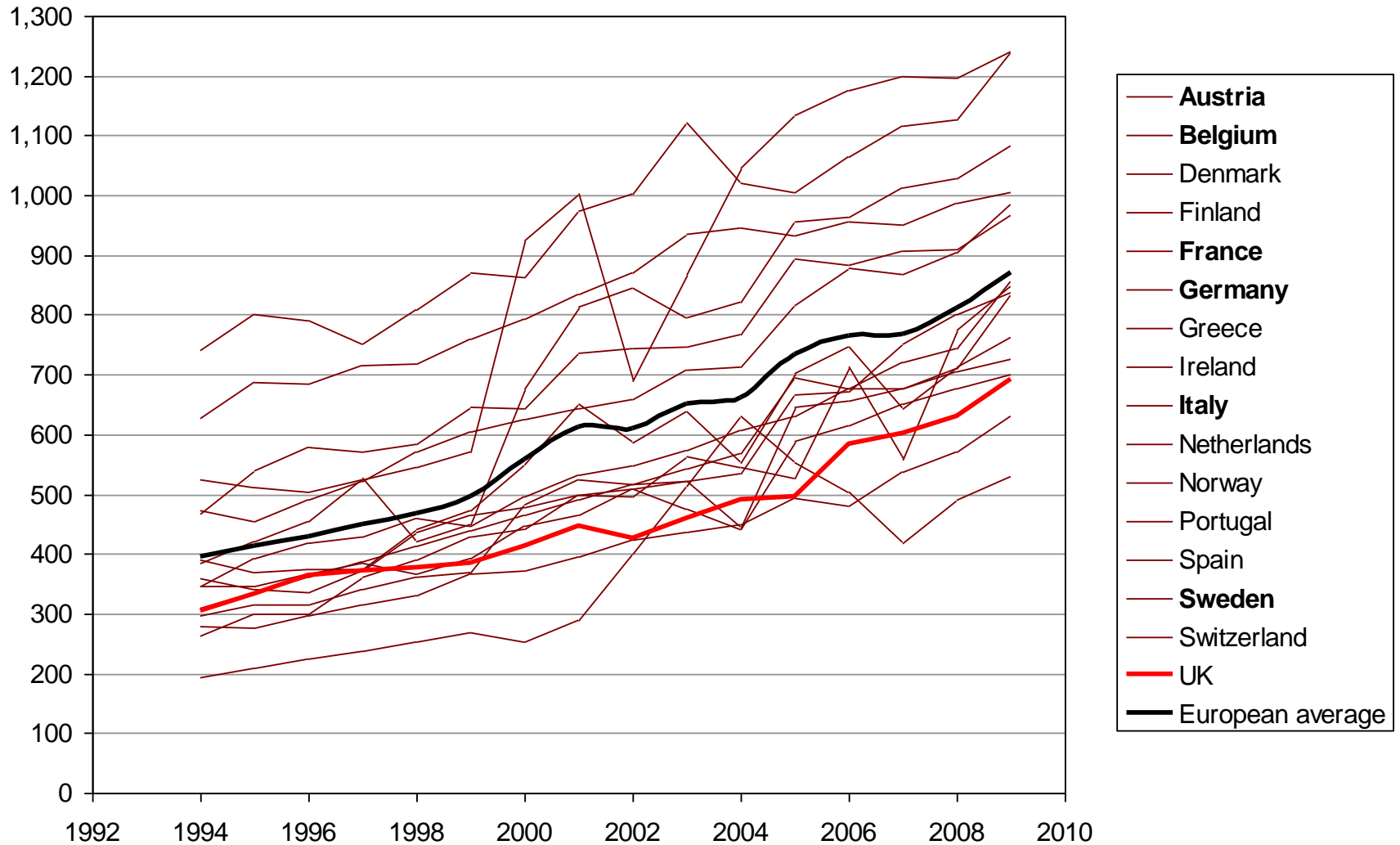
How many more pacemakers will we need?



16-year European implant trends

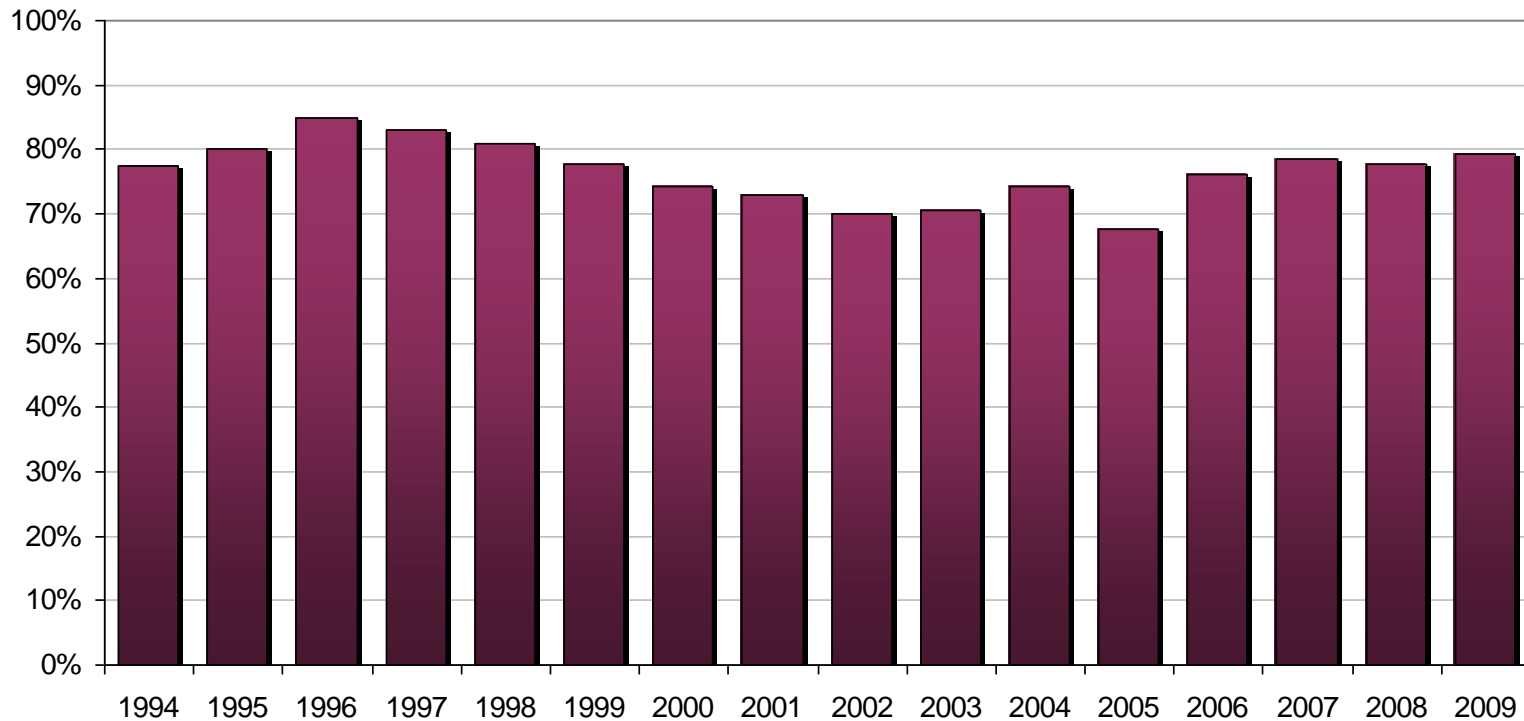
- **1994-2003**
 - European registries survey
 - Prof G Feruglio (Udine, IT)
 - Prof H Ector (Leuven, B)
- **2004-2009**
 - European manufacturers' survey
 - Pooled sales data
 - Eucomed
- **Complete data for Pacemakers and ICDs**
 - 16 European countries
 - Some extrapolations for missing data
 - Population coverage 411 million
 - 82% of EU

Total Pacemaker Implant Rate



Are we closing the Euro-gap?

UK Total Pacing Rate
as % of European Average



Conclusions

- **The National Device Survey will**
 - continue to evolve towards a National Clinical Audit
 - emphasise Quality of Outcomes measures
 - continue to work closely with clinicians & Networks
- **Implant rates are increasing**
 - but not much faster than European rates
 - the gap is not closing fast enough
- **CRT-D is replacing ICD implantation**
 - for NICE indications
- **The ageing population**
 - means we need more devices without actually increasing provision