

BCIS Audit Returns
Adult Interventional Procedures
Jan 2004 to Dec 2004



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BCIS National Audit Officer

On behalf of
British Cardiovascular Intervention Society

Audit Domains



2004 data: Ludman

- **Structure**
- **Appropriateness**
- **Process**
- **Outcome**

Angiography Centres - 2004

19 New Angiography Only centres 2004



Bedford Hospital

Darlington Memorial

Durham

East Surrey

Kent and Sussex

King George Hospital Ilford

King's Mill Centre, Mansfield

Lincoln County Hospital

Princess Alexandra, Harlow

Russells Hall

Scunthorpe

Solihull Hospital

South Tyneside

South Warwickshire

University Hospital Aintree

Wansbeck, Ashington

Westmorland General Hosp

Wexam Park

Whipps Cross

Angiography Centres - 2004



1 Stopped

North Tyneside (to Freeman Hospital)

1 Swapped

St Albans → fixed lab in Hemel Hempstead

3 Started PCI in 2004

Torbay
BUPA Hull
Southend

TOTAL: 83 Angiography Only Centres

(increase of 15 from 2003)

PCI Centres - 2004



2004 data: Ludman

3 Angio only centres now performing PCI in 2004

1. Torbay
2. Southend
3. BUPA Hull

New PCI centres in 2003

1. Manor Hospital, Oxford

TOTAL: 77 PCI Centres

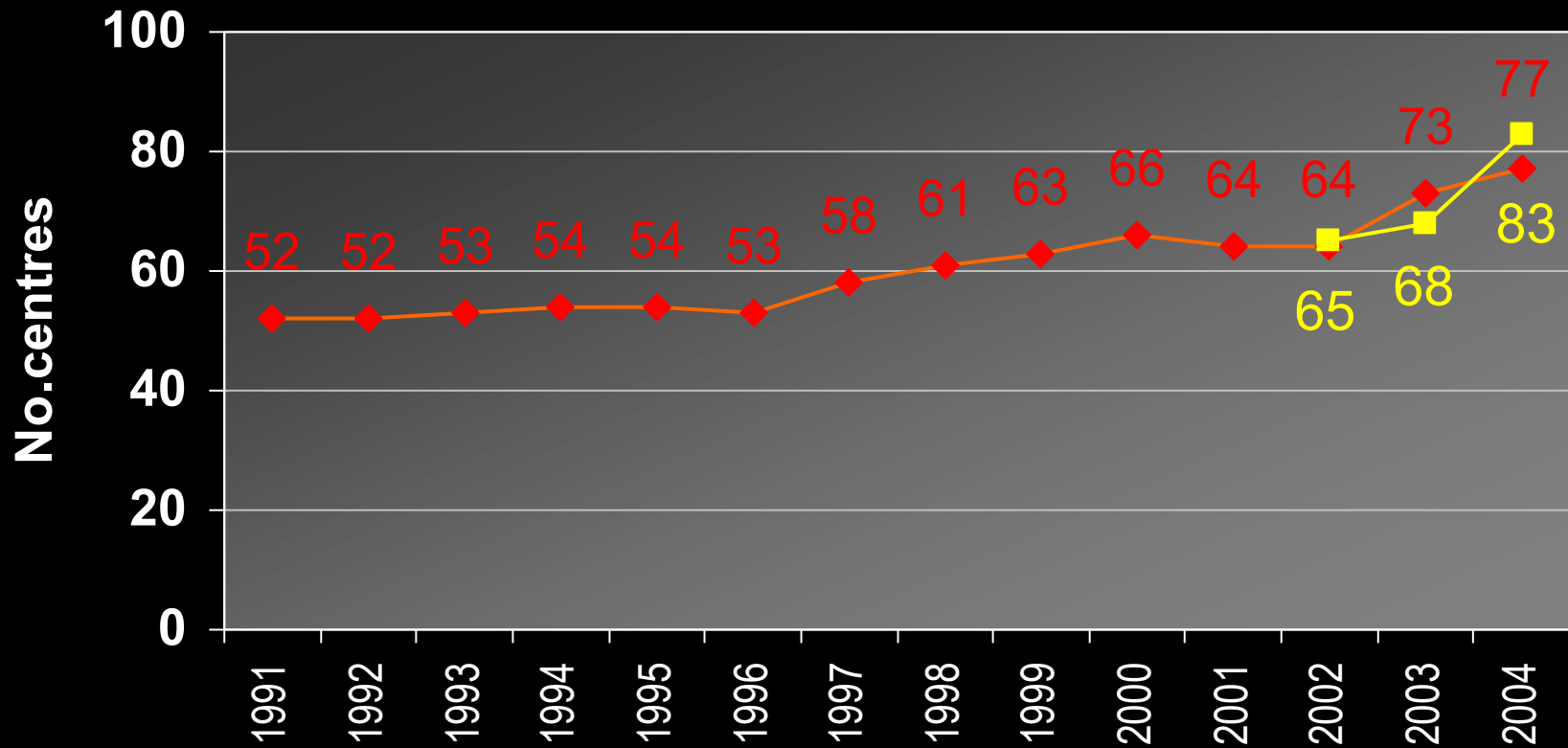
(increase of 4 from 2003)

UK Centres - 2004



2004 data: Ludman

◆ PCI ■ Angio only



PCI Centres NHS (1)



2004 data: Ludman

England

| | | |
|----|--------------------------------|----------------|
| 1 | Battle Hospital | Reading |
| 2 | Birmingham City Hospital | Birmingham |
| 3 | Birmingham Heartlands Hospital | Birmingham |
| 4 | Bristol Royal Infirmary | Bristol |
| 5 | Castle Hill Hospital | Cottingham |
| 6 | Cheltenham General Hospital | Cheltenham |
| 7 | City General Hospital | Stoke on Trent |
| 8 | Derriford Hospital | Plymouth |
| 9 | Eastbourne Hospital | Eastbourne |
| 10 | Freeman Hospital | Newcastle |
| 11 | Glenfield Hospital | Leicester |
| 12 | Hammersmith Hospital | London |
| 13 | Harefield Hospital | Uxbridge |
| 14 | Heart Hospital | London |
| 15 | James Cook University Hospital | Middlesbrough |

| | | |
|----|----------------------------|---------------|
| 16 | John Radcliffe Hospital | Oxford |
| 17 | King Edward VII | West Sussex |
| 18 | Kings College Hospital | London |
| 19 | Liverpool CTC | Liverpool |
| 20 | London Chest Hospital | London |
| 21 | Manchester Royal Infirmary | Manchester |
| 22 | New Cross Hospital | Wolverhampton |
| 23 | North Hampshire Hospital | Basingstoke |
| 24 | Northern General Hospital | Sheffield |
| 25 | Northwick Park Hospital | Harrow |
| 26 | Nottingham City Hospital | Nottingham |
| 27 | Papworth Hospital | Cambridge |
| 28 | Queen Elizabeth Hospital | Birmingham |
| 29 | Royal Brompton Hospital | London |

PCI Centres NHS (2)



2004 data: Ludman

England (cont)

| | | |
|----|------------------------------|---------------|
| 30 | Royal Cornwall Hospital | Truro |
| 31 | Royal Devon & Exeter | Exeter |
| 32 | Royal Free Hospital | London |
| 33 | Royal Sussex County Hospital | Brighton |
| 34 | Sandwell District General | West Bromwich |
| 35 | Southampton General | Southampton |
| 36 | Southend | |
| 37 | St Bartholomew's Hospital | London |
| 38 | St George's Hospital | London |
| 39 | St Mary's Hospital | London |

| | | |
|----|------------------------|------------|
| 40 | St Peter's Hospital | Chertsey |
| 41 | St Thomas' Hospital | London |
| 42 | Taunton & Somerset | Taunton |
| 43 | Torbay Hospital | Torquay |
| 44 | Victoria Hospital | Blackpool |
| 45 | Walsgrave Hospital | Walsgrave |
| 46 | Wythenshawe Hospital | Manchester |
| 47 | Yorkshire Heart Centre | Leeds |

PCI Centres NHS (3)



2004 data: Ludman

| PCI Centres NHS Scotland | | |
|--------------------------|---|---------------|
| 48 | Aberdeen Royal Infirmary | Aberdeen |
| 49 | Edinburgh Royal Infirmary | Edinburgh |
| 50 | Glasgow Royal Infirmary | Glasgow |
| 51 | Glasgow Western Infirmary | Glasgow |
| 52 | Golden Jubilee National Hospital (formerly HCI) | Clydesbank |
| 53 | Hairmyres Hospital | East Kilbride |
| 54 | Western General Hospital | Edinburgh |

| PCI Centres NHS Wales | | |
|-----------------------|------------------------------|---------|
| 55 | Morriston Hospital | Swansea |
| 56 | University Hospital of Wales | Cardiff |

| PCI Centres NHS Northern Ireland | | |
|----------------------------------|-------------------------|---------|
| 57 | Belfast City Hospital | Belfast |
| 58 | Royal Victoria Hospital | Belfast |

PCI Centres - Private



2004 data: Ludman

England

| | | |
|----|---------------------------|--------------|
| 59 | BMI Alexandra Hospital | Cheadle |
| 60 | BMI Park Hospital | Arnold |
| 61 | BMI Priory Hospital | Edgbaston |
| 62 | BUPA Cambridge Lea | Impington |
| 63 | BUPA Hospital Bristol | Redland Hill |
| 64 | BUPA Hospital Hull | Anlaby, Hull |
| 65 | BUPA Hospital Leeds | Roundhay |
| 66 | BUPA Hospital Leicester | Oadby |
| 67 | BUPA Hospital Southampton | Southampton |
| 68 | Capio Yorkshire Clinic | Bingley |
| 69 | Cromwell Hospital | London |

| | | |
|----|-------------------------|------------|
| 70 | Harley Street Clinic | London |
| 71 | Leeds Nuffield Hospital | Leeds |
| 72 | London Bridge Hospital | London |
| 73 | London Independent | London |
| 74 | Manor Hospital | Headington |
| 75 | St Anthony's Hospital | Surrey |
| 76 | Wellington Hospital | London |

Scotland

| | | |
|----|--------------------|---------|
| 77 | Ross Hall Hospital | Glasgow |
|----|--------------------|---------|

Angiography Only Centres (1)



2004 data: Ludman

| | |
|----|------------------------------------|
| 1 | Airedale General Hospital |
| 2 | Altmagelium Hospital |
| 3 | Arrowe Park Hospital |
| 4 | Ayr Hospital |
| 5 | Bedford Hospital NHS Trust |
| 6 | BMI The Princess Margaret Hospital |
| 7 | BMI Thornbury Hospital |
| 8 | Bradford Royal Infirmary |
| 9 | Broomfield Hospital |
| 10 | BUPA Hospital, Little Aston |
| 11 | BUPA Murrayfield Hospital |
| 12 | Calderdale Royal Hospital |
| 13 | Conquest Hospital |
| 14 | County Hospital |
| 15 | Craigavon Hospital |
| 16 | Cumberland Infirmary |
| 17 | Darlington Memorial Hospital |
| 18 | Derbyshire Royal Infirmary |

| | |
|----|-------------------------------------|
| 19 | Dewsbury and District Hospital |
| 20 | Diana Princess of Wales Hospital |
| 21 | Doncaster Royal Infirmary |
| 22 | Droitwich Spa Hospital |
| 23 | Dudley Group of Hospitals |
| 24 | Dumfries & Galloway Royal Infirmary |
| 25 | Ealing Hospital |
| 26 | East Surrey Hospital |
| 27 | Good Hope District General Hospital |
| 28 | Goring Hall Hospital |
| 29 | Great Western Hospital |
| 30 | Harrogate District Hospital |
| 31 | Hemel Hempstead General |
| 32 | Huddersfield Royal Infirmary |
| 33 | Inverclyde Royal Hospital |
| 34 | Kent and Sussex Hospital |
| 35 | King George Hospital |
| 36 | Kings Mill Hospital |

Angiography Only Centres (2)



2004 data: Ludman

| | |
|----|---------------------------------------|
| 37 | Lincoln County Hospital |
| 38 | Lister Hospital |
| 39 | Manor Hospital |
| 40 | Mayday University Hospital |
| 41 | Nevill Hall Hospital |
| 42 | Ninewells Hospital |
| 43 | Norfolk & Norwich Hospital |
| 44 | North Middlesex Hospital |
| 45 | North Staffordshire Nuffield Hospital |
| 41 | Northampton General Hospital |
| 42 | Pinderfields General Hospital |
| 43 | Prince Philip Hospital |
| 44 | Princess Alexandra Hospital |
| 45 | Princess of Wales Hospital |
| 46 | Princess Royal Hospital |
| 47 | Princess Royal University Hospital |
| 48 | Queen Elizabeth Hospital |
| 49 | Queen Elizabeth Hospital |

| | |
|----|-------------------------------------|
| 50 | Queens Medical Centre |
| 51 | Raigmore Hospital |
| 52 | Rochdale Infirmary |
| 53 | Rotherham Hospital |
| 54 | Royal Bournemouth Hospital |
| 55 | Royal Gwent Hospital |
| 56 | Royal Liverpool University Hospital |
| 57 | Royal Shrewsbury Hospital |
| 58 | Royal Surrey County Hospital |
| 59 | Royal United Hospital |
| 60 | Salisbury District Hospital |
| 61 | Scunthorpe General Hospital |
| 62 | Solihull Hospital |
| 63 | South Tyneside District Hospital |
| 64 | South Warwickshire NHS Trust |
| 64 | St James' University Hospital |
| 65 | St. Mary's Hospital |

Angiography Only Centres (3)



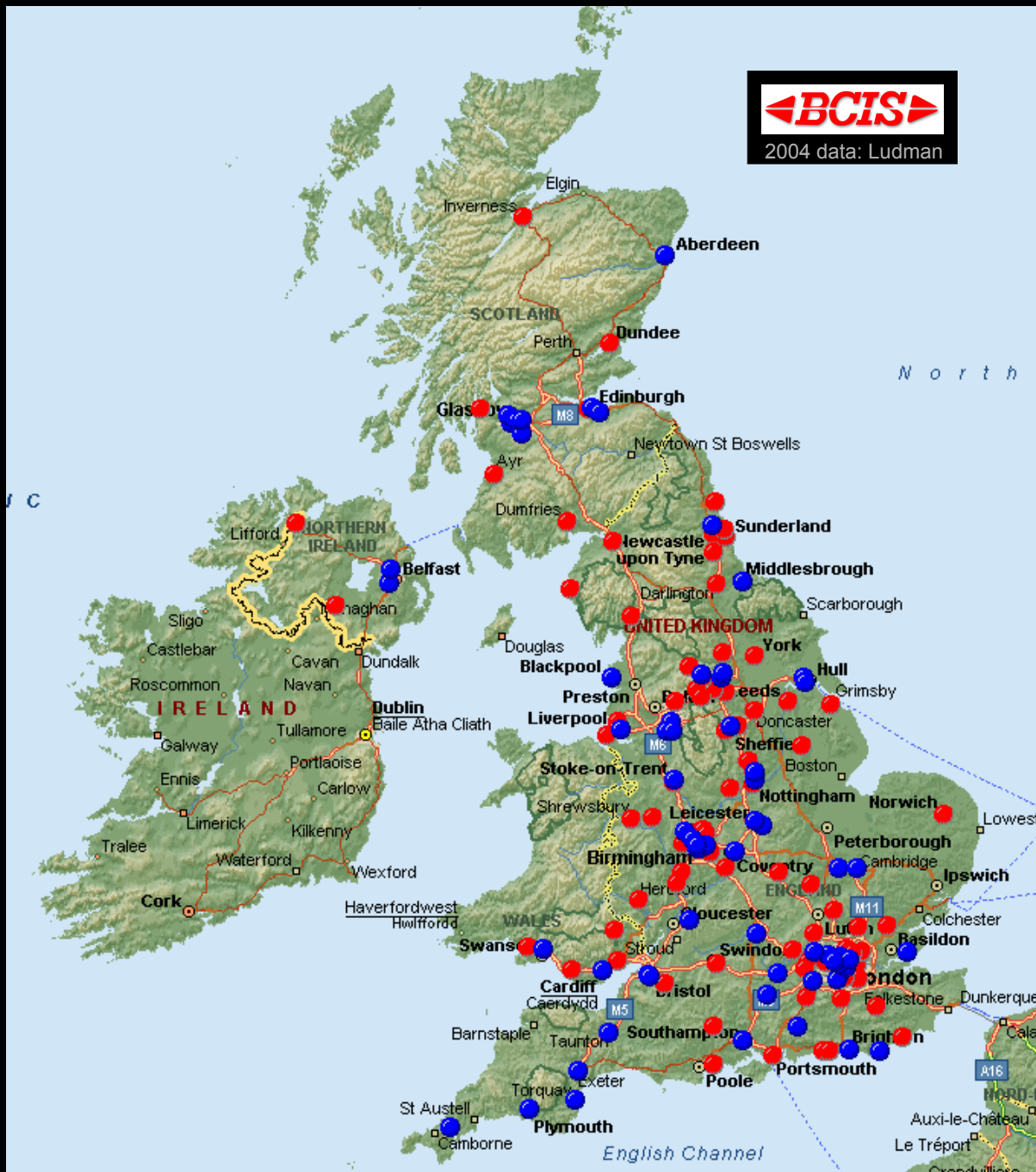
2004 data: Ludman

| | |
|----|-------------------------------------|
| 66 | Sunderland Royal Hospital |
| 67 | University Hospital Aintree |
| 68 | University Hospital of North Durham |
| 69 | Wansbeck Hospital |
| 70 | West Cumberland Hospital |
| 71 | Westmorland General Hospital |
| 72 | Wexham Park Hospital |
| 73 | Whipps Cross University Hospital |
| 74 | Worcester Royal Hospital |
| 75 | Worthing Hospital |
| 76 | Wycombe Hospital |
| 77 | York District General Hospital |

2004



2004 data: Ludman



● PCI centres

77

● Angiography only Centres

83

UK Interventional and Diagnostic centres

2004



2004 data: Ludman

| | No. | No cath data | No PCI data | Caths (% of total) | PCIs (% of total) |
|-------------------------------|------------|--------------|-------------|--------------------|-------------------|
| NHS Interventional | 58 | 4 | 3 | | |
| Private Interventional | 19 | 2 | 1 | | |
| Diagnostic only | 83 | 12 | | | |
| TOTAL | 160 | | | | |

Missing cath data estimated from 2003 figures

PCI Centres not reporting diagnostic numbers for 2004



2004 data: Ludman

NHS

- Derriford Hospital
- St Mary's Hospital, London
- St Peter's Hospital, Chertsey
- (Belfast City Hospital – very late)

Private

- BMI Park Hospital, Notts
- Harley Street Clinic

Angio only Centres not reporting diagnostic numbers for 2004



2004 data: Ludman

- Broomfield Hospital
- Diana Princess of Wales Hospital, Grimsby
- Dumfries & Galloway RI
- Ealing Hospital
- Neville Hall Hospital
- Queen Elizabeth Hospital, Woolwich
- Royal Gwent Hospital
- Royal Surrey County Hosp
- Salisbury District Hospital
- Wycombe Hospital
- South Warwickshire NHS Trust
- South Tyneside District Hospital

UK Interventional and Diagnostic centres 2004



2004 data: Ludman

| | No. | No cath data | No PCI data | Caths (% of total) | PCIs (% of total) |
|-------------------------------|------------|--------------|-------------|-------------------------|----------------------|
| NHS Interventional | 58 | 4 | 3 | 139,978 (70%) | |
| Private Interventional | 19 | 2 | 1 | 9,956 (5%) | |
| Diagnostic only | 83 | 12 | | 51,446 (25%) | |
| TOTAL | 160 | | | 201,380 | |

Missing cath data estimated from 2003 figures if known

Centres Not Reporting PCI numbers for 2004



2004 data: Ludman

- Southend
- St Peter's Hospital, Chertsey
- (Belfast City Hospital – very late)
- BMI Park Hospital

UK Interventional and Diagnostic centres 2004



2004 data: Ludman

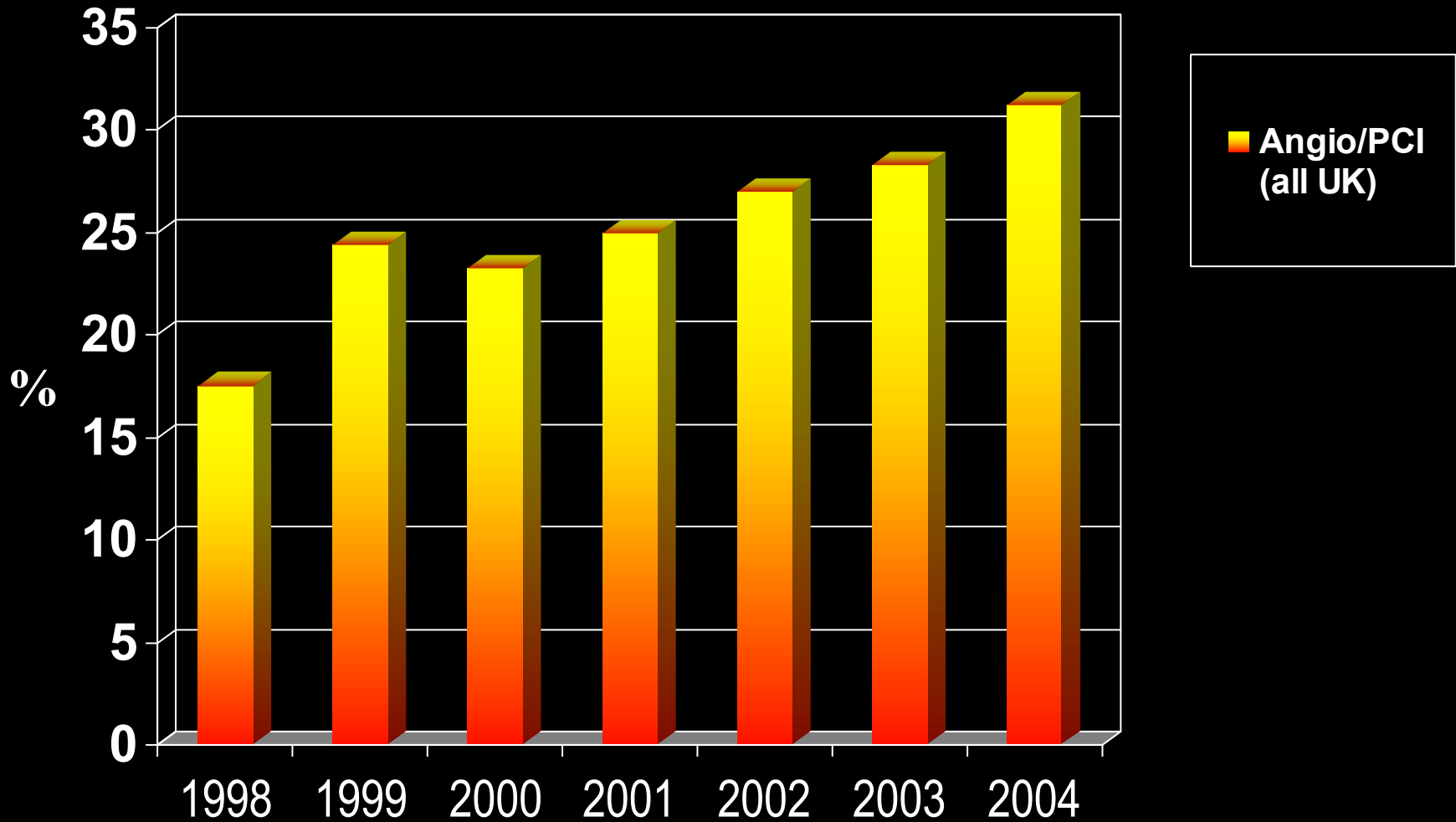
| | No. | No cath data | No PCI data | Caths (% of total) | PCIs (% of total) |
|-------------------------------|------------|--------------|-------------|-------------------------|------------------------|
| NHS Interventional | 58 | 4 | 3 | 139,978 (70%) | 59,532 (95%) |
| Private Interventional | 19 | 2 | 1 | 9,956 (5%) | 3,248 (5%) |
| Diagnostic only | 83 | 12 | | 51,446 (25%) | |
| TOTAL | 160 | | | 201,380 | 62,780 |

Missing cath data estimated from 2003 figures if known

PCI per Angiogram ratio



2004 data: Ludman



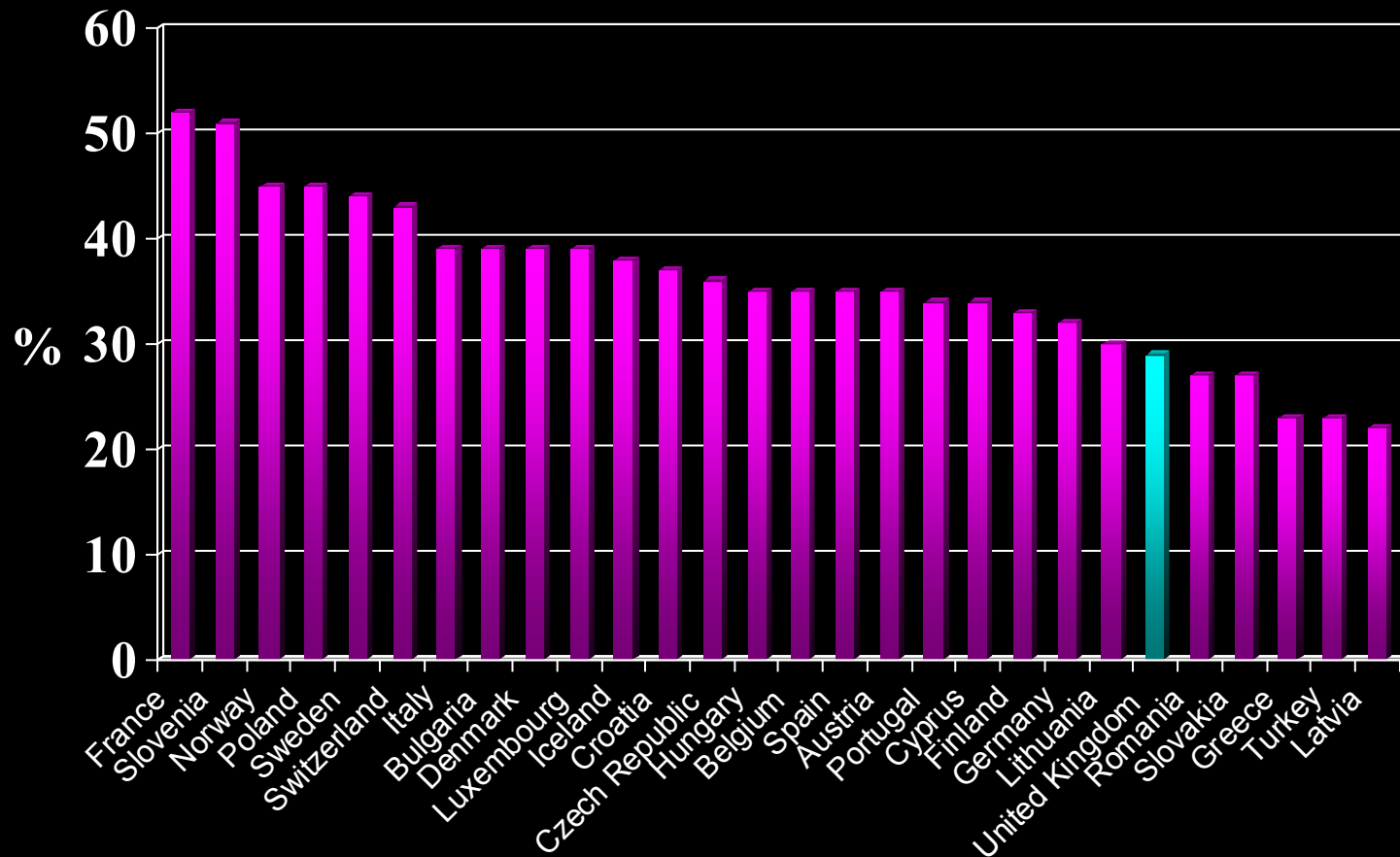
PCI per Angiogram ratio

ESC Survey 2003

Cook S for Working Group on Interventional Cardiology (WG 10) of the ESC *In Press*



2004 data: Ludman



Total UK PCI Procedures



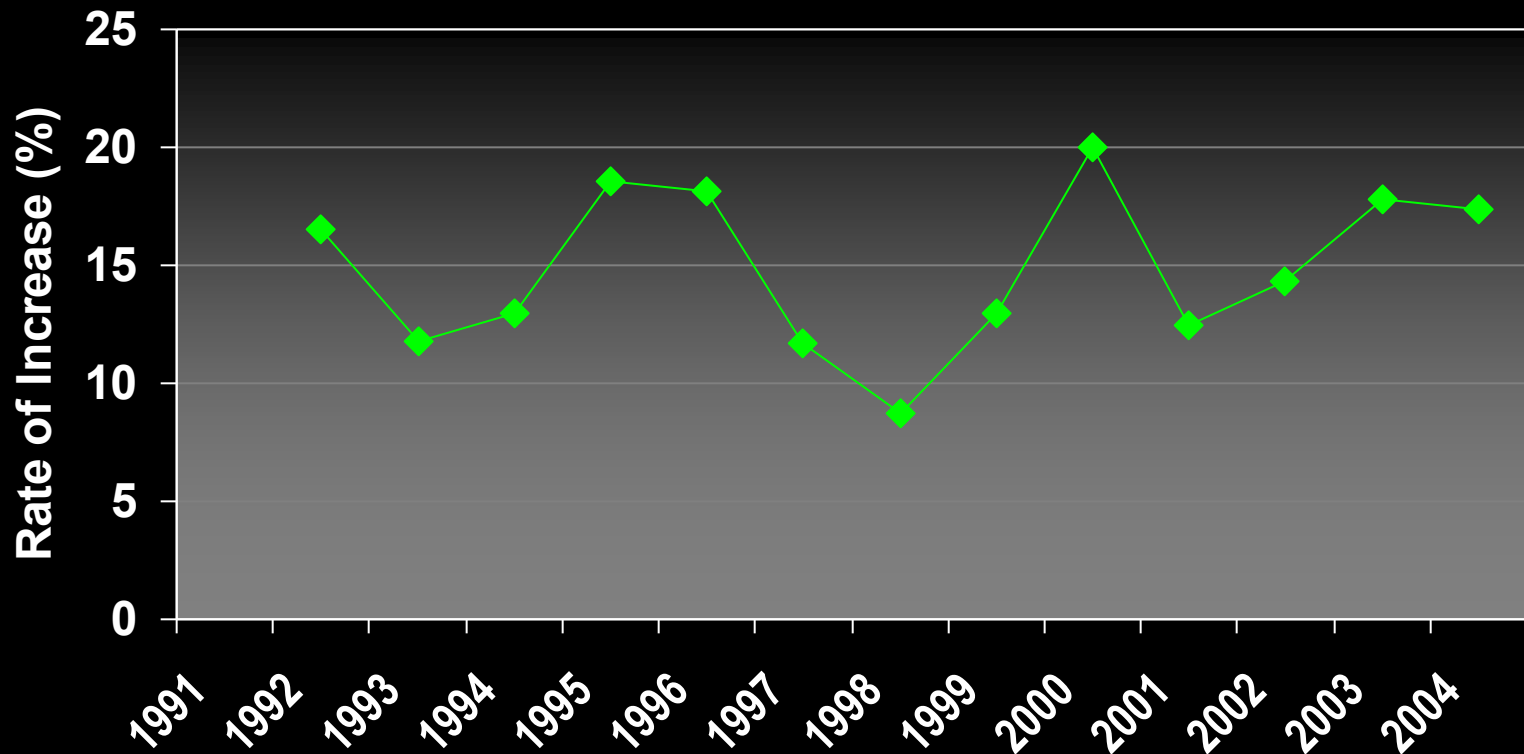
2004 data: Ludman

| Year | Centres | Total Procedures | Rate per million | Increase (%) |
|------|---------|------------------|------------------|--------------|
| 1991 | 52 | 9,933 | 174 | |
| 1992 | 52 | 11,575 | 203 | 16.5 |
| 1993 | 53 | 12,937 | 227 | 11.8 |
| 1994 | 54 | 14,624 | 256 | 13.0 |
| 1995 | 54 | 17,344 | 304 | 18.6 |
| 1996 | 53 | 20,511 | 359 | 18.1 |
| 1997 | 58 | 22,902 | 402 | 11.7 |
| 1998 | 61 | 24,899 | 437 | 8.7 |
| 1999 | 63 | 28,133 | 494 | 13 |
| 2000 | 66 | 33,652 | 590 | 20 |
| 2001 | 64 | 38,992 | 664 | 12.5 |
| 2002 | 64 | 44,913 | 759 | 14.3 |
| 2003 | 73 | 53,261 | 894 | 17.8 |
| 2004 | 77 | 62,780 | 1050 | 17.4 |

Rate of increase in PCI numbers pmp



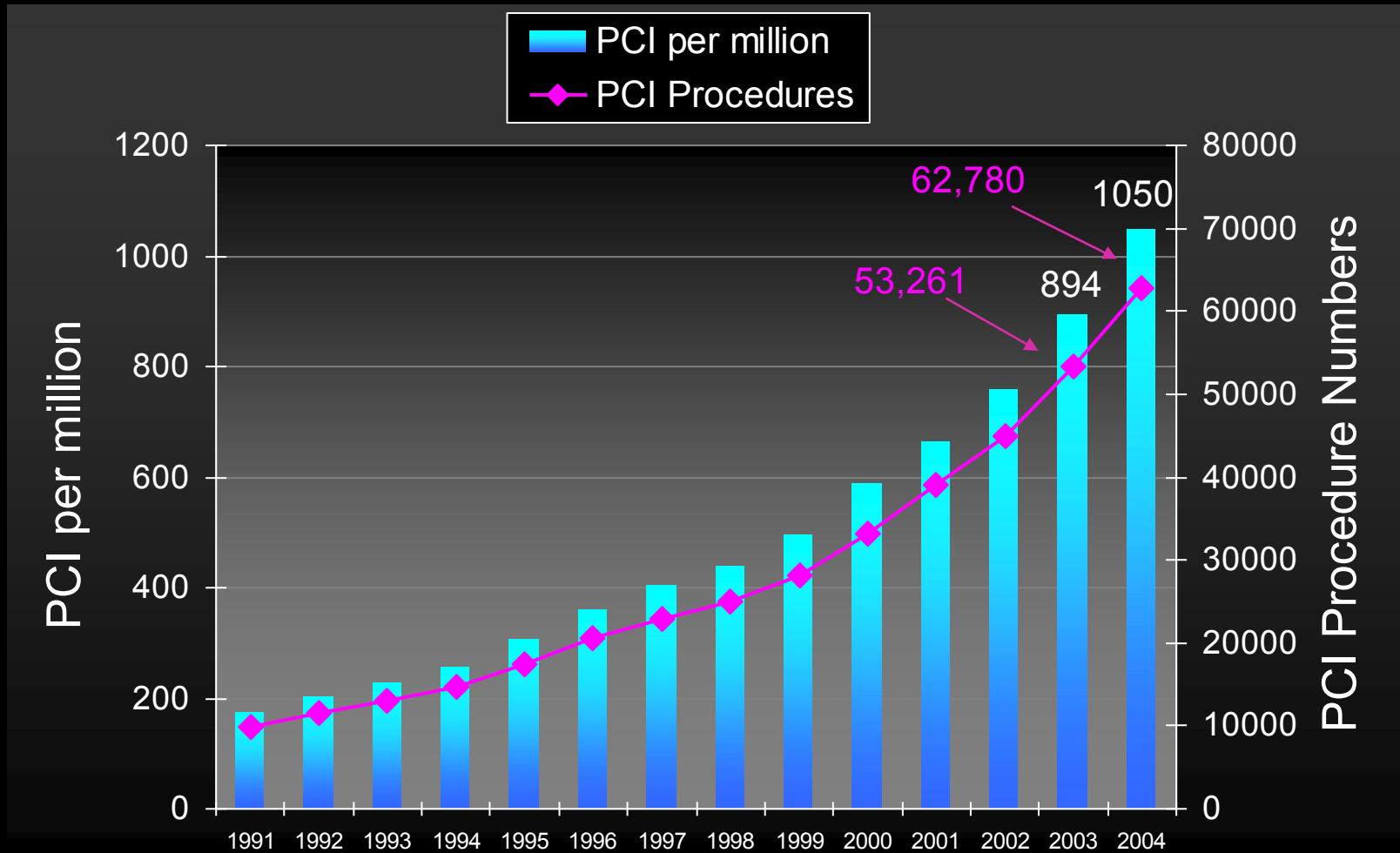
2004 data: Ludman



PCI activity to 2004 (UK)



2004 data: Ludman

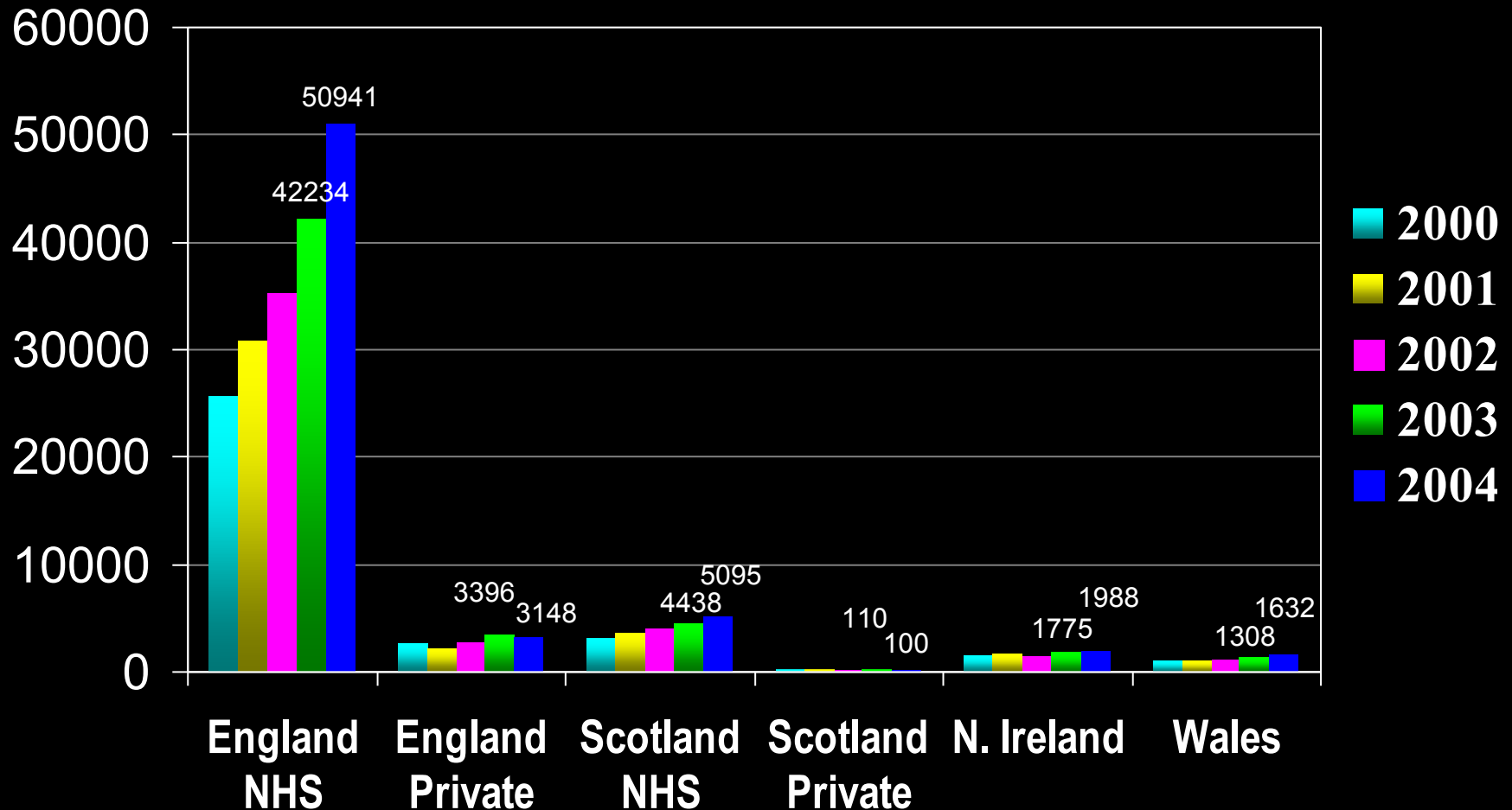


Total PCIs in the UK Countries



2004 data: Ludman

Total No.s of PCI



Population estimates

Mid 2004



2004 data: Ludman



Total UK: 59.8 m

Scotland 5.08 m

Northern Ireland 1.71 m

England 50.09 m

Welsh Rx in England 0.7 m

Total Rx in England 50.79 m

Wales 2.95 m

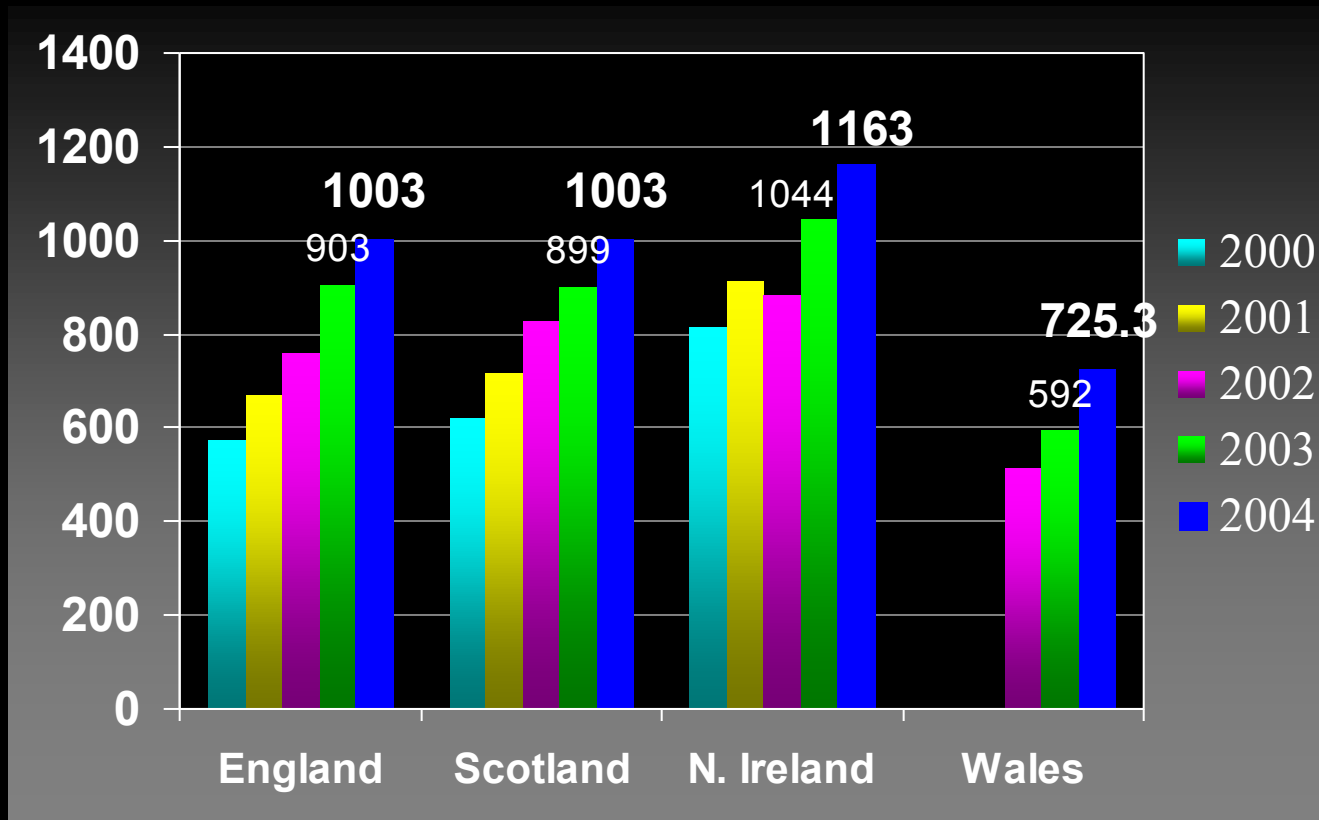
Rx in Wales: 2.25 m

PCIs/million UK Countries

(2000 to 2004)



2004 data: Ludman

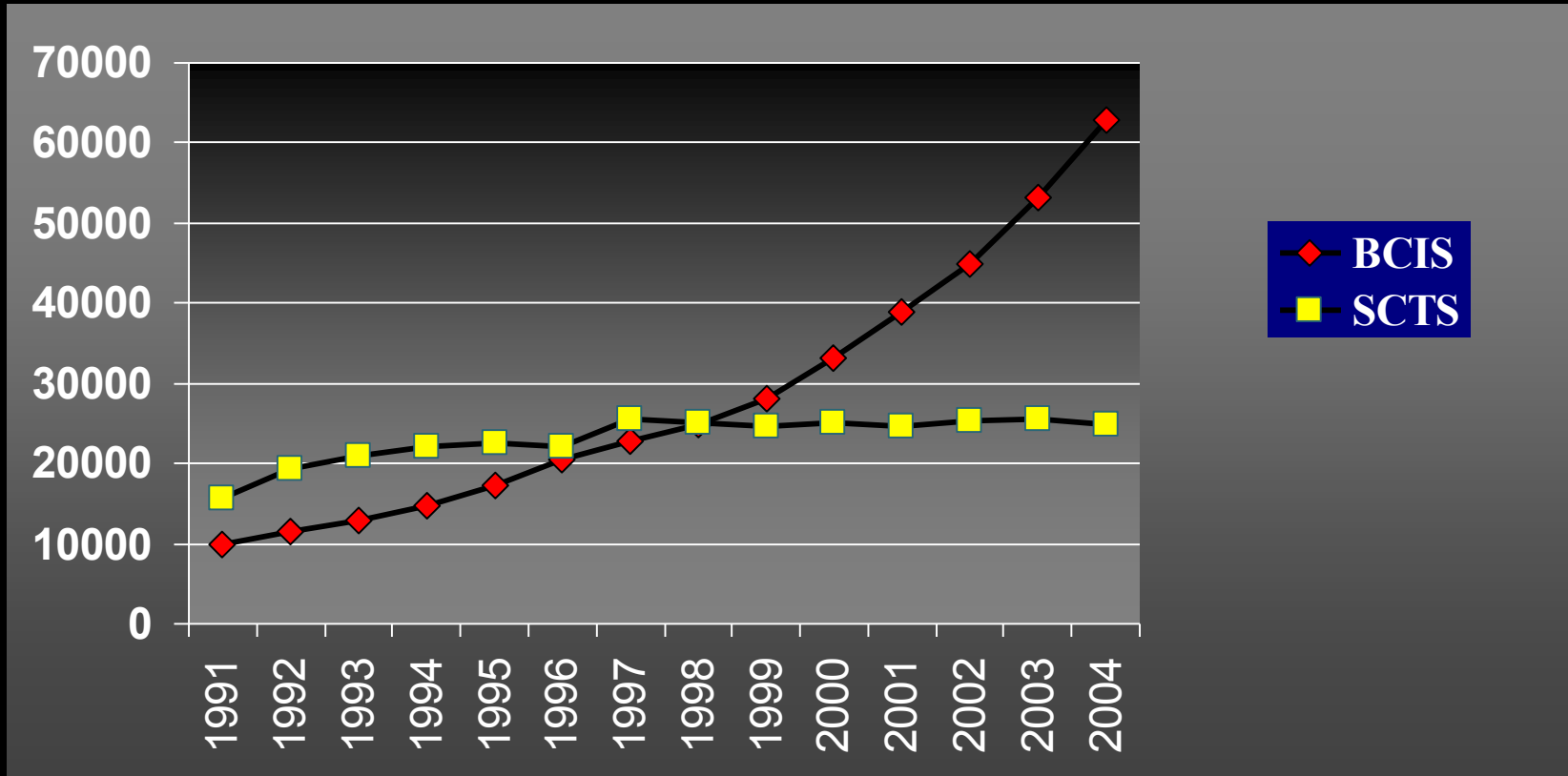


PCI vs Isolated CABG Numbers (UK)

Data from BCIS and SCTS Registry



2004 data: Ludman



Note:

CABG data for financial yr
all PCI v NHS CABG

CABG data for 2003 and 2004 from DoH

PCI vs Isolated CABG Ratio (UK)

Data from BCIS and SCTS Registry



2004 data: Ludman

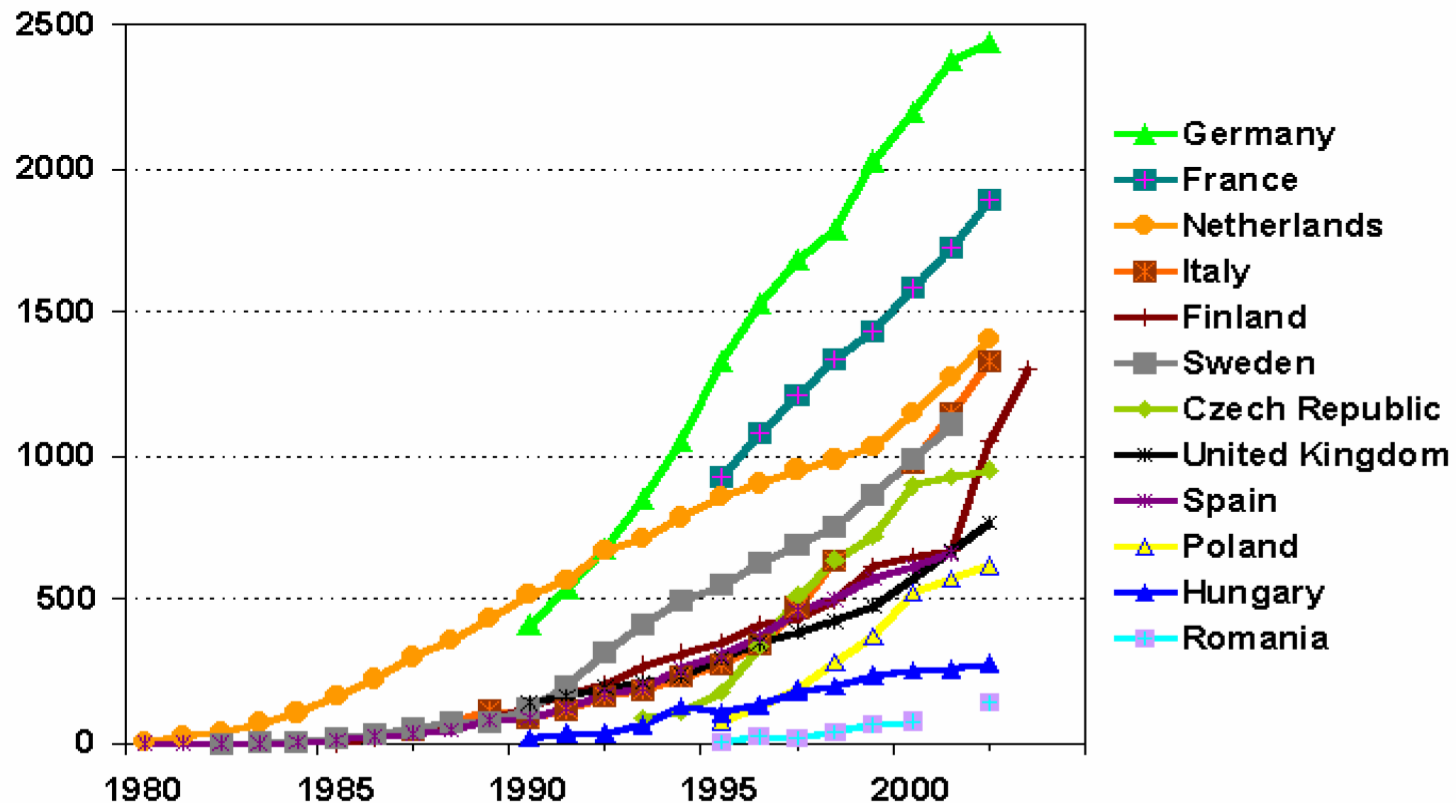


Cardiovascular Diseases in Europe 2004

www.escardio.org/knowledge/ehs/slides/

Euro Heart Survey 3rd Report

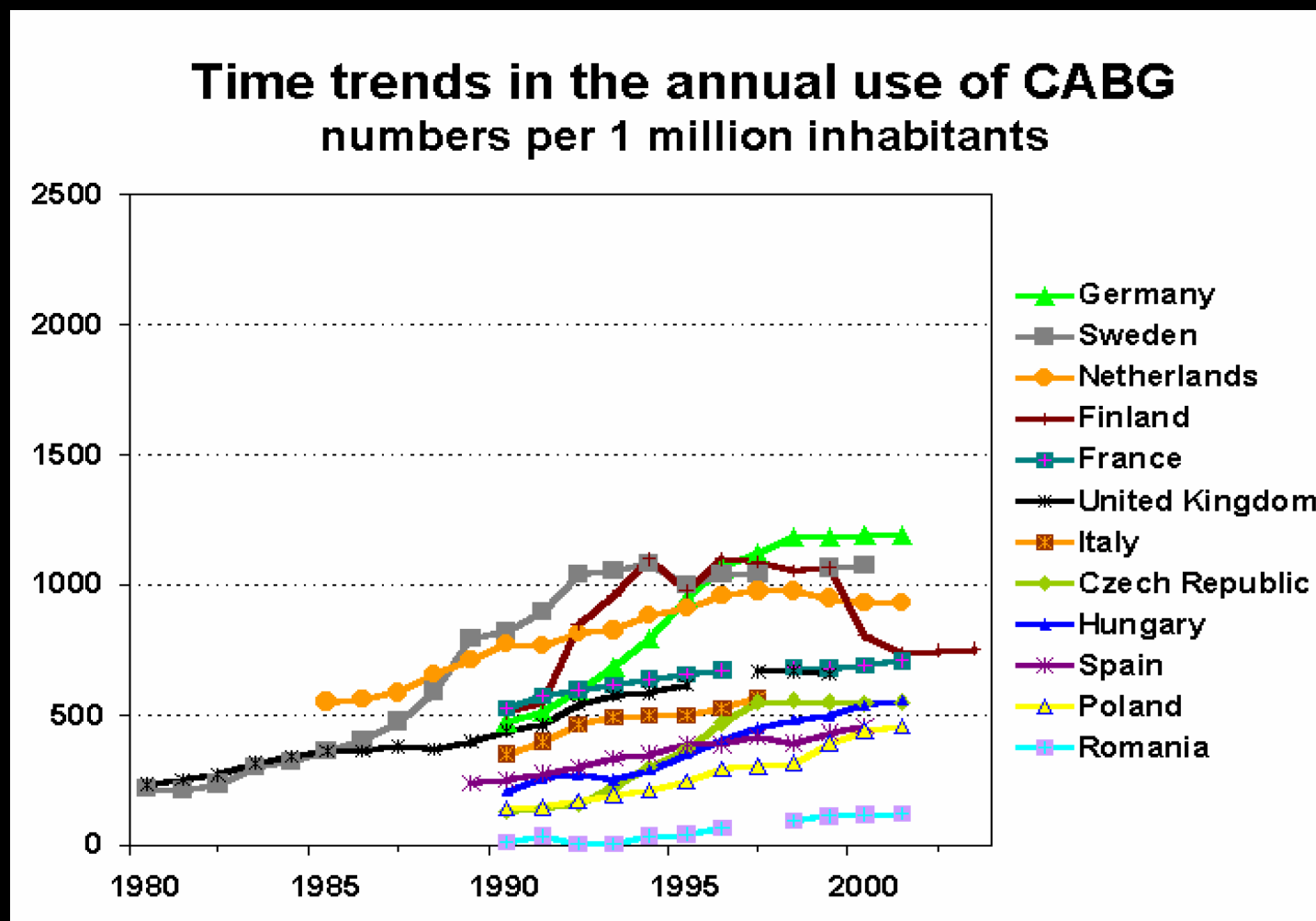
**Time trends in the annual use of PCI
numbers per 1 million inhabitants**



Cardiovascular Diseases in Europe 2004

www.escardio.org/knowledge/ehs/slides/

Euro Heart Survey 3rd Report



Annual Procedures per cath lab (NHS centres)



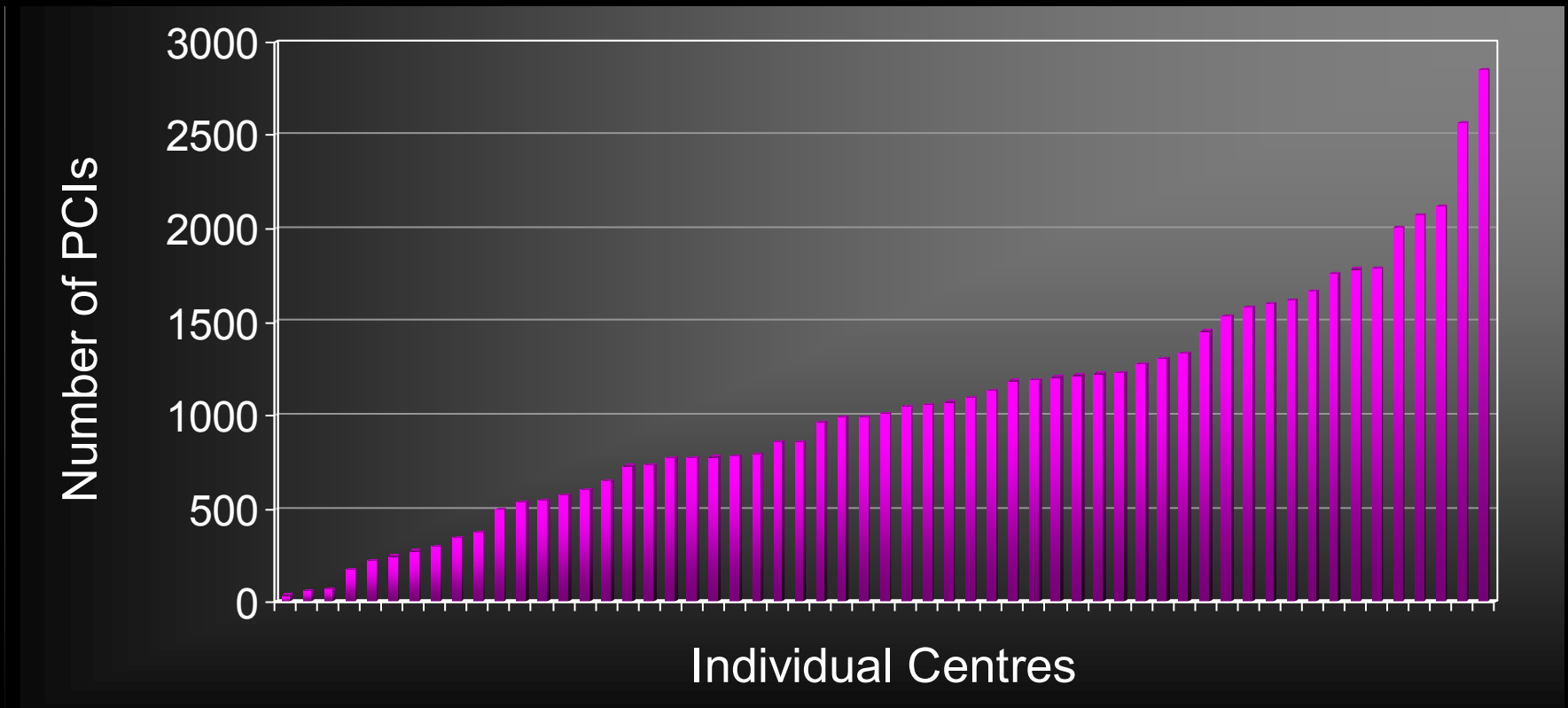
2004 data: Ludman

| | Mean | Median | Range |
|------------------------------------|-------------|-------------|--------------------|
| Interventional labs | | | |
| Procedures (pa) per lab | 1148 | 1093 | 543 to 2304 |
| PCIs (pa) per lab | 449 | 408 | 36 to 856 |
| Diagnostic labs | | | |
| Caths (pa) per lab* | 669 | 544 | 40 to 2786 |

Number of PCIs performed in NHS Centres (Total Per Annum)



2004 data: Ludman



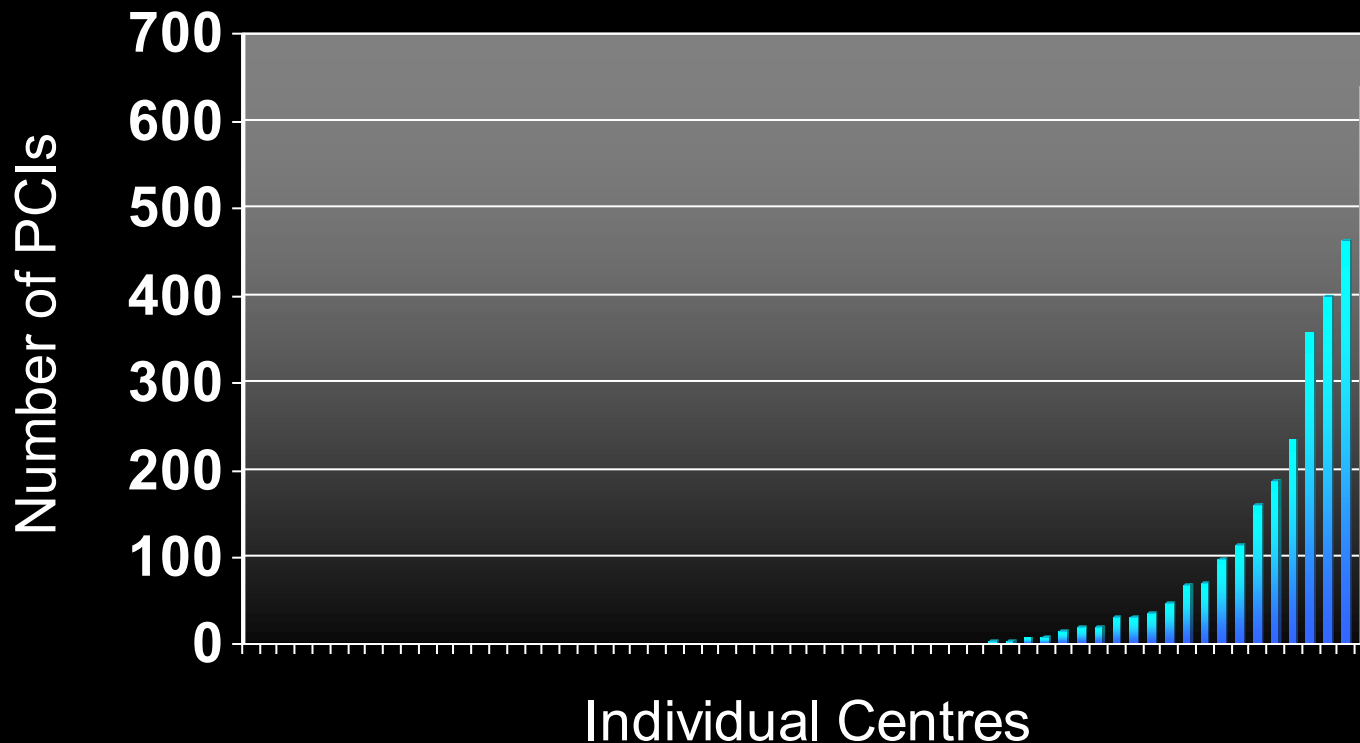
Data from: 57 of 58 centres (2 centres estimated data)

Day Case PCI



2004 data: Ludman

- **22 of 77 Units performing day case PCI**
 - Total of 3018 procedures performed (21% increase cf 2003)
 - 4.8% of all PCI procedures (4.6% 2003)

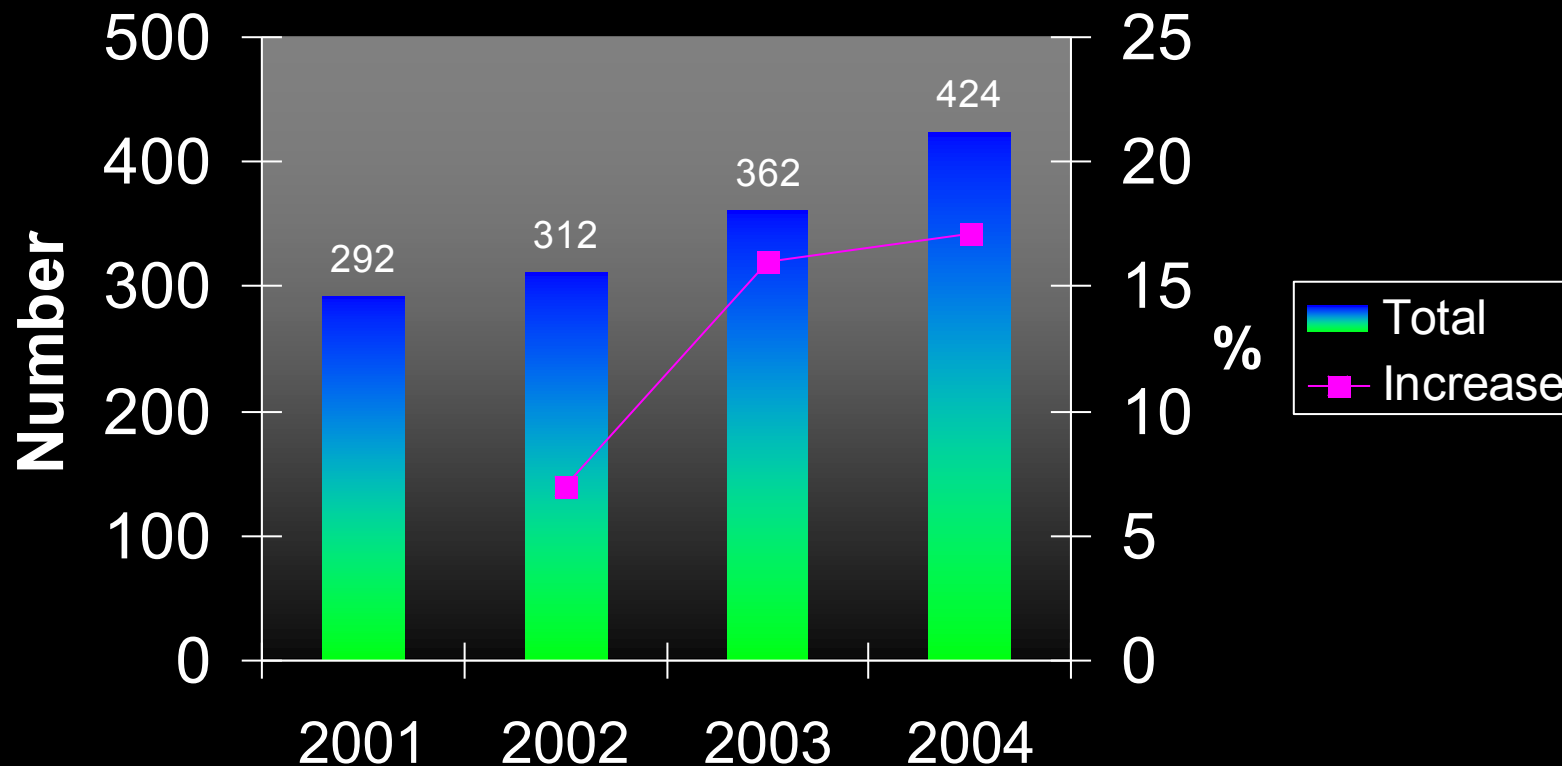


Data from: 64 of 77 centres

No. of Interventional Consultants (NHS centres)



2004 data: Ludman



Data from: 57 of 58 centres

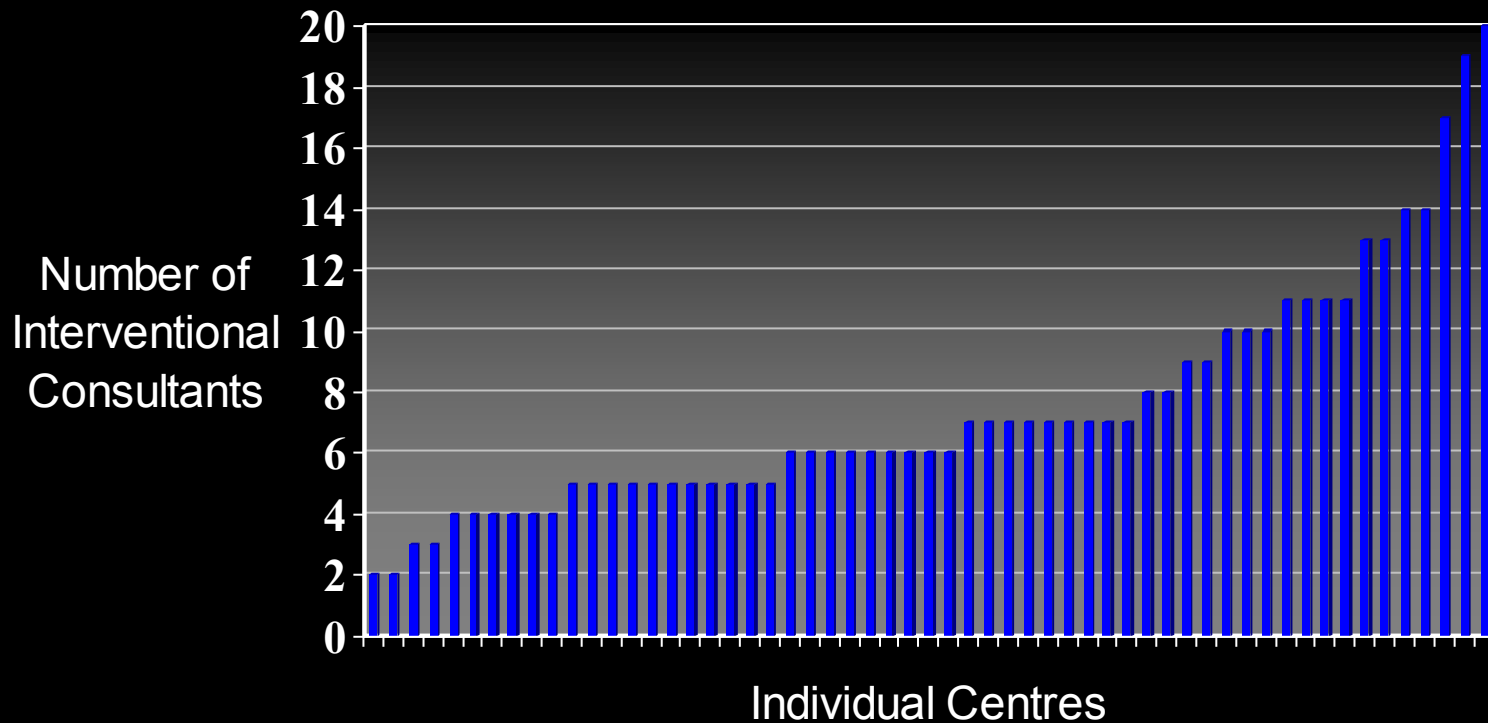
Note: if work at two NHS centres will be counted twice
Includes cardiologists and radiologists

No. of Interventional Consultants (NHS centres)



2004 data: Ludman

2004



| Mean | |
|------|-----|
| 2000 | 5.5 |
| 2001 | 6.1 |
| 2002 | 6.5 |
| 2003 | 6.7 |
| 2004 | 7.4 |

No. of PCIs per Consultant

(NHS Centres) 2004 data from 56 of 58 centres



2004 data: Ludman



| Mean PCI/consultant | |
|------------------------|-----|
| 2000 | 125 |
| 2001 | 126 |
| 2002 | 138 |
| 2003 | 139 |
| 2004 | 143 |

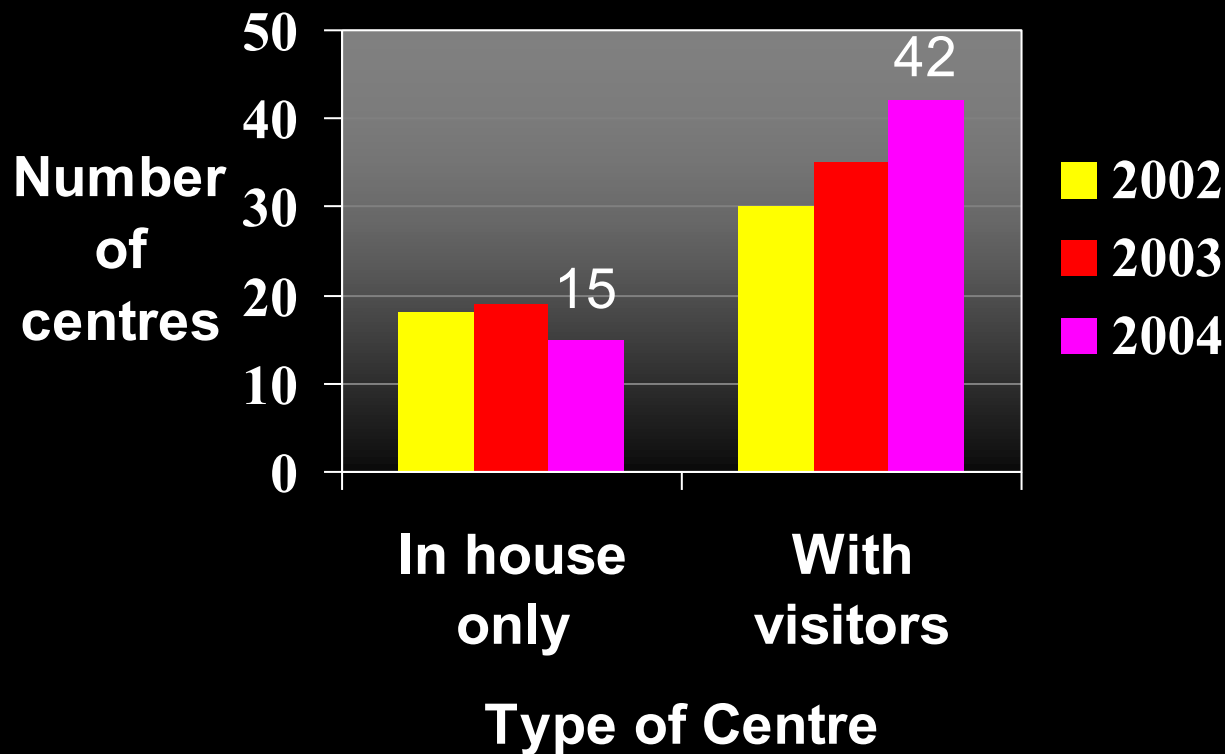
Note: data from institutional volume divided by No operators per institution

Visiting Interventionists

(NHS Centres) 2004 data from 57 of 58 centres



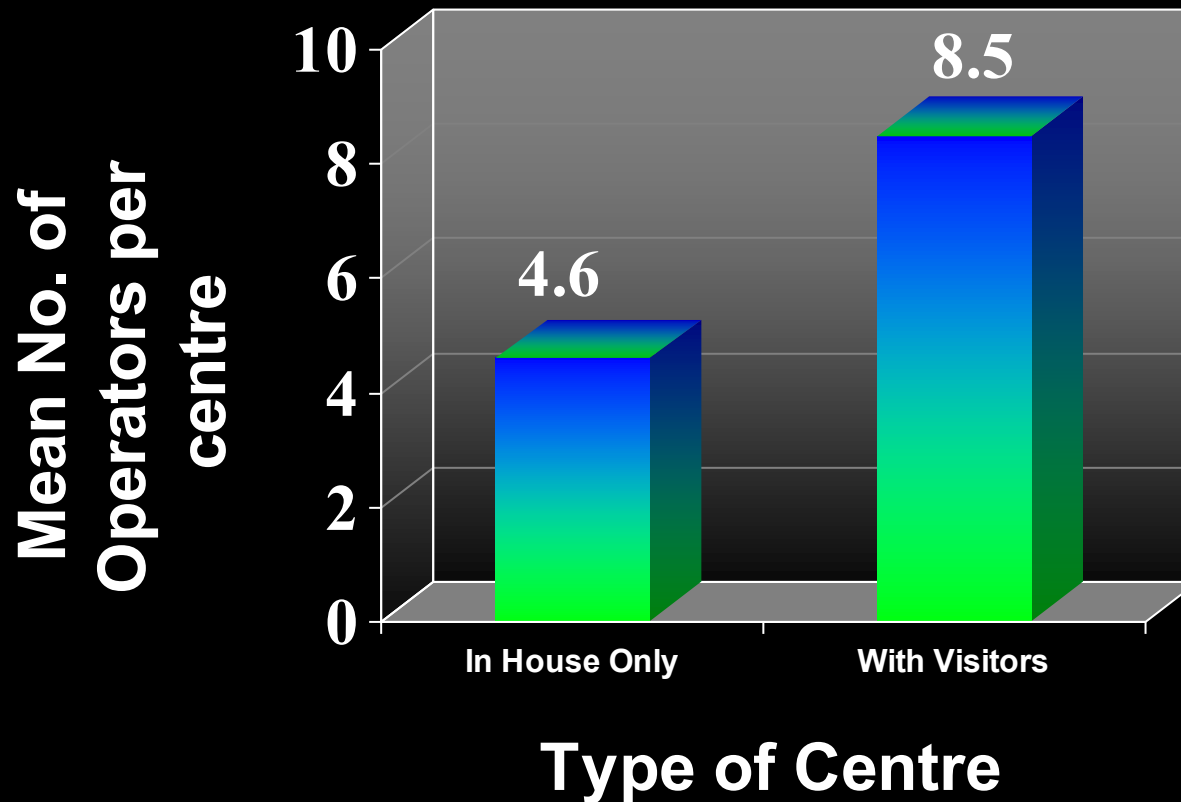
2004 data: Ludman



Visiting Interventionists (NHS Centres)



2004 data: Ludman



Surgical Cover

(NHS Centres)



2004 data: Ludman

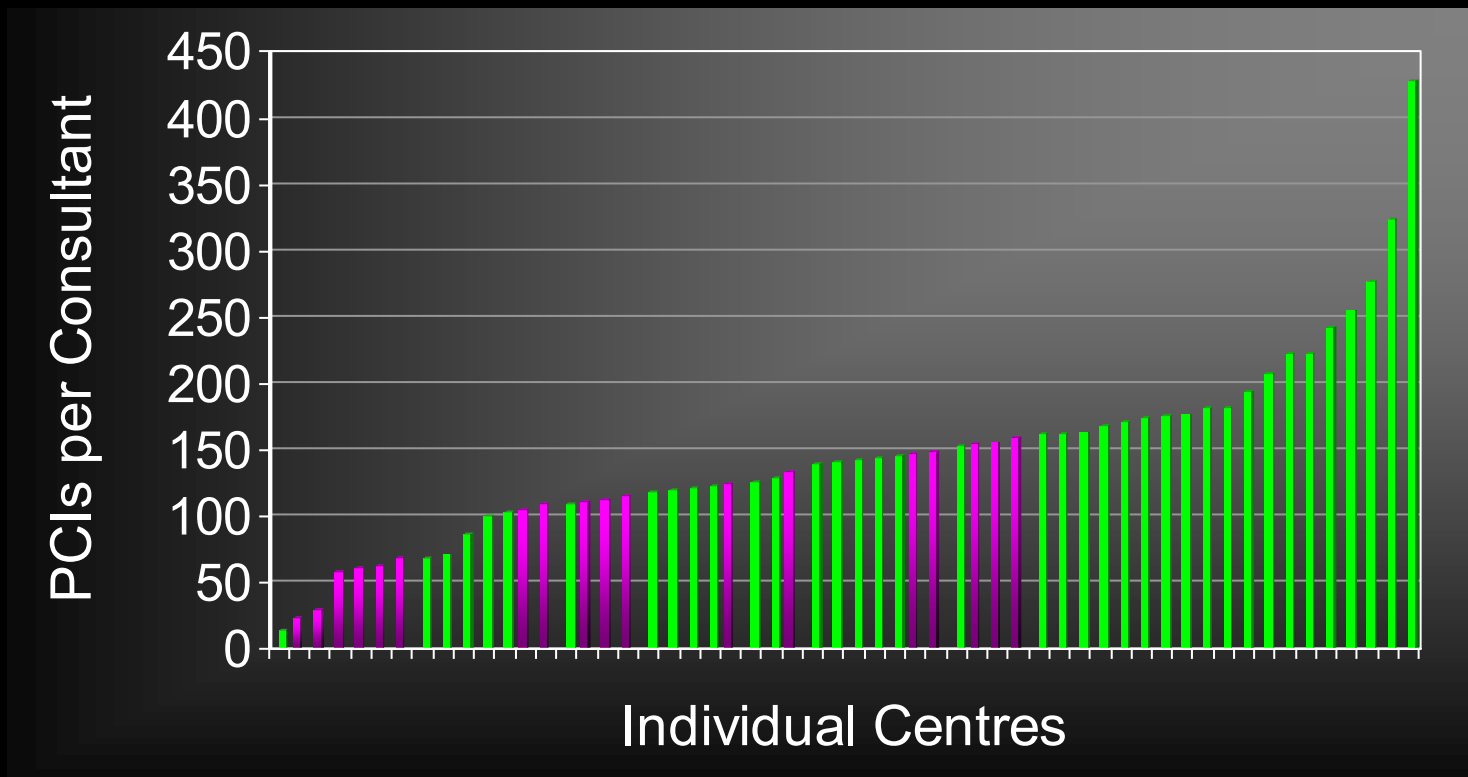
| | On site | Off site |
|--|------------------------|----------------------|
| No of centres | 57 (74%) | 20 (26%) |
| No. of PCI (% of total) | 53,390 (85%) | 9390 (15%) |
| Mean No. procedures per centre | 936.7 | 494.2 |
| Operator volume: PCIs per interventionist * | 164.6 | 104.3 |

Surgical Cover

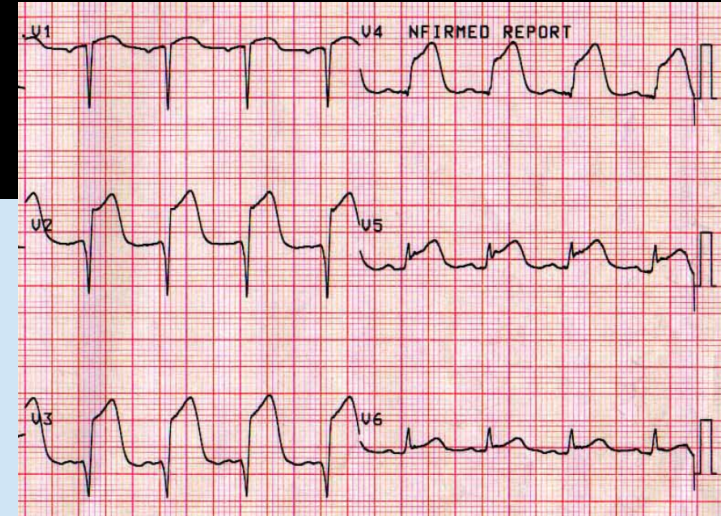
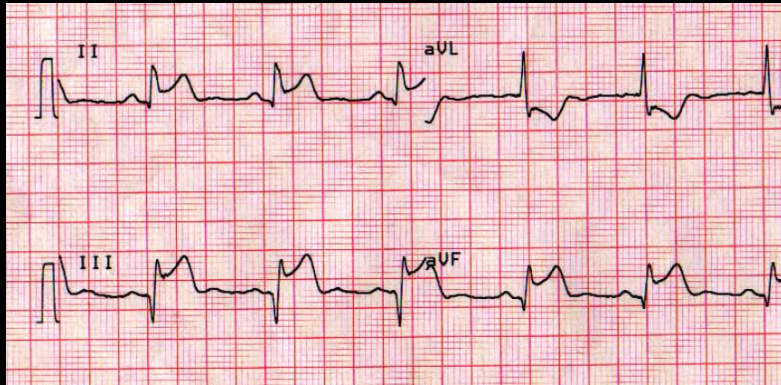


2004 data: Ludman

Off site On Site



STEMI

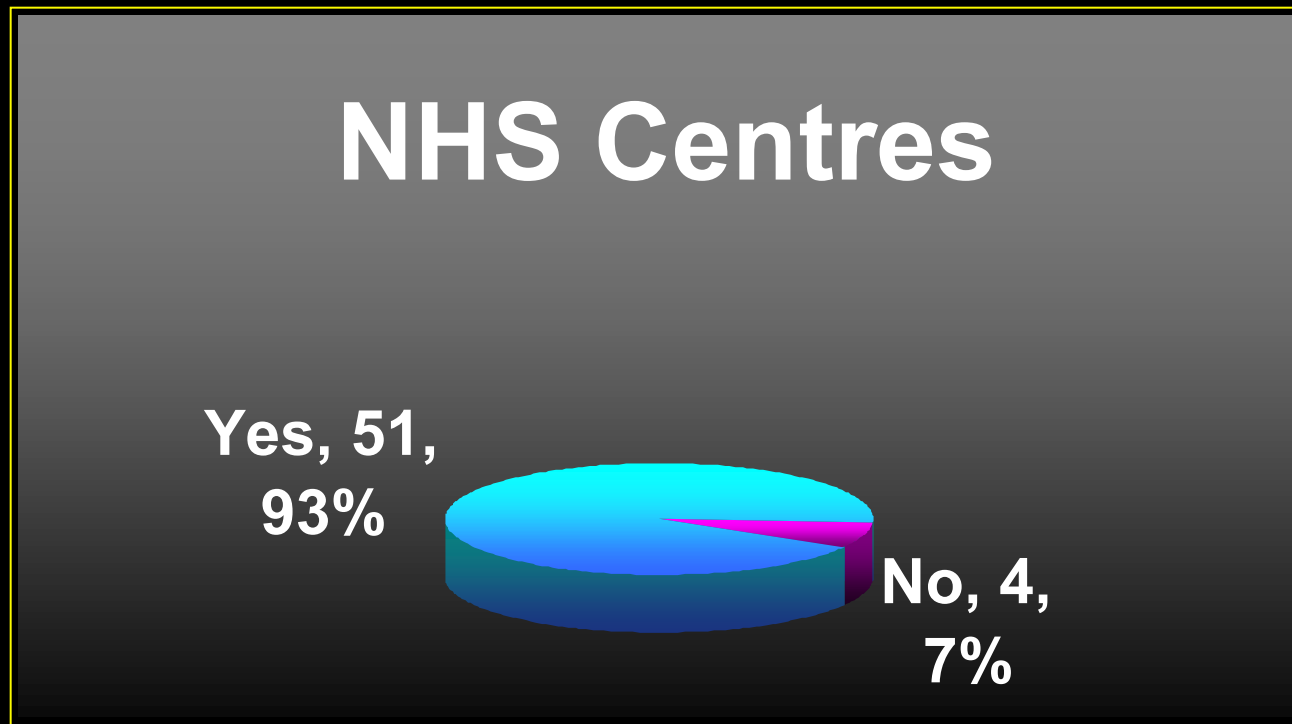


Primary PCI for STEMI



2004 data: Ludman

- Do you offer at least some PCI for STEMI?



Data from: 55 of 58 centres

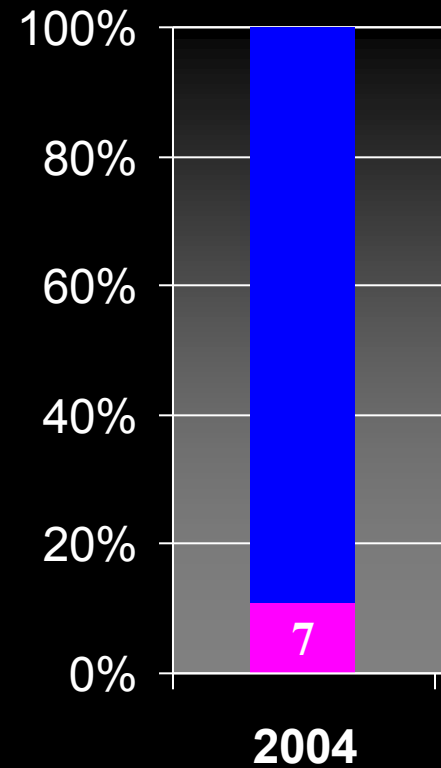
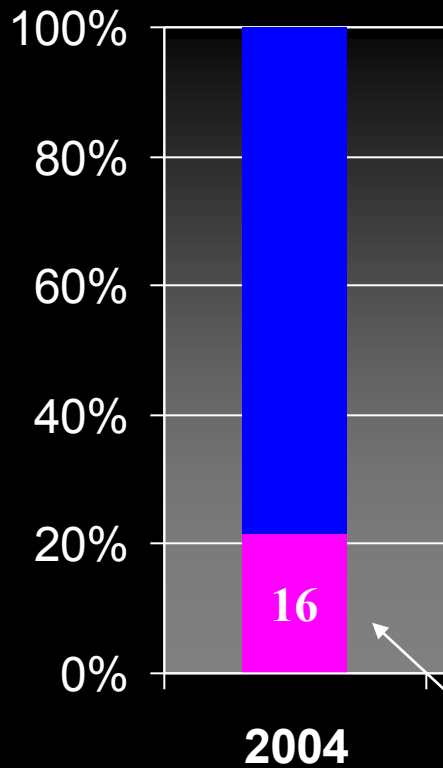
Primary PCI Routine Rx for STEMI



2004 data: Ludman

Working Hours Only

24/7



Number of Centres

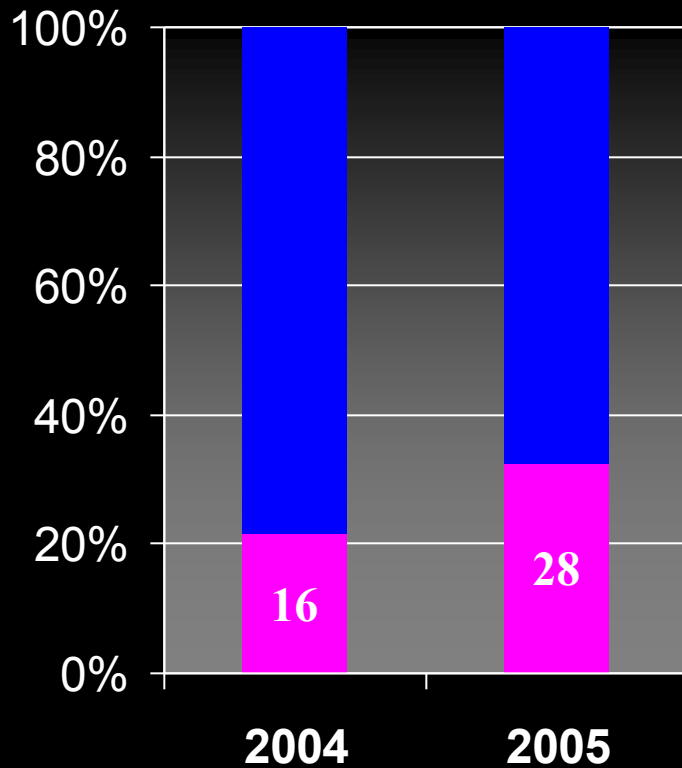
Data from: 55 of 58 centres

Primary PCI Routine Rx for STEMI

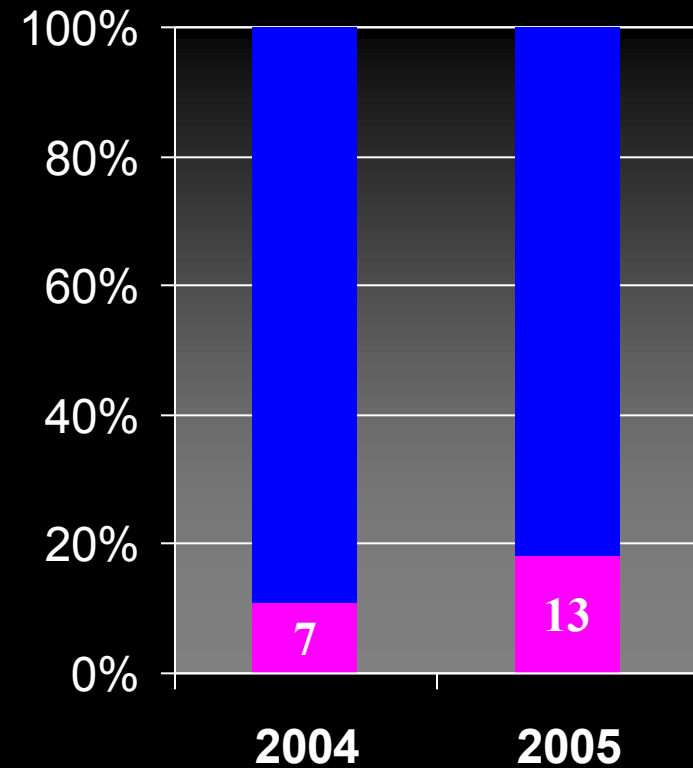


2004 data: Ludman

Working Hours Only



24/7



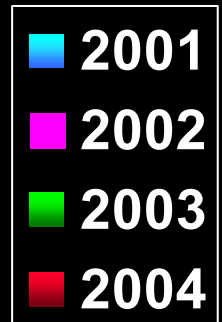
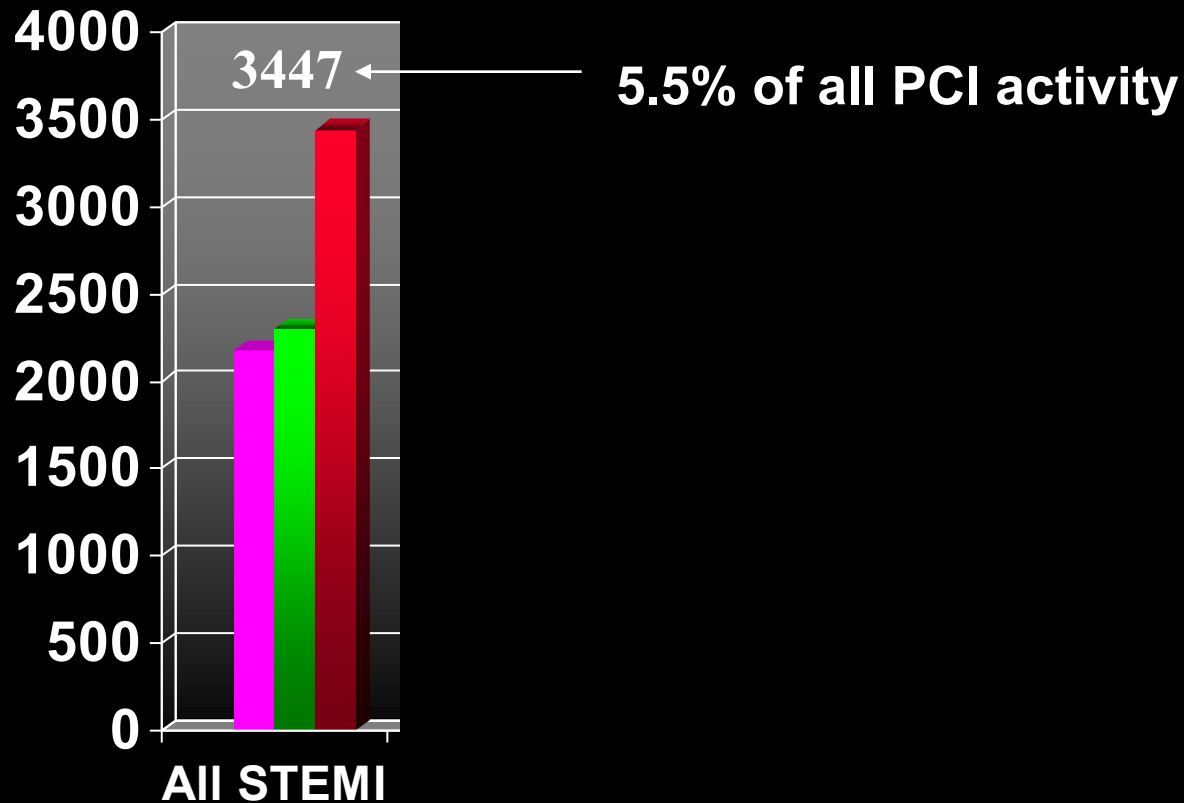
Data from: 55 of 58 centres

PCI for STEMI

(2004 NHS Hospitals: data from 48 of 58 units)



2004 data: Ludman

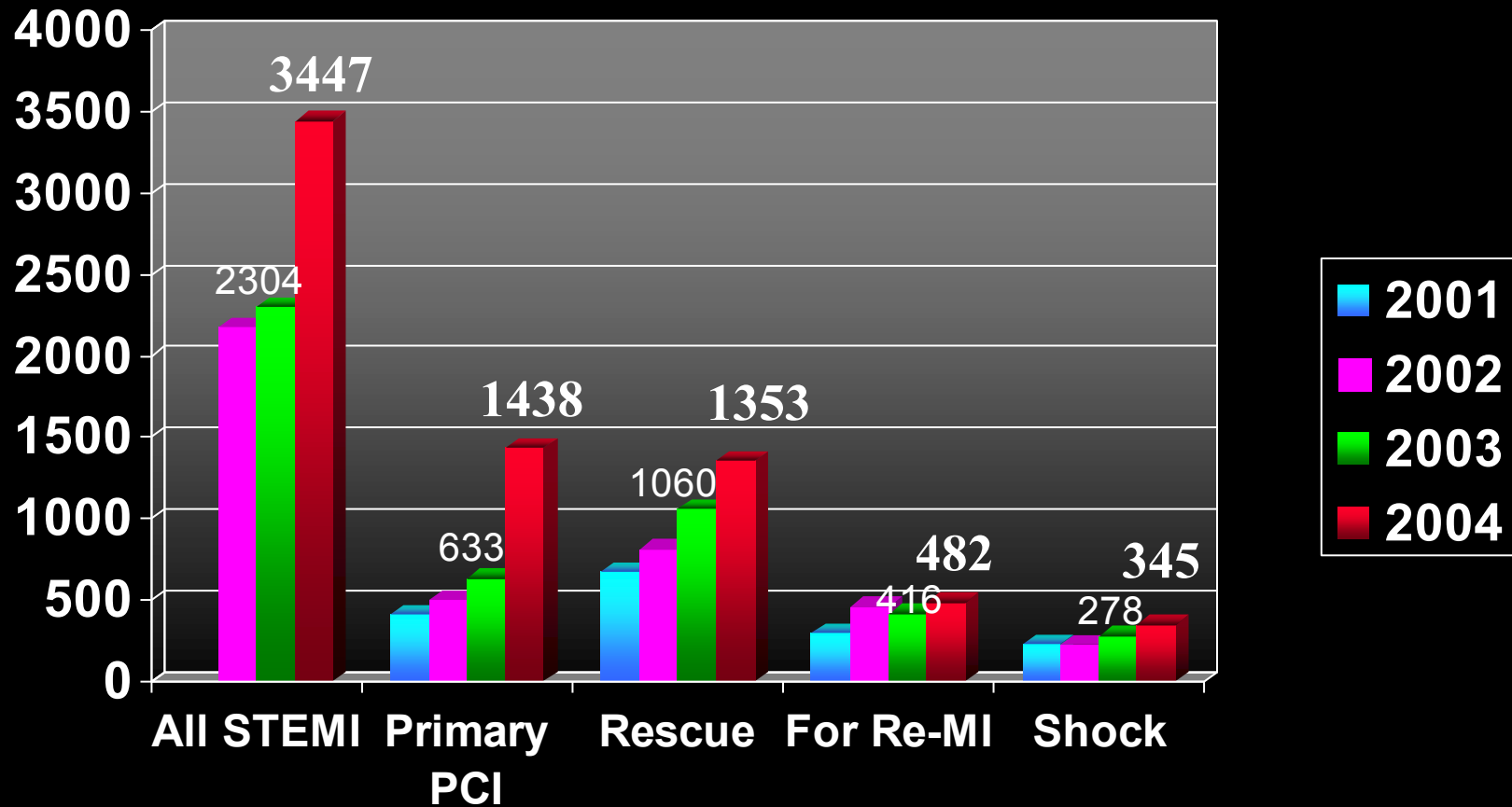


PCI for STEMI

(2004 NHS Hospitals: data from 48 of 58 units)



2004 data: Ludman



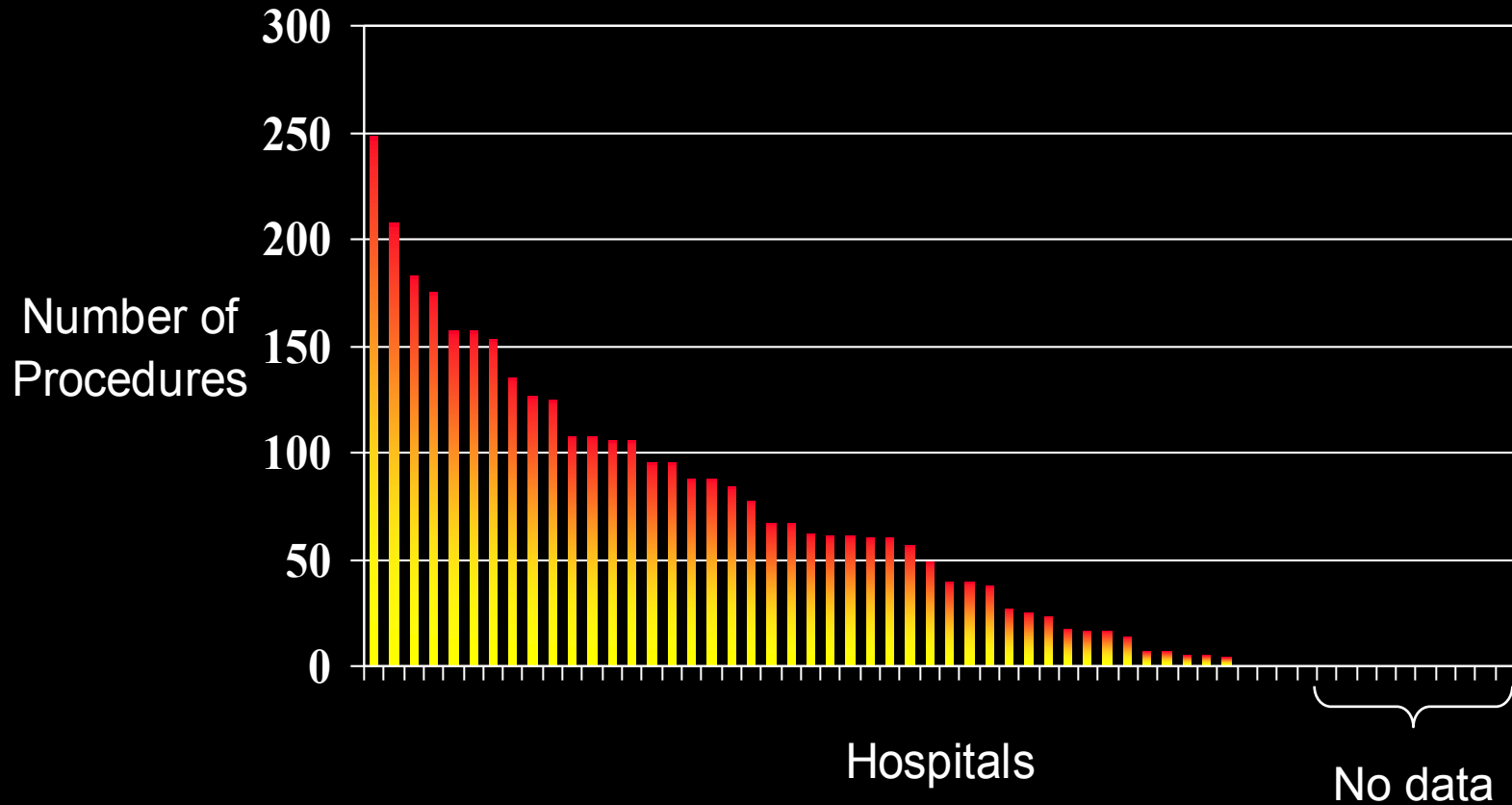
PCI for All STEMI

2004 data from 48 of 58 centres

Total 3447 procedures



2004 data: Ludman



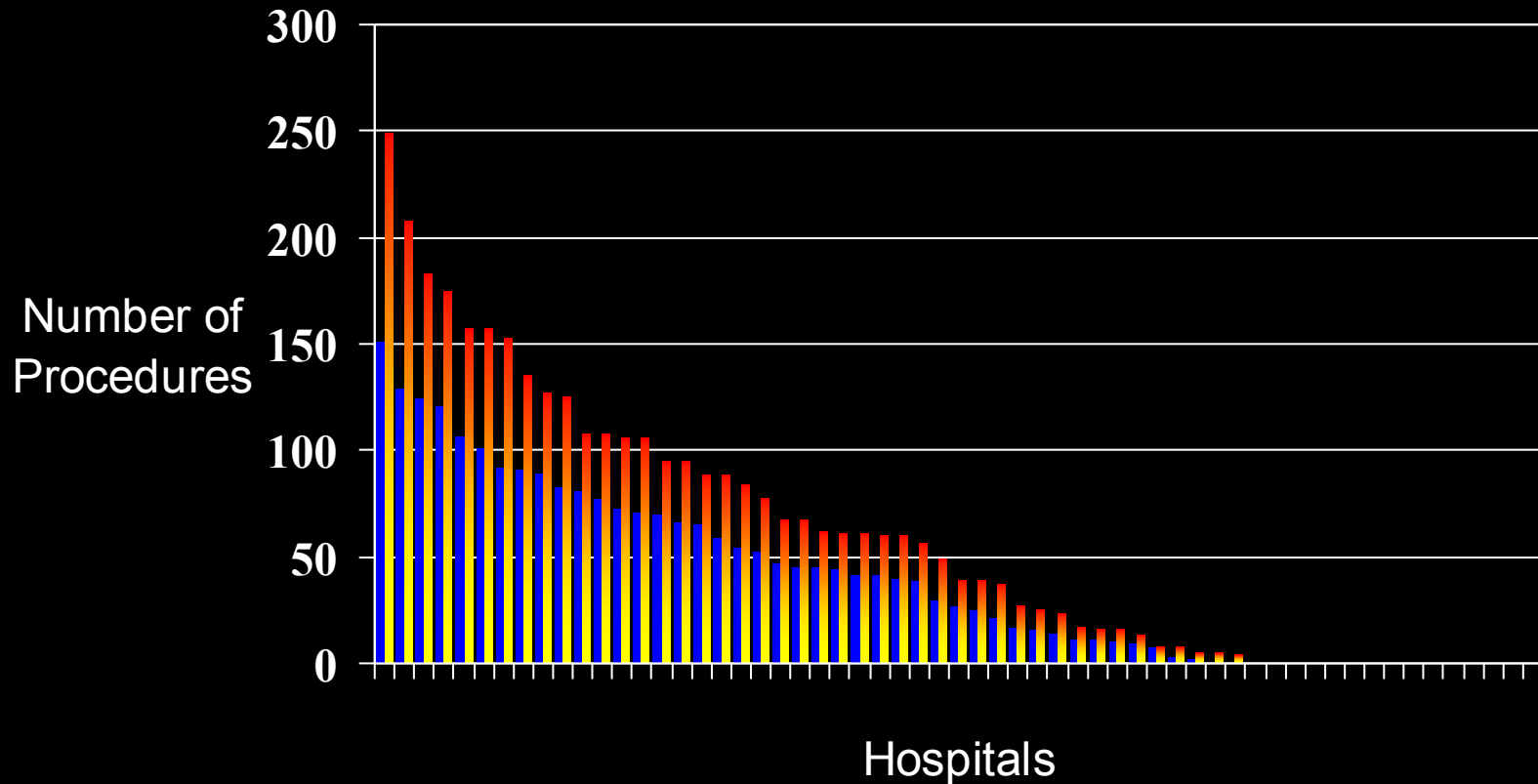
PCI for All STEMI

2004 data from 48 centres

Total 3447 procedures



2004 data: Ludman



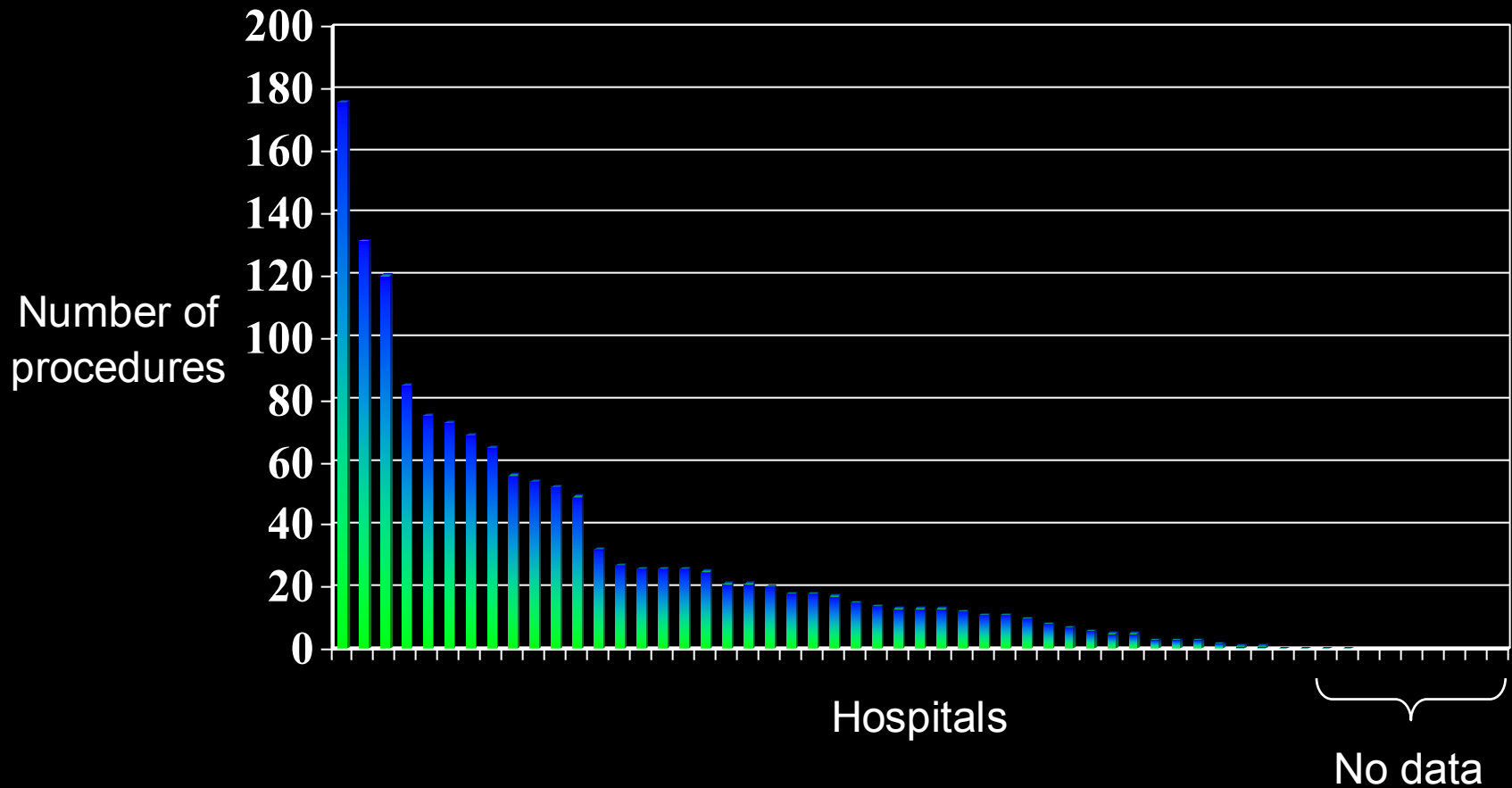
Primary PCI for STEMI

2004 data from 48 centres

Total 1438 procedures



2004 data: Ludman



Primary PCI for STEMI

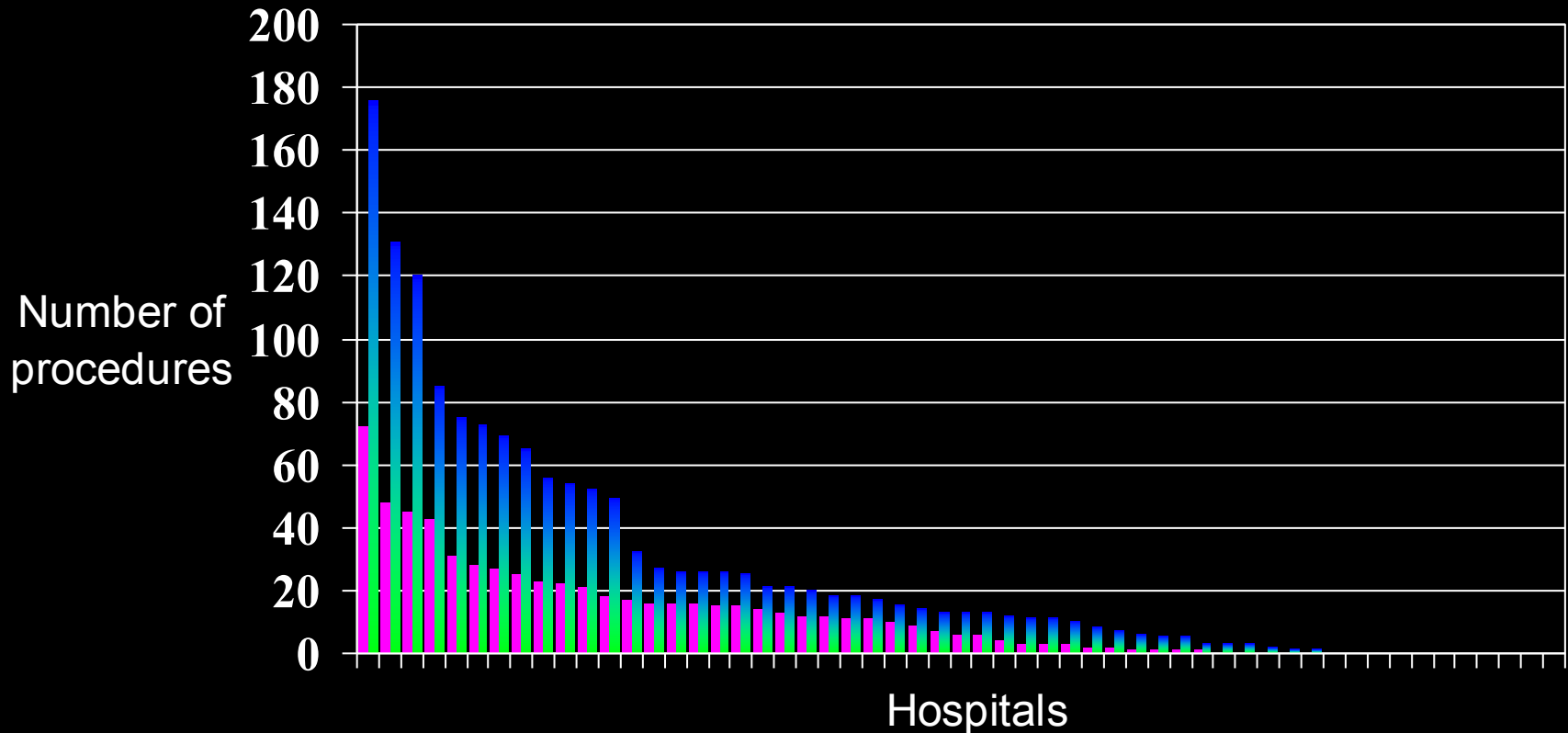
2004 data from 48 centres

Total 1438 procedures



2004 data: Ludman

2003 2004

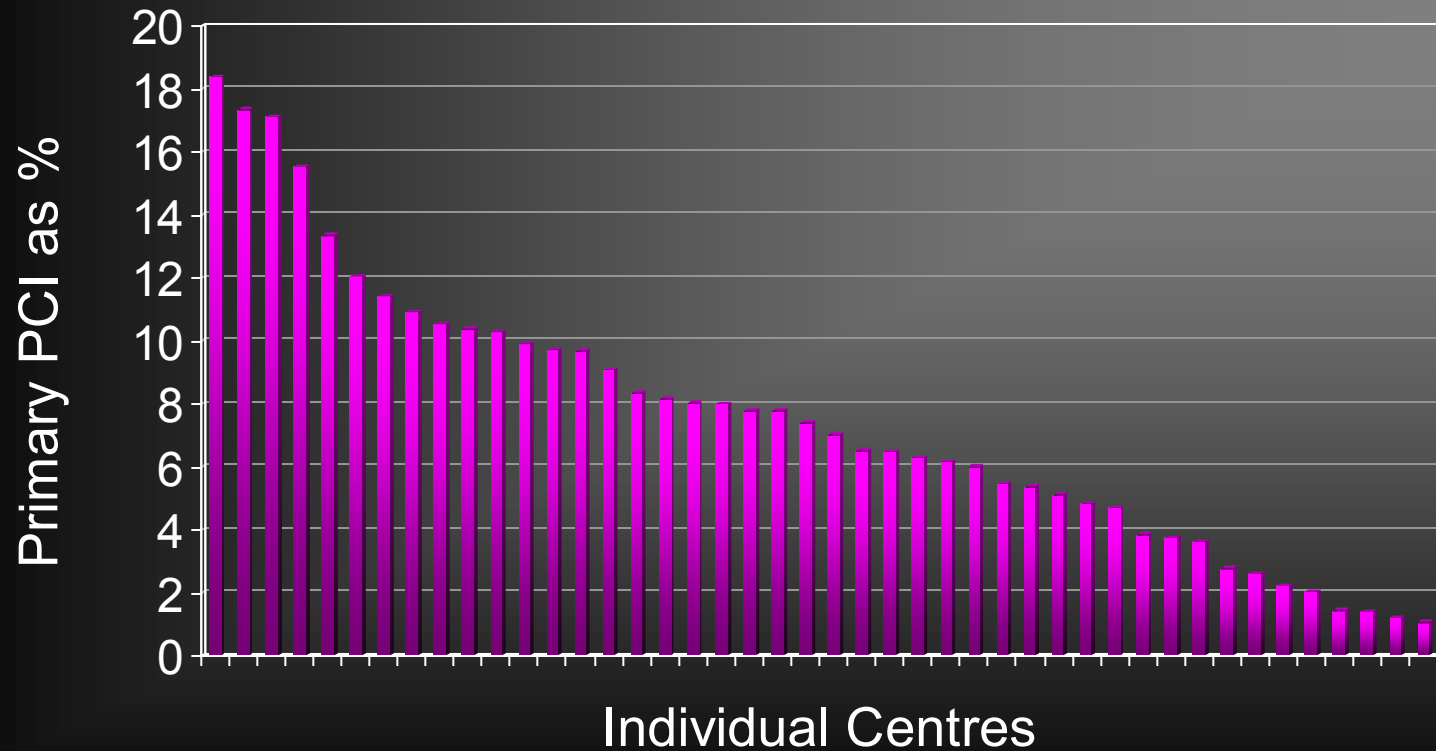


Primary PCI for STEMI



2004 data: Ludman

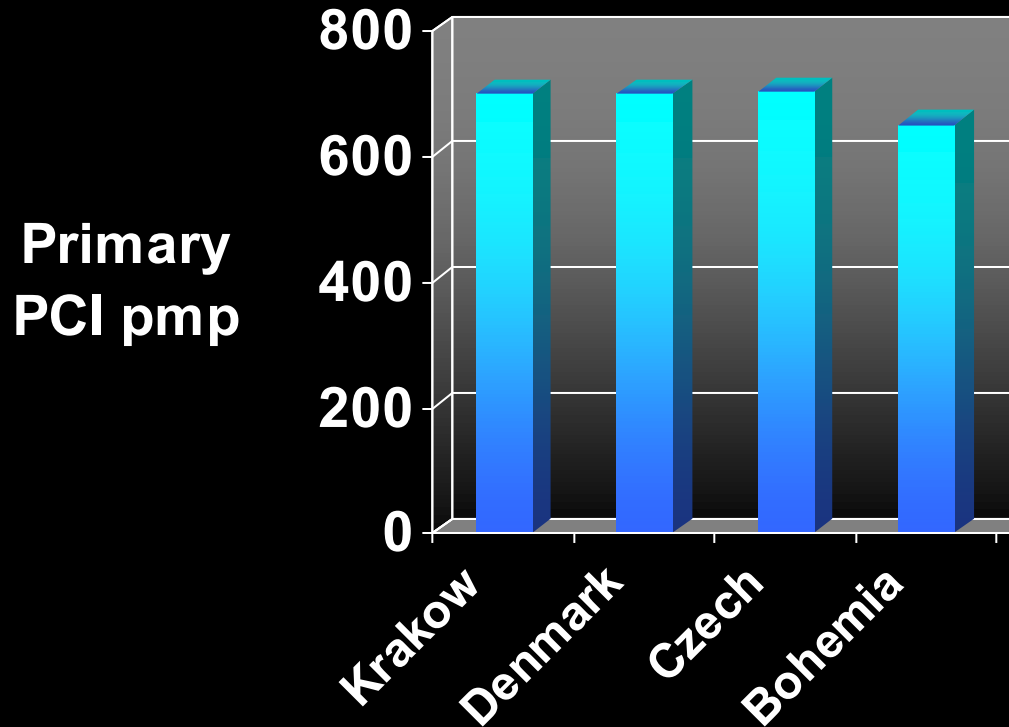
As Percentage of Each Centre's PCI Activity



Primary PCI – the experience



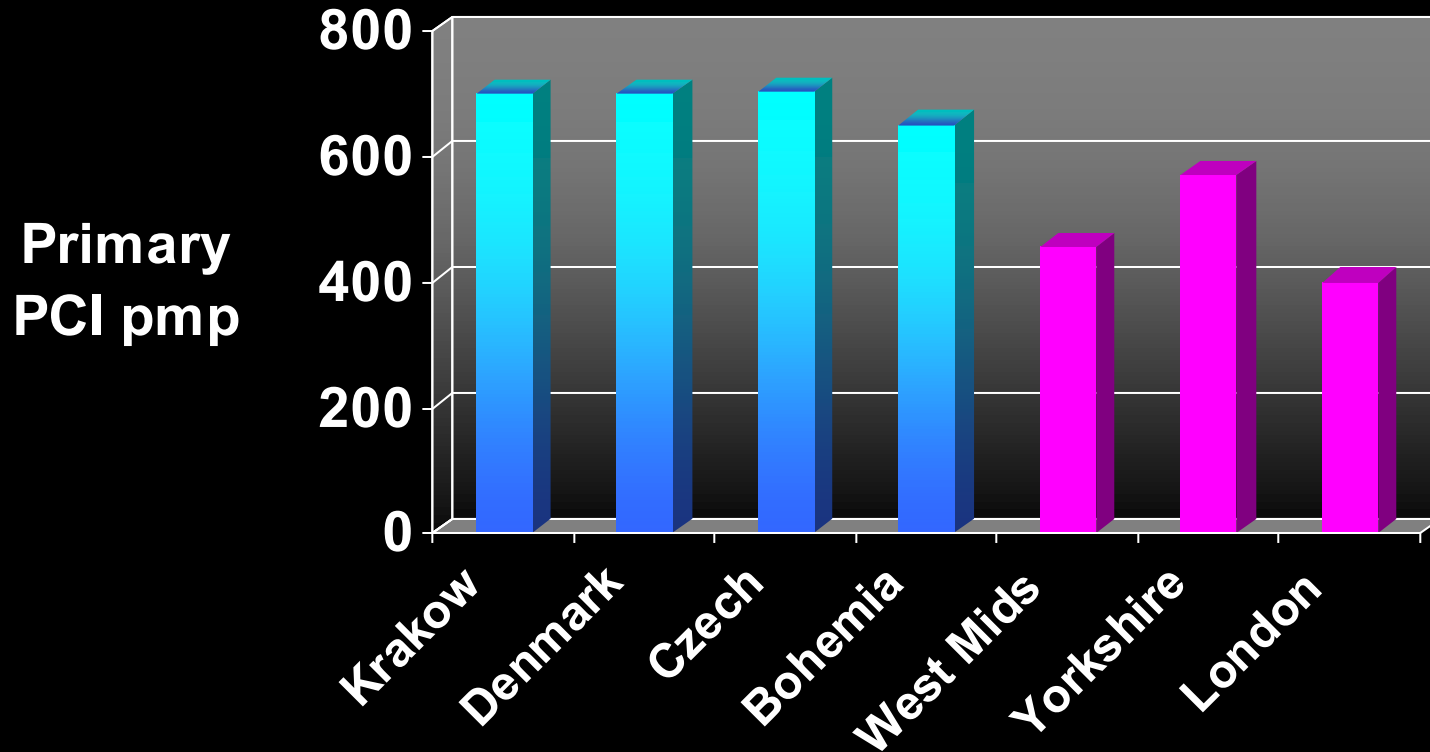
2004 data: Ludman



Primary PCI – the experience



2004 data: Ludman

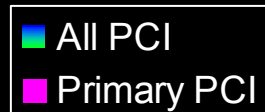
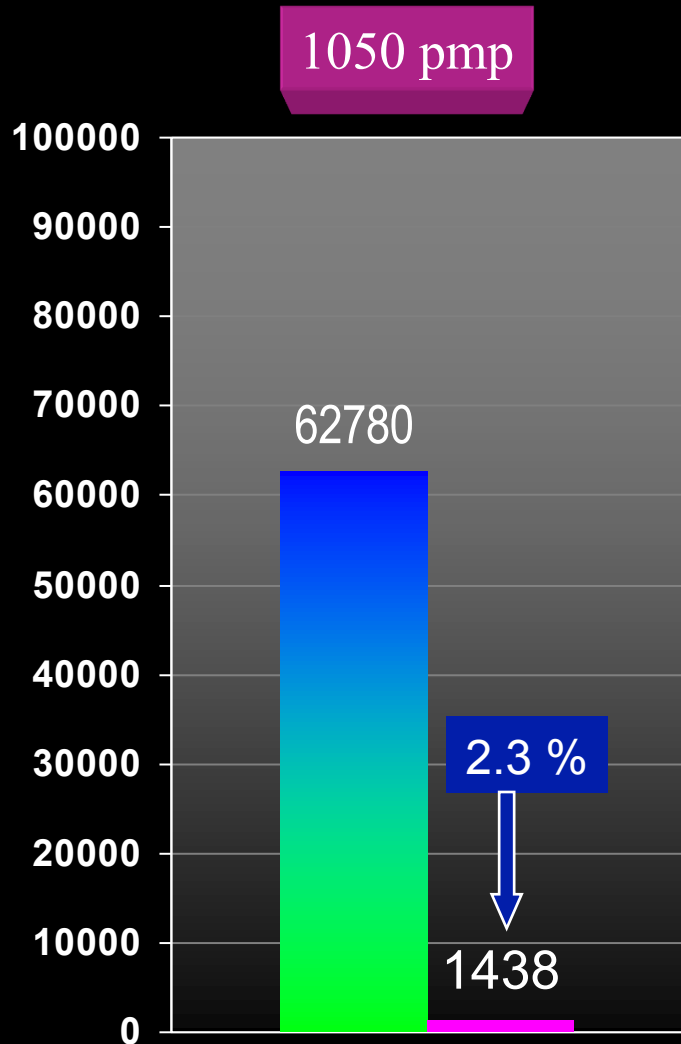


UK population 60 million, at 500 pmp = 30,000 procedures pa

UK Activity 2004



2004 data: Ludman

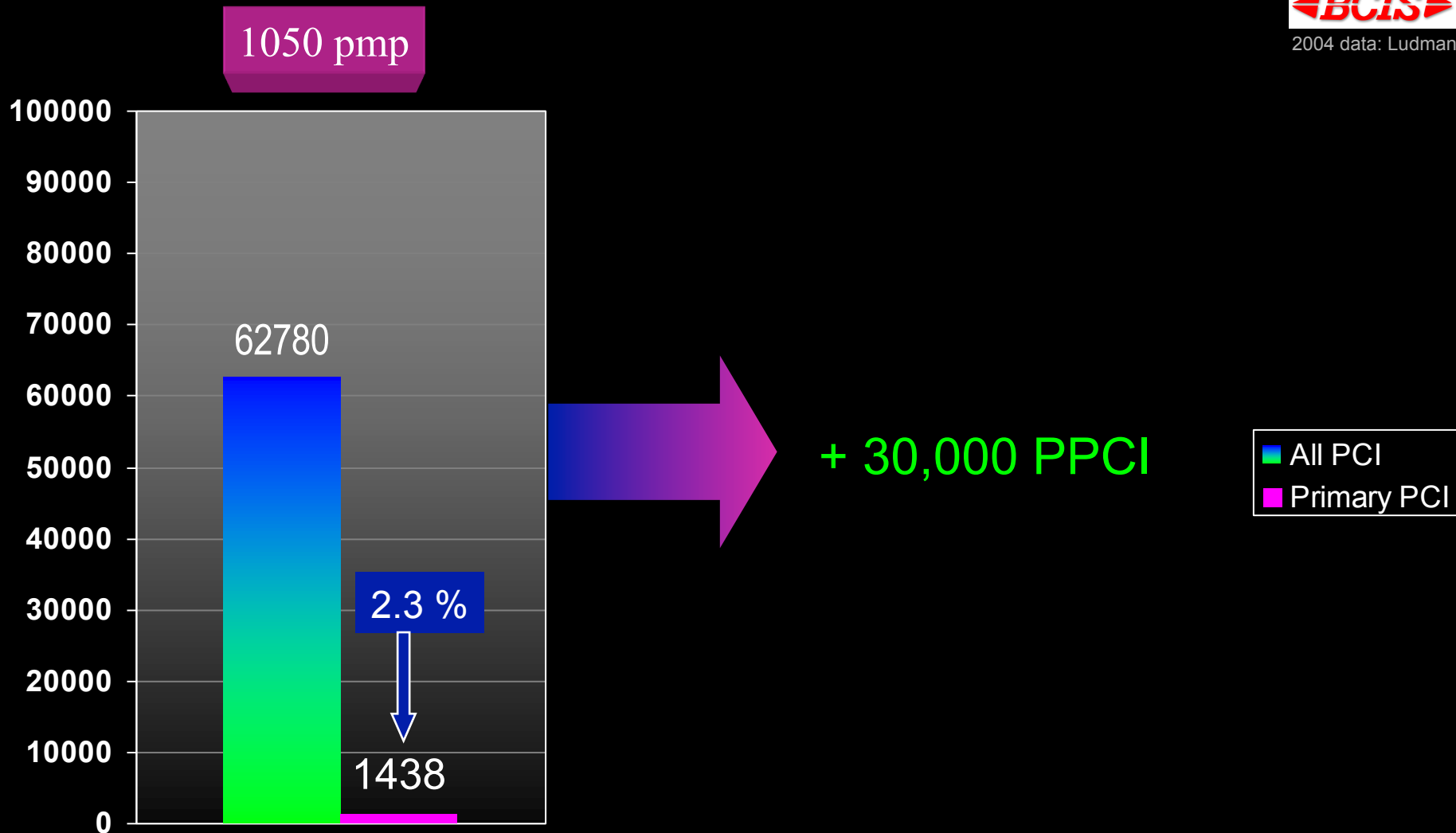


UK Growth

assuming no ↑ in other PCI pmp



2004 data: Ludman



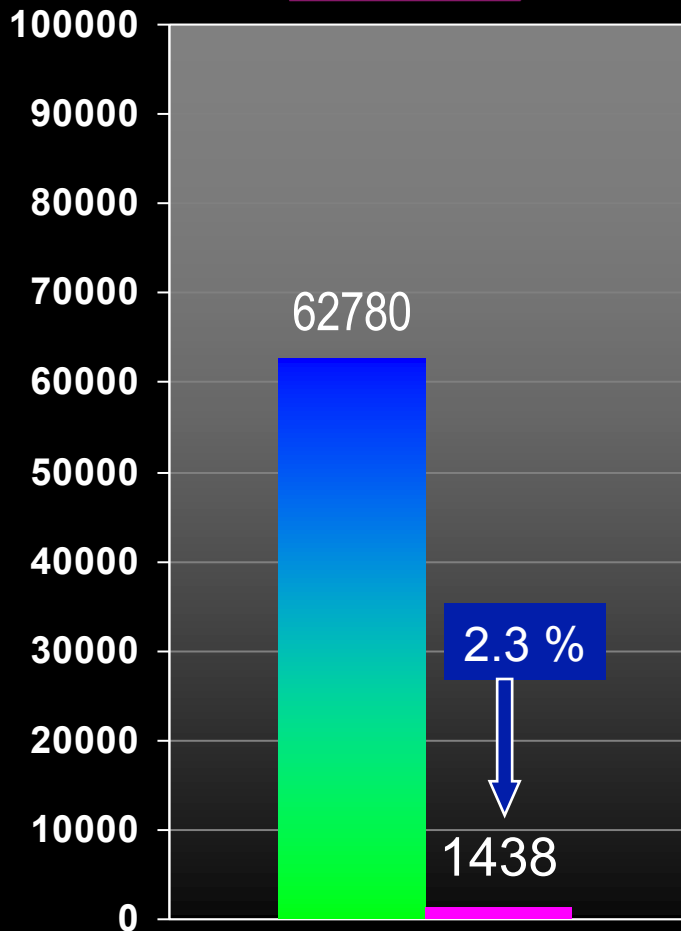
UK Growth

assuming no ↑ in other PCI pmp

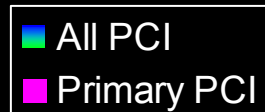
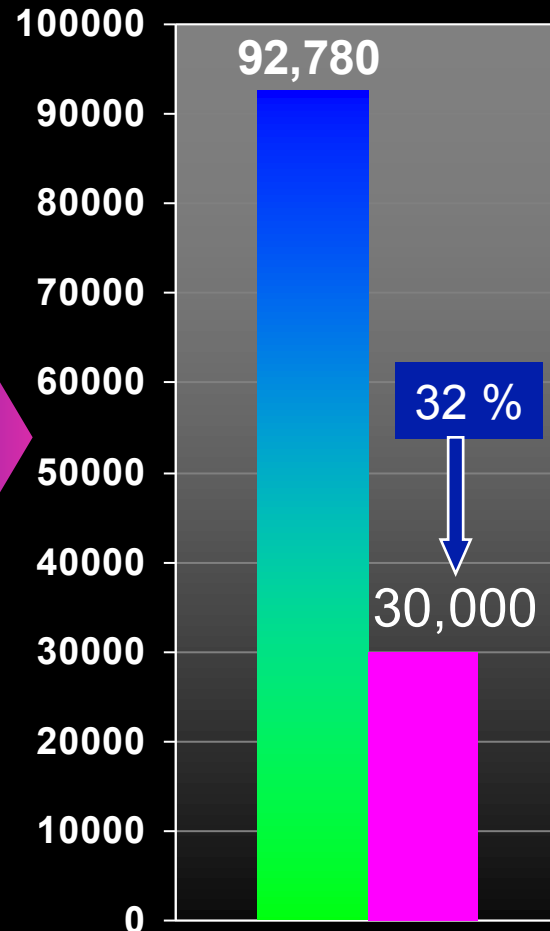


2004 data: Ludman

1050 pmp



1546 pmp

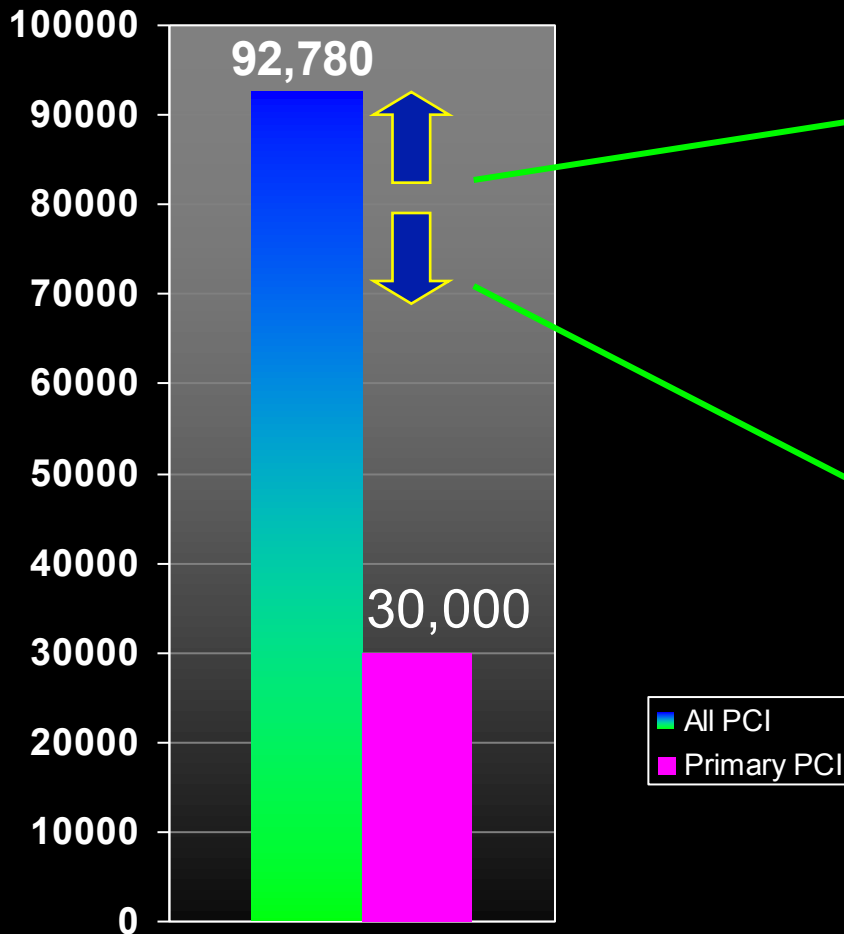


Uncertainties



2004 data: Ludman

1546 pmp



PPCI patients

50% SVD

30% staged PCI later

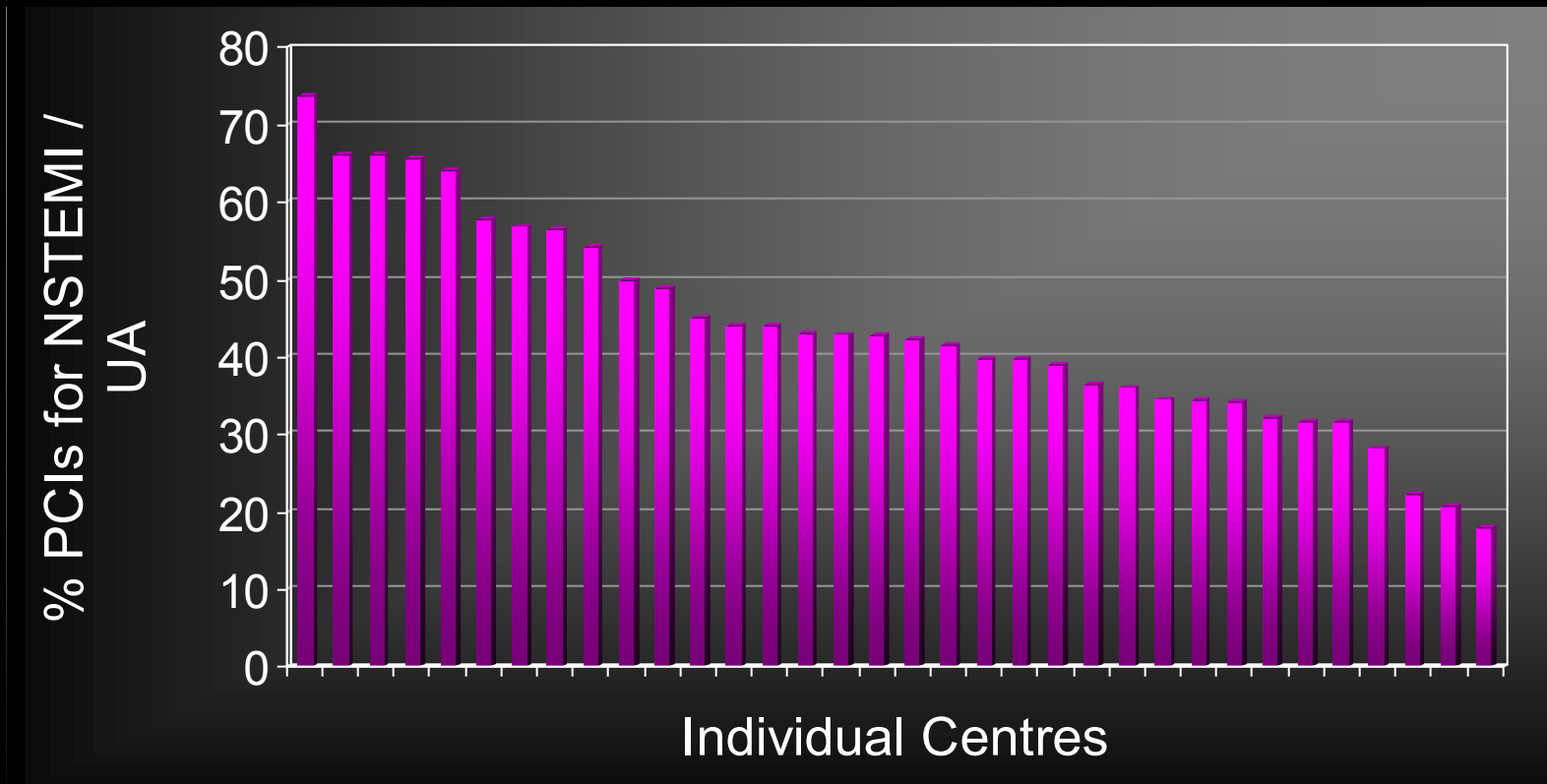
Overall PCI rate increasing

Current lysis patients

60% angiography

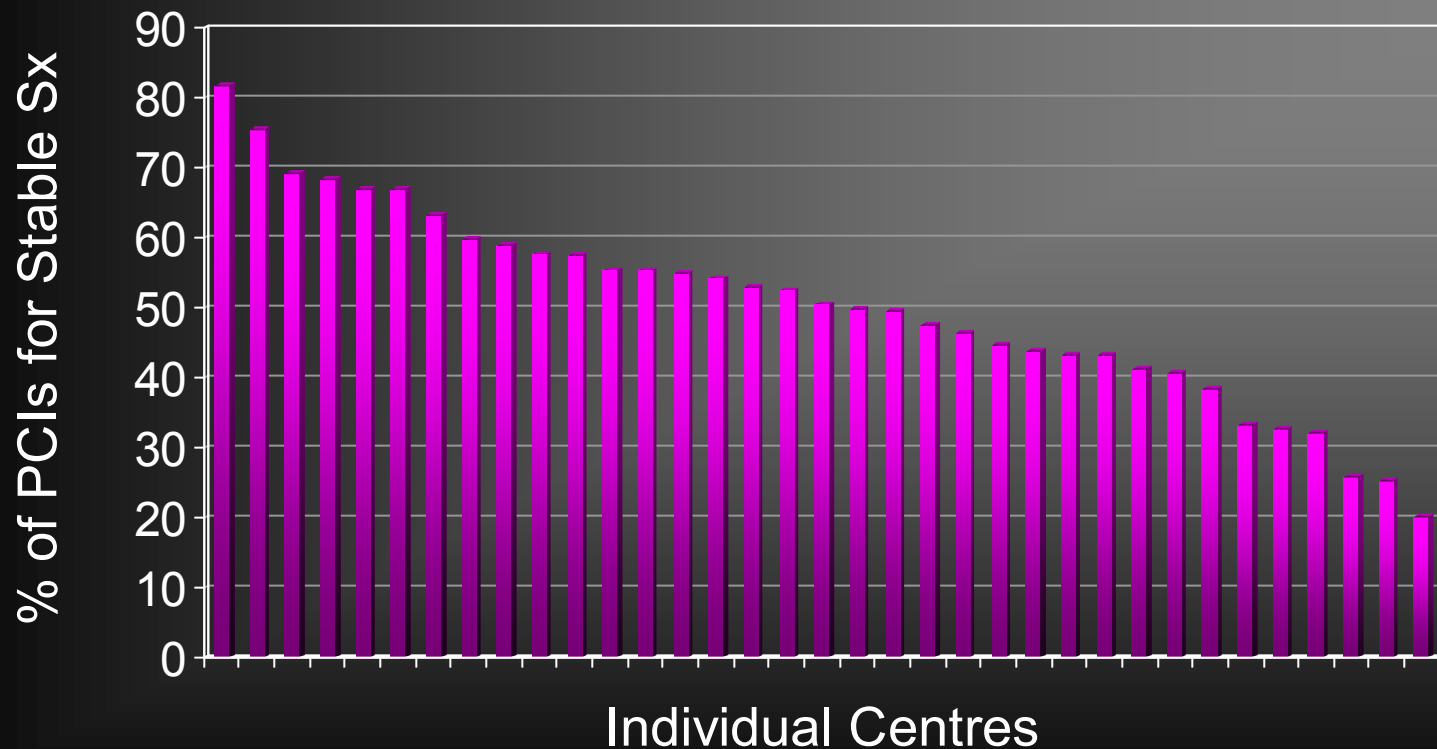
PCI for Stable v ACS

- Of Total PCIs performed
 - 44% ACS (excluding STEMI)
 - 50% Elective



PCI for Stable v ACS

- Of Total PCIs performed
 - 44% ACS (excluding STEMI)
 - 50% Elective



Audit Domains

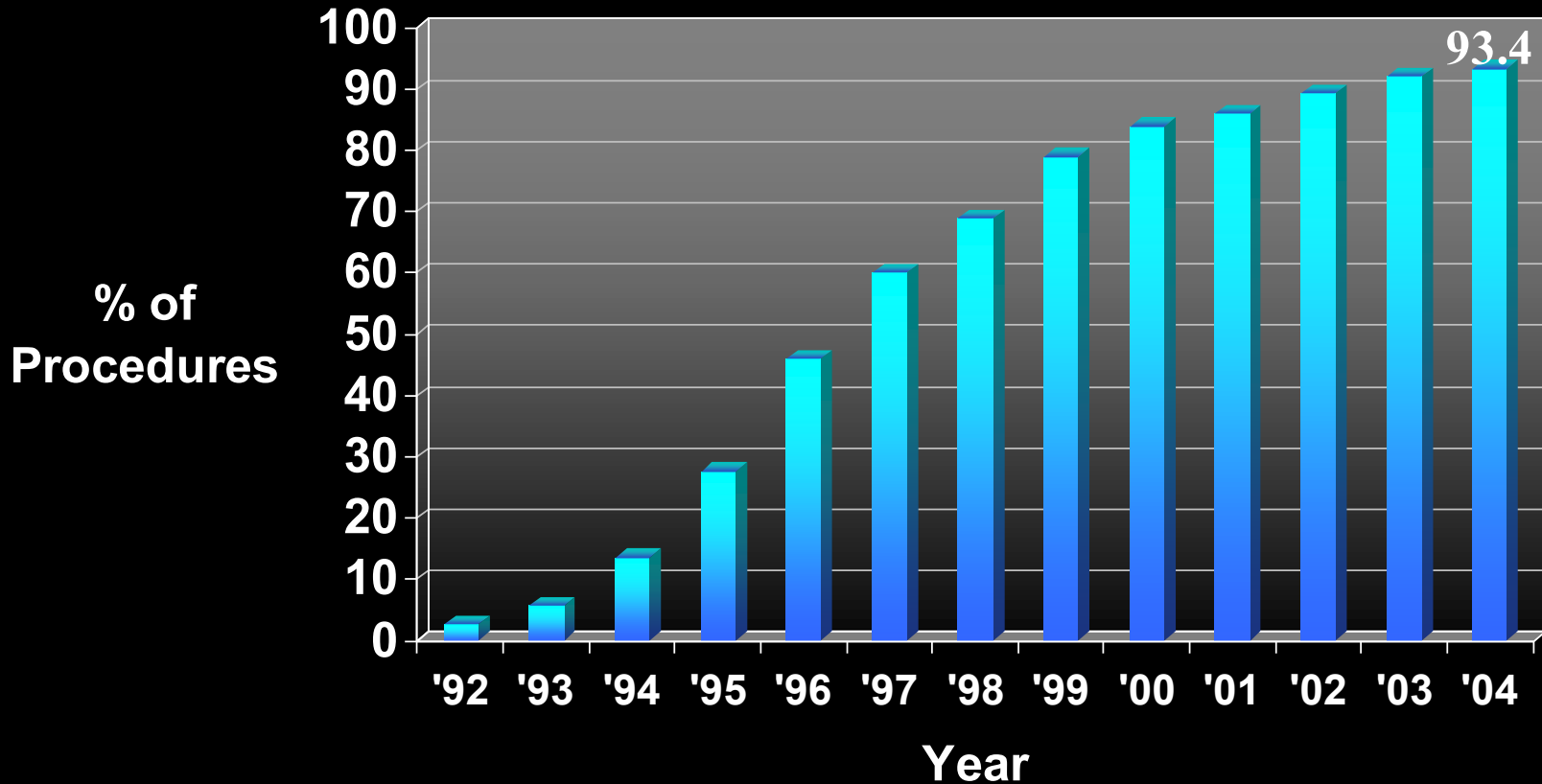
- Structure
- Appropriateness
- **Process**
- Outcome

Stent procedures

2004 data from 60 of 77 centres



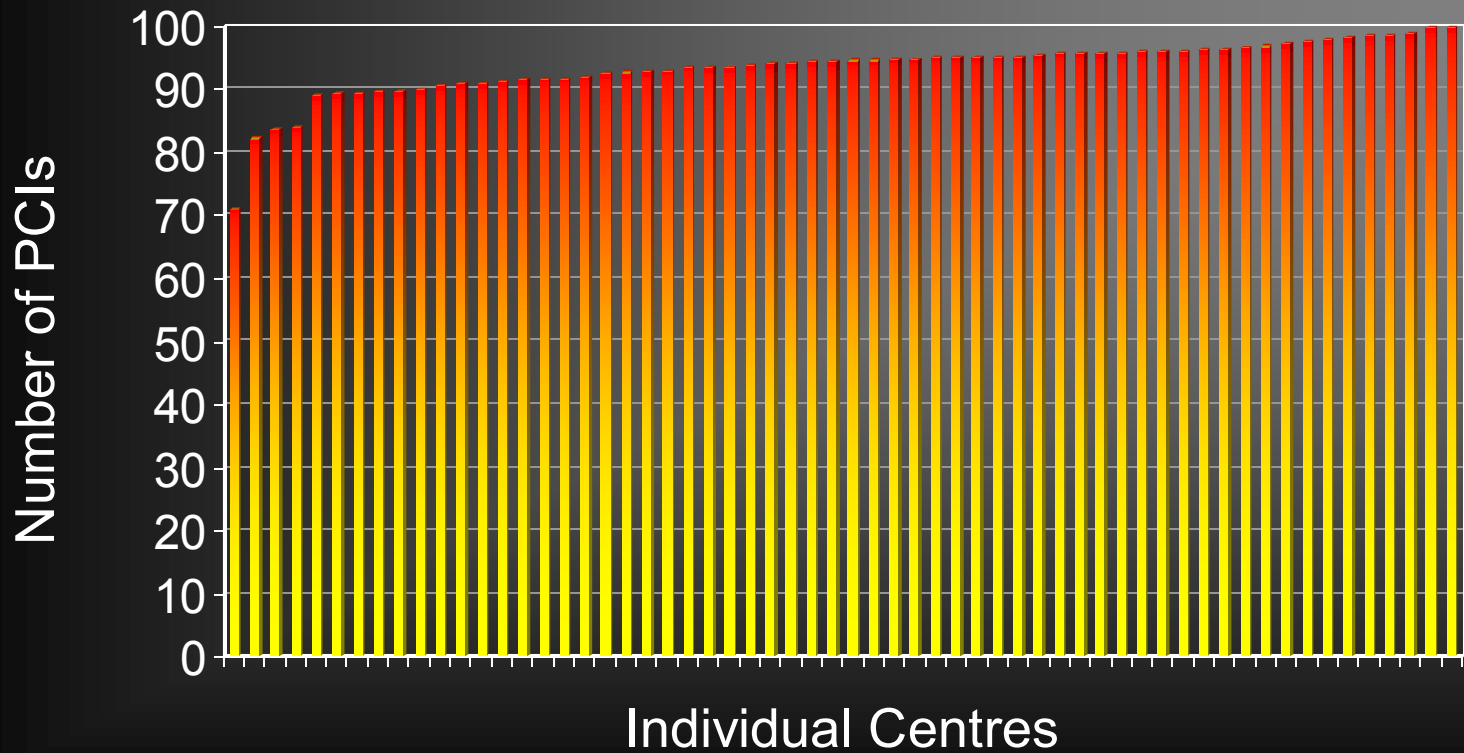
2004 data: Ludman



Stenting in Different Centres



2004 data: Ludman

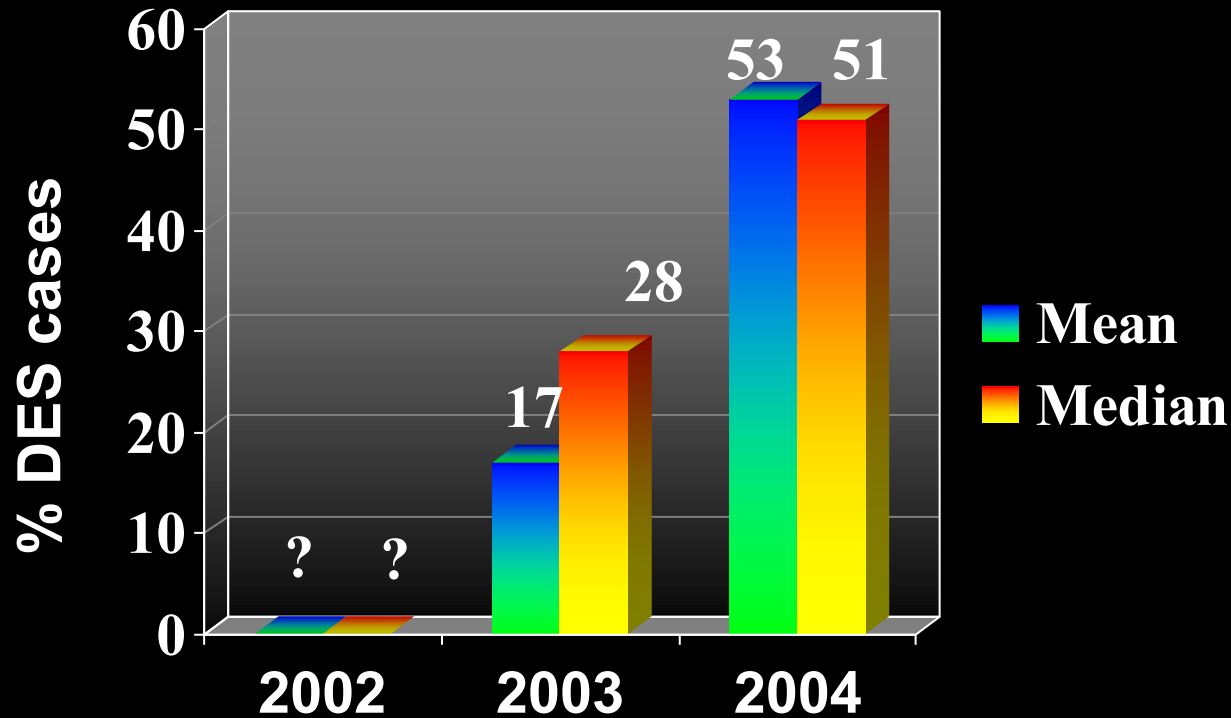


Drug Eluting Stent cases

2004 data from 69 of 77 centres



2004 data: Ludman



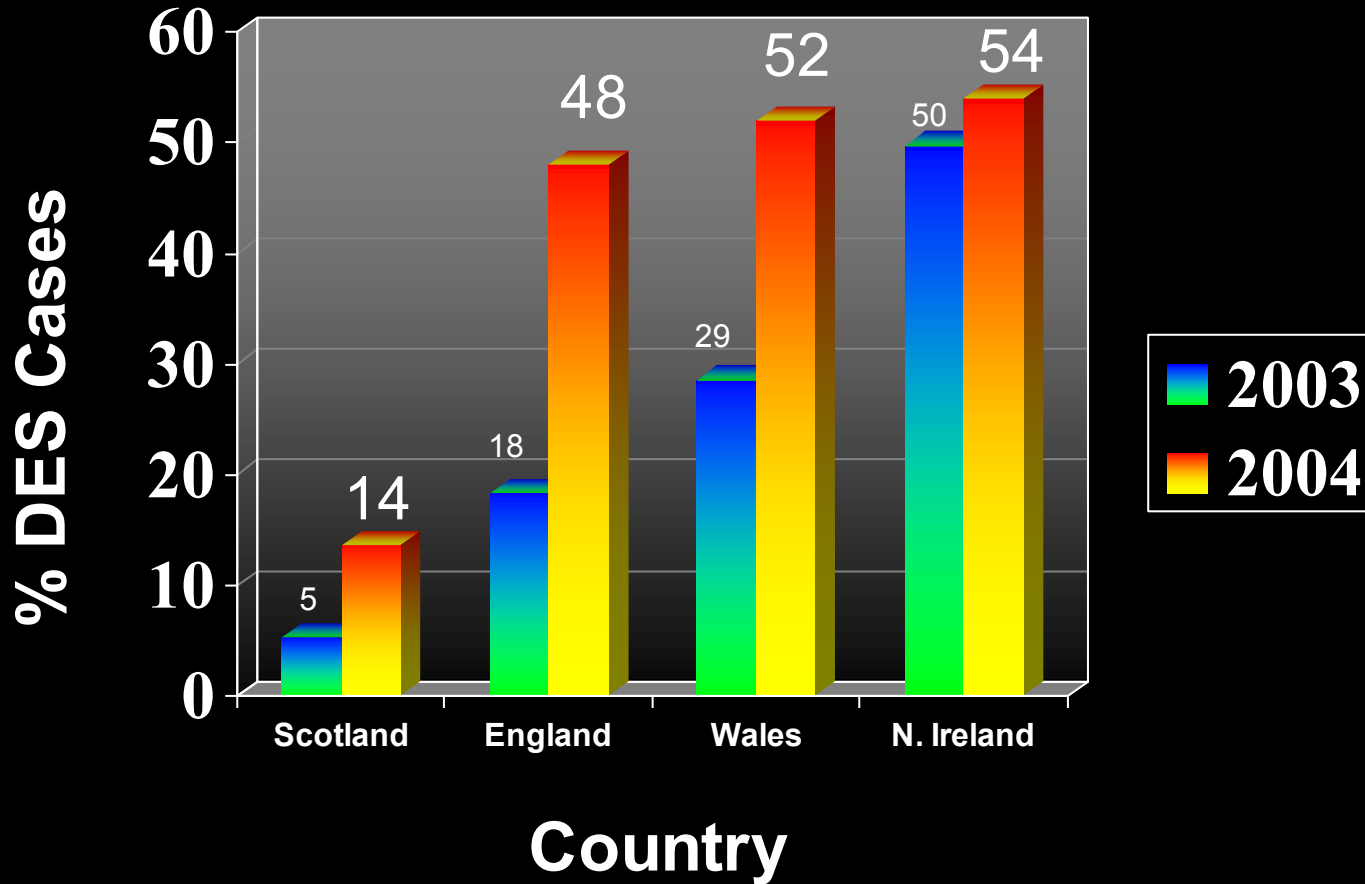
NHS and private

Drug Eluting Stent cases

2004 data from 53 of 58 centres



2004 data: Ludman

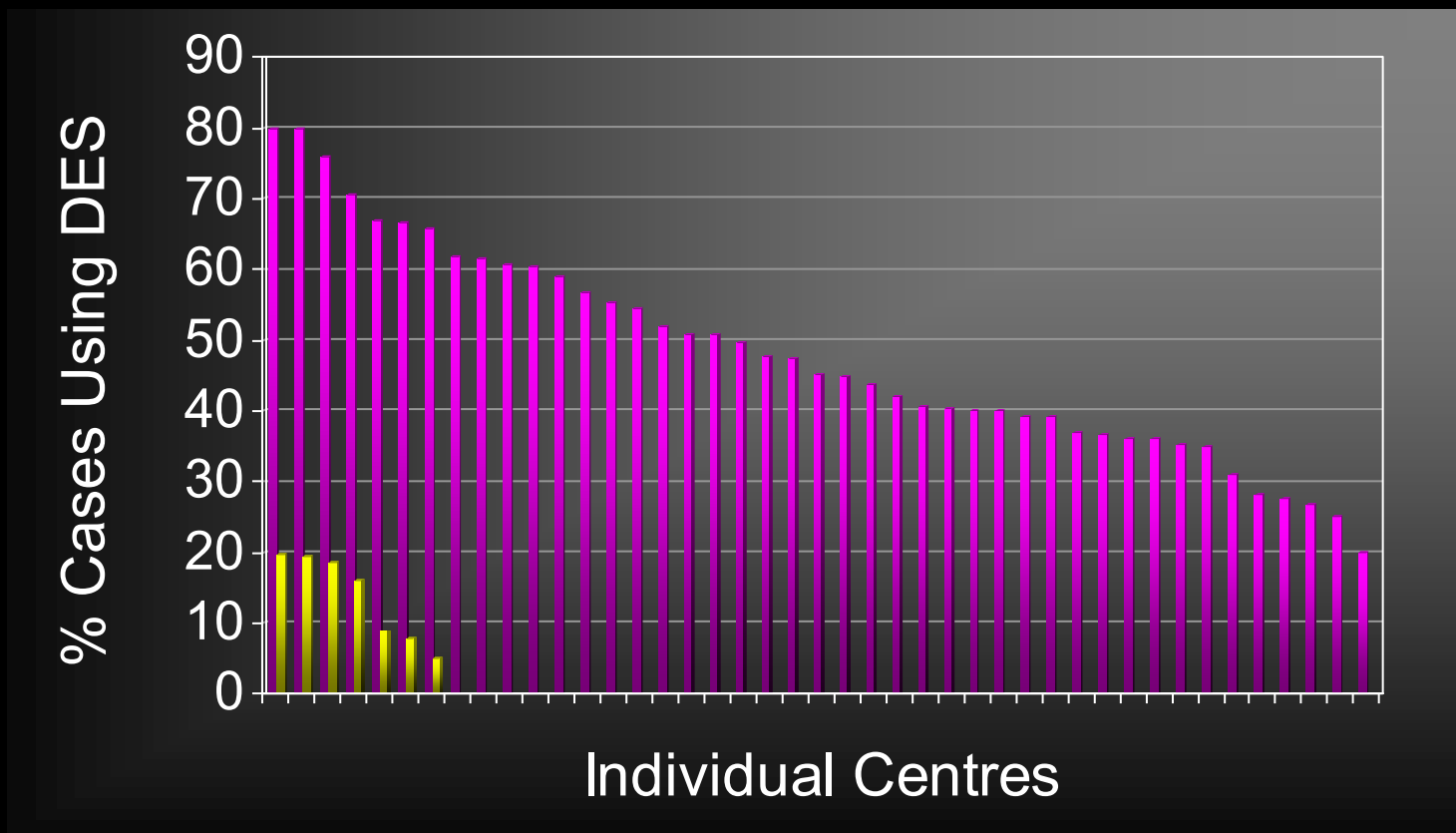


DES use by Centre (NHS)



2004 data: Ludman

■ England ■ Scotland

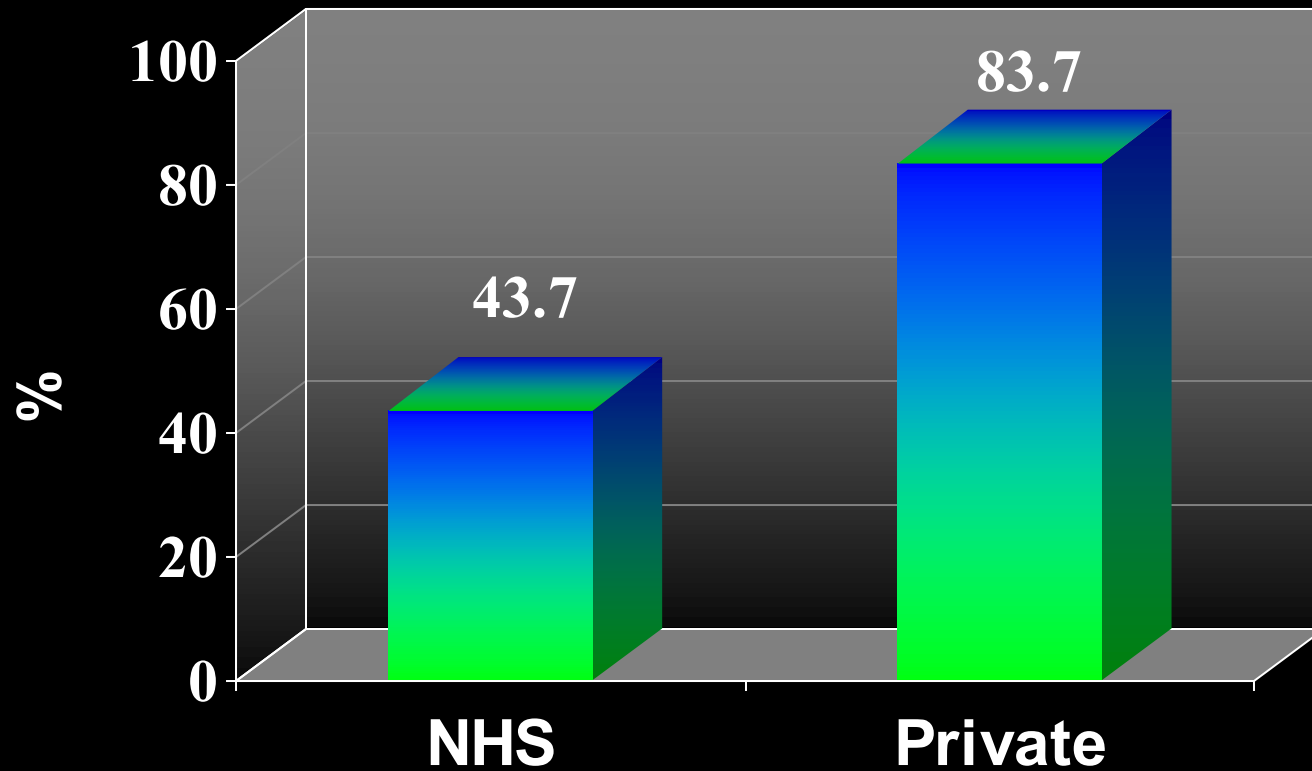


Drug Eluting Stent cases

2004 data from 53 of 58 centres



2004 data: Ludman



PCI for Restenosis

(2004 data from 54 of 77 centres)



2004 data: Ludman

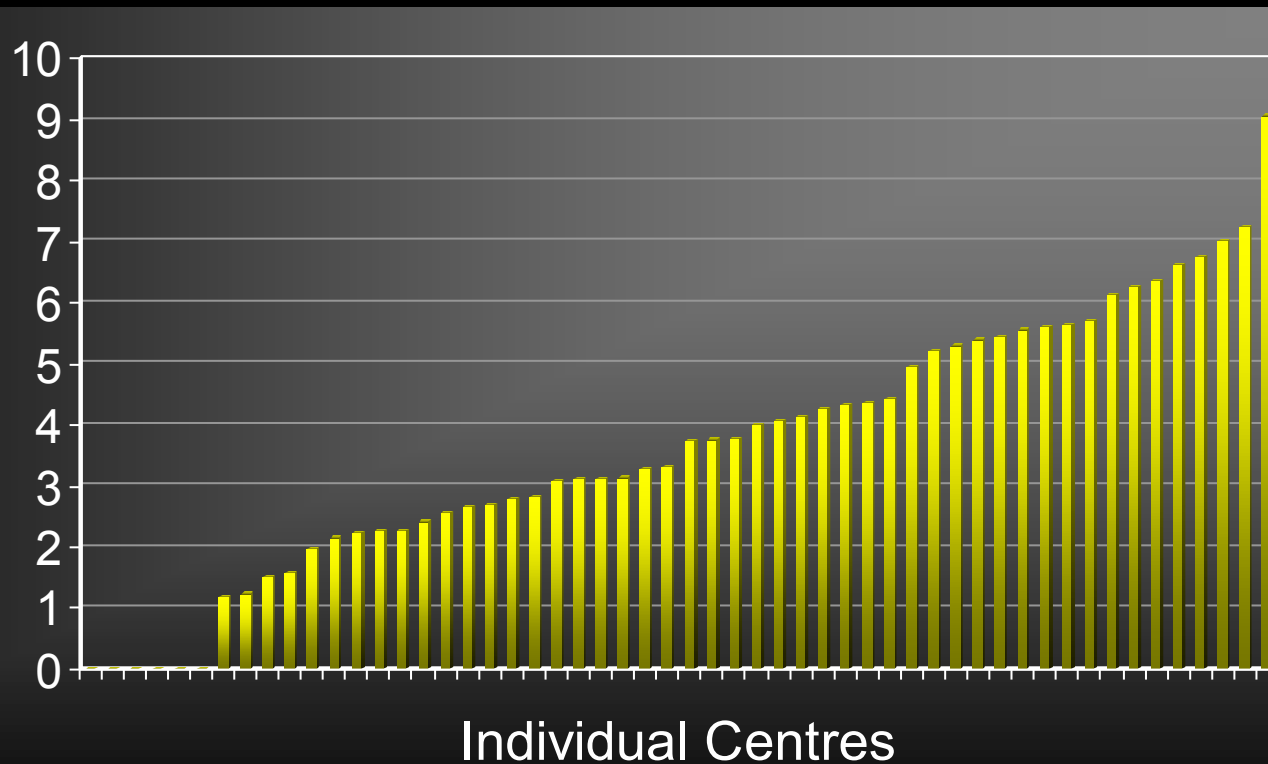
Mean:

2002 4.9%

2003 4.3%

2004 3.6%

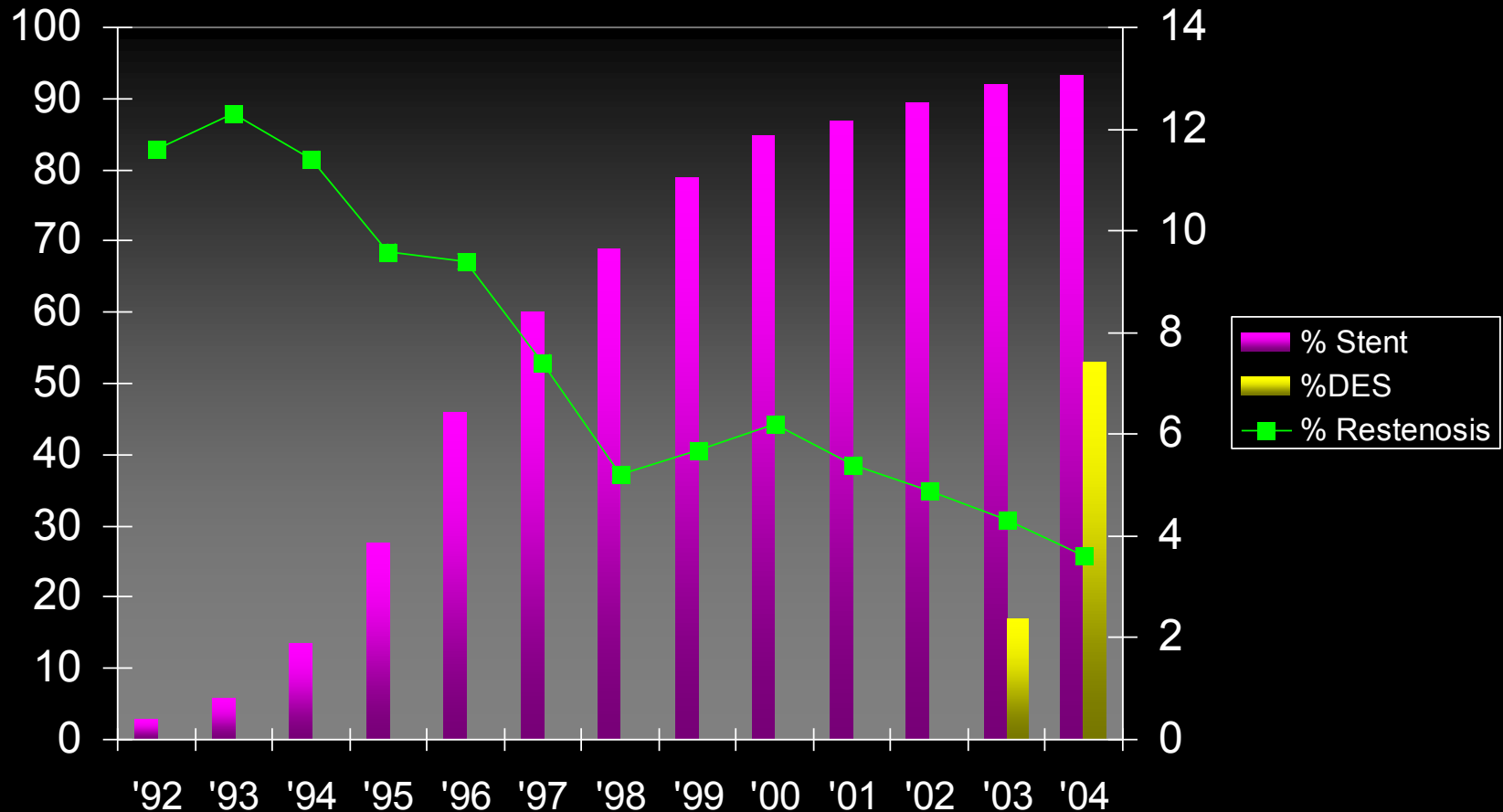
% PCIs for
Restenosis



Bare Metal and DES use v PCI for Restenosis



2004 data: Ludman



PCI in patients with past CABG

(Data from 53 of 77 centres)



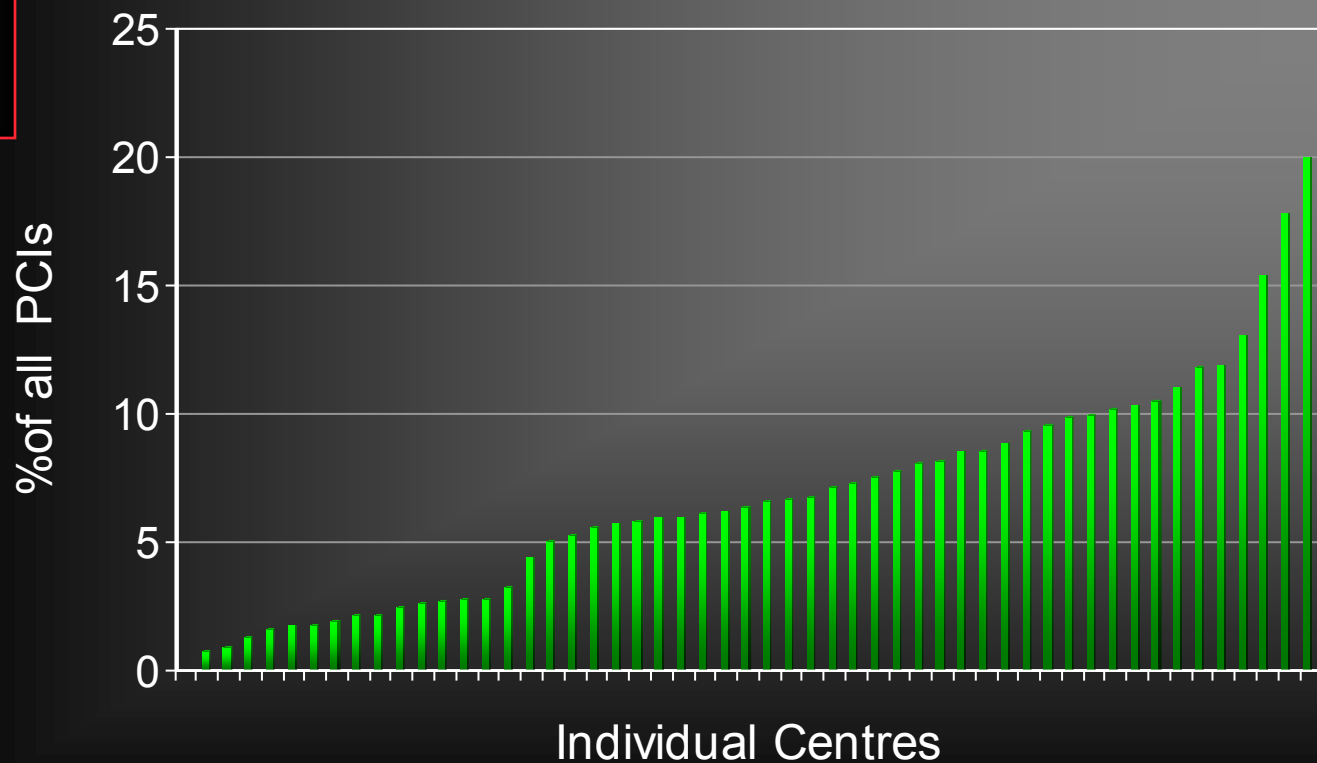
2004 data: Ludman

Mean

2002 8.4%

2003 6.8%

2004 6.7%



Note: Includes procedures on native vessels and grafts

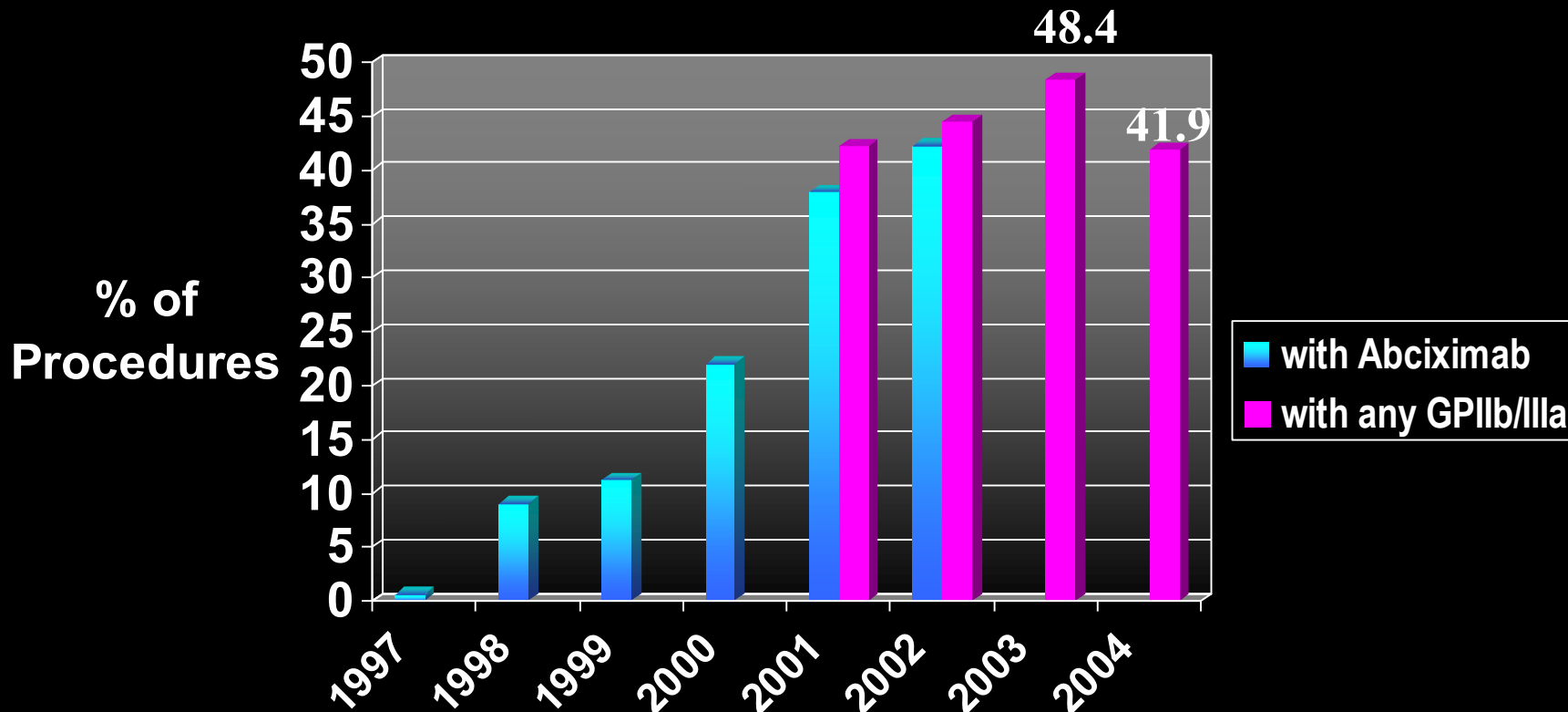
Use of GP IIb/IIIa blockers

2004 data from 71 of 77 centres



2004 data: Ludman

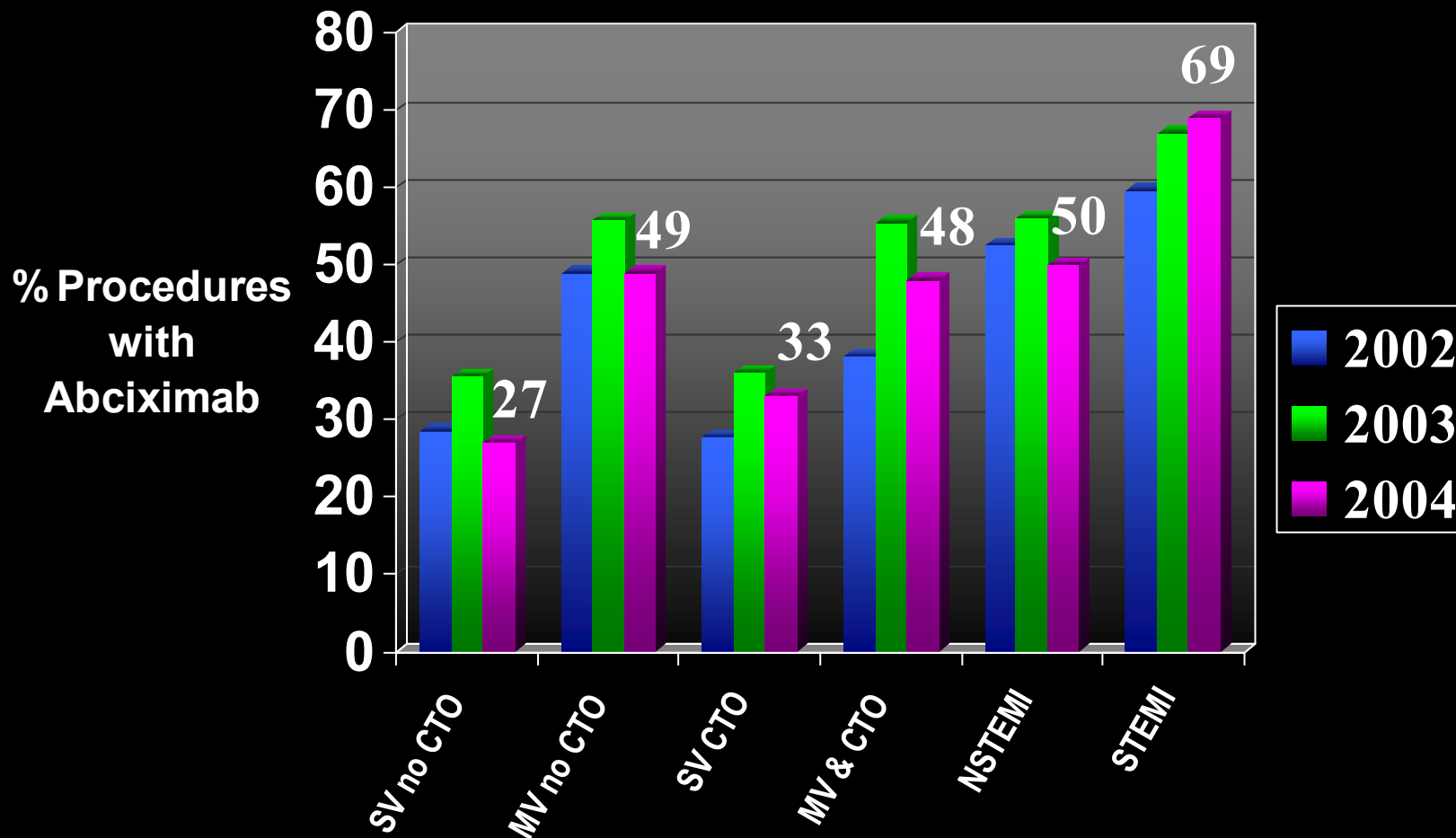
Overall mean % use



Abciximab use by Clinical Presentation



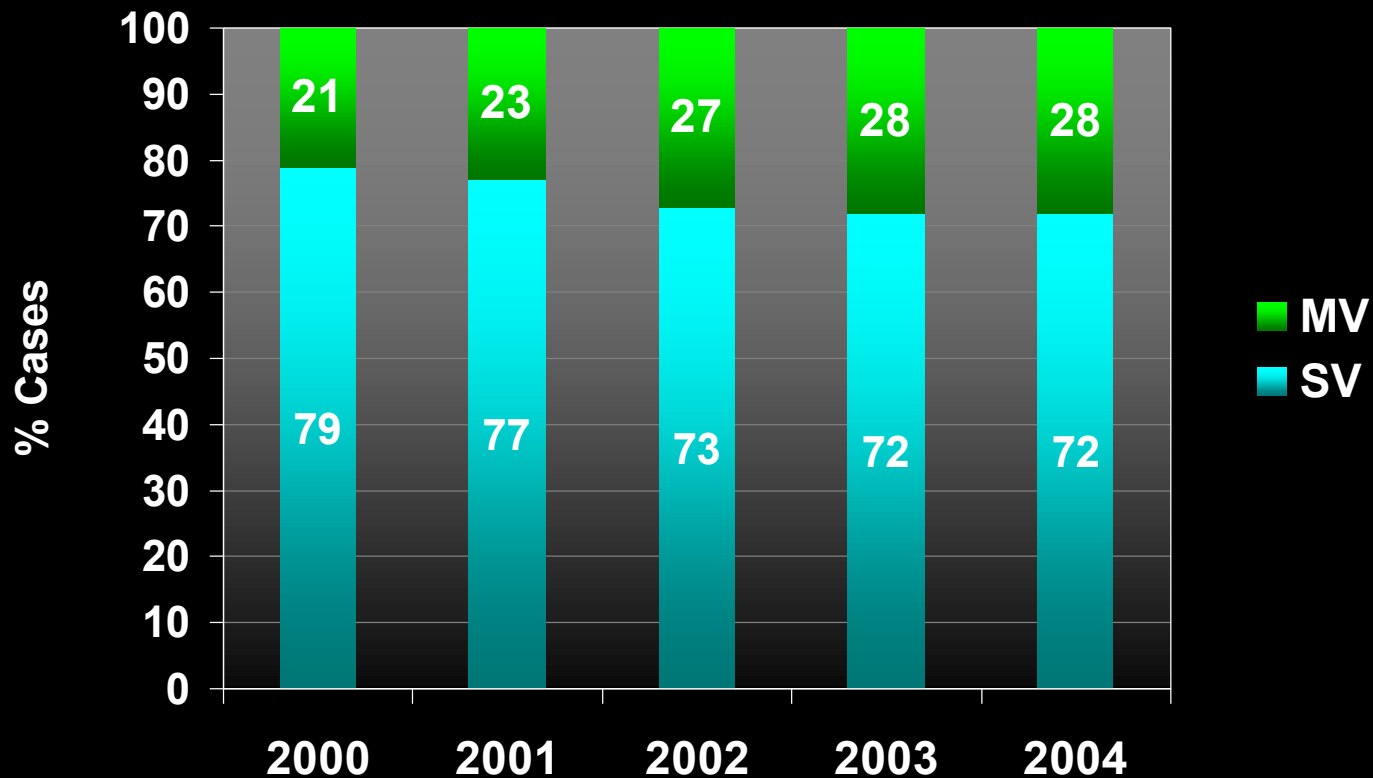
2004 data: Ludman



Multi-vessel Treatment Excluding Rx of STEMI



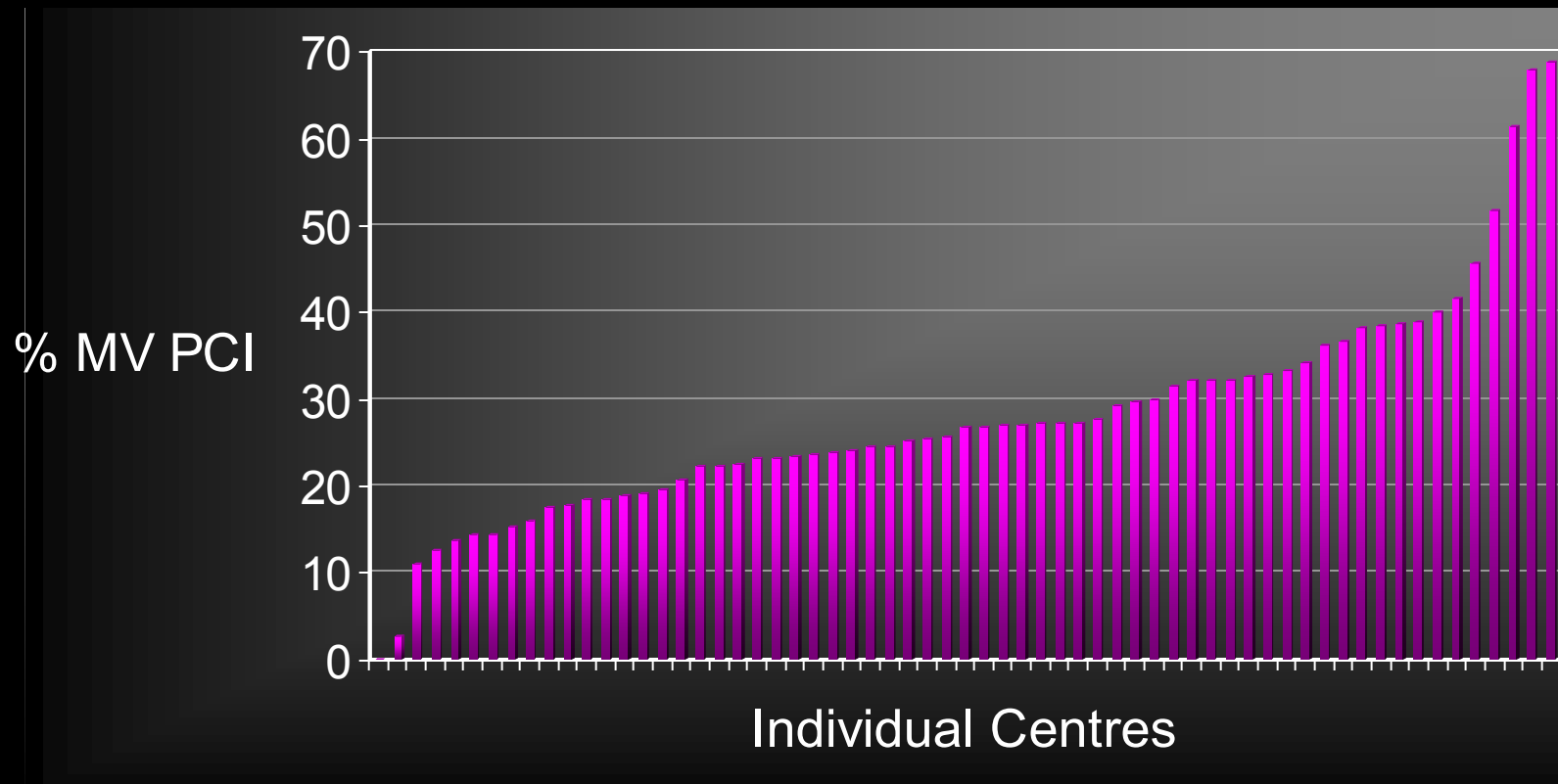
2004 data: Ludman



Multi-vessel Treatment Excluding Rx of STEMI



2004 data: Ludman

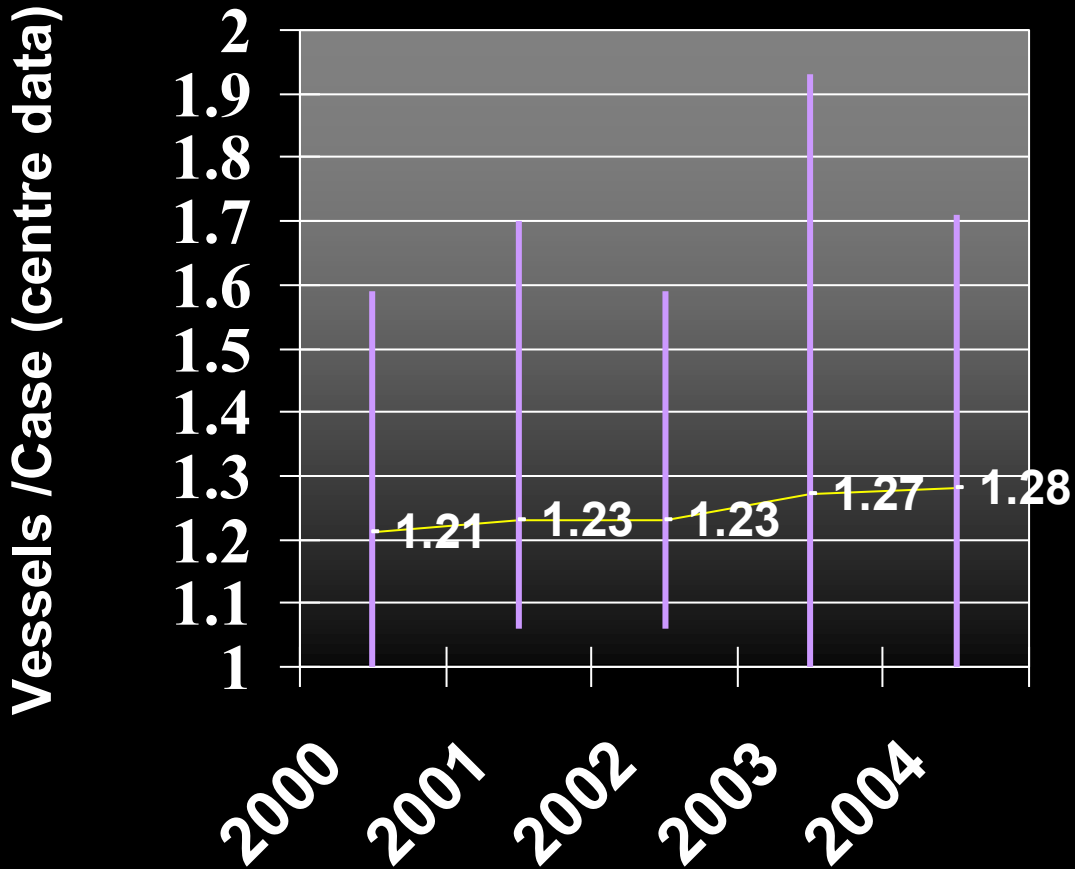


Multi-vessel Treatment

All Clinical Presentations



2004 data: Ludman

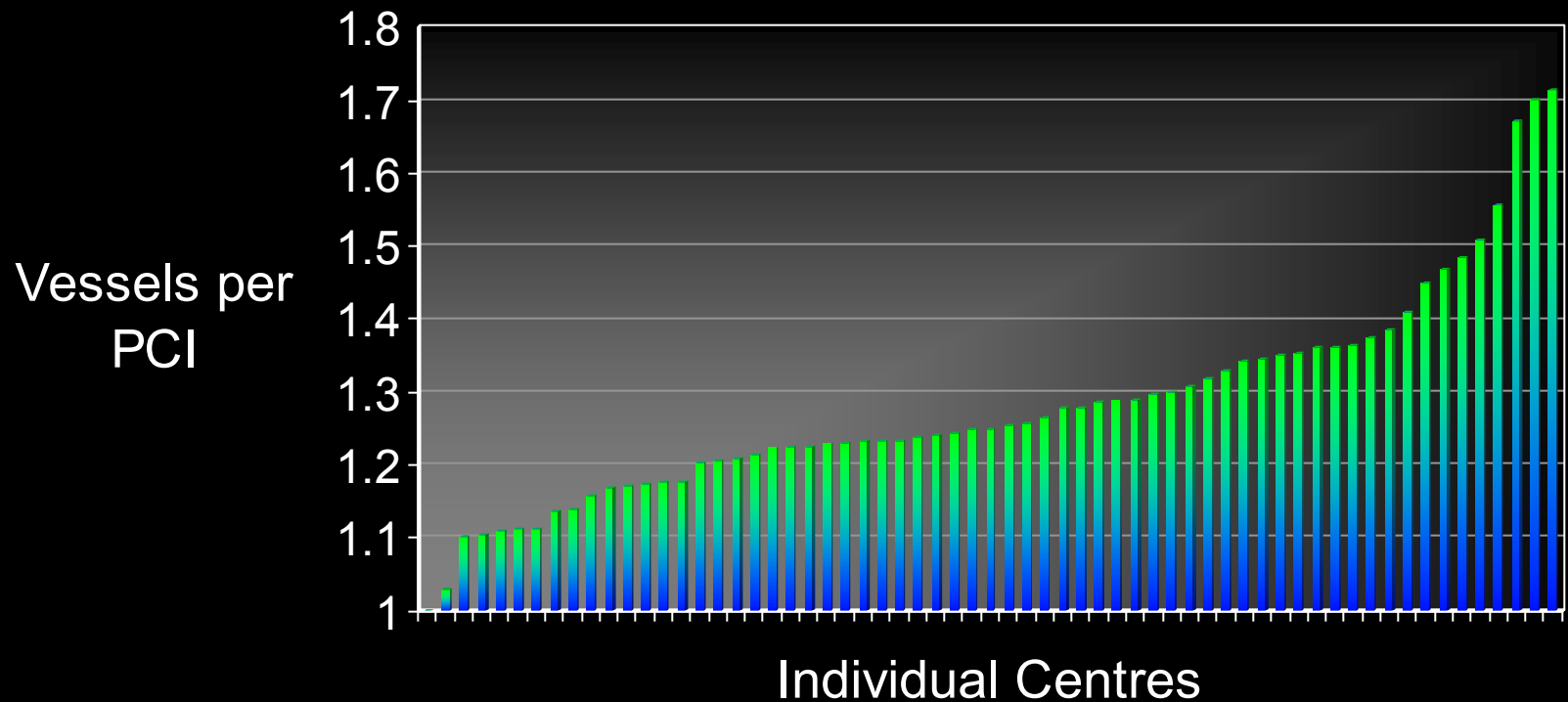


Mean (Range)

Multi-vessel Treatment Excluding Rx of STEMI



2004 data: Ludman



Additional Interventional Coronary Techniques (1)

2004 data from 74 of 77 centres



2004 data: Ludman

| | Units | No | Δ % cf 2003 | * % of all procs | Mean** | Range |
|------------------------|-----------|-------------|--------------|------------------|------------|--------------|
| Rotablation | 33 | 338 | +17% | 0.54 | 10 | 1-54 |
| Atherctmy (DCA) | 7 | 11 | -27% | 0.017 | 1.6 | 1-7 |
| TEC | 2 | 2 | -33% | 0.003 | 1 | 1 |
| Laser | 3 | 61 | +177% | 0.1 | 20 | 1- 47 |
| Cutting balloon | 51 | 1169 | -12% | 1.8 | 23 | 1-328 |

*% of all UK interventional procedures

**Mean number in units using the technique

Additional Interventional Coronary Techniques (2)

2004 data from 74 of 77 centres



2004 data: Ludman

| | Units | No | Δ cf 2003 | % of all procs | Mean | Range |
|--------------------------|-----------|------------|---------------------|-------------------|-------------|-------------|
| Thrombectomy | 31 | 363 | +12 % | 0.58 | 12 | 1-56 |
| Distal protection | 46 | 550 | + 59 % | 0.87 | 12 | 1-67 |
| Brachytherapy | 4 | 59 | -50% | 0.09 | 14.7 | 4-21 |

Other

Interventional Techniques

2004 data from 74 of 77 centres



2004 data: Ludman

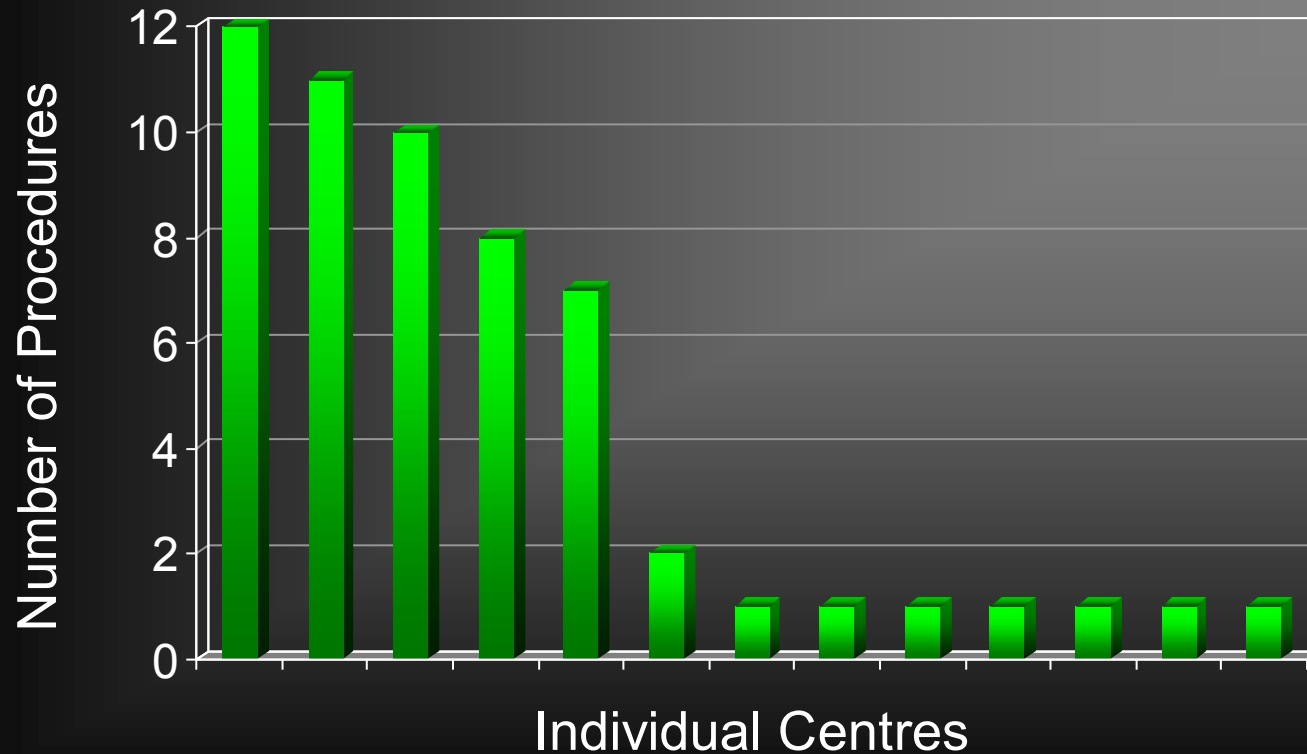
| | Units | No | Δ cf 2003 | % of all procedures | Mean | Range |
|------------------------|-----------|-----------|---------------------|------------------------|------------|-------------|
| PTMR | 1 | 7 | - 61% | 0.01 | 7 | 7 |
| Septal ablation | 13 | 57 | 0 % | 0.1 | 4.4 | 1-12 |

Alcohol Mediated Septal Ablation (HOCM)



2004 data: Ludman

Total 57 procedures



Other Diagnostic Techniques

2004 data from 74 of 77 centres



2004 data: Ludman

| | Units | No | Δ cf 2003 | % of all procedures | Mean | Range |
|-------------|-----------|------------|--------------|---------------------|-----------|--------------|
| IVUS | 38 | 689 | + 18% | 1.1 | 18 | 1-167 |

| | | | | | | |
|-------------------|-----------|-------------|----------------|------------|-----------|--------------|
| Press wire | 42 | 1281 | + 30.5% | 2 | 31 | 1-169 |
| Flow wire | 6 | 119 | + 1387% | 0.2 | 20 | 1-98 |

Adult non coronary intervention

2004 data from 74 of 77 centres



2004 data: Ludman

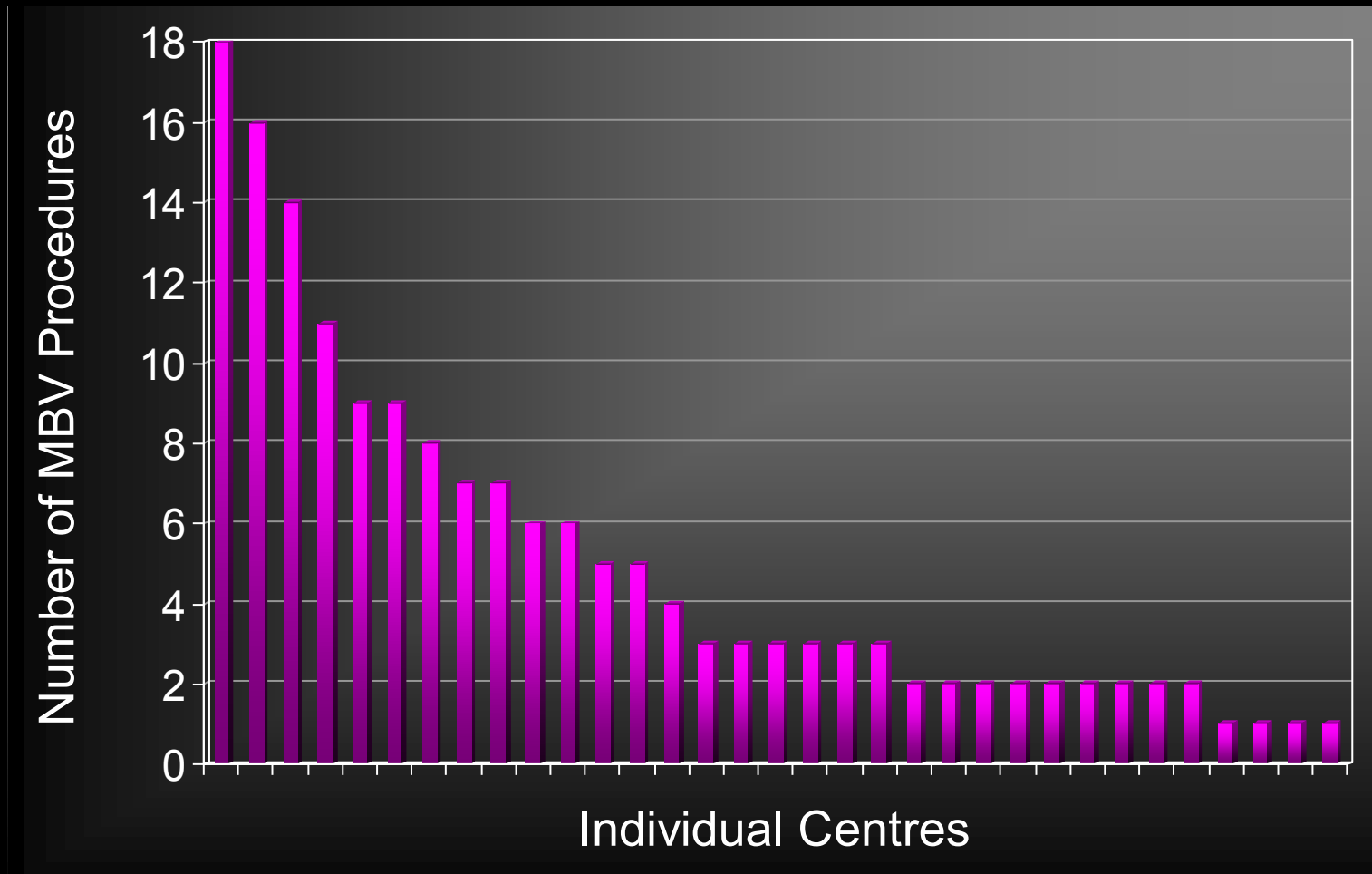
| | Units | No | Δ cf 2003 | % of all procedures | Mean | Range |
|------------------|-----------|------------|---------------------|------------------------|------------|-------------|
| MV plasty | 33 | 165 | -28% | 0.26 | 5 | 1-18 |
| AV plasty | 9 | 22 | +29% | 0.04 | 2.4 | 1-5 |
| PV plasty | 9 | 26 | +4% | 0.04 | 2.9 | 1-9 |
| TV plasty | 2 | 2 | NA | | 1 | 1-2 |
| PDA | 9 | 39 | +2.6% | 0.06 | 4.3 | 1-19 |
| ASD | 28 | 475 | +5.6% | 0.8 | 17 | 2-74 |
| PFO | 28 | 379 | +94% | 0.6 | 14 | 1-86 |
| VSD | 14 | 34 | +6% | 0.05 | 2.4 | 1-6 |

Mitral Balloon Valvuloplasty



2004 data: Ludman

Total 165



Adult great vessel intervention

2004 data from 74 of 77 centres



2004 data: Ludman

| | Units | No | Δ cf 2003 | % of all procedures | Mean | Range |
|-------------------|-------|----|---------------------|------------------------|------|-------|
| Coarct / Re-coart | 9 | 35 | -60% | 0.06 | 3.4 | 1-9 |
| Carotid | 4 | 29 | +7% | 0.04 | 7.25 | 1-19 |
| Aorta | 2 | 7 | -41% | 0.01 | 3.5 | 1-6 |
| Pulm art | 8 | 32 | +3% | 0.05 | 4 | 1-9 |
| SVC | 8 | 34 | -42% | 0.05 | 5.9 | 1-17 |

Other procedures

2004 data from 74 of 77 centres



2004 data: Ludman

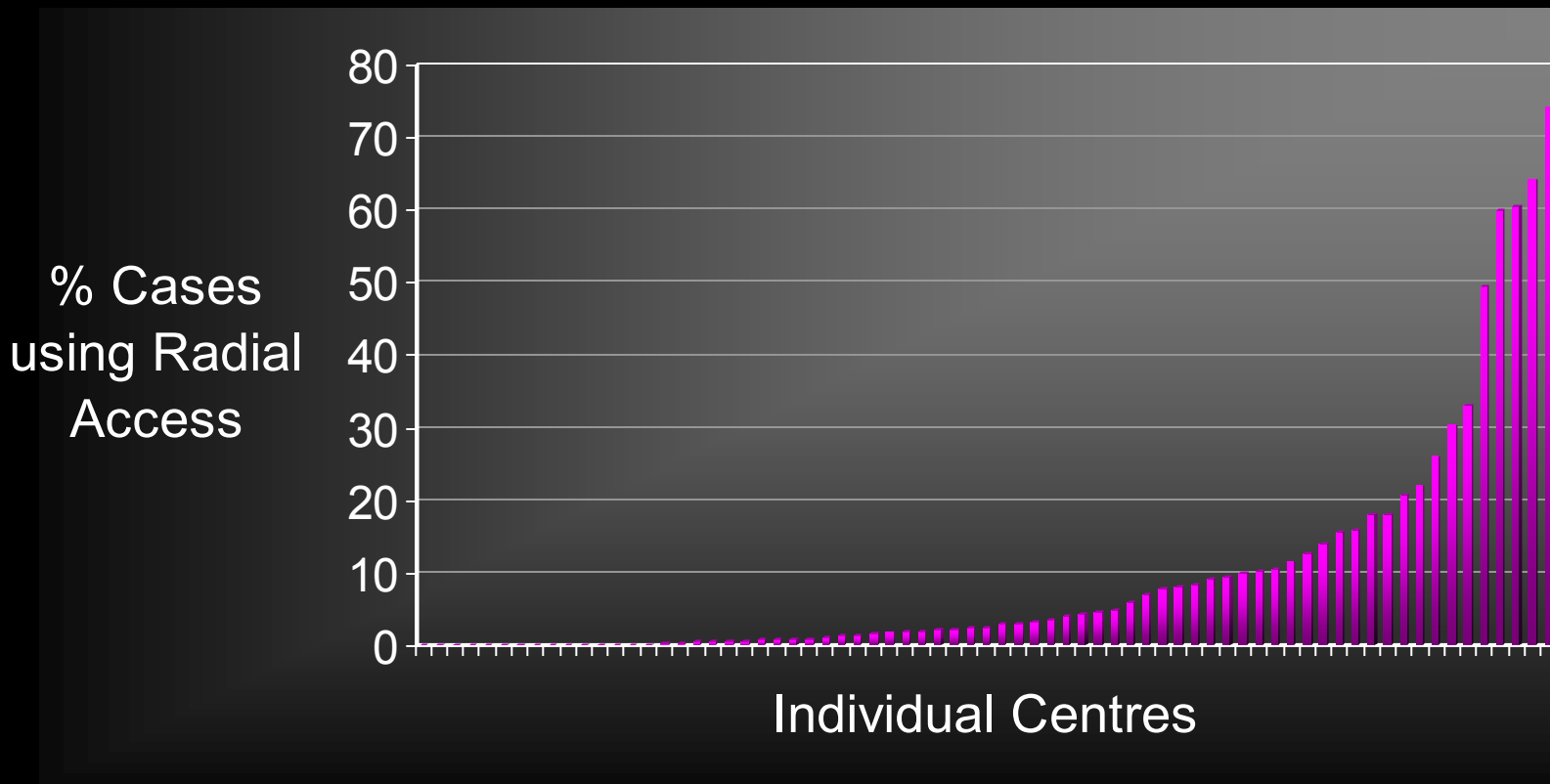
| | Units | No | Δ % cf 2002 | % of all procs | Mean | Range |
|------------------------------------|--------------|-----------|------------------------|---------------------------|-------------|--------------|
| Foreign body removal | 11 | 27 | -4% | 0.04 | 2.4 | 1-9 |
| Embolisation | 9 | 27 | -51% | 0.03 | 2.4 | 1-7 |
| Balloon Pericardiectomy | 3 | 3 | -78% | 0.004 | 1 | 1 |
| Spinal cord stimulator | 3 | 28 | +115% | 0.04 | 9 | 1-20 |

Radial Artery Access



2004 data: Ludman

6457 cases: 10.2% of all PCI



Data from: 68 of 77 centres

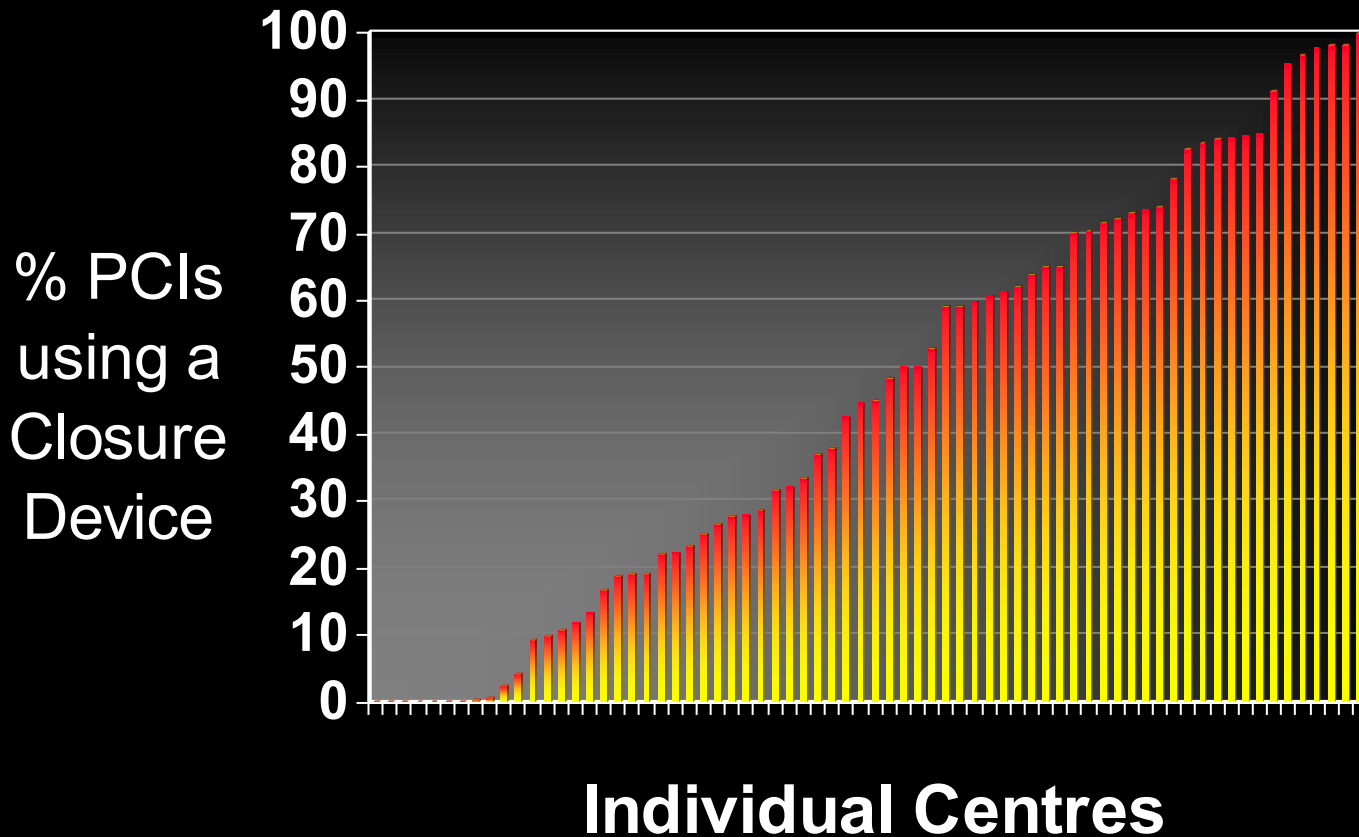
Femoral artery closure devices

2004 data from 69 of 77 centres



2004 data: Ludman

Mean: 45%



Audit Domains

- Structure
- Appropriateness
- Process
- Outcome

Data to end of Procedure only

2004 data

| | |
|-------------------------|---------------|
| Battle Hospital | Reading |
| Birmingham Heartlands | Birmingham |
| City General Hospital | Stoke |
| Eastbourne Hospital | Eastbourne |
| Glenfield Hospital | Leicester |
| Heart Hospital | London |
| North Hampshire | Basingstoke |
| Royal Free Hospital | London |
| St Bartholomew's | London |
| Victoria Hospital | Blackpool |
| Wythenshawe Hospital | Manchester |
| Glasgow Royal Infirmary | Glasgow |
| Golden Jubilee National | Clydesbank |
| Hairmyres Hospital | East Kilbride |
| BMI Alexandra Hospital | Cheadle |

| | |
|---------------------------|--------------|
| BUPA Cambridge Lea | Impington |
| BUPA Hull and East Riding | Anlaby, Hull |
| BUPA Hospital Leeds | Roundhay |
| BUPA Leicester | Oadby |
| Capio Yorkshire Clinic | Bingley |
| Cromwell Hospital | London |
| Leeds Nuffield Hospital | Leeds |
| London Independent | London |
| Manor Hospital | Headington |
| St Anthony's Hospital | Surrey |
| Wellington Hospital | London |
| Ross Hall Hospital | Glasgow |

Mortality - All PCIs

To end of PCI or hosp discharge



2004 data: Ludman

| Year | Data From | Total with mortality data | Mortality % | Range % |
|-------------|--------------|----------------------------------|-------------|--------------|
| 1995 | 35/54 | 11,365 (17,344) | 0.69 | 0-3.4 |
| 1996 | 37/53 | 14,476 (20,511) | 0.72 | 0-3.2 |
| 1997 | 41/58 | 17,577 (22,902) | 0.91 | 0-10 |
| 1998 | 44/61 | 16,946 (24,899) | 0.80 | 0-9.1 |
| 1999 | 48/63 | 20,975 (28,133) | 0.61 | 0-4 |
| 2000 | 48/66 | 24,323 (33,652) | 0.64 | 0-2.6 |
| 2001 | 45/64 | 29,001 (38,992) | 0.75 | 0-2.8 |
| 2002 | 53/64 | 37,437 (44,913) | 0.54 | 0-1.9 |
| 2003 | 64/73 | 49,194 (53,261) | 0.53 | 0-2.0 |
| 2004 | 66/78 | 56,027 (62,780) | 0.56 | 0-2.2 |

MACE - All PCIs



2004 data: Ludman

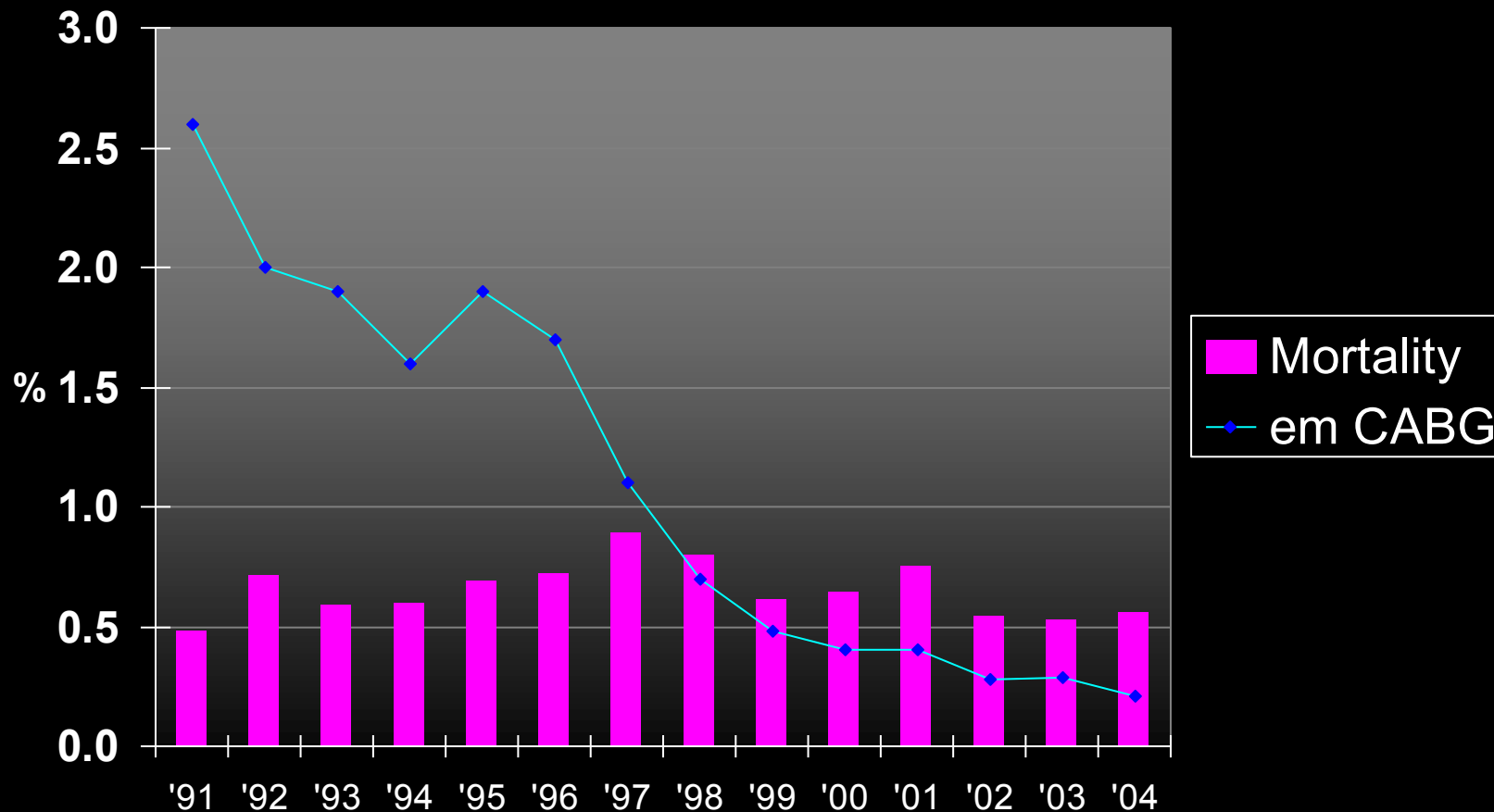
To end of PCI or hosp discharge

| Year | % Procedure Success | % QMI | % Re PCI for acute closure | % Em. CABG | Mortality (%) |
|-------------|---------------------------|---------------------------|----------------------------|---------------------------|---------------------------|
| 1995 | 89 | 1.4 | | 1.9 | 0.69 |
| 1996 | 90 | 1.4 | | 1.7 | 0.72 |
| 1997 | 92 | 1.2 | | 1.1 | 0.89 |
| 1998 | 92 | 0.8 | | 0.7 | 0.80 |
| 1999 | 90 | 0.57 | | 0.48 | 0.61 |
| 2000 | 92 | 0.6 | | 0.4 | 0.64 |
| 2001 | 94 | 0.5 | | 0.4 | 0.75 |
| 2002 | 92 (51 of 64) | 0.57 (49 of 64) | 0.33 (50 of 64) | 0.28 (53 of 64) | 0.54 (53 of 64) |
| 2003 | 92 (62 of 73) | 0.36 (56 of 73) | 0.17 (62 of 73) | 0.29 (64 of 73) | 0.53 (64 of 73) |
| 2004 | 93.5 (63 of 78) | 0.30 (57 of 78) | 0.30 (61 of 78) | 0.21 (64 of 78) | 0.56 (66 of 78) |

All Procedures: Outcome



2004 data: Ludman



Data on *HOSPITAL* outcome

(2004 data 43 of 77 sites)

| | |
|---|-------------------------|
| Birmingham City Hospital | Birmingham |
| Bristol Royal Infirmary | Bristol |
| Castle Hill Hospital (Hull and East Yorkst) | Cottingham |
| Cheltenham General Hospital | Cheltenham |
| Derriford Hospital | Plymouth (limited data) |
| Freeman Hospital | Newcastle upon Tyne |
| Hammersmith Hospital | London |
| Harefield Hospital | Uxbridge |
| James Cook University Hospital | Middlesbrough |
| John Radcliffe Hospital | Oxford |
| King Edward VII | West Sussex |
| Kings College Hospital | London |
| Liverpool Cardiothoracic Centre | Liverpool |
| Manchester Royal Infirmary | Manchester |
| New Cross Hospital | Wolverhampton |

Data on *HOSPITAL* outcome

(2004 data 43 of 77 sites)

| | |
|------------------------------------|------------------|
| Northern General Hospital | Sheffield |
| Northwick Park Hospital | Harrow |
| Nottingham City Hospital | Nottingham |
| Papworth Hospital | Cambridge |
| Queen Elizabeth Hospital | Birmingham |
| Royal Brompton Hospital | London |
| Royal Cornwall Hospital | Truro |
| Royal Devon & Exeter Hospital | Exeter |
| Royal Sussex County Hospital | Brighton, Sussex |
| Sandwell District General Hospital | West Bromwich |
| Southampton General Hospital | Southampton |
| St George's Hospital | London |
| St Mary's Hospital | London |
| St Thomas' Hospital | London |
| Taunton & Somerset | Taunton |

Data on *HOSPITAL* outcome

(2004 data 43 of 77 sites)

| | |
|------------------------------|------------------------|
| Torbay Hospital | Torquay |
| Walsgrave Hospital | Walsgrave |
| Aberdeen Royal Infirmary | Aberdeen |
| Edinburgh Royal Infirmary | Edinburgh |
| Glasgow Western Infirmary | Glasgow |
| Western General Hospital | Edinburgh |
| Morrison Hospital | Swansea |
| University Hospital of Wales | Cardiff (limited data) |
| Royal Victoria Hospital | Belfast |
| BMI Priory Hospital | Edgbaston |
| BUPA Hospital Southampton | Southampton |
| Harley Street Clinic | London |
| London Bridge Hospital | London |

Data on *HOSPITAL* outcome

(2004 data of 77 sites)



Hospital Outcome 2004

Data from 43 centres



2004 data: Ludman

All Patients

| No. | Success | Partial Success | Failed | Repeat PCI | CABG | QMI | Death (Range) |
|-----|---------|--------------------|--------|---------------|------|-----|------------------|
|-----|---------|--------------------|--------|---------------|------|-----|------------------|

Hospital Outcome 2004

Data from 37 to 40 centres



2004 data: Ludman

Elective Patients

| No. | Success | Partial Success | Repeat PCI | CABG | QMI | Death (Range) |
|-----|---------|--------------------|---------------|------|-----|------------------|
|-----|---------|--------------------|---------------|------|-----|------------------|

All Elective Cases – Overall MACE

| | | | | | | |
|--|---------------|--|--|--|--|--|
| | 22,992 | | | | | |
|--|---------------|--|--|--|--|--|

| | | | | | | |
|--|--|--|--|-------------------------|--|--|
| | | | | 0.25% (0-1.3) | | |
|--|--|--|--|-------------------------|--|--|

| | | | | | | |
|--|--|--|--|--|--|-------------------------|
| | | | | | | 0.24% (0-1.7) |
|--|--|--|--|--|--|-------------------------|

Hospital Outcome 2004

Data from 34 to 37 centres



2004 data: Ludman

Patients with previous bypass grafts Patients treated for restenosis

| No. | Success | Partial Success | Repeat PCI | CABG | QMI | Death (Range) |
|------------|----------------|----------------------------|-----------------------|-------------|------------|--------------------------|
|------------|----------------|----------------------------|-----------------------|-------------|------------|--------------------------|

Does not account for clinical syndrome
CABG patients includes Rx of native and grafts

Hospital Outcome 2004

Data from 28 to 30 centres



2004 data: Ludman

Patients Rx for acute vessel closure

| No. | Success | Partial Success | Repeat PCI | CABG | Q MI | Death (Range) |
|-----|---------|--------------------|---------------|------|------|------------------|
|-----|---------|--------------------|---------------|------|------|------------------|

Equivalent to SAT rate 0.32% - likely underestimate

Hospital Outcome 2004

Data from 36 to 38 centres



2004 data: Ludman

UA and NSTEMI

| No. | Success | Partial Success | Repeat PCI | CABG | Q MI | Death (Range) |
|------------|----------------|----------------------------|-----------------------|-------------|-------------|--------------------------|
|------------|----------------|----------------------------|-----------------------|-------------|-------------|--------------------------|

Includes all classified as treated for UA and post MI angina (stable and unstable)

Hospital Outcome 2004

Data from 30 to 32 centres



2004 data: Ludman

Patients Rx for STEMI

| No. | Success | Partial Success | Repeat PCI | CABG | re-MI | Death (Range) |
|-----|---------|--------------------|---------------|------|-------|------------------|
|-----|---------|--------------------|---------------|------|-------|------------------|

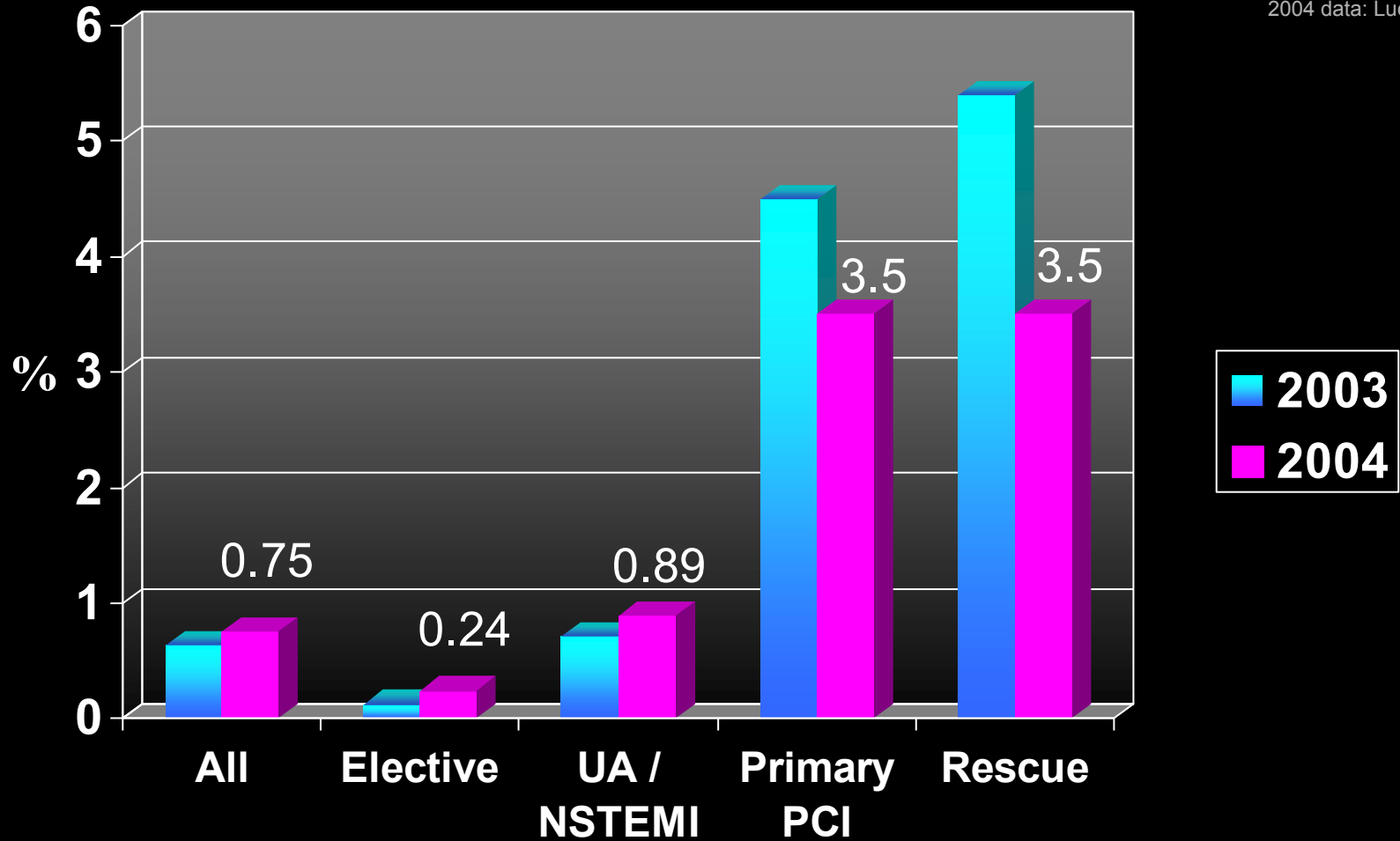
Summary: In Hospital Mortality

Risk Stratified by Syndrome

(Data from approx 43,000 patients)



2004 data: Ludman

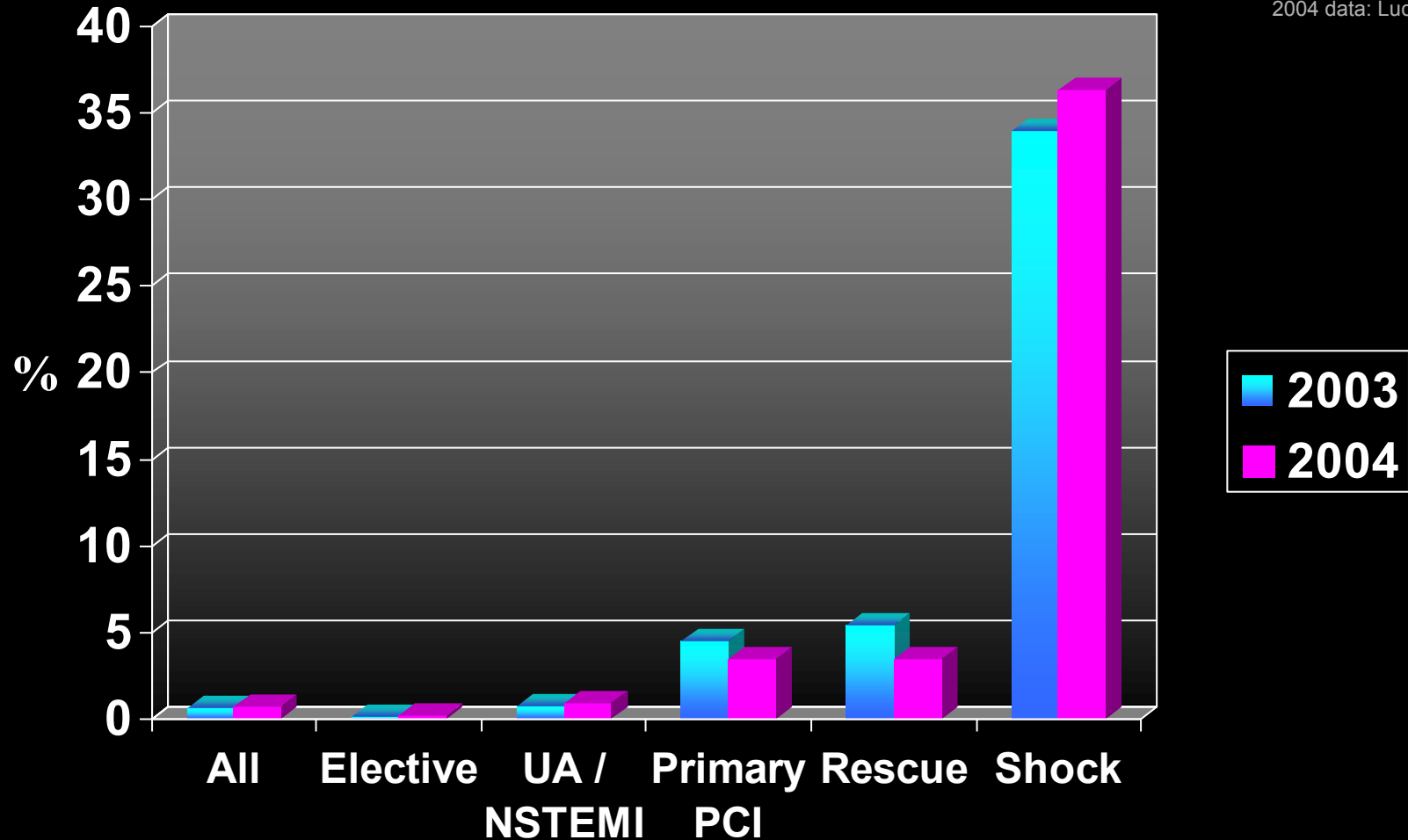


In Hospital Mortality by Syndrome

(Data from approx 43,000 patients)



2004 data: Ludman

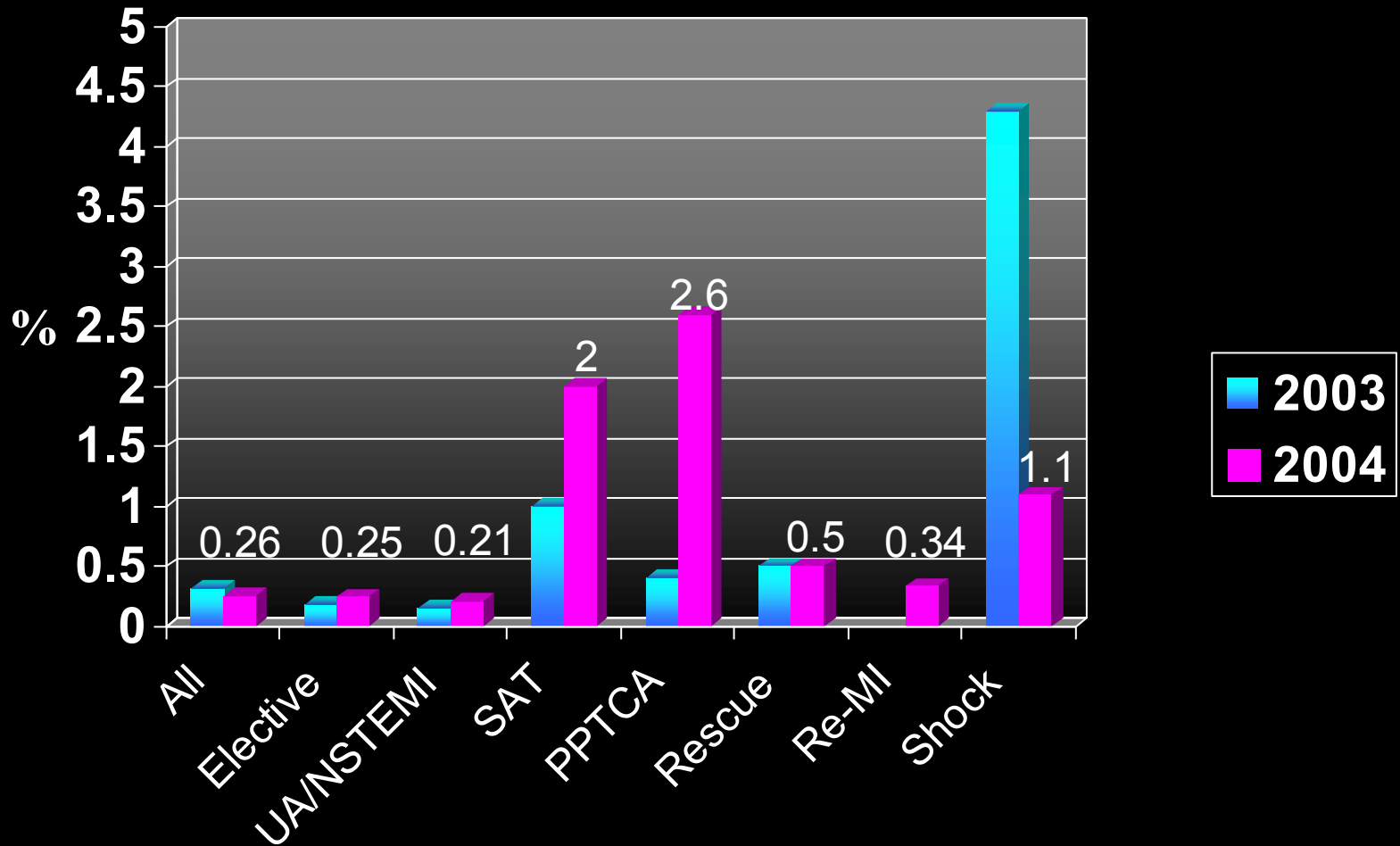


Emergency CABG by Syndrome

(Data from approx 43,000 patients)



2004 data: Ludman

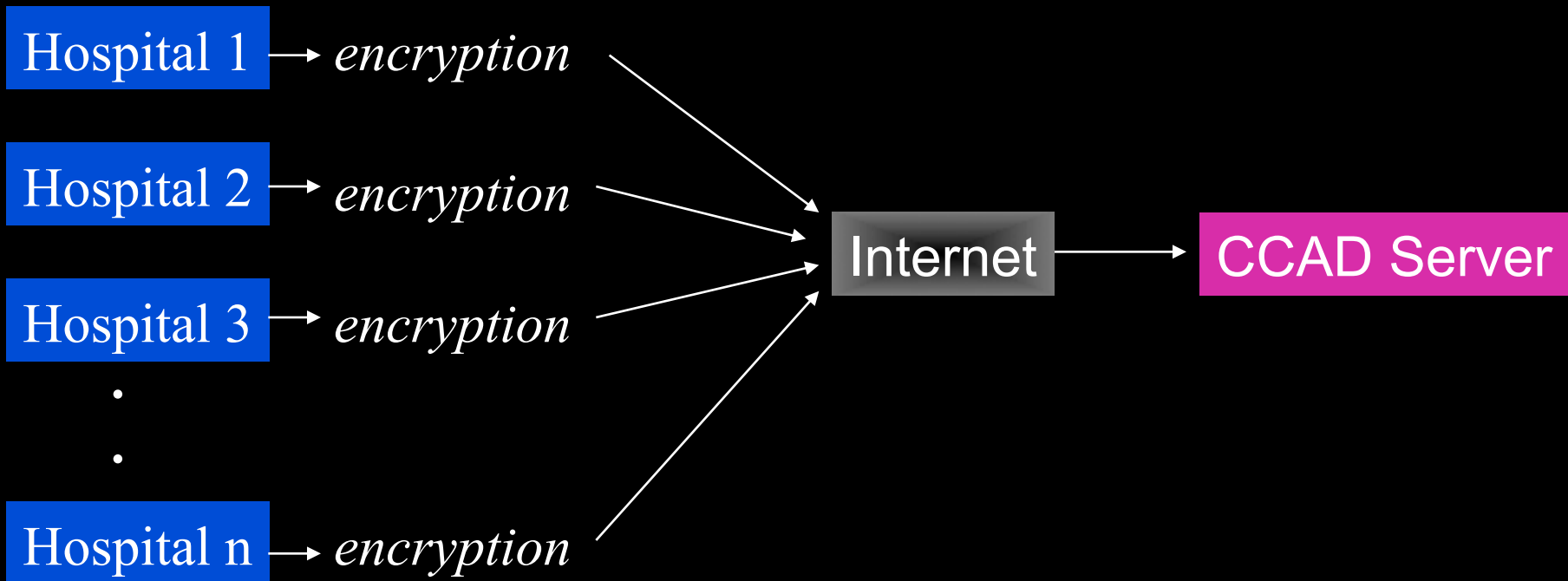


Late Events post Discharge

- **BCIS - CCAD**

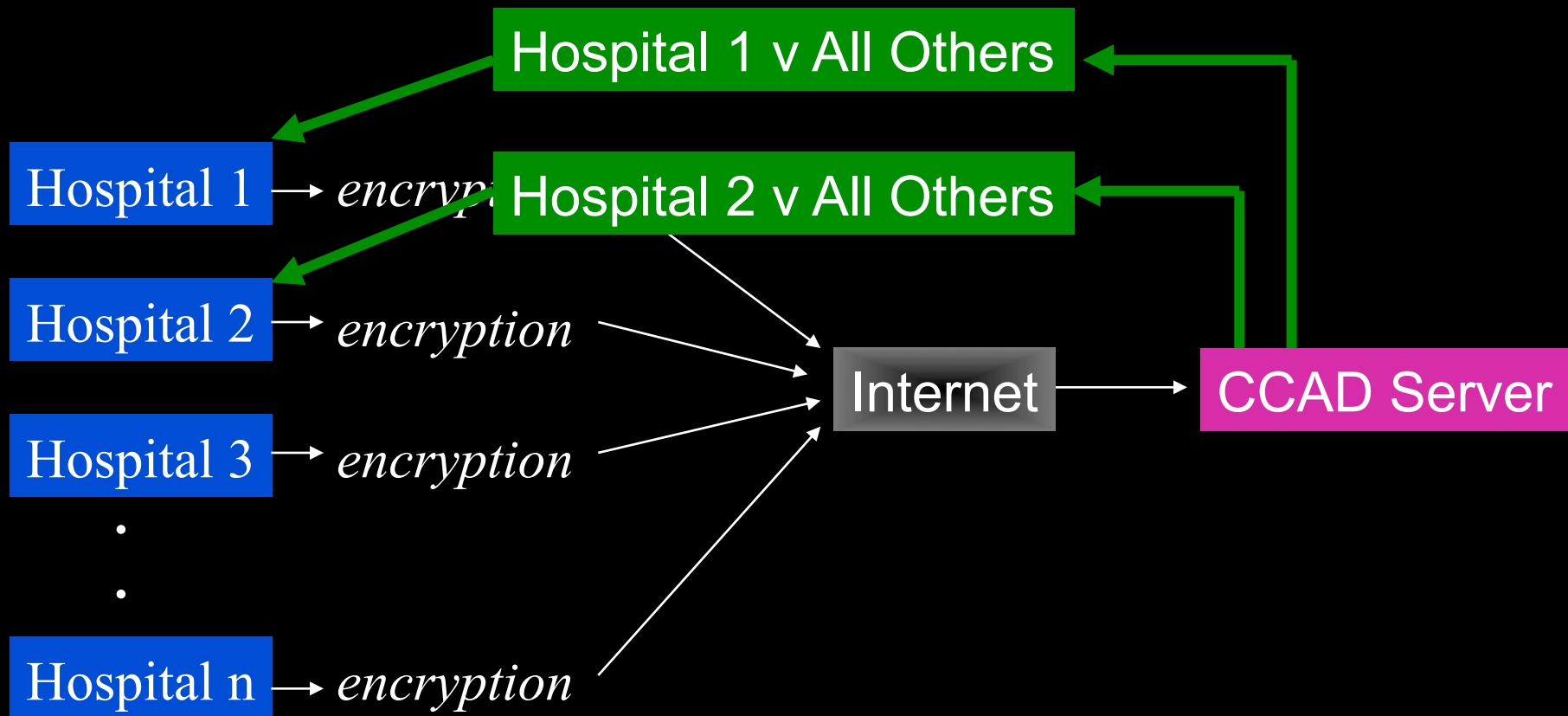
BCIS / CCAD project

The Vision



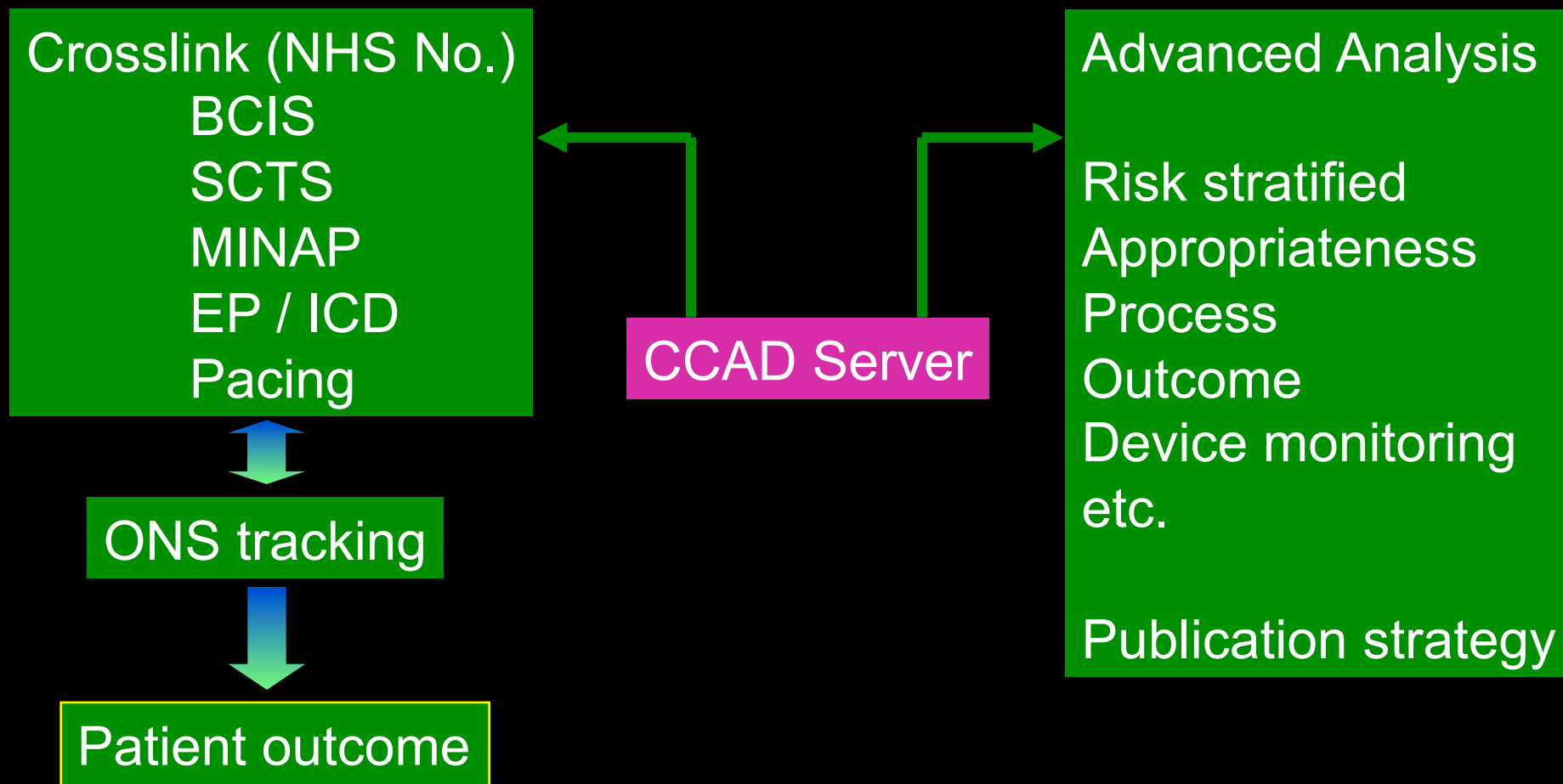
BCIS / CCAD project

The Vision



BCIS / CCAD project

The Vision



Downloading to CCAD

September 2005

21 Centres

| |
|--------------------------------|
| Birmingham Heartlands Hospital |
|--------------------------------|

| |
|------------------|
| Freeman Hospital |
|------------------|

| |
|--------------------|
| Glenfield Hospital |
|--------------------|

| |
|--------------------------------|
| James Cook University Hospital |
|--------------------------------|

| |
|---------------------------------|
| John Radcliffe Hospital, Oxford |
|---------------------------------|

| |
|---------------------------|
| King Edward VII, Midhurst |
|---------------------------|

| |
|------------------------|
| Kings College Hospital |
|------------------------|

| |
|-----------------------|
| London Chest Hospital |
|-----------------------|

| |
|---------------------------------|
| Queen Elizabeth Hospital, B'ham |
|---------------------------------|

| |
|-------------------------------|
| Royal Devon & Exeter Hospital |
|-------------------------------|

| |
|-------------------|
| Southend Hospital |
|-------------------|

| |
|---------------------------|
| St Bartholomew's Hospital |
|---------------------------|

| |
|---------------------|
| St Peter's Hospital |
|---------------------|

| |
|-----------------|
| Torbay Hospital |
|-----------------|

| |
|------------------------|
| Yorkshire Heart Centre |
|------------------------|

| |
|--------------------------|
| Bradford Royal infirmary |
|--------------------------|

| |
|-------------------|
| Royal Bournemouth |
|-------------------|

| |
|-----------------|
| Hemel Hempstead |
|-----------------|

| |
|---------------------------|
| University Hospital Wales |
|---------------------------|

| |
|----------------------|
| Harley Street clinic |
|----------------------|

| |
|------------------------|
| London Bridge Hospital |
|------------------------|

Some Data to CCAD

September 2005

Total 28 Centres

| |
|-------------------------------|
| North Hampshire Hospital |
| St Thomas' Hospital |
| Victoria Hospital |
| Walsgrave Hospital |
| Wythenshawe Hospital |
| Harefield Hospital (imminent) |
| Bristol Royal Infirmary |



NO Data to CCAD

September 2005



26 Centres

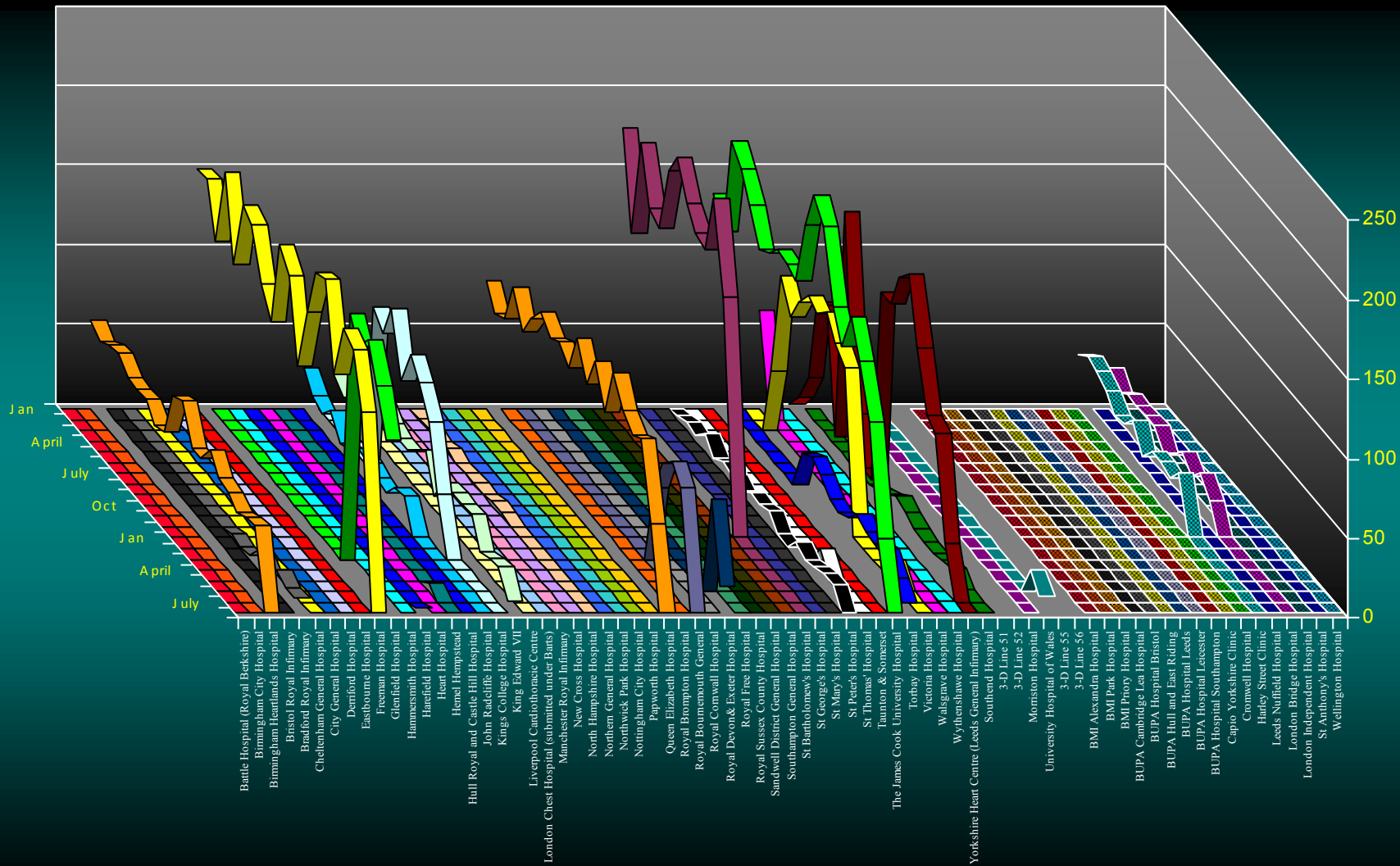
| |
|-----------------------------------|
| Birmingham City Hospital |
| Castle Hill / Royal Hull Hospital |
| Cheltenham General Hospital |
| City General Hospital |
| Derriford Hospital |
| Eastbourne Hospital |
| Hammersmith Hospital |
| Heart Hospital (UCLH) |

| |
|----------------------------|
| Liverpool CTC |
| Manchester Royal |
| New Cross Hospital |
| Northern General Hospital |
| Northwick Park Hospital |
| Nottingham City Hospital |
| Papworth Hospital |
| Royal Berkshire and Battle |
| Royal Brompton Hospital |

| |
|---------------------------|
| Royal Cornwall Hospital |
| Royal Free Hospital |
| Royal Sussex County |
| Sandwell District General |
| Southampton General |
| St George's Hospital |
| St Mary's Hospital |
| Taunton & Somerset |
| Morrison |

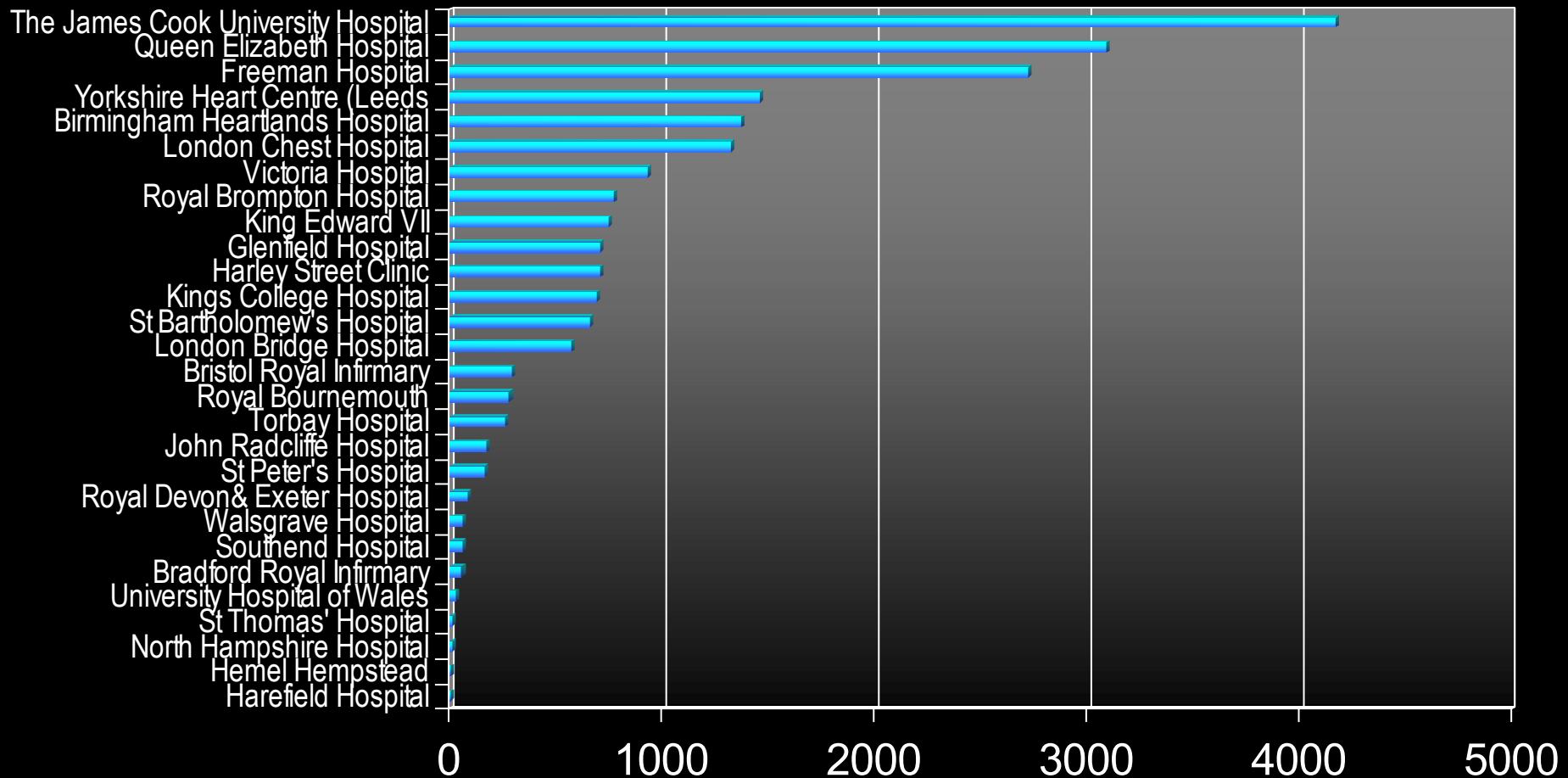
Monthly CCAD data

Jan 2004 to Sept 2005



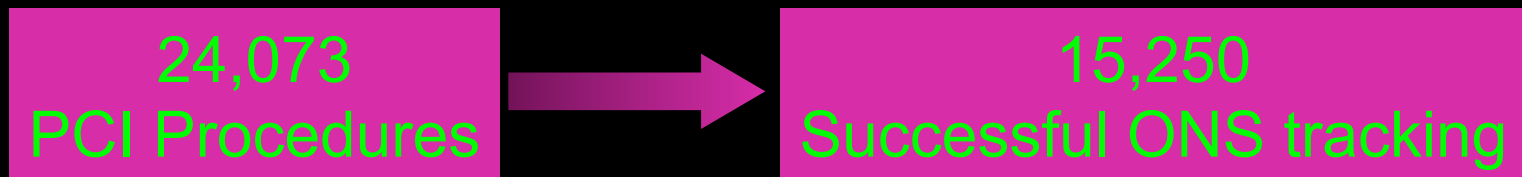
Total Data in CCAD

to Sept 2005



Tracking via CCAD

- Data completeness
- NHS numbers
 - National Average 63%
 - MINAP 87%
 - SCTS 83%

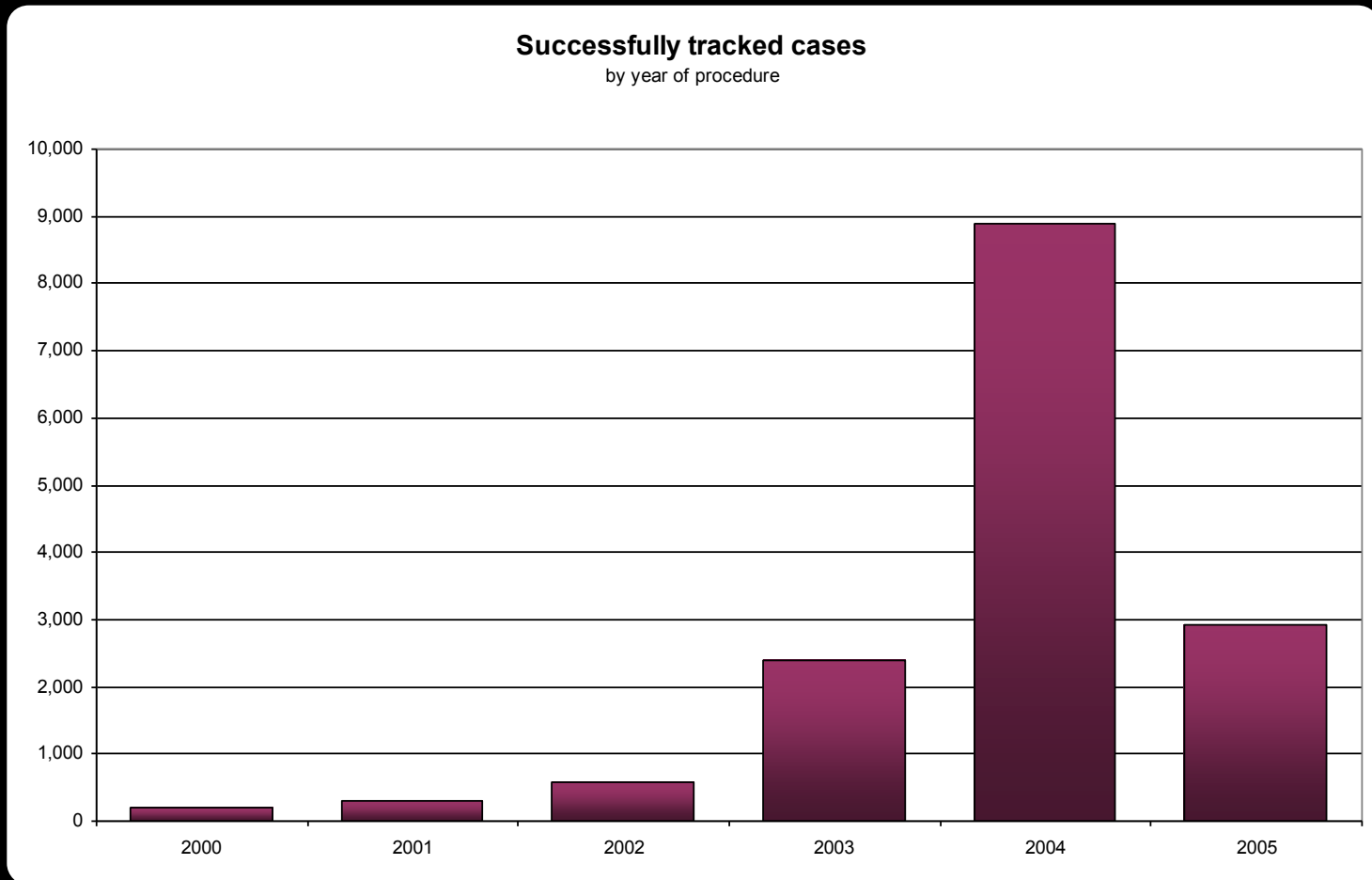


Length of follow-up

(tracking performed July 2005)



Median = 362 days

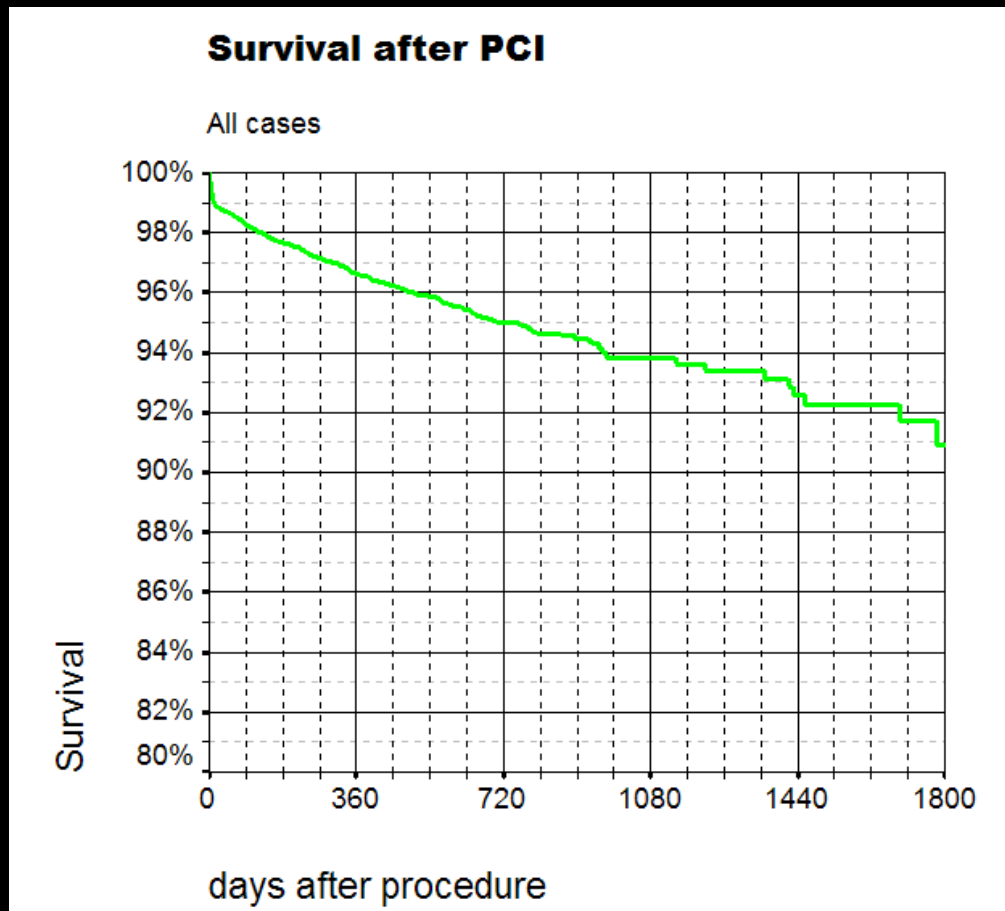


Survival after Any PCI

(tracking performed July 2005)

In Hospital †: 0.61%
Subsequent †: 3.0%

BCIS CCAD



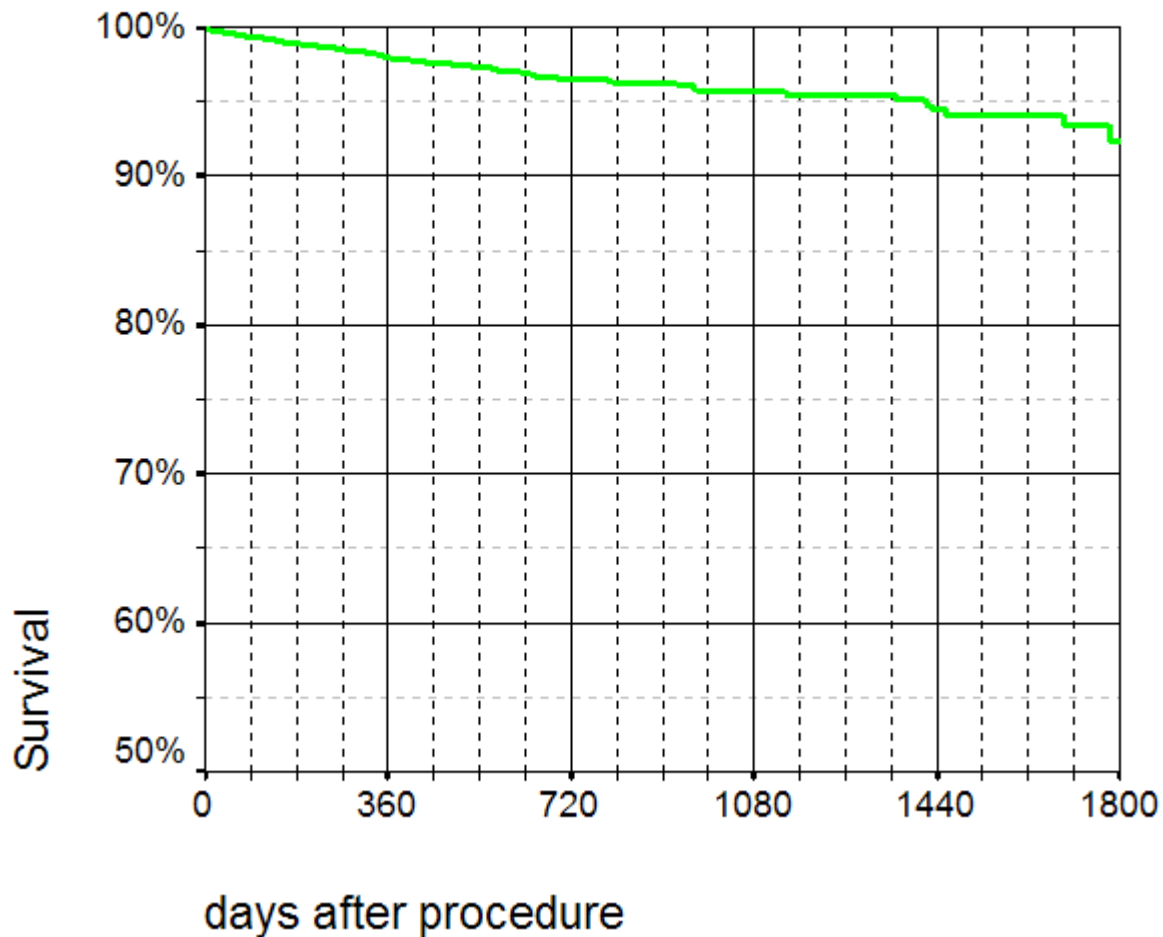
Approx 1.7% pa

Survival after Elective PCI

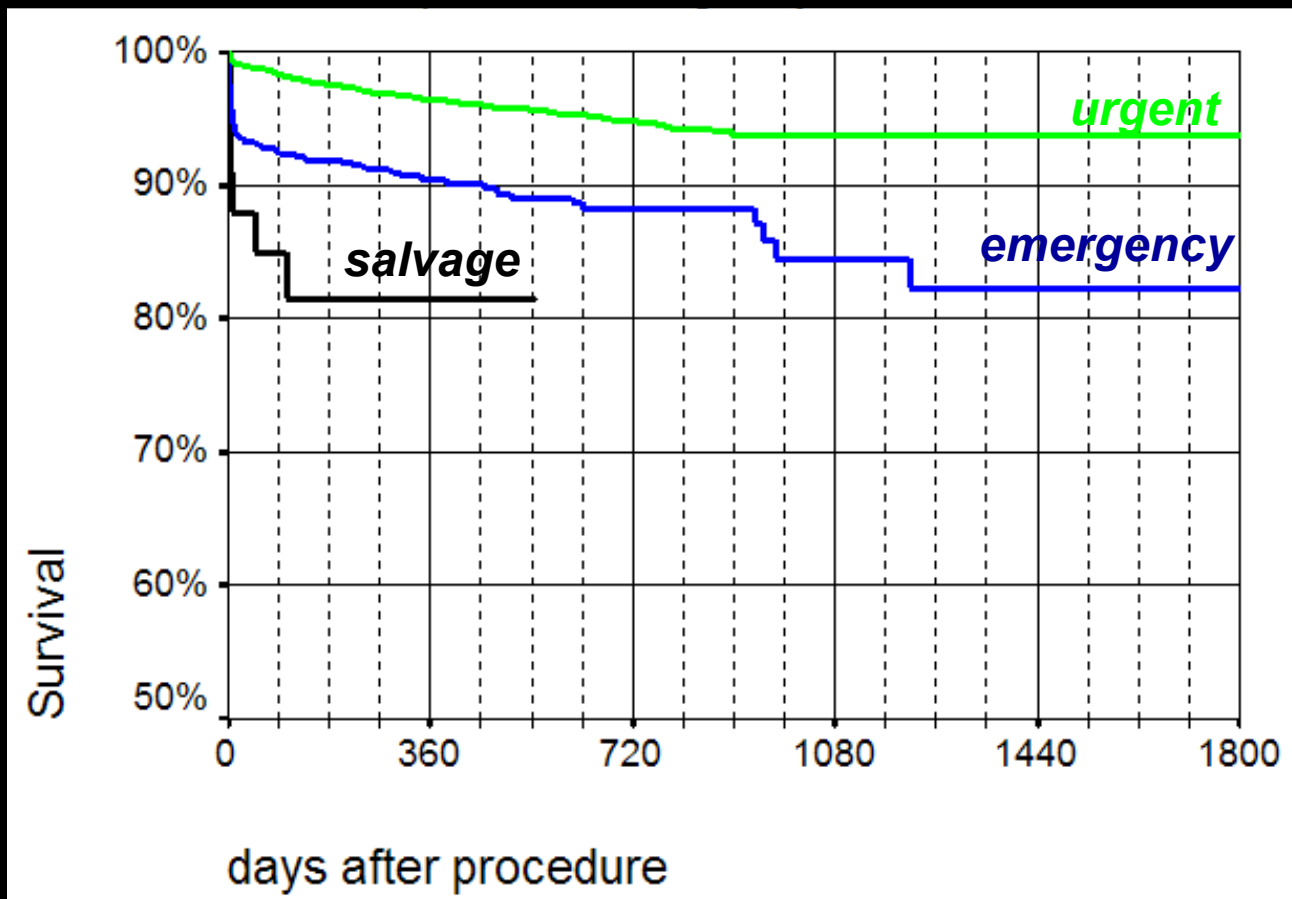
(tracking performed July 2005)

Approx 1 % pa

BCIS CCAD

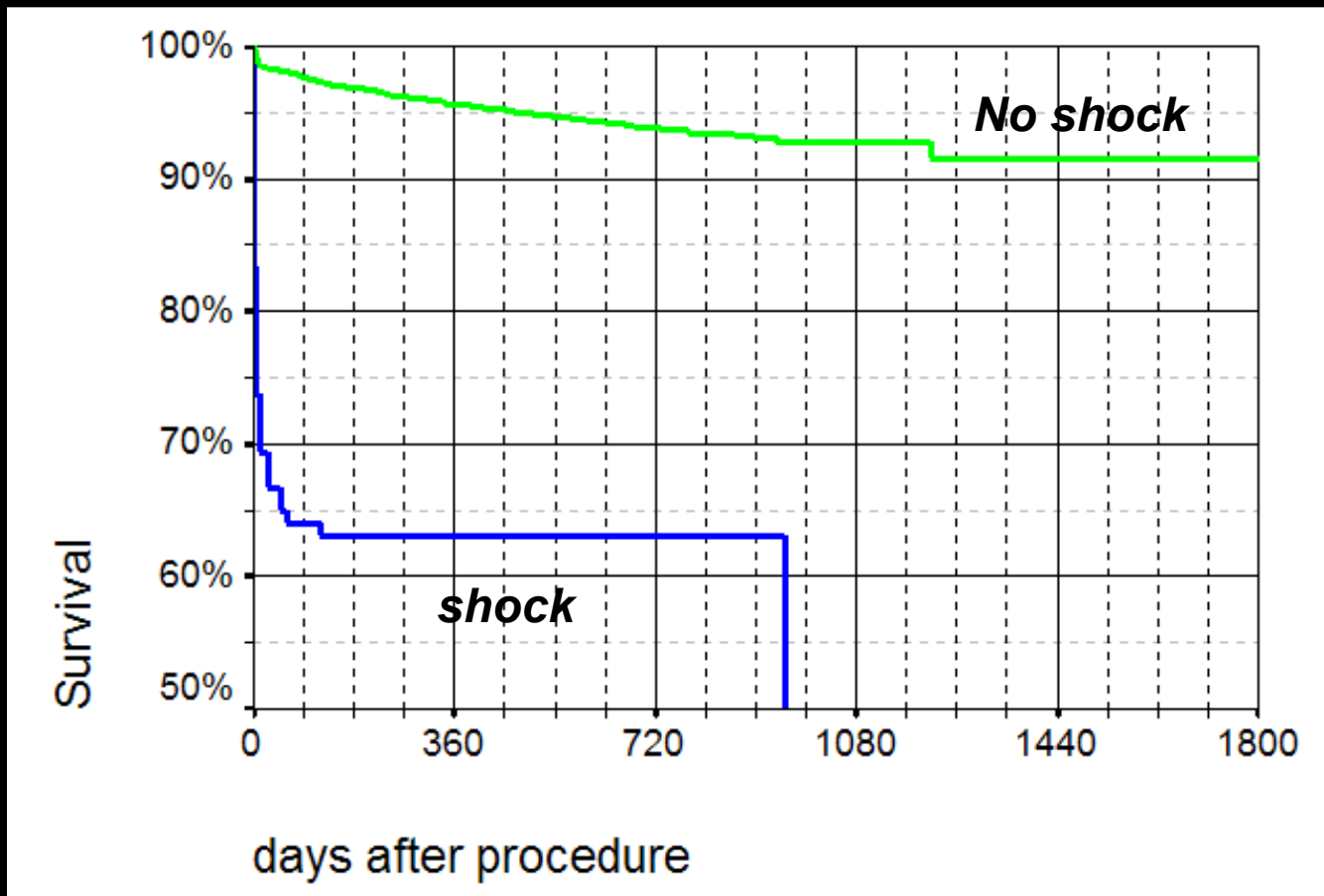


Survival after PCI for UA / NSTEMI by Procedure Urgency



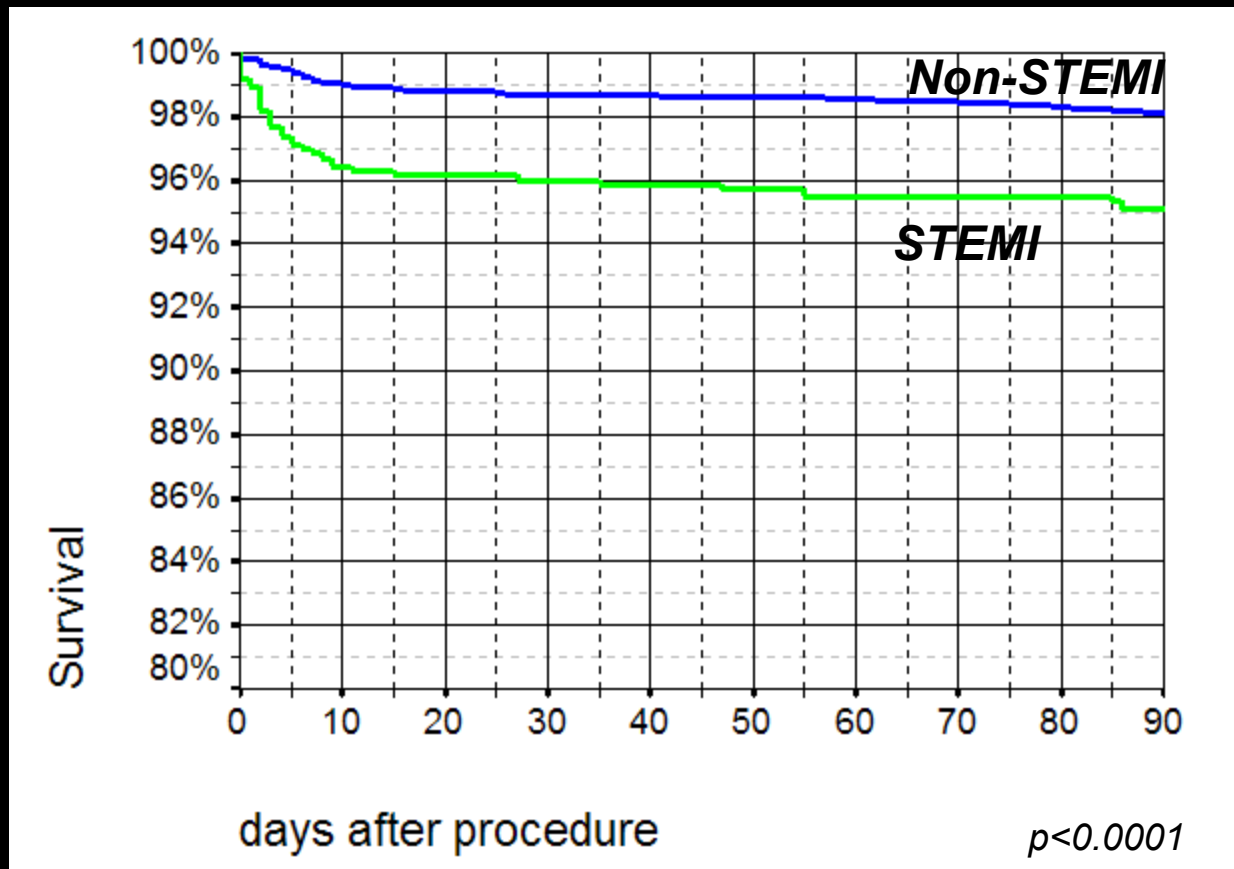
Survival after PCI

All Shock



Survival after PCI for ACS

STEMI v NSTEMI / UA

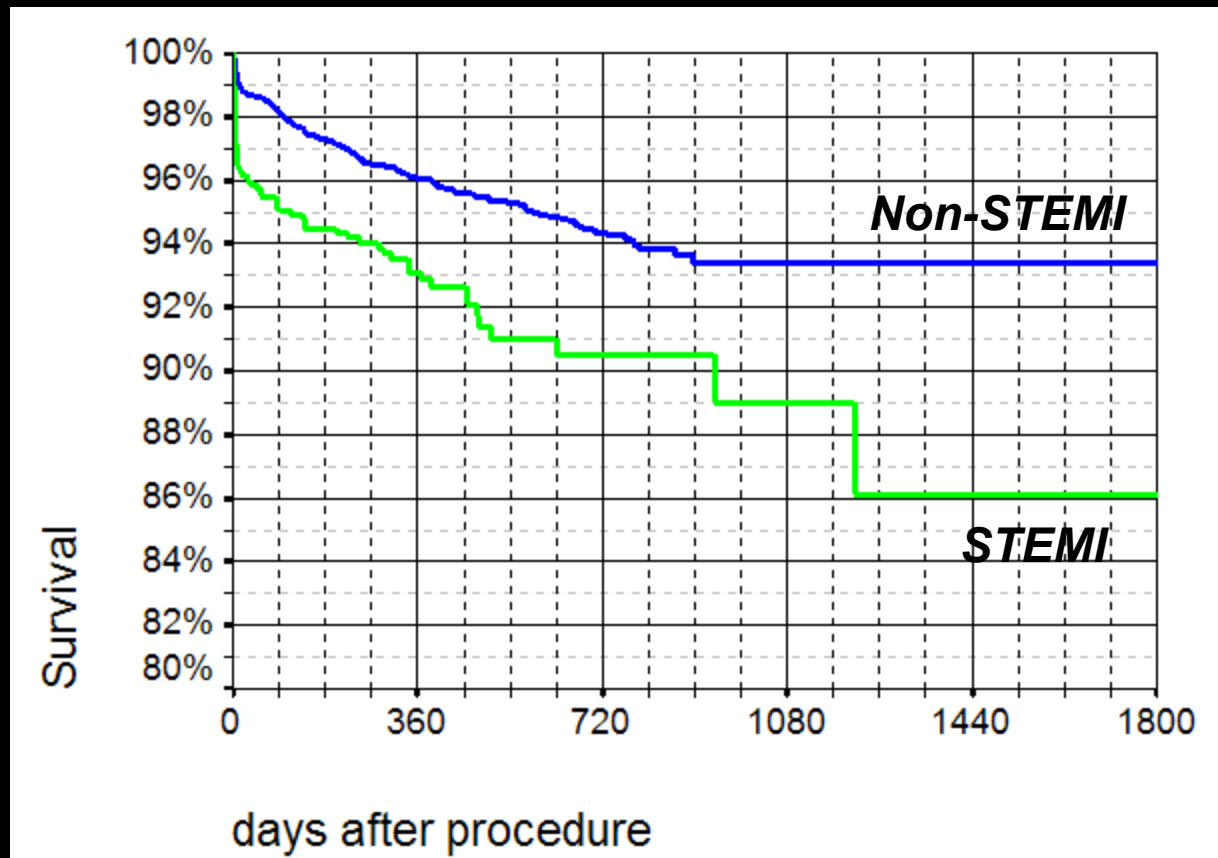


Shock excluded

(tracking performed July 2005)

Survival after PCI for ACS

STEMI v NSTEMI / UA

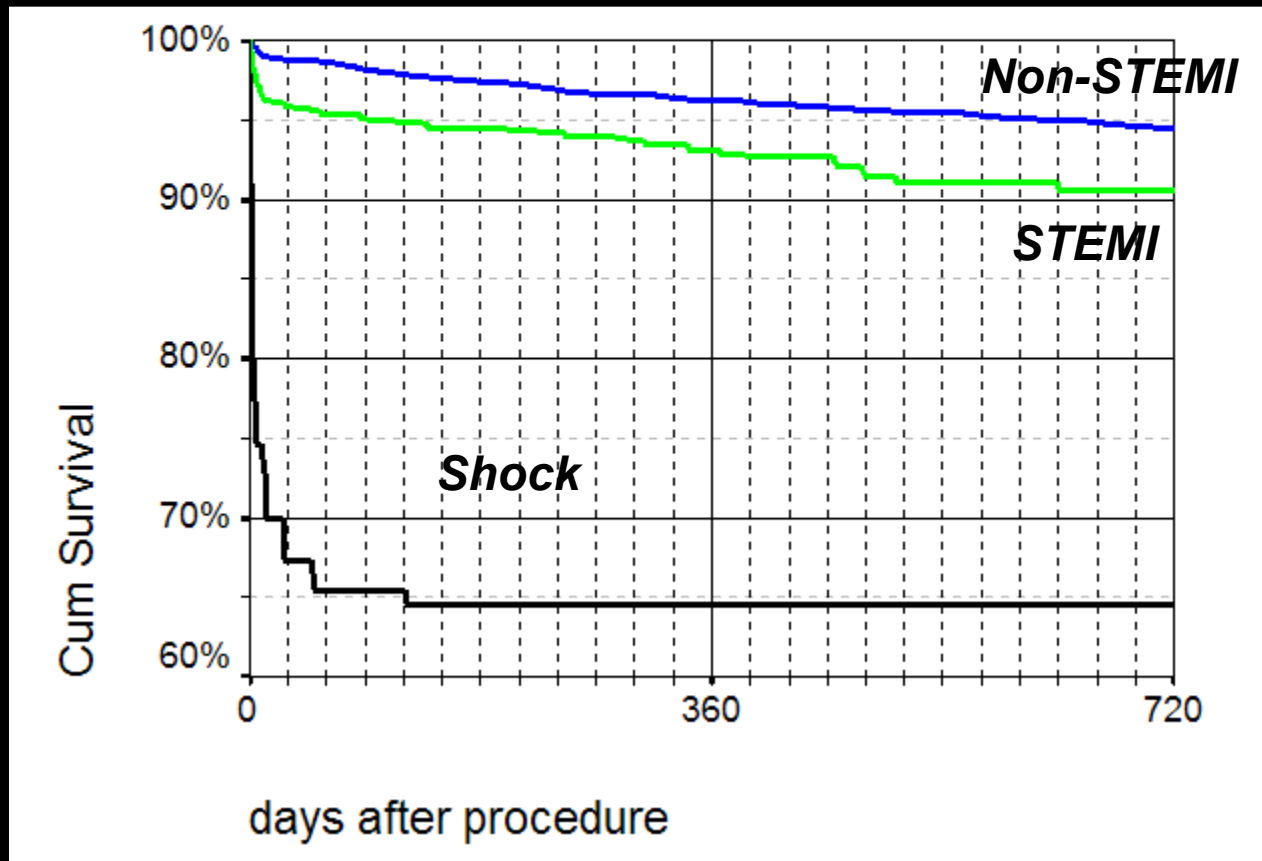


Shock excluded

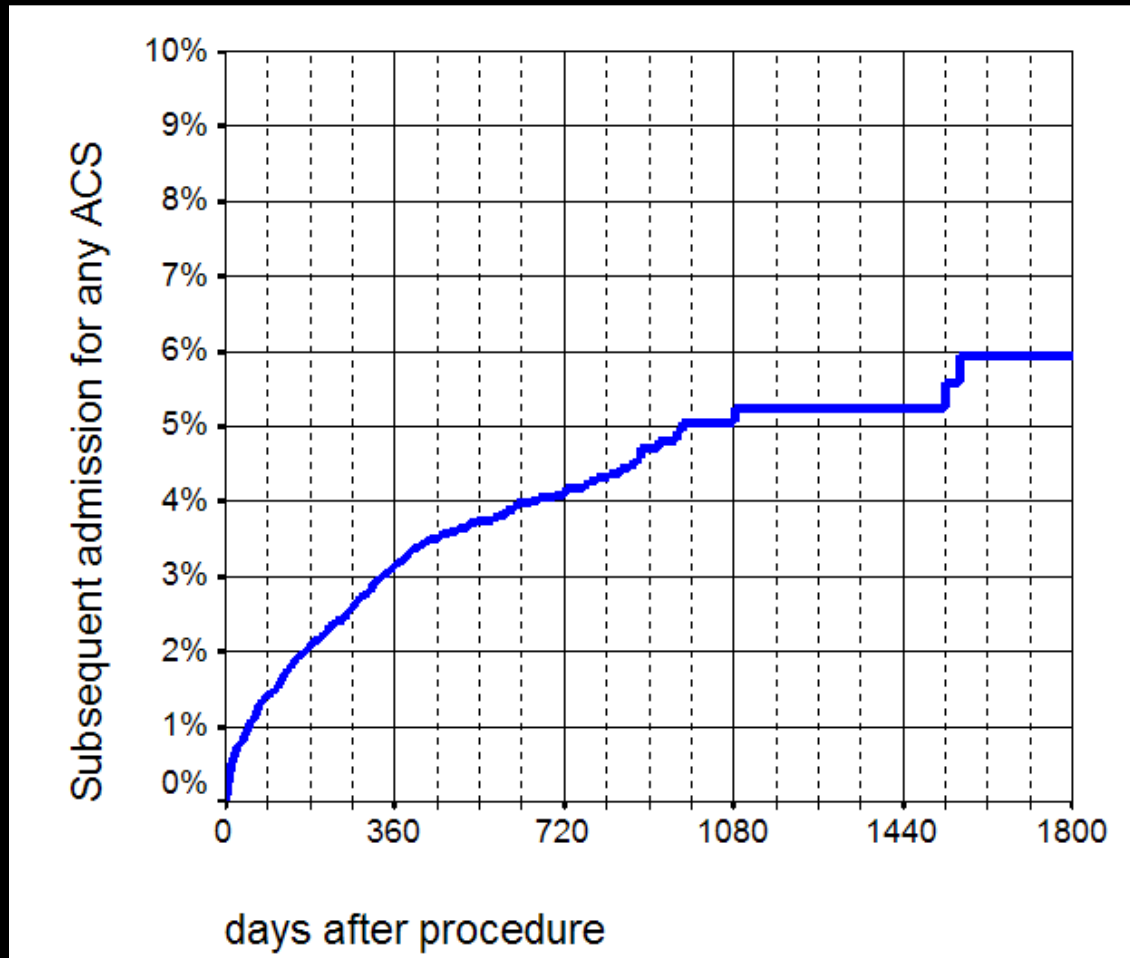
(tracking performed July 2005)

Survival after PCI for ACS

STEMI v NSTEMI / UA v Shock

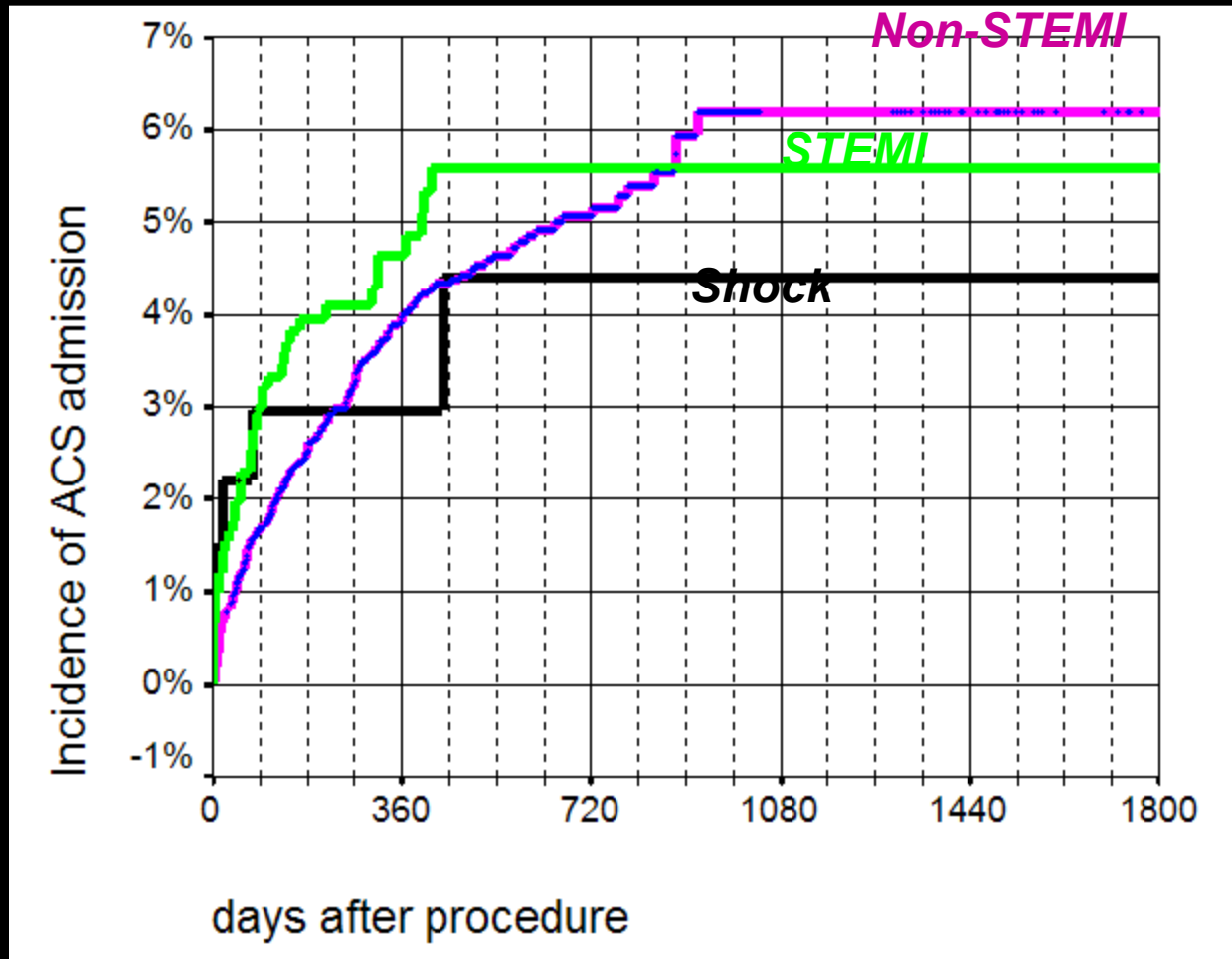


Admission with ACS after PCI (any PCI indication)



Re-admission with ACS after PCI

STEMI v NSTEMI v Shock

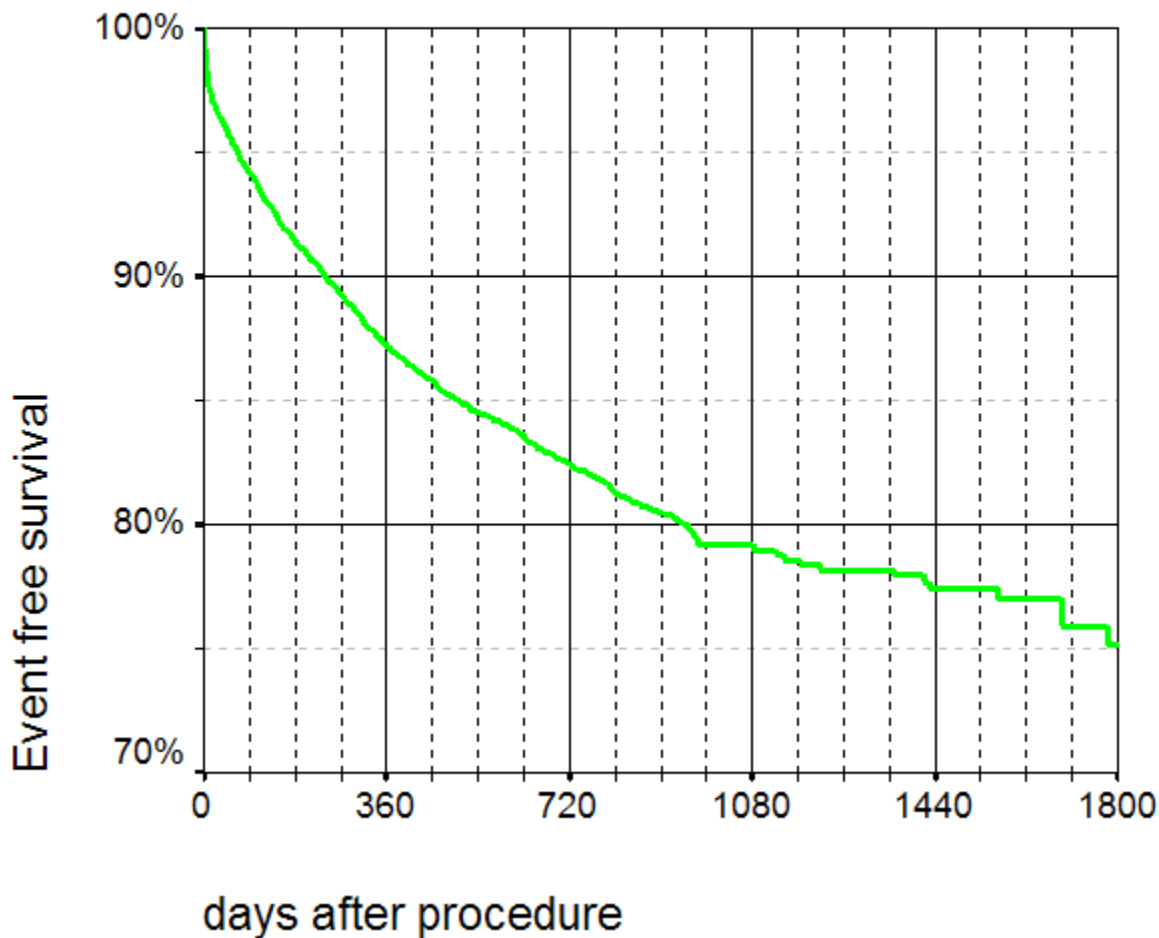


Event free survival after PCI

All Cases

BCIS CCAD

Events: death, ACS admission, redo PCI, cardiac surgery

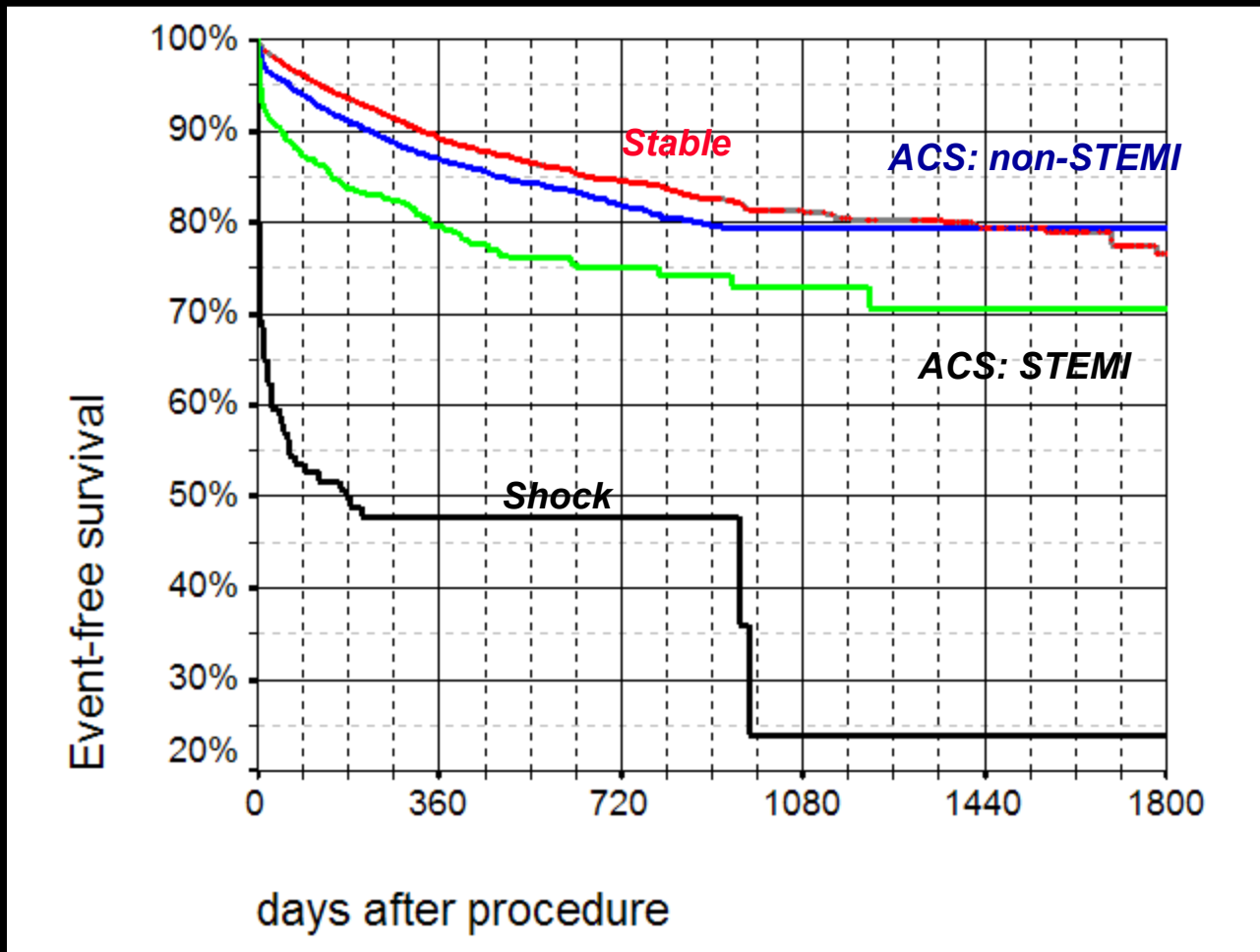


87% 1 yr
83% 2 yr

(tracking performed July 2005)

Event free survival after PCI

Events: death, ACS admission, redo PCI, cardiac surgery



(tracking performed July 2005)

Summary

- 77 PCI centres in UK
- 1050 PCI pmp in UK
- Cath : PCI = 31.3%
- PCI : CABG = 2.5 : 1
- MACE
 - Stable syndromes
 - mortality 0.24%, CABG 0.25%
 - UA / NSTEMI
 - Mortality 0.75%, CABG 0.21%
- BCIS – CCAD
 - A new dawn

