BCIS Audit Returns
Adult Interventional Procedures

Jan 2007 to Dec 2007

Peter F Ludman

BCIS National Audit Lead

On behalf of

British Cardiovascular Intervention Society

Crewe 2008

Contents

2007 data: Ludman

- Structure
  - New centres
  - Total PCI numbers (cut many ways)
  - No of procedures per unit
  - Effects of new units on existing units
  - PCI Operators
  - Surgical cover
  - Day case activity
  - Primary PCI units
- PCI Procedure specific data
  - CCAD
  - data completeness
  - Demographics
  - indication for PCI / Clinical syndrome
  - Stents (BMS and DES)
  - Adjunctive therapy
  - LV support
  - Multi-vessel treatment
  - Additional interventional techniques
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  - Delays to treatment NSTEMI
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  - Mitral valuloplasty
  - Other adult structural intervention
  - Transcutaneous Aortic Valves
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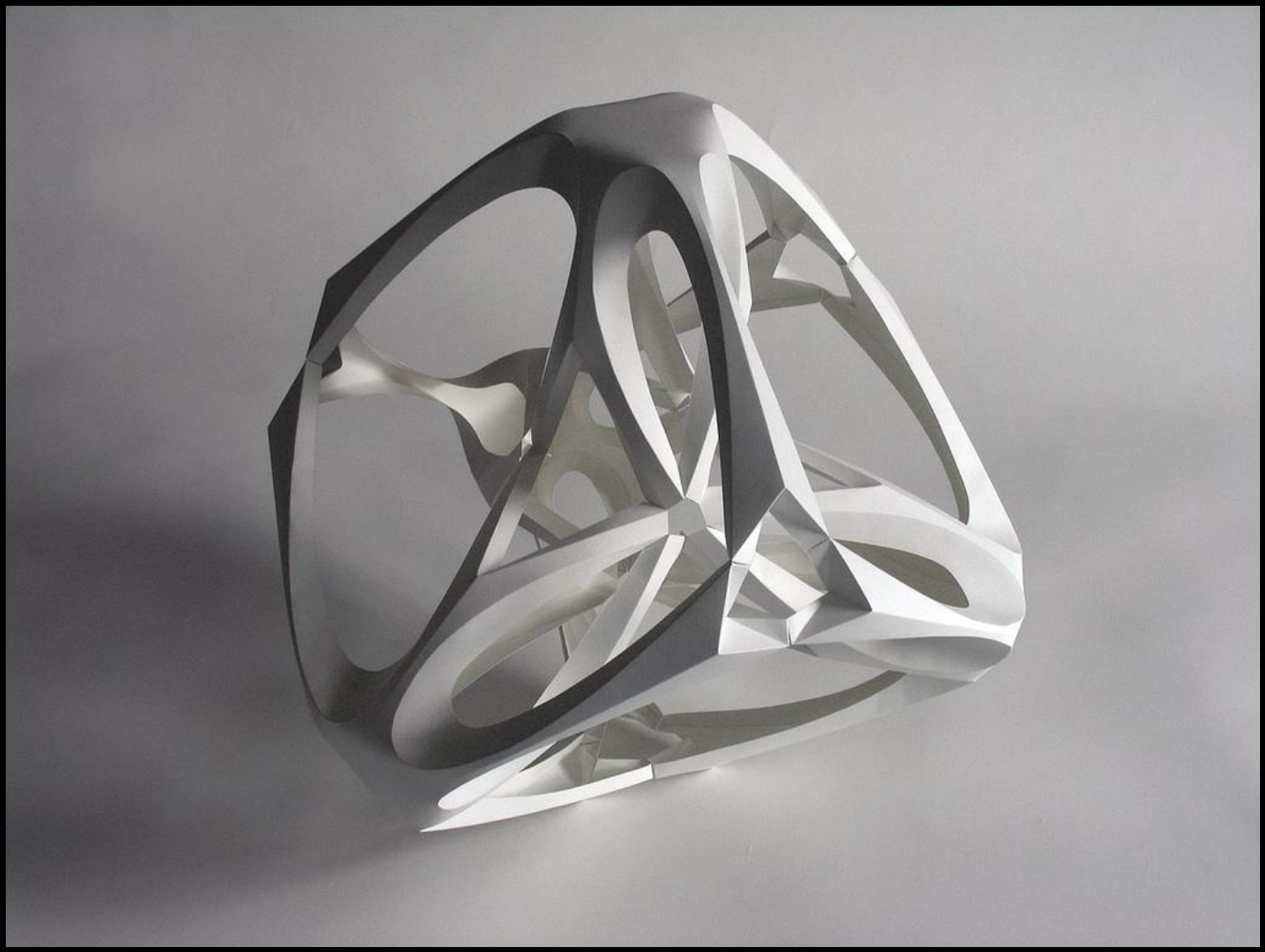
  - MACCE
  - ONS tracking
  - Outcome by lesion and syndrome
  - Mortality by coronary syndrome
  - Mortality for PCI of bypass grafts, CTO, LMS
  - Models for risk adjusted outcome
  - Cumulative funnel plots

Structure

2007 data: Ludman



Angiography Centres 2007

2007 data: Ludman

New Centres

Royal Glamorgan Hospital

Kingston Hospital

Tameside Hospital

Addenbrookes Hospital

Queen Mary's Sidcup

Centres ceasing activity

BMI princess Margaret, Windsor

Inverclyde

BUPA Murrayfield

PCI Centres 2007

2007 data: Ludman

PCI Centres stop

Western General Edinburgh (moved to ERI)

King Edwards, Midhurst

PCI Centres 2007

2007 data: Ludman

New PCI Centres

BMI Meriden

Frimley Park Hospital

PCI centres from existing angiography units

Conquest, Hastings

Dorset County Hospital

Essex Heart Centre, Basildon

Ninewells Hospital, Dundee

Queen Elizabeth Hospital, Woolwich

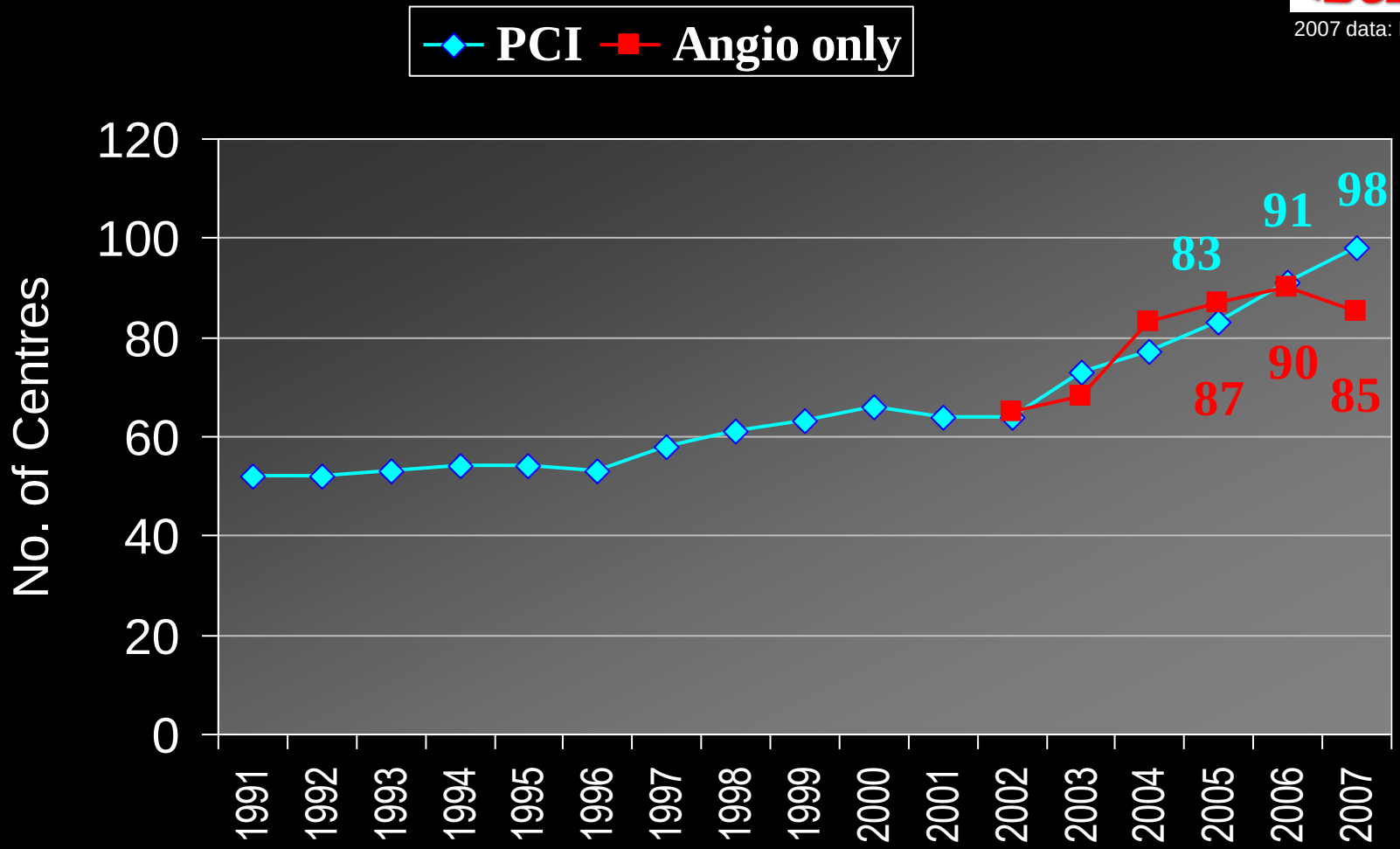
Wigan Royal Infirmary

Wycombe Hospital

UK Centres 2007

BCIS

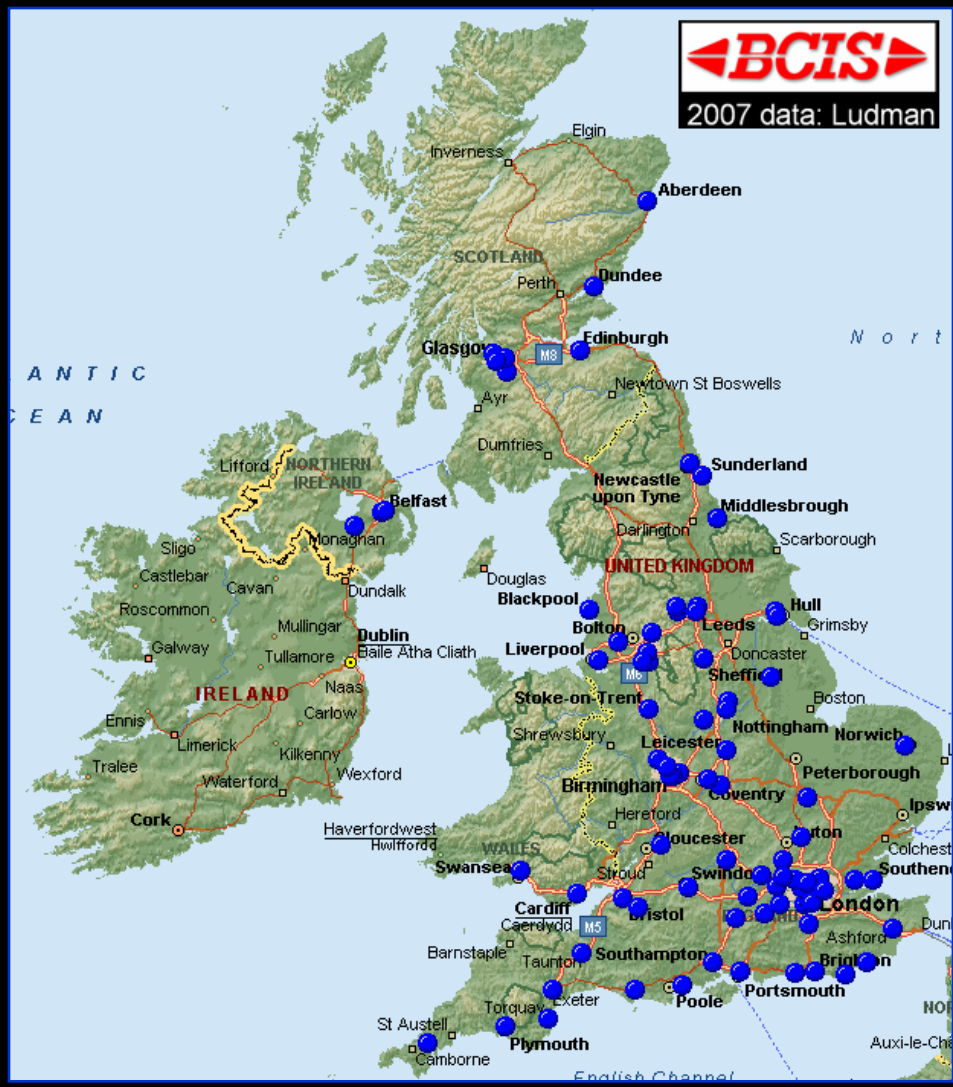
2007 data: Ludman

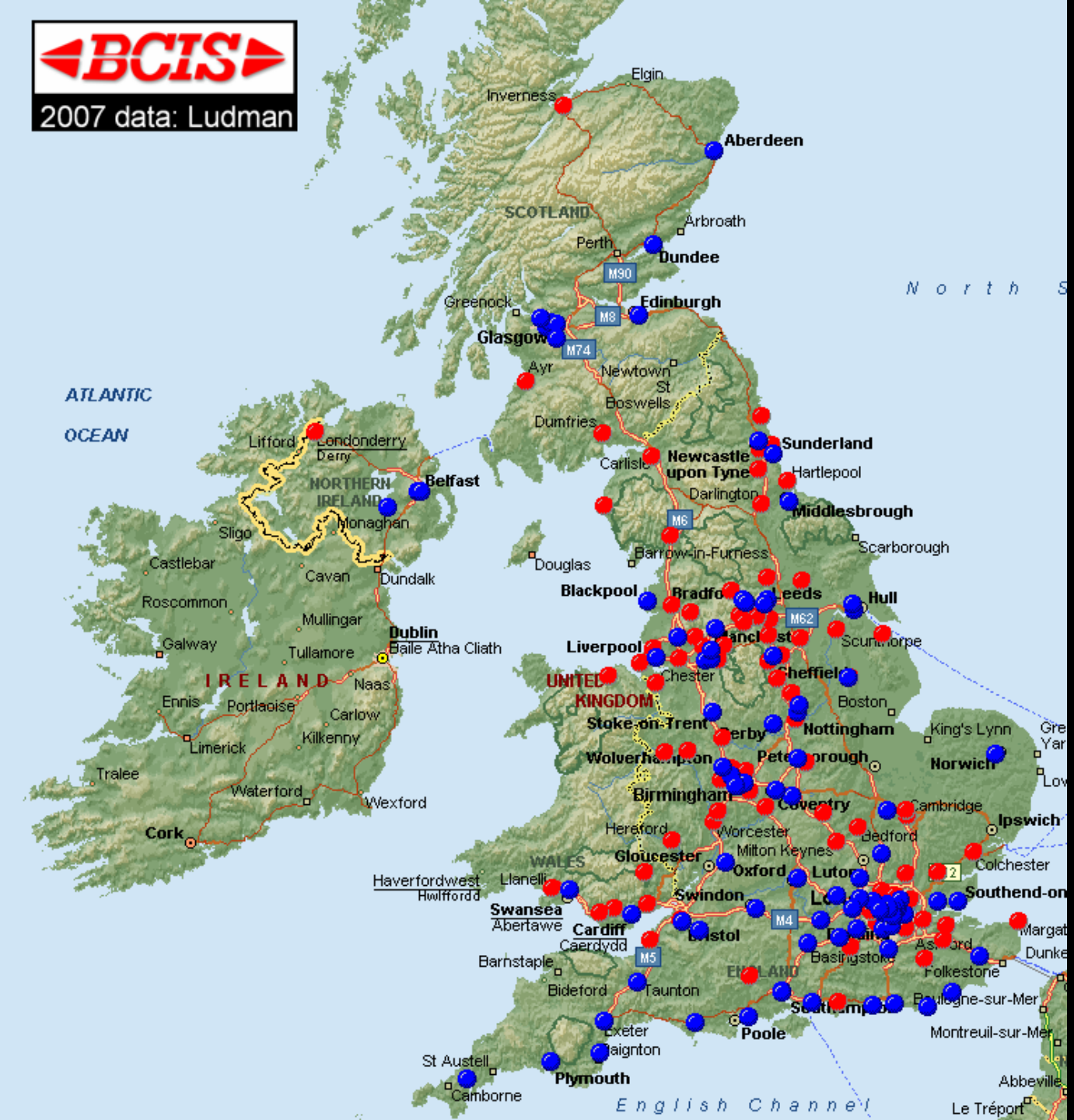


UK Centres 2007

Angiography (85)

PCI (98)





2007

- Angiography (85)
- PCI (98)

PCI Centres in 2007

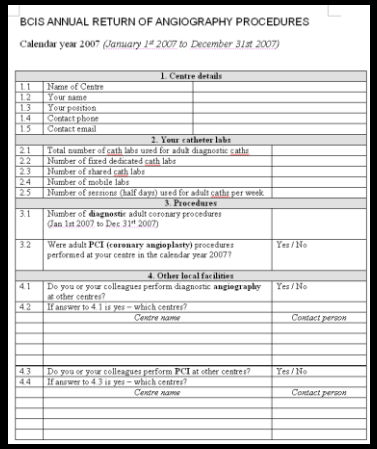
UK Countries

Scotland	NHS	7
	Private	1
England	NHS	69
	Private	16
N Ireland		3
Wales		2
	Total	98

PCI Data Sources

All UK

Angio Only Audit form

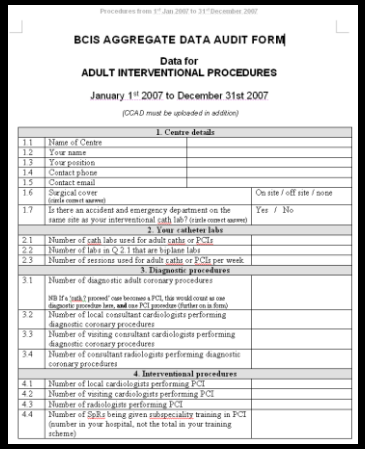


BCIS ANNUAL RETURN OF ANGIOGRAPHY PROCEDURES

Calendar year 2007 *(January 1st 2007 to December 31st 2007)*

1. Centre details		
1.1	Name of Centre	
1.2	Your name	
1.3	Your position	
1.4	Contact phone	
1.5	Contact email	
2. Your catheter labs		
2.1	Total number of cath labs used for adult diagnostic cathr	
2.2	Number of fixed dedicated cath labs	
2.3	Number of shared cath labs	
2.4	Number of mobile labs	
2.5	Number of sessions (half days) used for adult cathr per week	
3. Procedures		
3.1	Number of **diagnostic** adult coronary procedures (Jan 1st 2007 to Dec 31st 2007)	
3.2	Were adult **PCI (coronary angioplasty)** procedures performed at your centre in the calendar year 2007?	Yes / No
4. Other local facilities		
4.1	Do you or your colleagues perform diagnostic **angiography** at other centres?	Yes / No
4.2	If answer to 4.1 is yes – which centres?	
	Centre name	*Contact person*
4.3	Do you or your colleagues perform **PCI** at other centres?	Yes / No
4.4	If answer to 4.3 is yes – which centres?	
	Centre name	*Contact person*

Aggregate PCI Audit form



Procedures from 1st Jan 2002 to 31st December 2002

BCIS AGGREGATE DATA AUDIT FORM

Data for
ADULT INTERVENTIONAL PROCEDURES

January 1st 2007 to December 31st 2007

(CCAD must be uploaded in addition)

1. Centre details		
1.1	Name of Centre	
1.2	Your name	
1.3	Your position	
1.4	Contact phone	
1.5	Contact email	
1.6	Surgical cover (circle correct answer)	On site / off site / none
1.7	Is there an accident and emergency department on the same site as your interventional cath lab? (circle correct answer)	Yes / No
2. Your catheter labs		
2.1	Number of cath labs used for adult cathr or PCIr	
2.2	Number of labs in Q 2.1 that are biplane labs	
2.3	Number of sessions used for adult cathr or PCIr per week	
3. Diagnostic procedures		
3.1	Number of diagnostic adult coronary procedures NB If a 'cath ? proceed' case becomes a PCI, this would count as one diagnostic procedure here, **and** one PCI procedure (Further on in form)	
3.2	Number of local consultant cardiologists performing diagnostic coronary procedures	
3.3	Number of visiting consultant cardiologists performing diagnostic coronary procedures	
3.4	Number of consultant radiologists performing diagnostic coronary procedures	
4. Interventional procedures		
4.1	Number of local cardiologists performing PCI	
4.2	Number of visiting cardiologists performing PCI	
4.3	Number of radiologists performing PCI	
4.4	Number of SpRs being given subspecialty training in PCI (number in your hospital, not the total in your training scheme)	

England
Wales

partial
Scotland (via MINERVA upload)

CCAD

UK Interventional and Diagnostic centres 2007

2007 data: Ludman

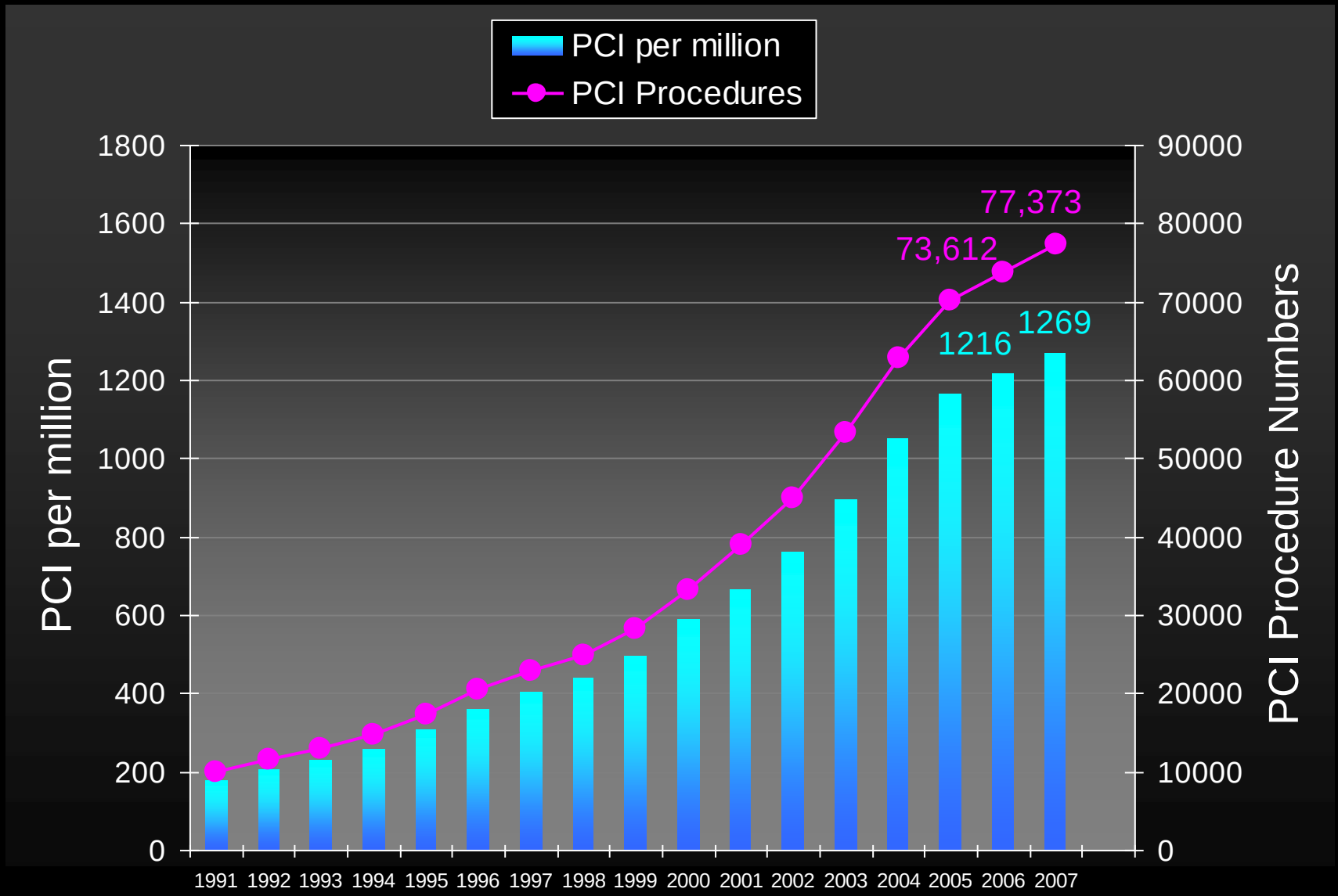
	No.	No cath data	No PCI data	Caths (% of total)	PCIs (% of total)
NHS Interventional	81	2	0	158,250	75,017
Private Interventional	17	0	0	7,038	2,356
Diagnostic only	85	2	na	58,350	0
TOTAL	183			223,638	77,373

Aggregate forms

PCI activity to 2007 (UK)

BCIS

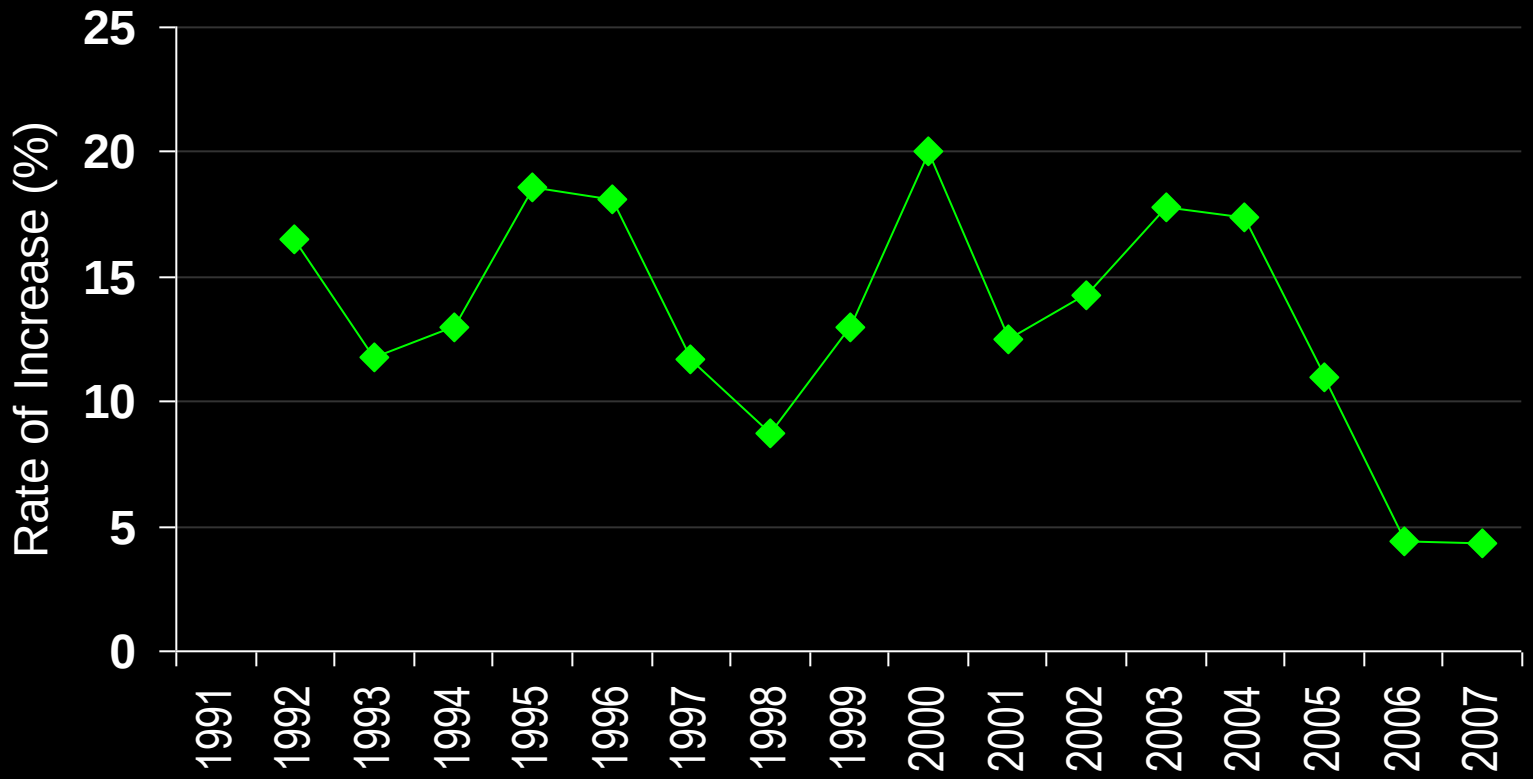
2007 data: Ludman



Aggregate forms

Rate of increase in PCI numbers pmp

2007 data: Ludman

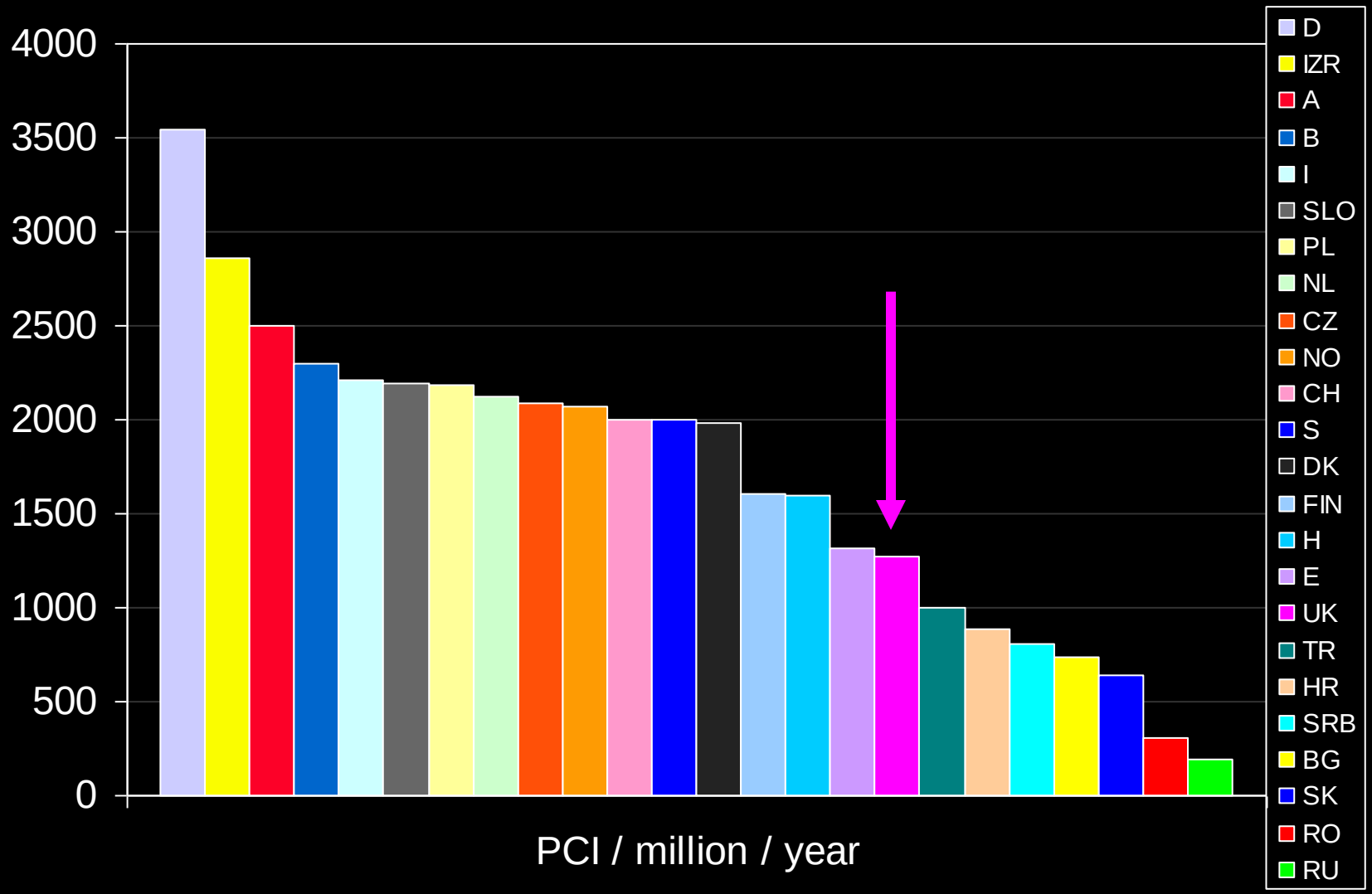


Aggregate forms

PCI pmp Europe

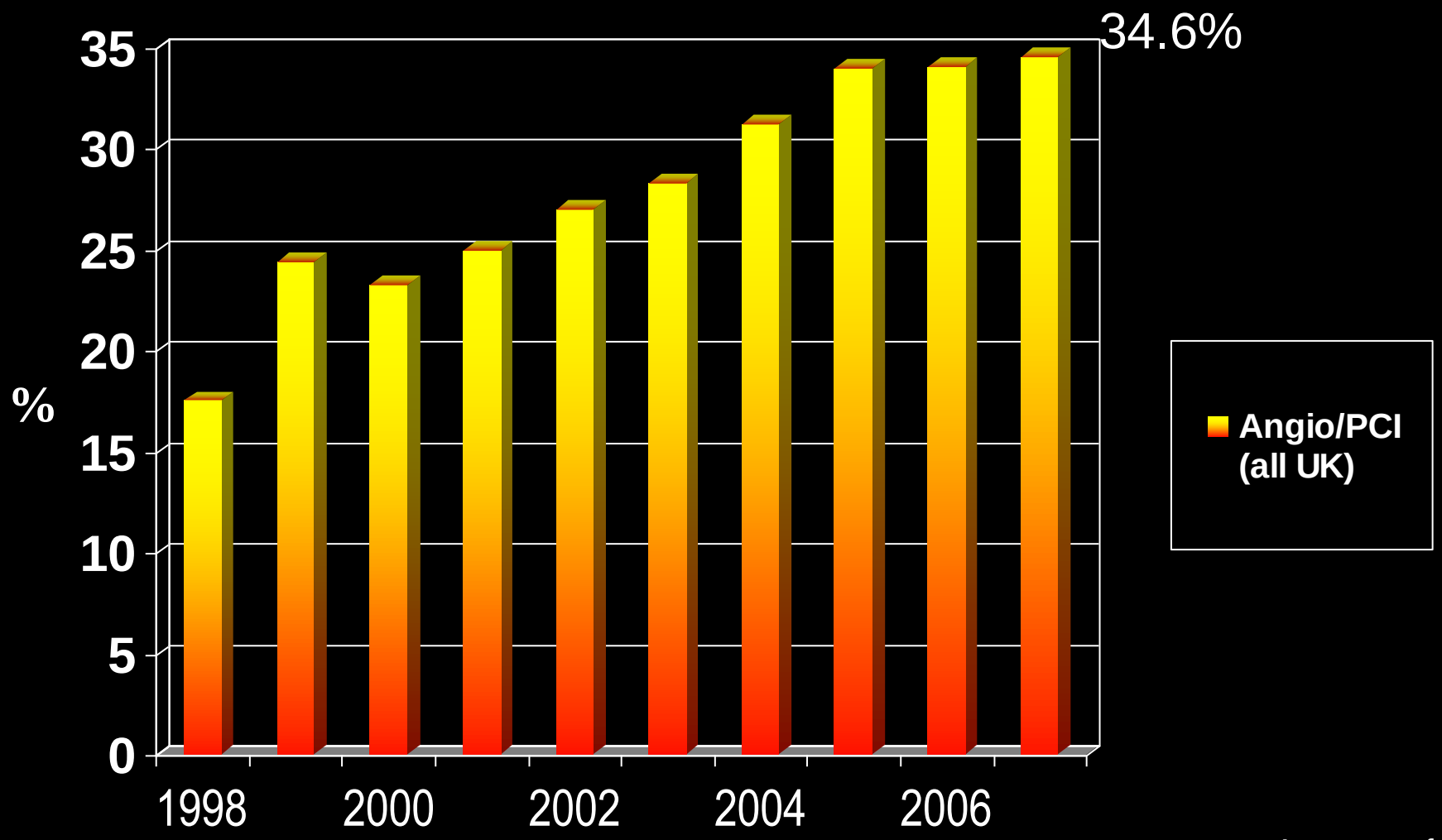
2007

Widimsky P, ESC 2008



PCI per Angiogram ratio

2007 data: Ludman



Aggregate forms

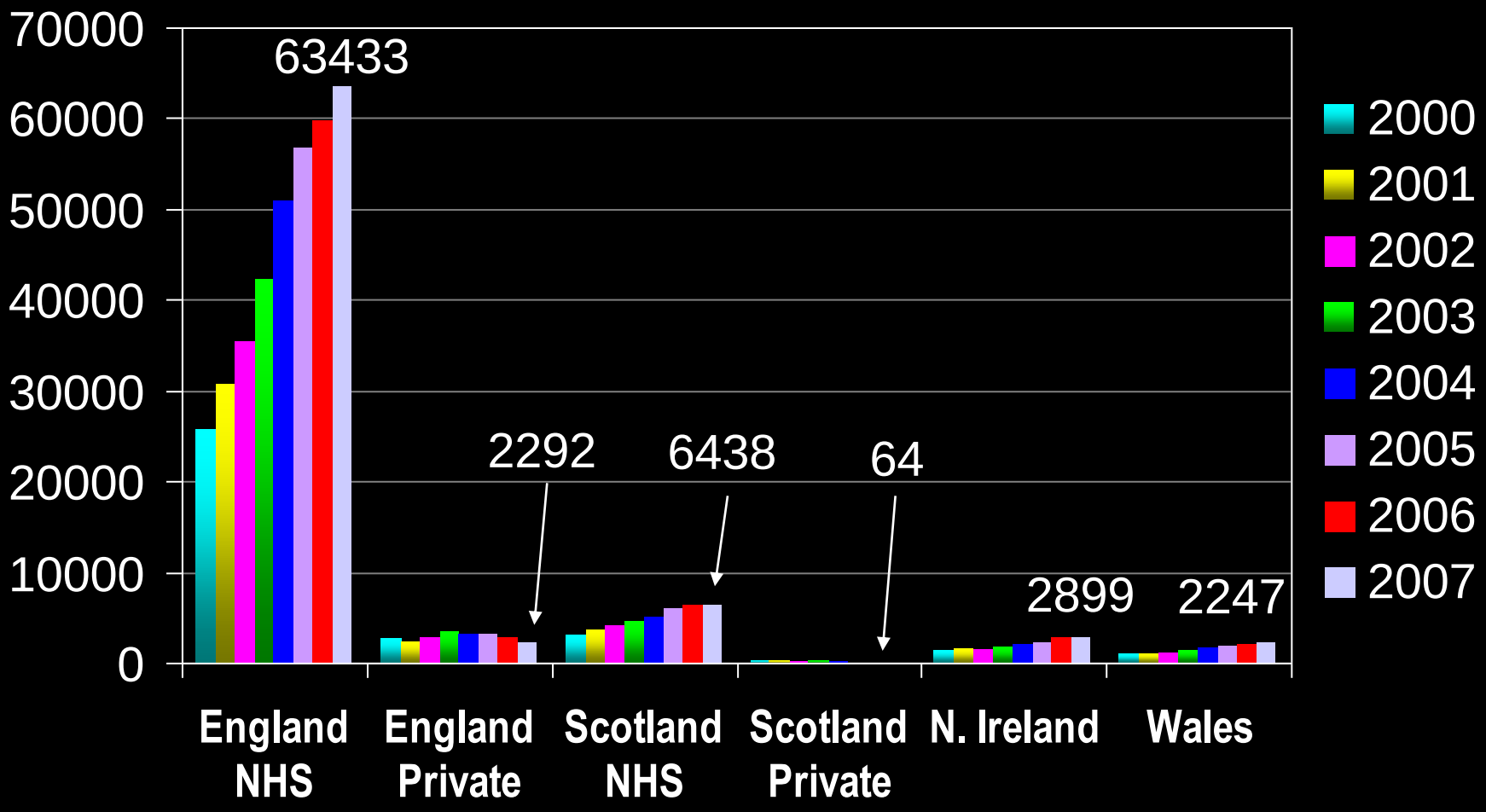
Total PCIs in the UK Countries

by Type of Institution

BCIS

2007 data: Ludman

Total No.s of PCI



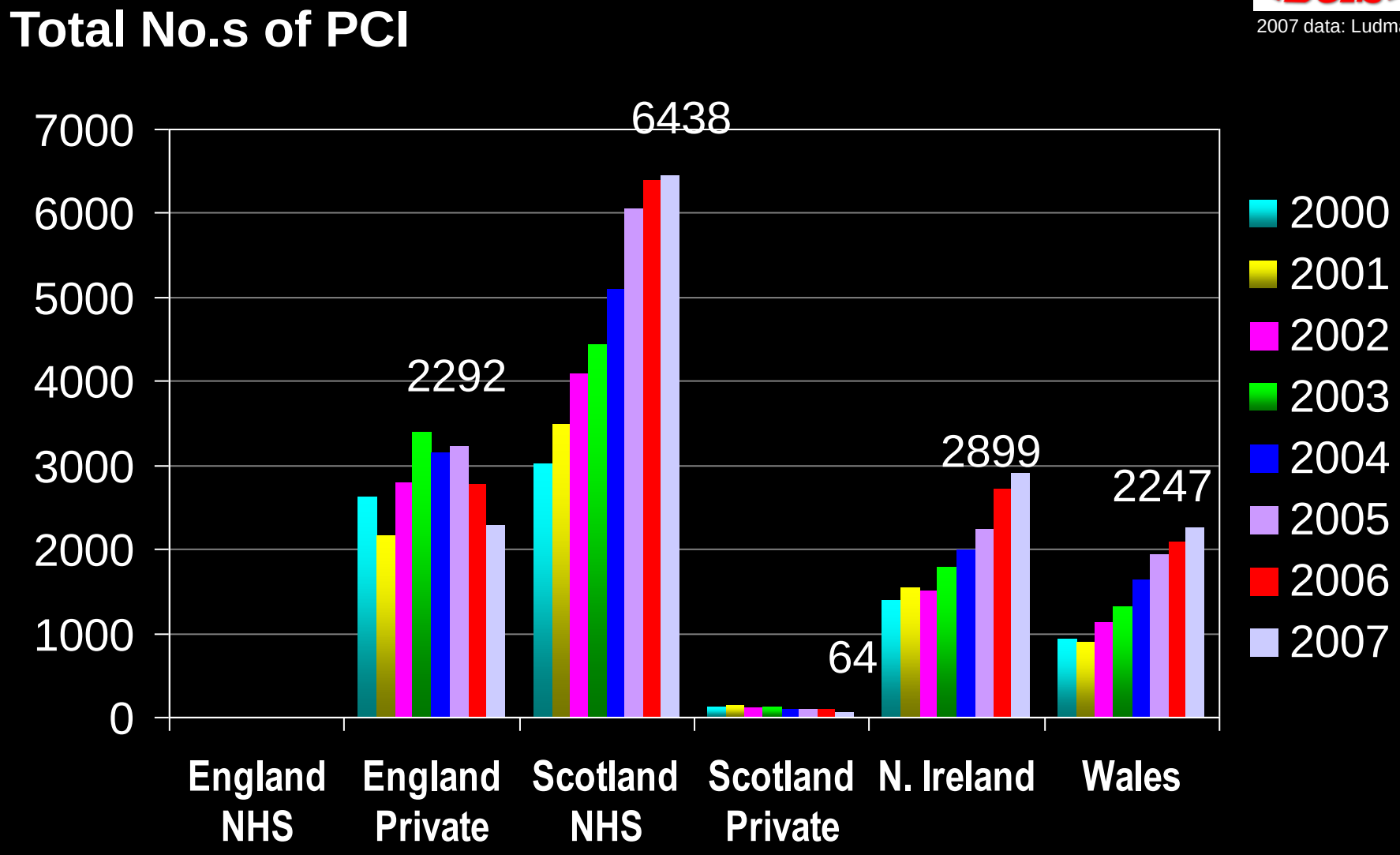
Aggregate forms

Total PCIs in the UK Countries

by Type of Institution

BCIS

2007 data: Ludman



Aggregate forms

Population estimates

Mid 2007

BCIS

2007 data: Ludman

Total UK: 60.975 m

Scotland 5.144 m

Northern Ireland 1.759 m

England 51.093 m

est: Welsh Rx in England 0.8 m

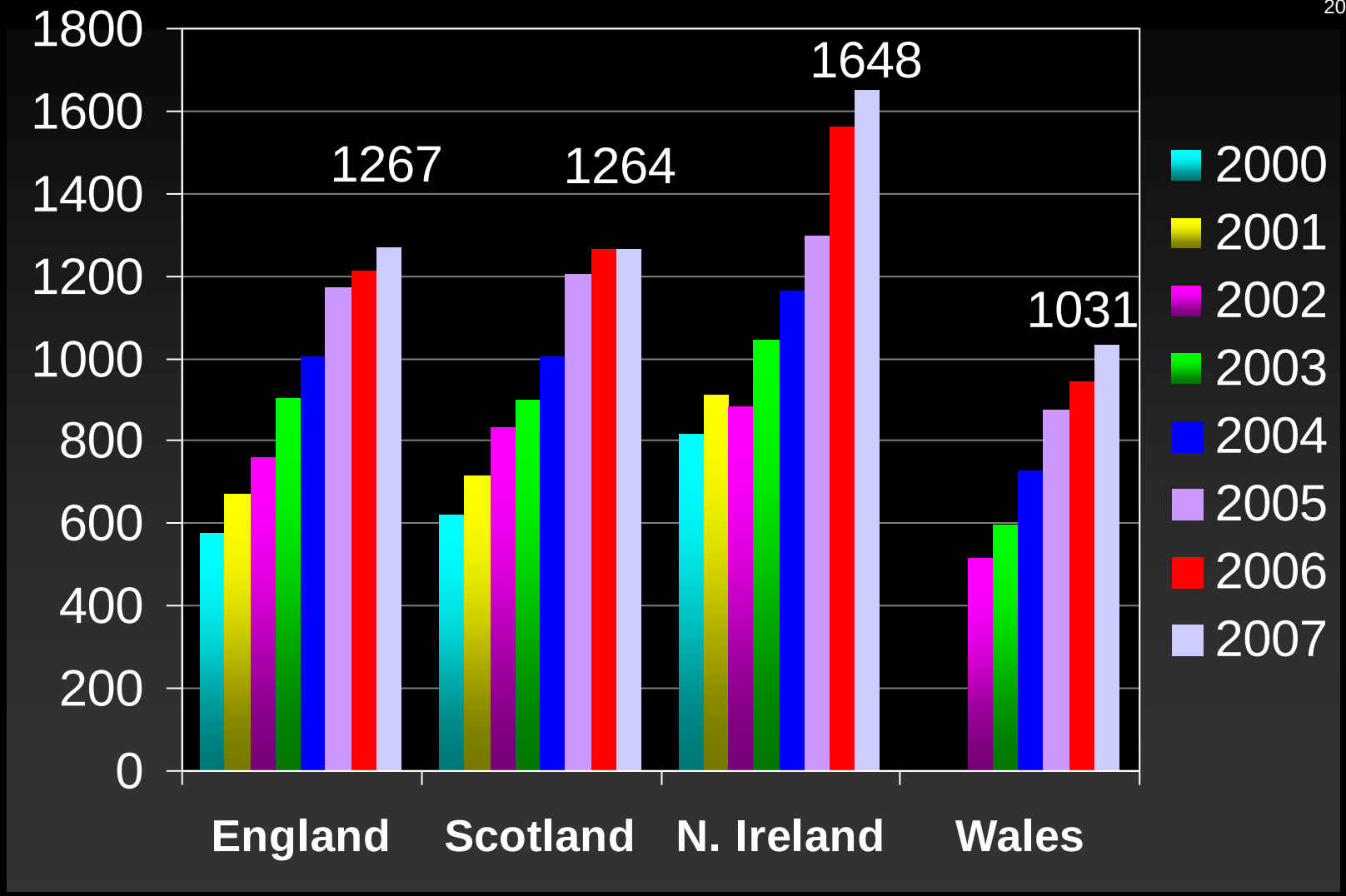
Total Rx in England 51.9 m

Wales 2.98 m

est: Rx in Wales: 2.2 m

PCIs/million UK Countries

2007 data: Ludman

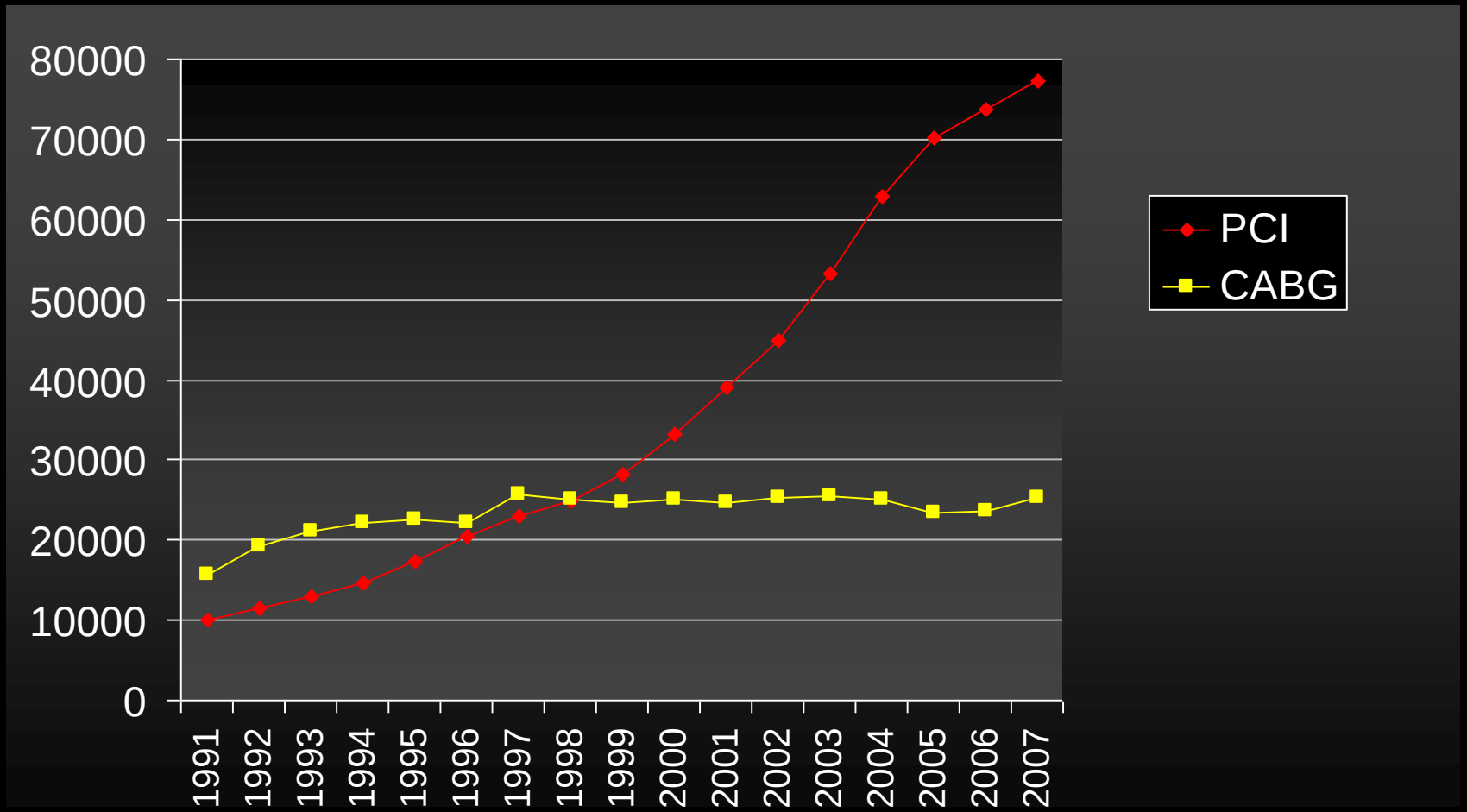


Aggregate forms

PCI vs Isolated CABG Numbers (UK)

1991 to 2007

2007 data: Ludman



Note: CABG data for financial yr

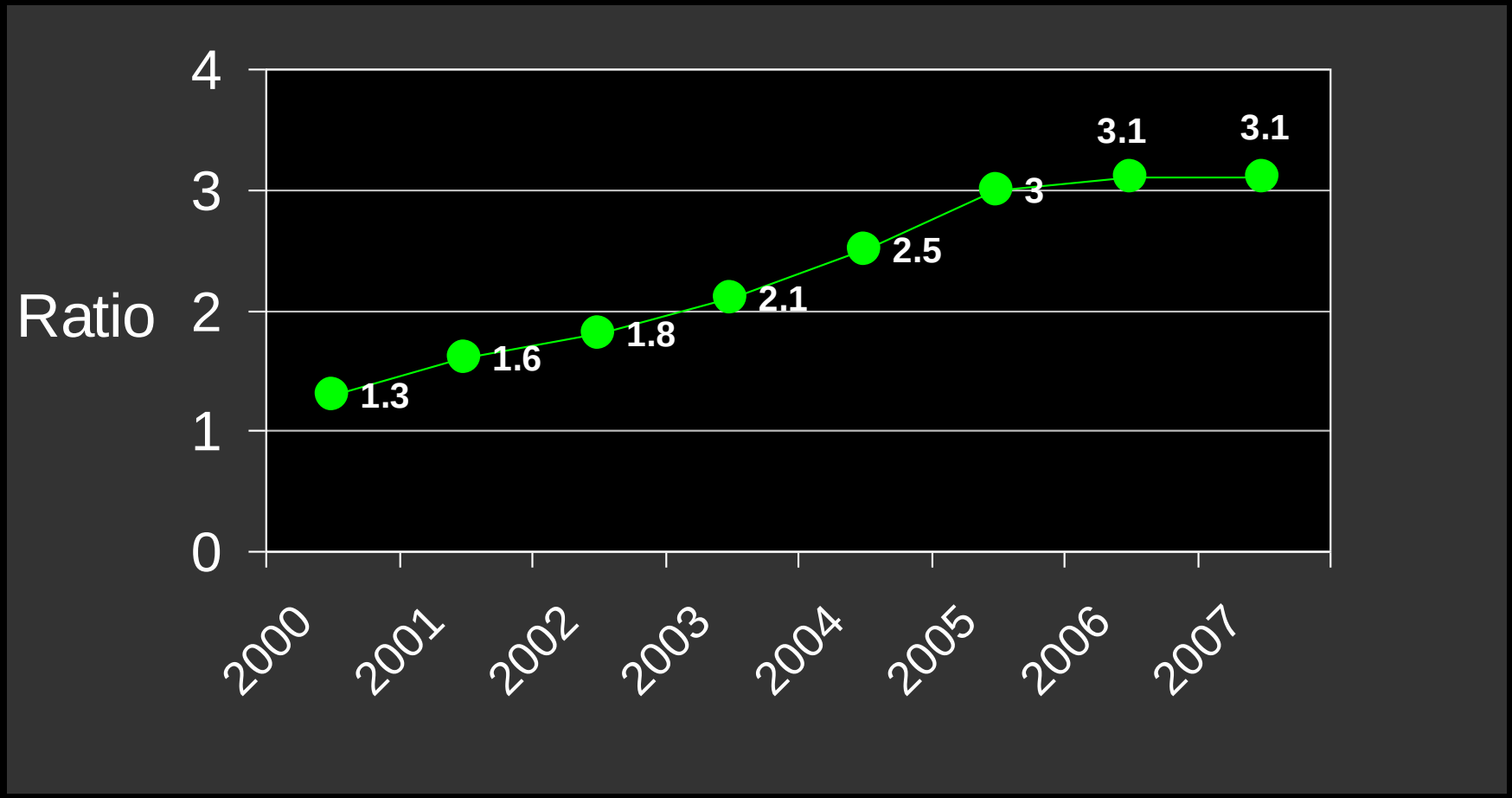
Aggregate forms

PCI vs Isolated CABG Ratio (UK)

2000 to 2007

BCIS

2007 data: Ludman



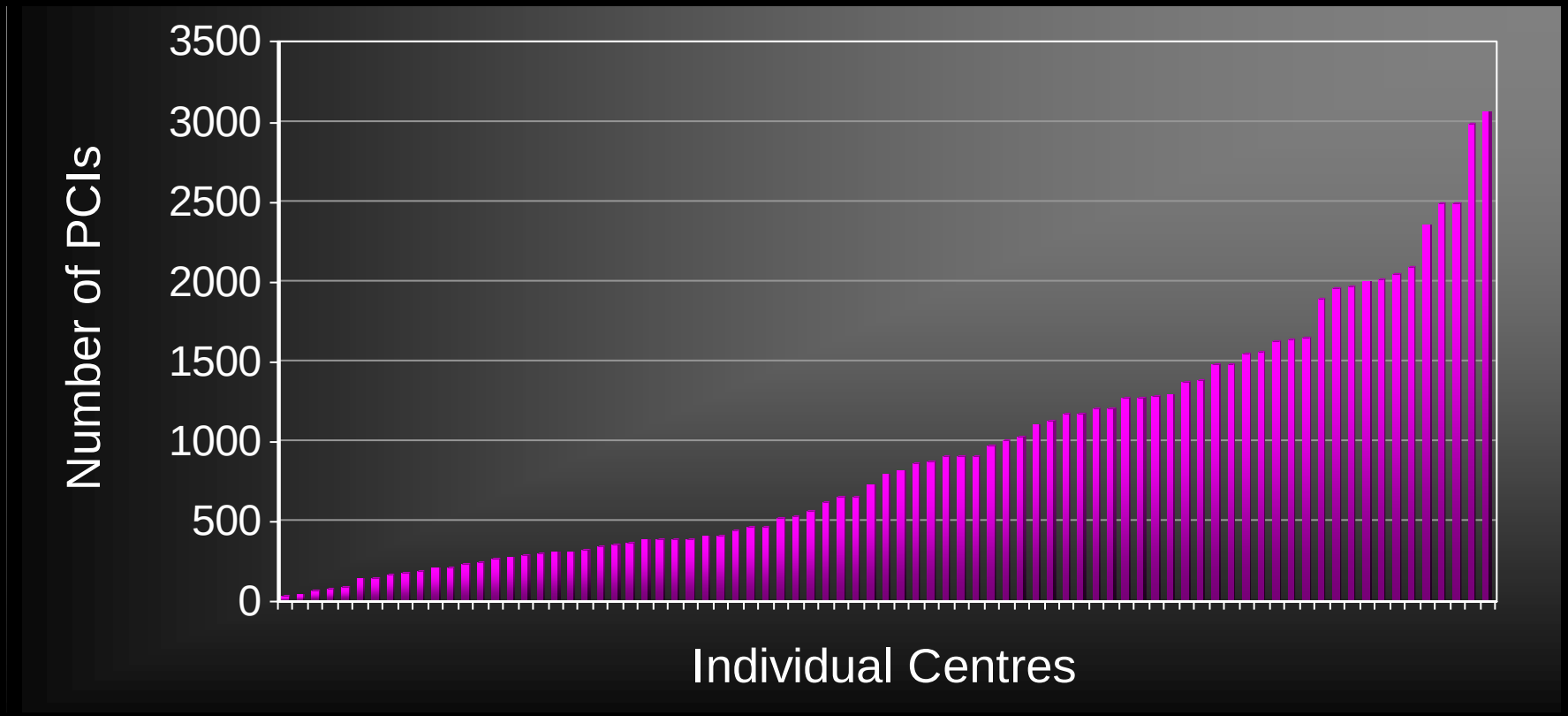
Aggregate forms

Number of PCIs performed in 2007

(per NHS Centre)

Mean = 926

2007 data: Ludman



Data from: all NHS centres

Aggregate forms

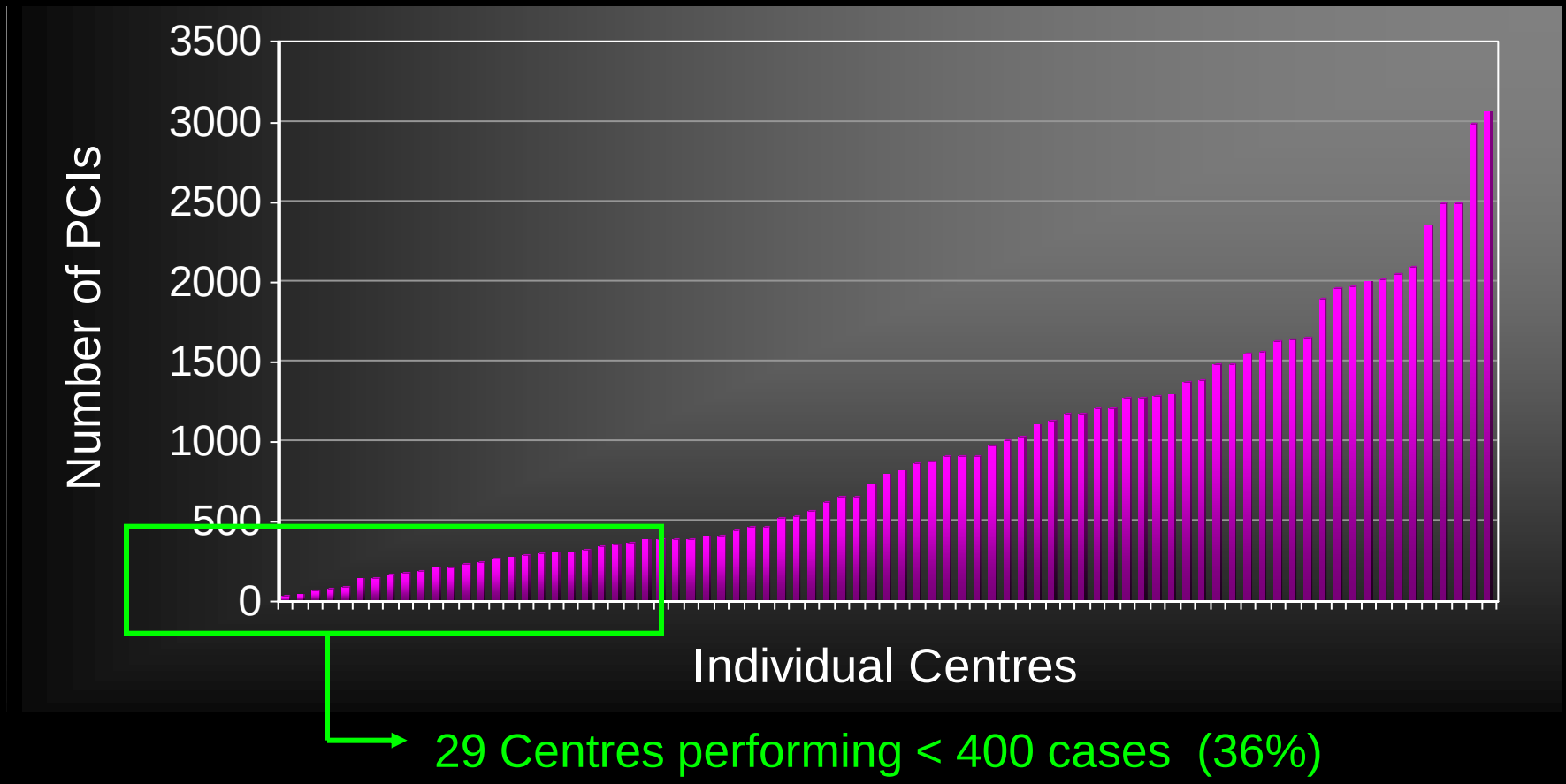
Number of PCIs performed in 2007

(per NHS Centre)

BCIS

2007 data: Ludman

Mean = 926



Data from: all NHS centres

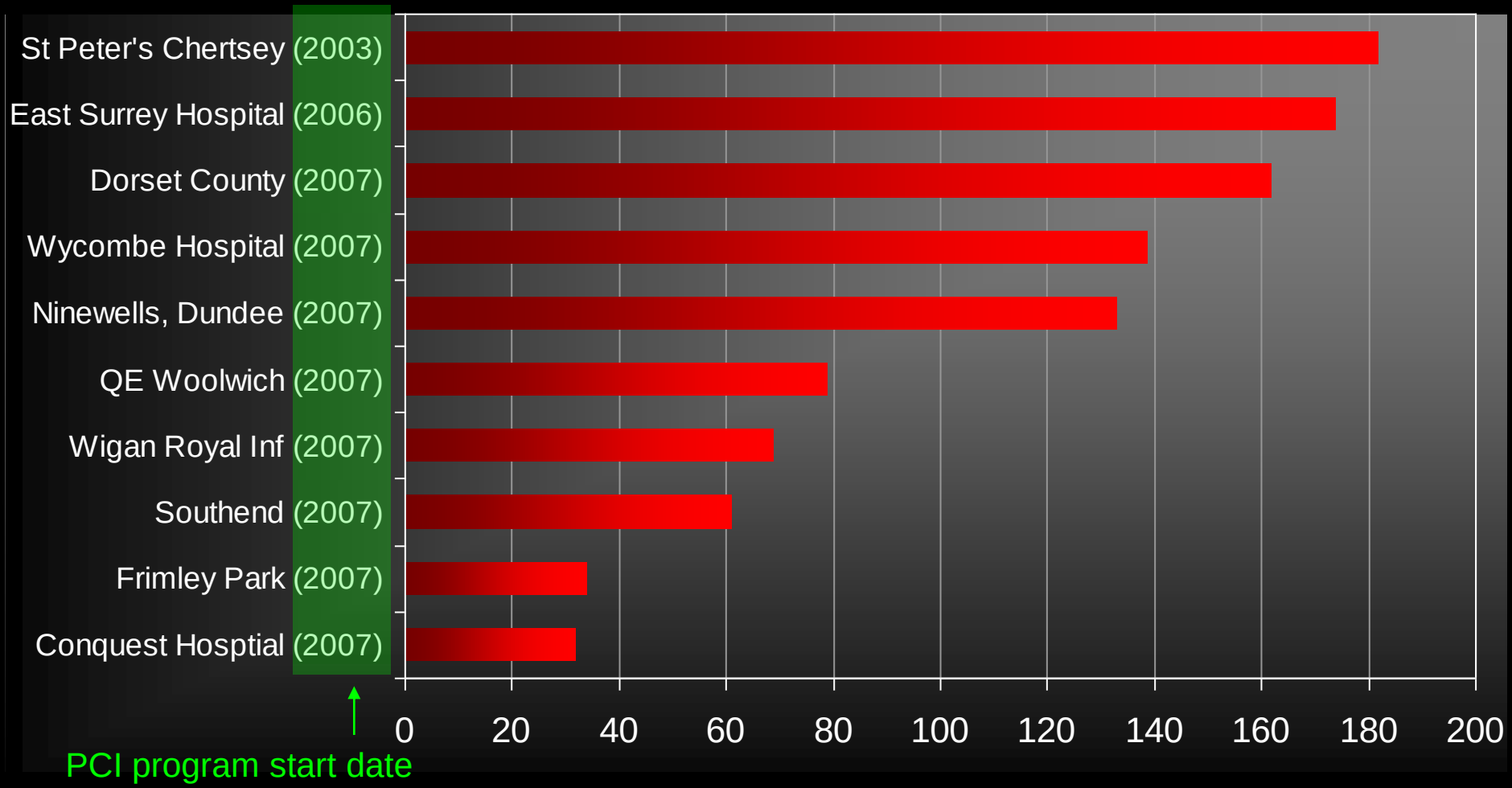
Aggregate forms

Number of PCIs performed in 2007

BCIS

2007 data: Ludman

10 Centres performing < 200 procedures

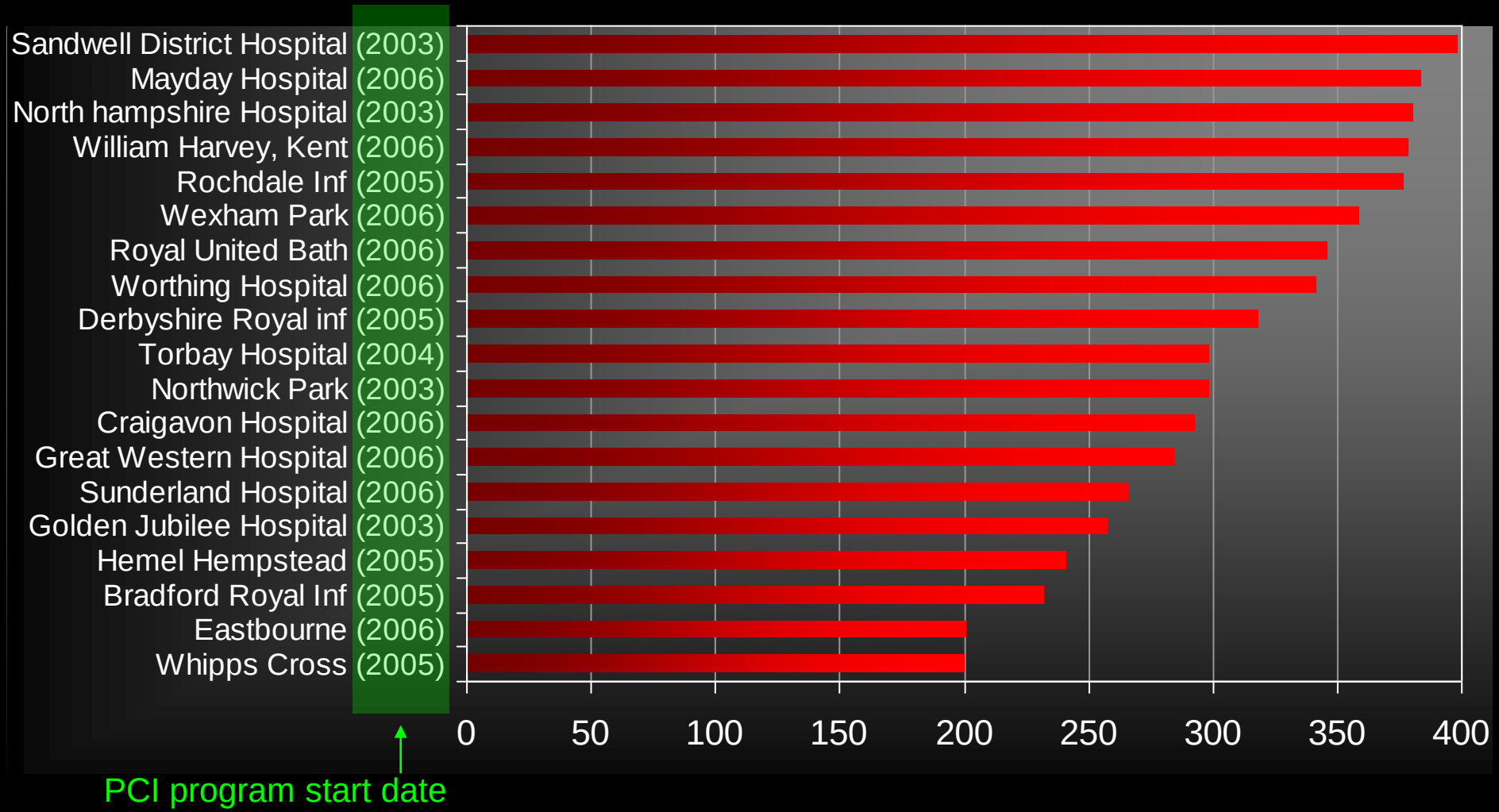


Number of PCIs performed in 2007

19 Centres performing 200 to 400 procedures

BCIS

2007 data: Ludman

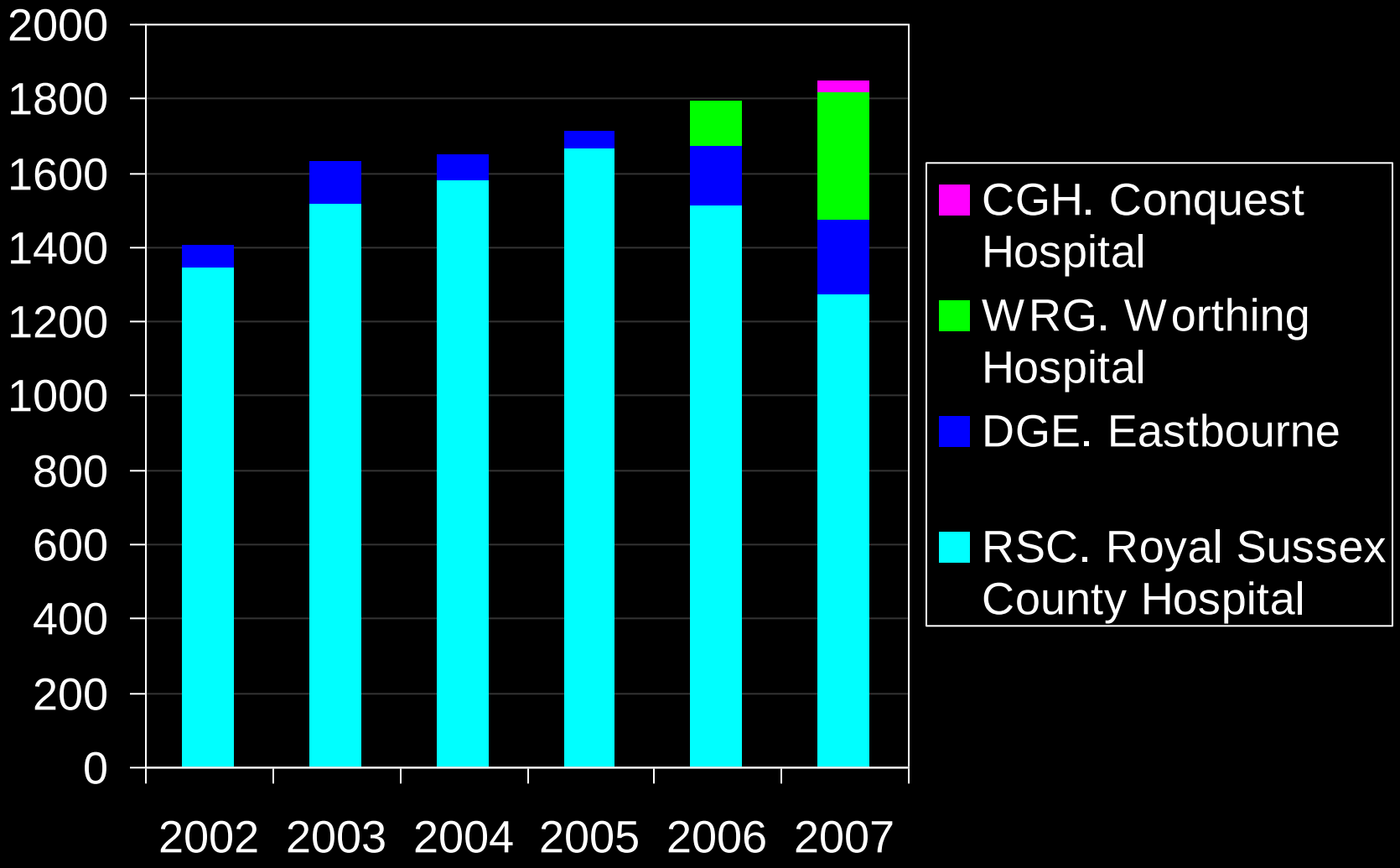


Effect of New Centres

Effect of New Centres

Effect of New Centres

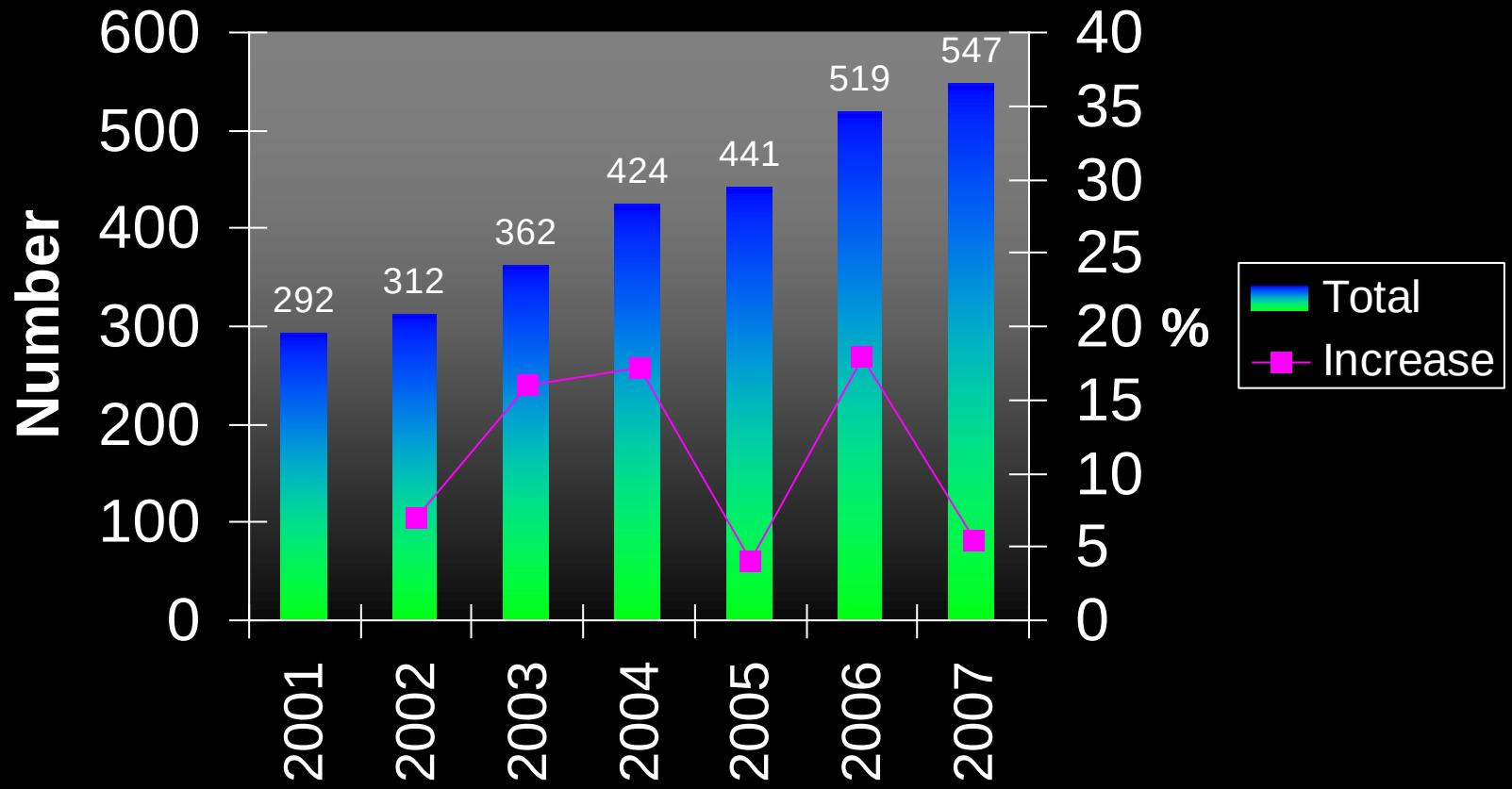
2007 data: Ludman



No. of Interventional Consultants

(NHS centres)

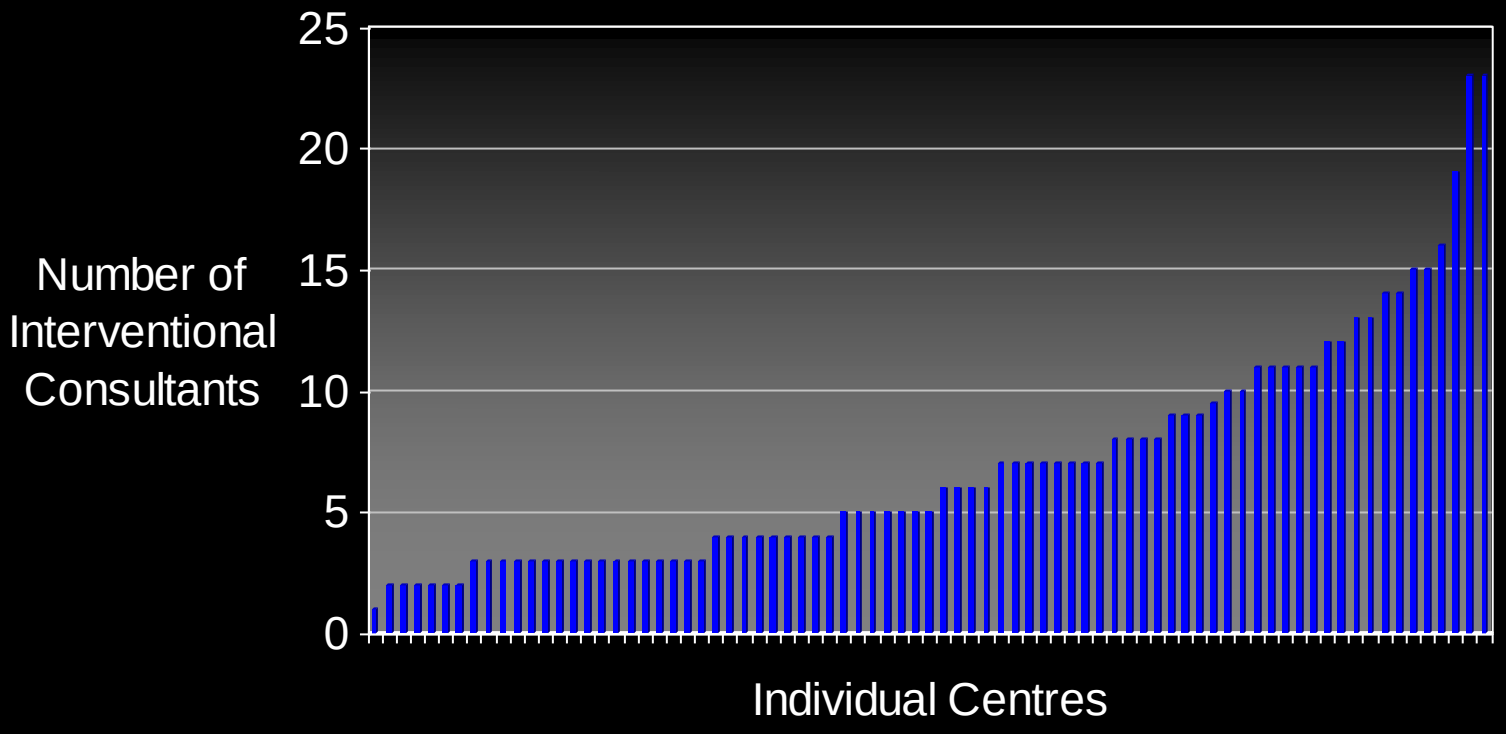
2007 data: Ludman



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

No. of Interventional Consultants
(NHS centres 2007)

2007 data: Ludman



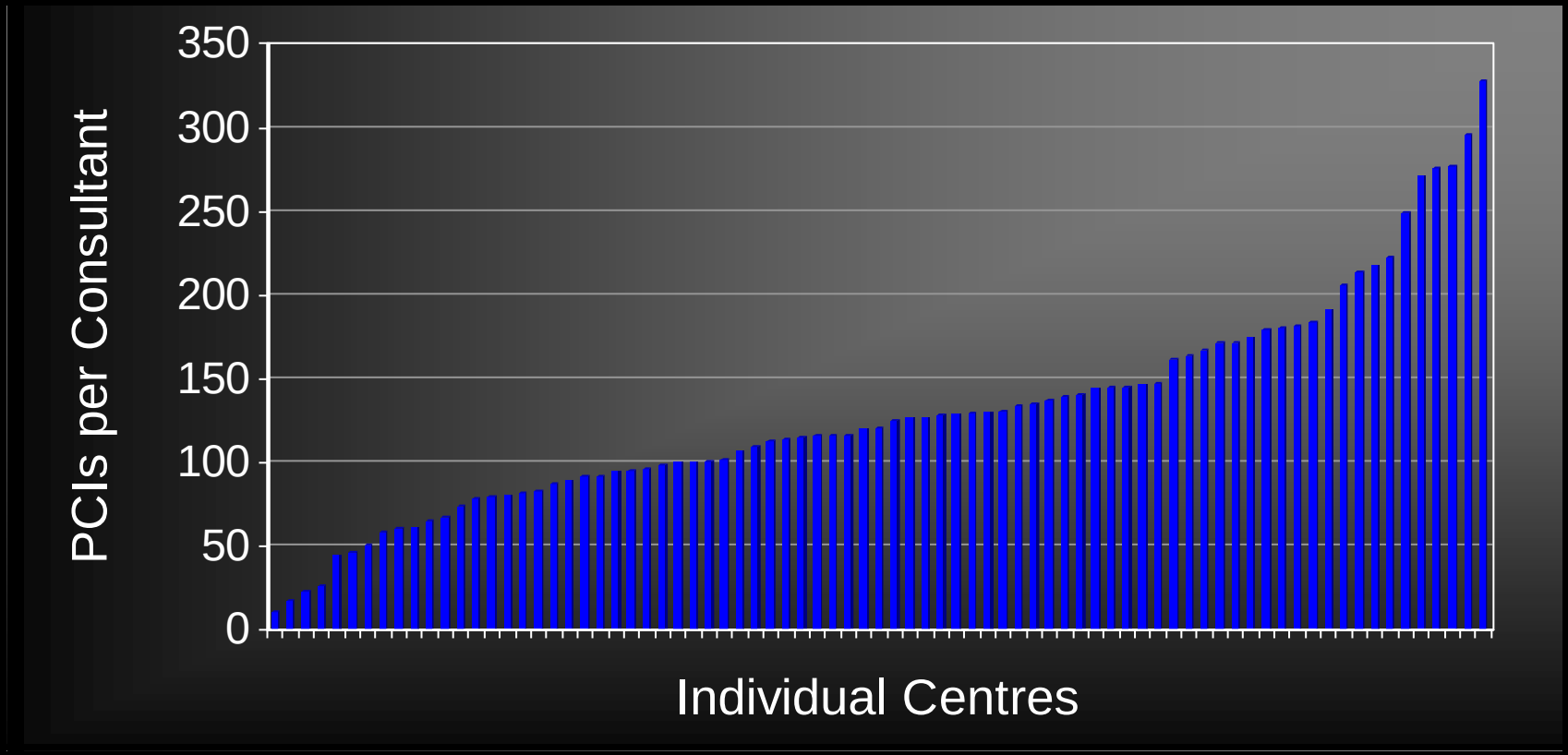
Mean	
2000	5.5
2001	6.1
2002	6.5
2003	6.7
2004	7.4
2005	7.0
2006	6.9
2007	6.9

Note: if work at two NHS centres will be counted twice

No. of PCIs per Consultant

(NHS Centres 2007)

2007 data: Ludman



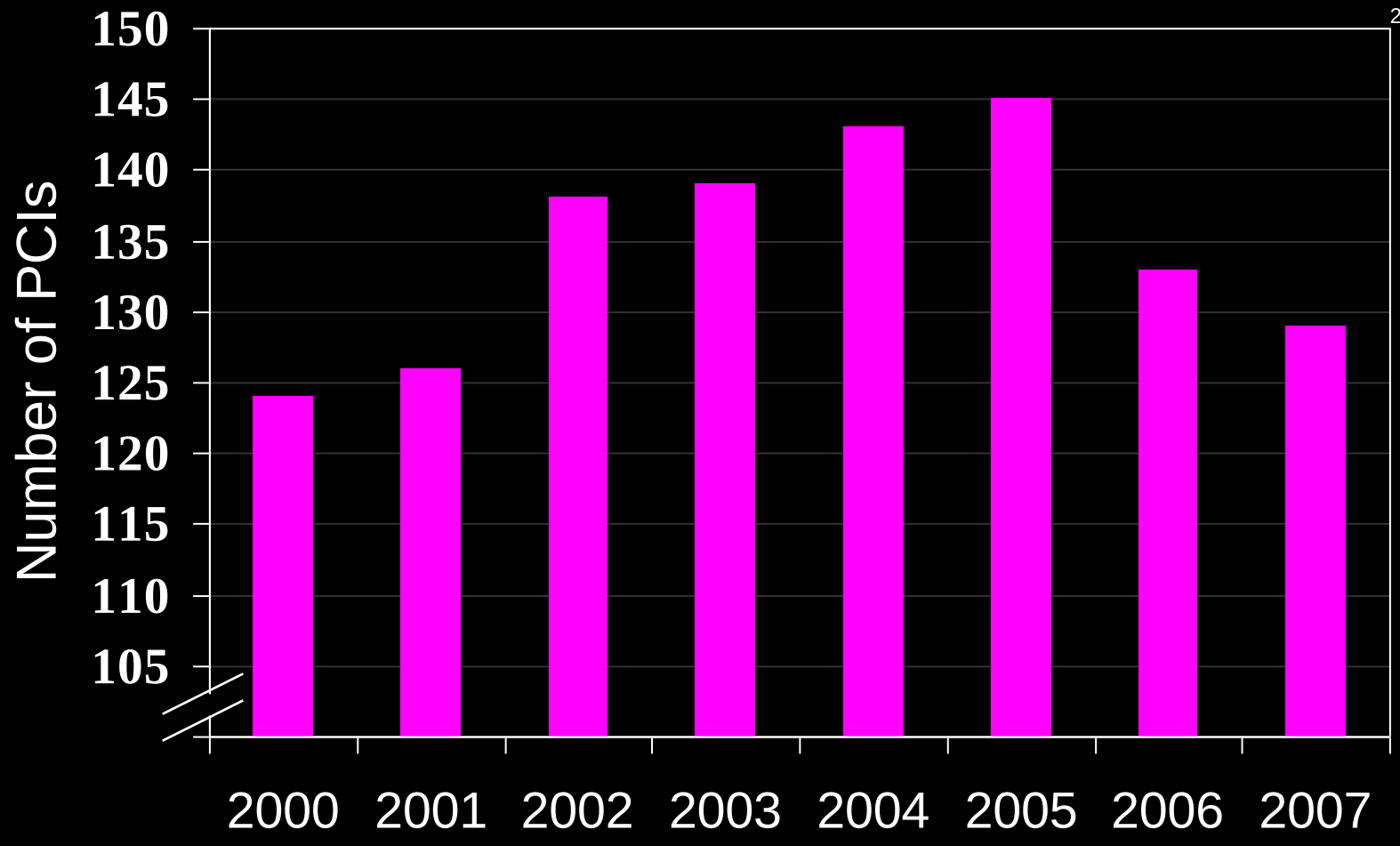
Note:
Data from institutional volume divided by No operators per institution
Some consultants work in multiple institutions

PCI per Consultant

Unit case number / Number of operators

BCIS

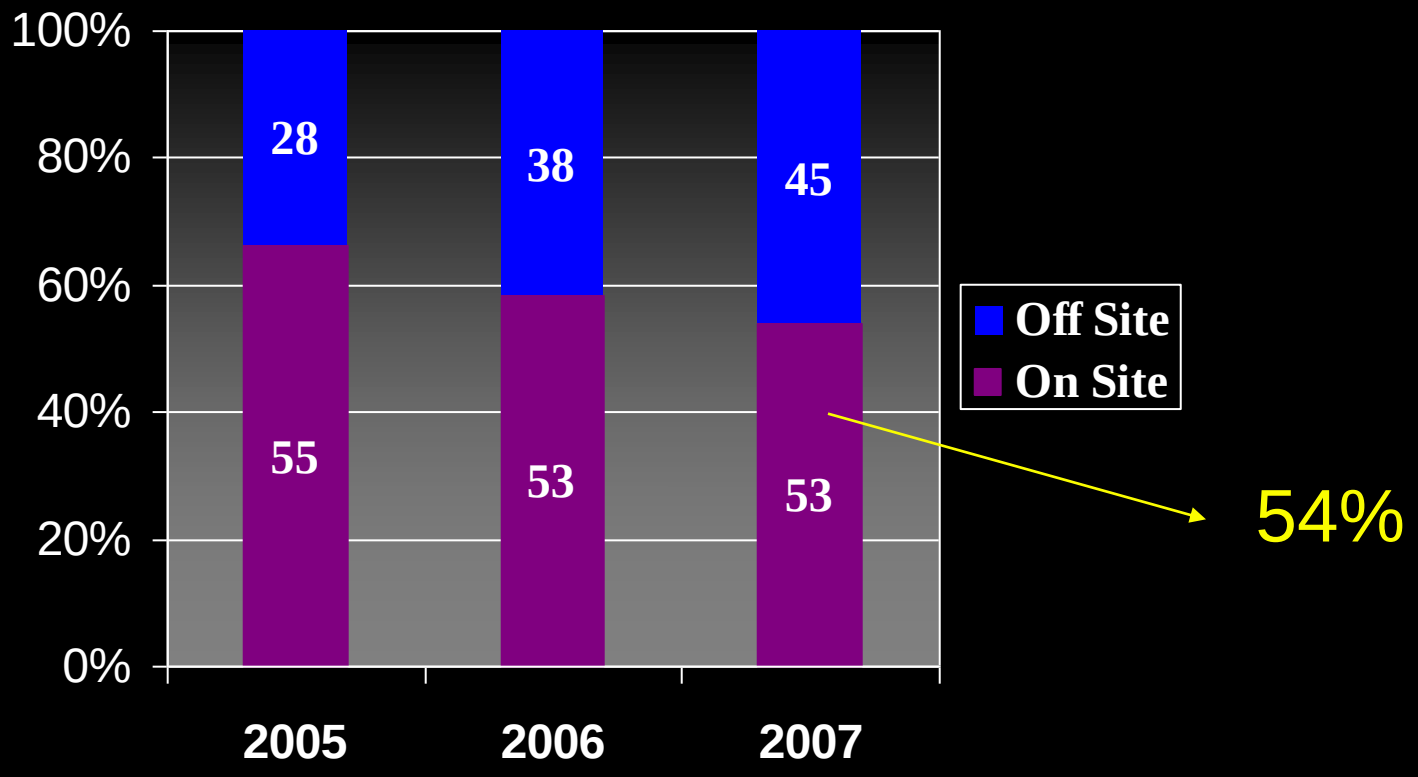
2007 data: Ludman



On v Off Site Surgery

All Centres (NHS and private)

2007 data: Ludman

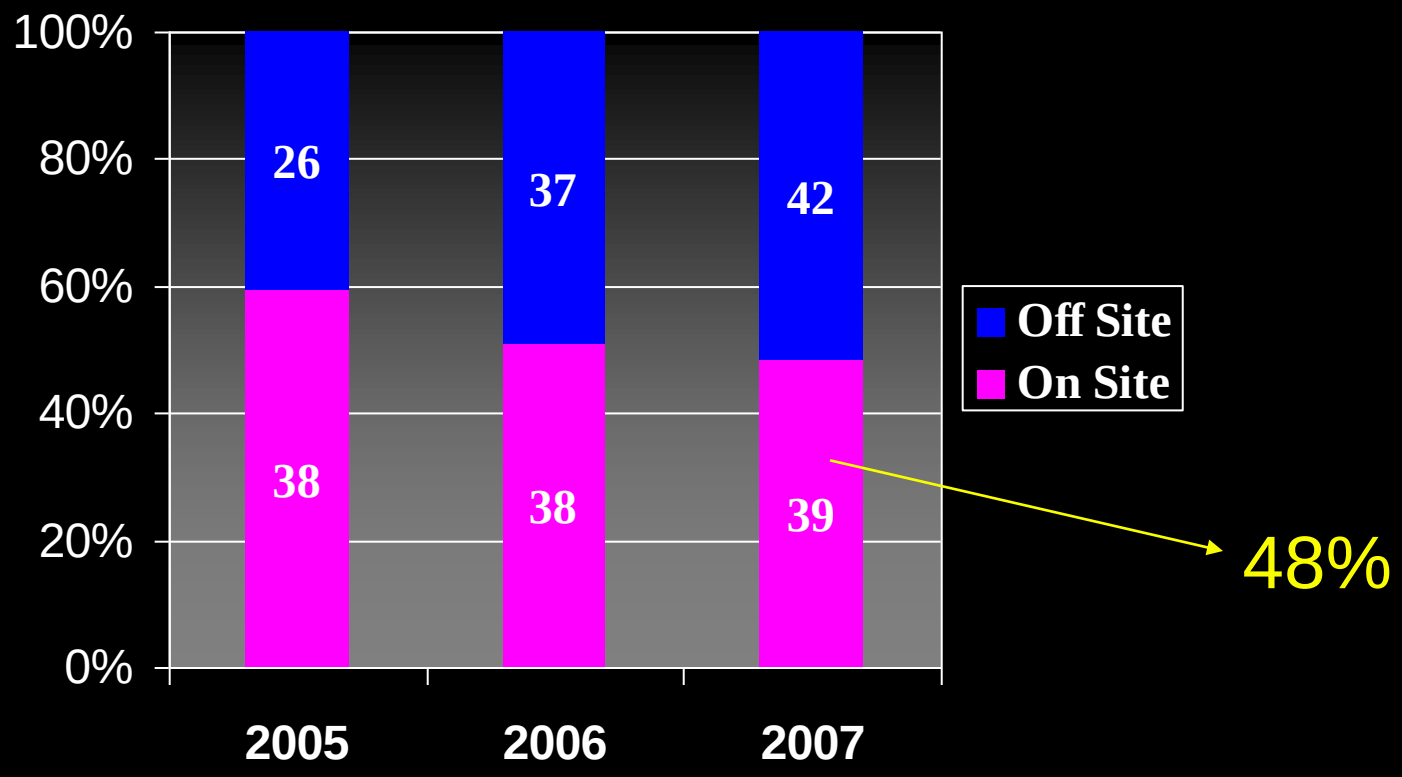


Aggregate forms

On v Off Site Surgery

NHS Centres only

2007 data: Ludman



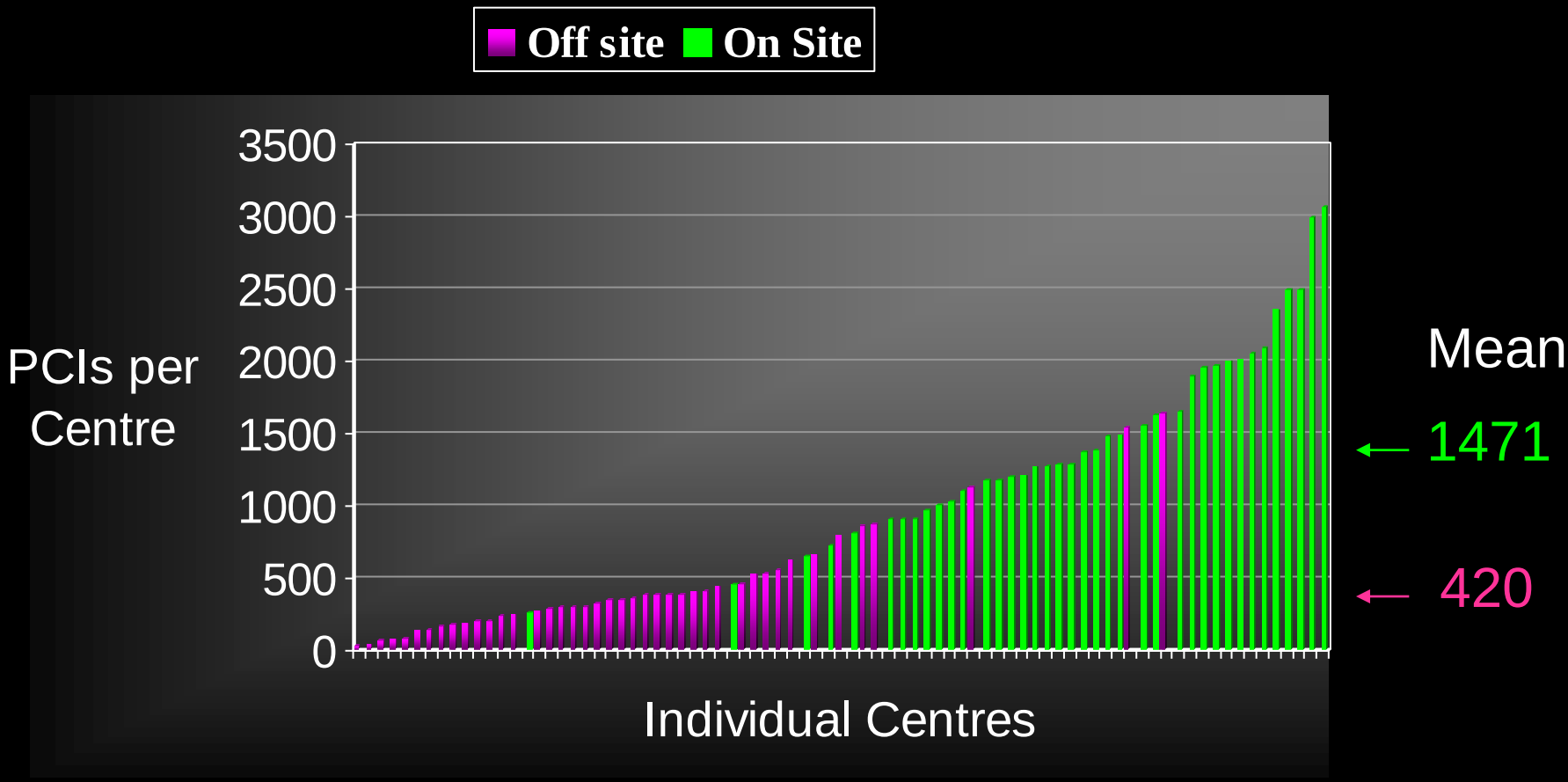
Aggregate forms

Surgical Cover

(2007 - all 81 NHS centres)

BCIS

2007 data: Ludman



Aggregate forms

Surgical Cover

(all 98 NHS and Private Centres)

BCIS

2007 data: Ludman

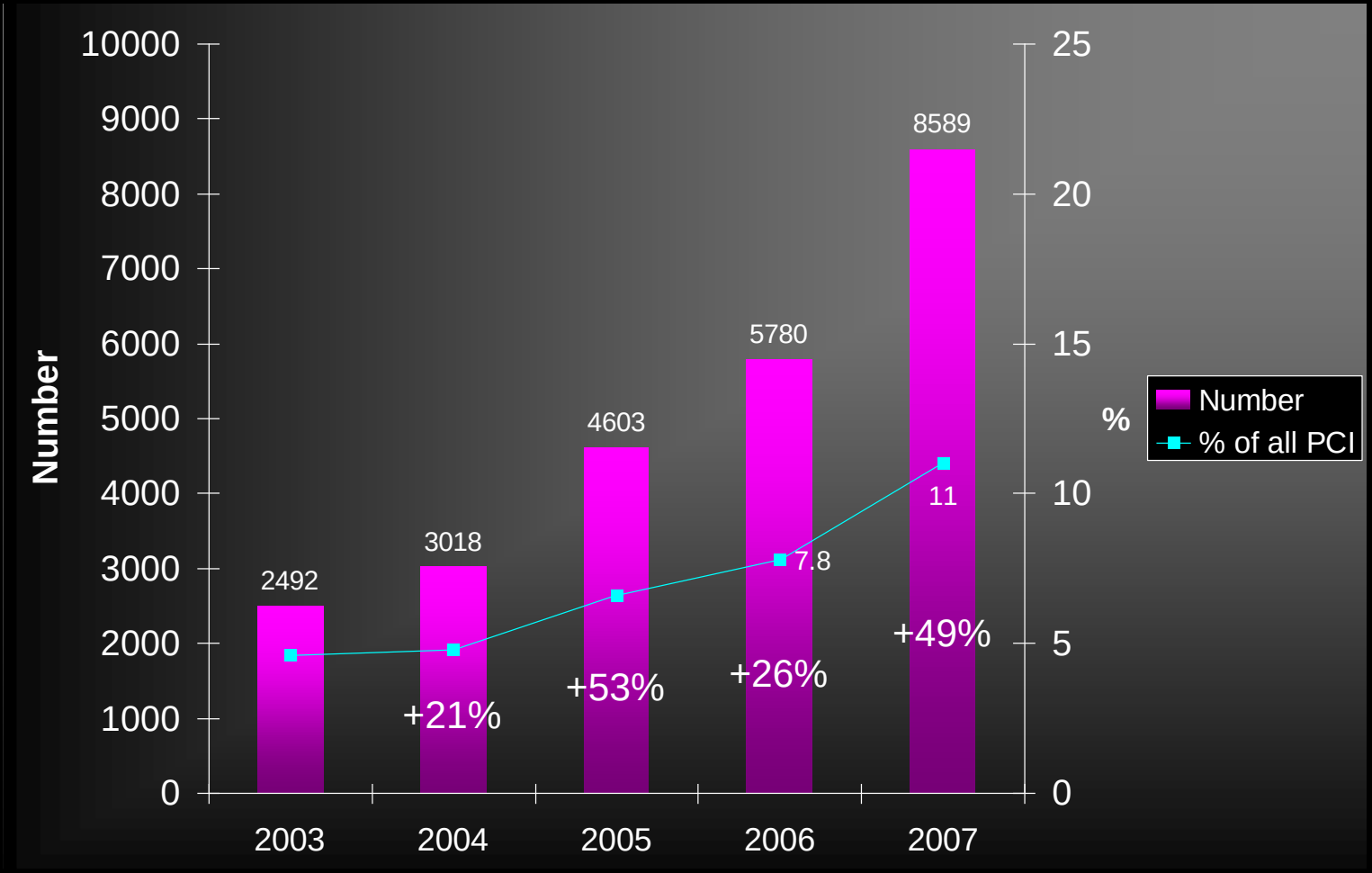
	On site	Off site
No of centres	53 (54%)	45 (46%)
No. of PCI (% of total)	59,455 (77%)	17,918 (23%)
Mean No. PCI per centre (all)	1122	398
Mean No. PCI per centre (NHS)	1471	420

Aggregate forms

Day Case PCI

2007 data: Ludman

- **47 of 87 Units performing day case PCI**



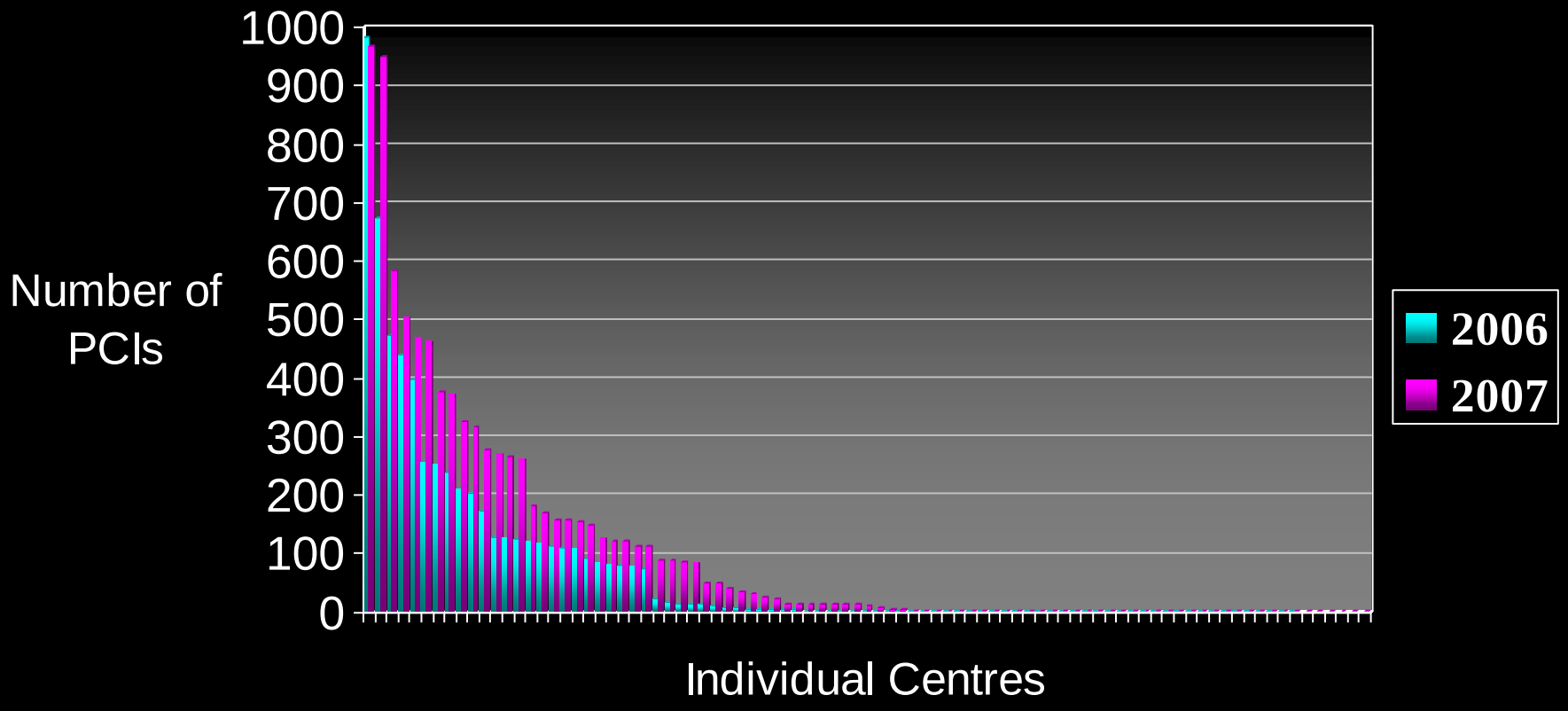
Data from: 87 of 98 centres

Day Case PCI

(2007 Data from 87 of 98 centres)

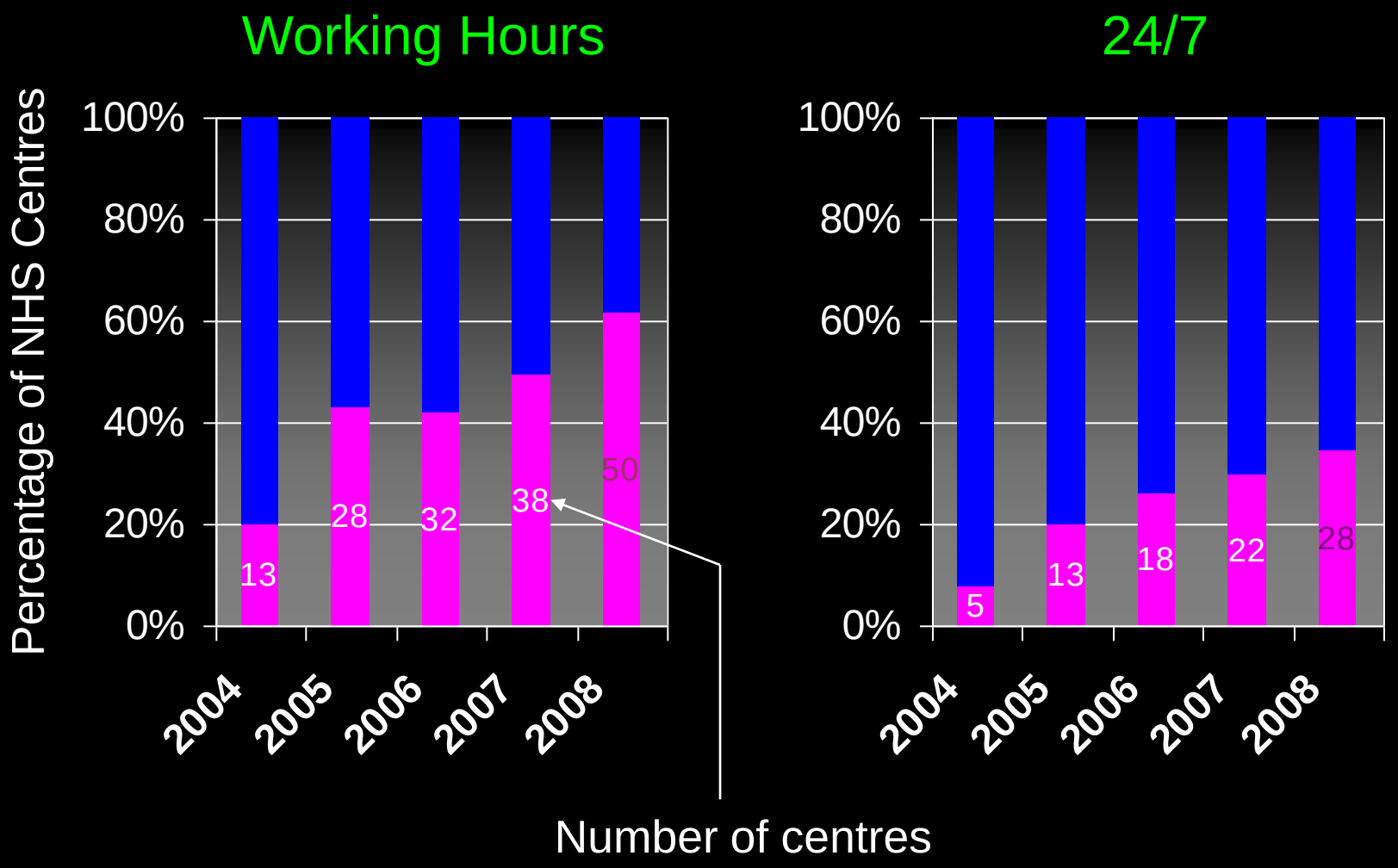
BCIS

2007 data: Ludman



Primary PCI
Routine Rx for STEMI

2007 data: Ludman



81 NHS Centres only

Working Hrs includes all 24/7 sites

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  - Cumulative funnel plots

Procedure Specific Analysis

CCAD

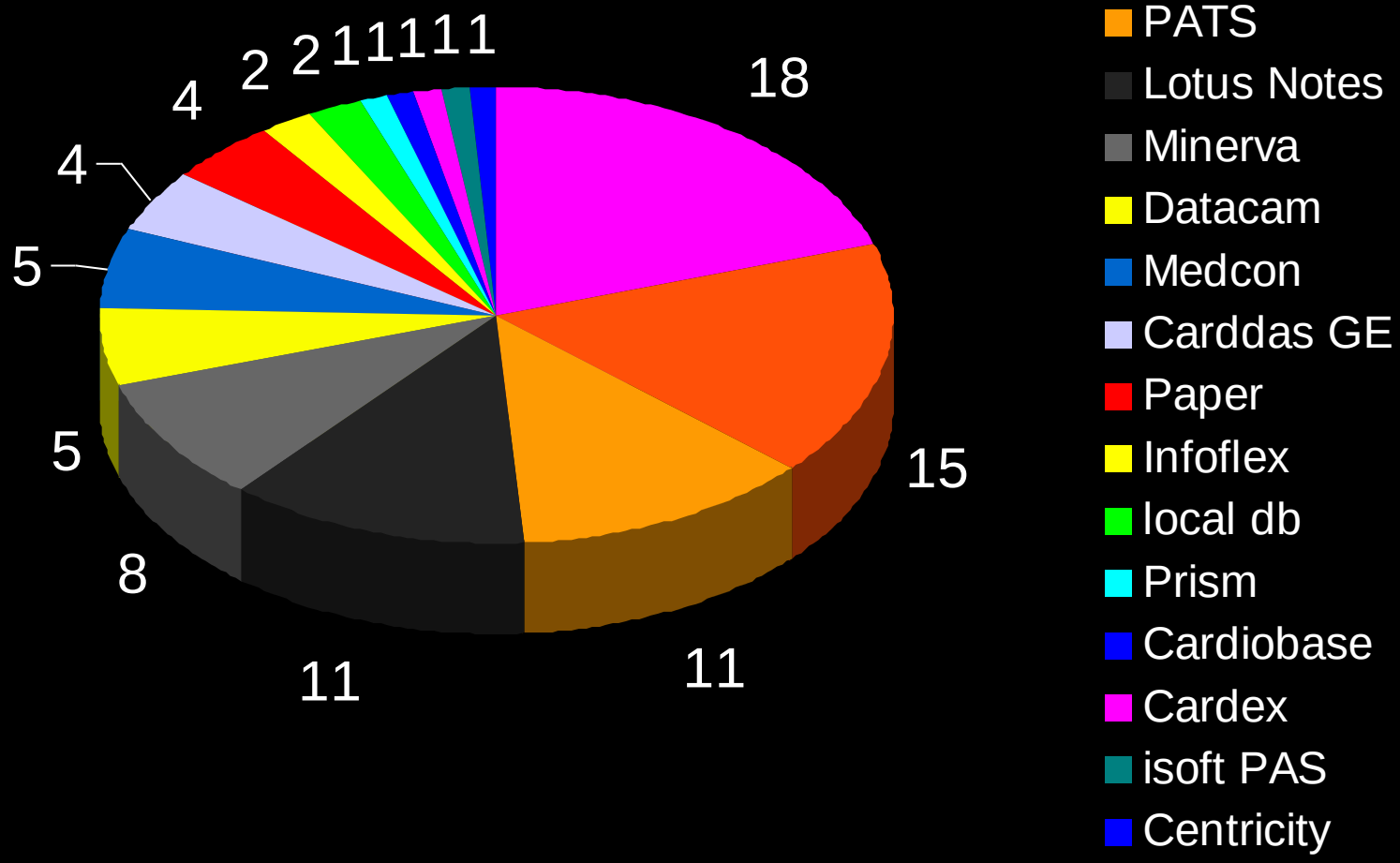
Participation

2007 data: Ludman

		Total No. of Centres	Data to CCAD	Participation
England	NHS	67 (69)*	67	100%
	Private	16	6	37%
Wales		2	2	100%
N Ireland		3	0	0
Scotland	NHS	7	7 via link*	100%

*2 new centres not yet linked

‘Front end’ Database used

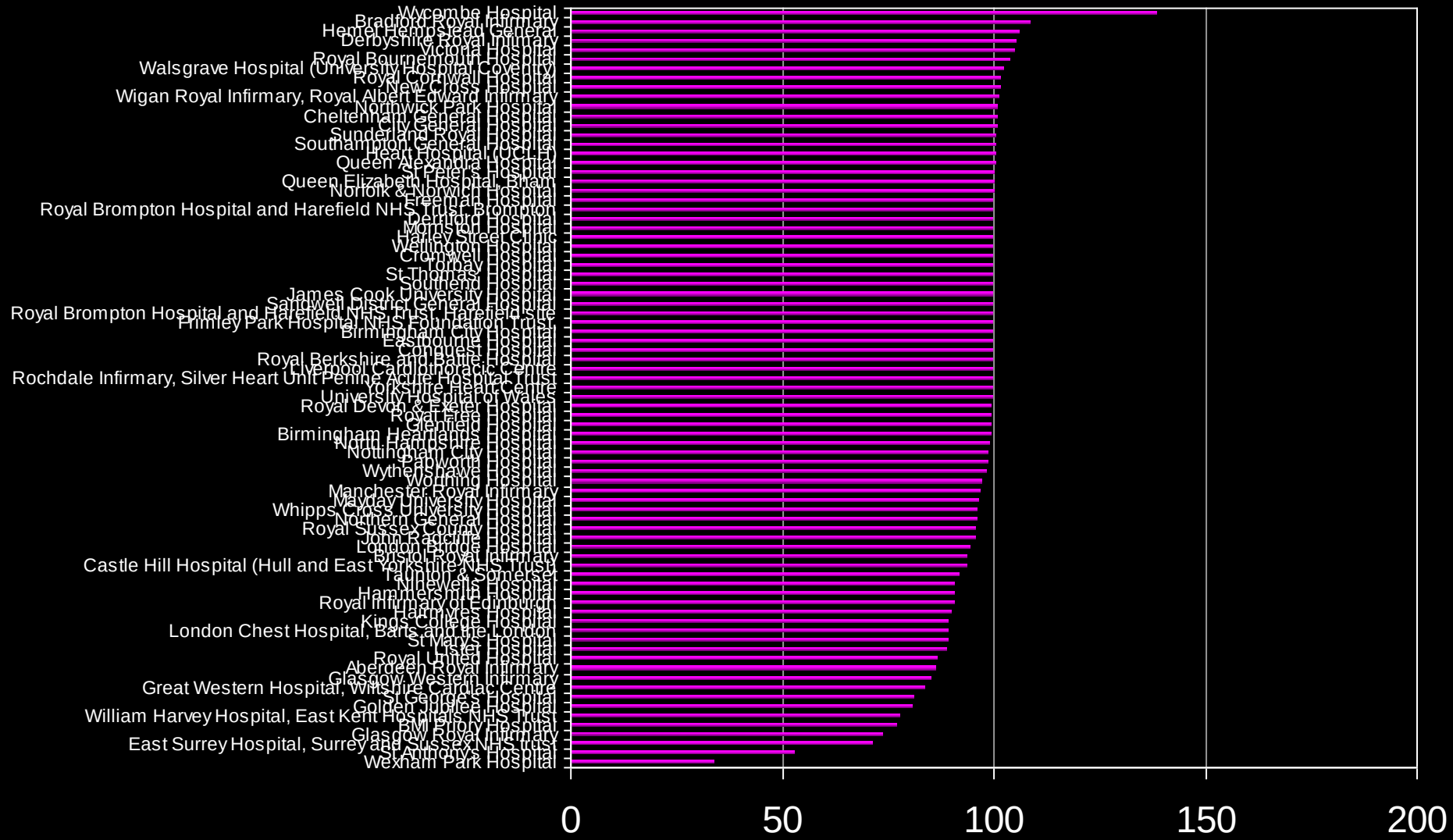


CCAD data quality

PCI data in CCAD as % of Reported Totals

BCIS

2007 data: Ludman



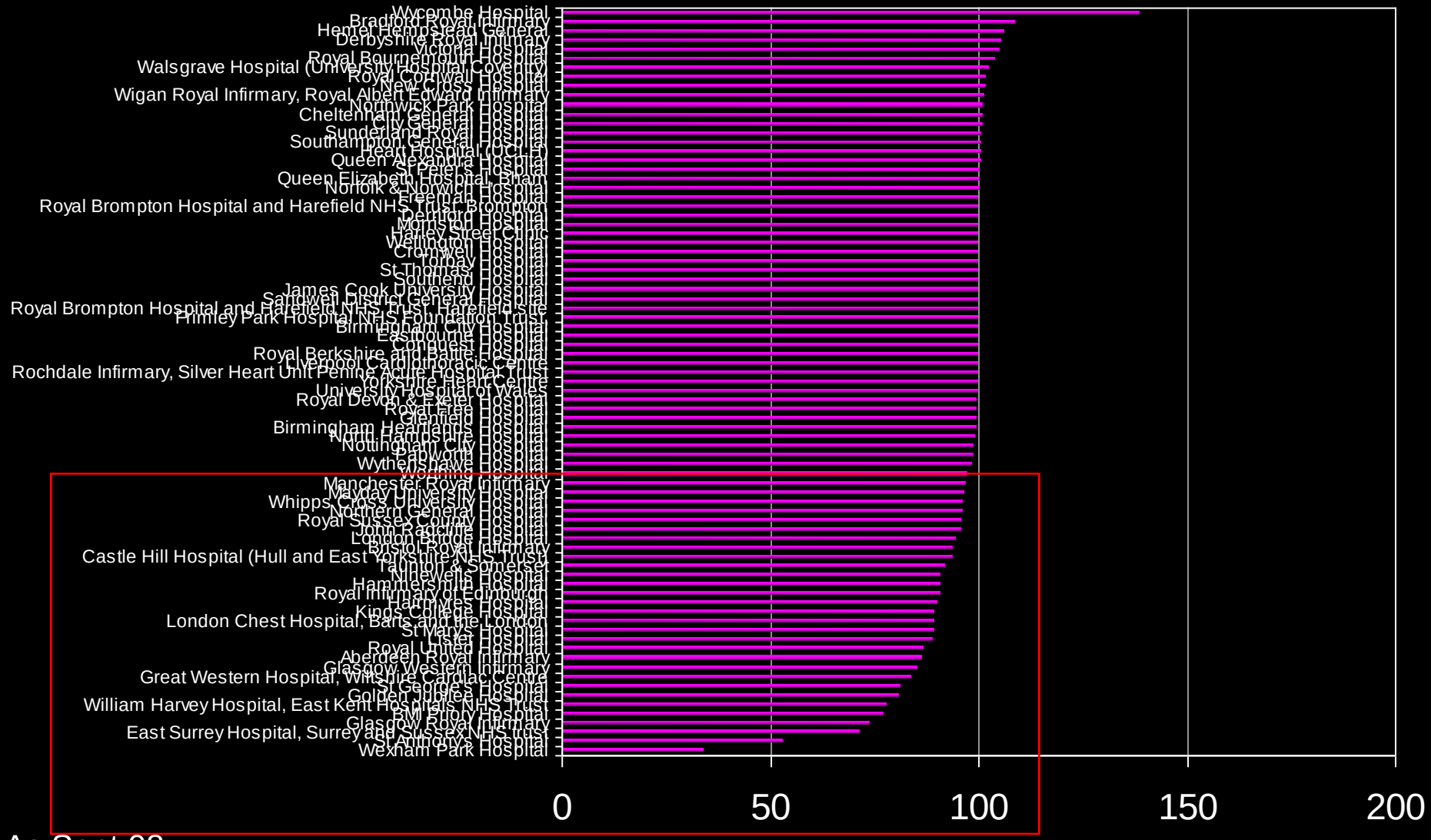
As Sept 08

CCAD data quality

PCI data in CCAD as % of Reported Totals

BCIS

2007 data: Ludman



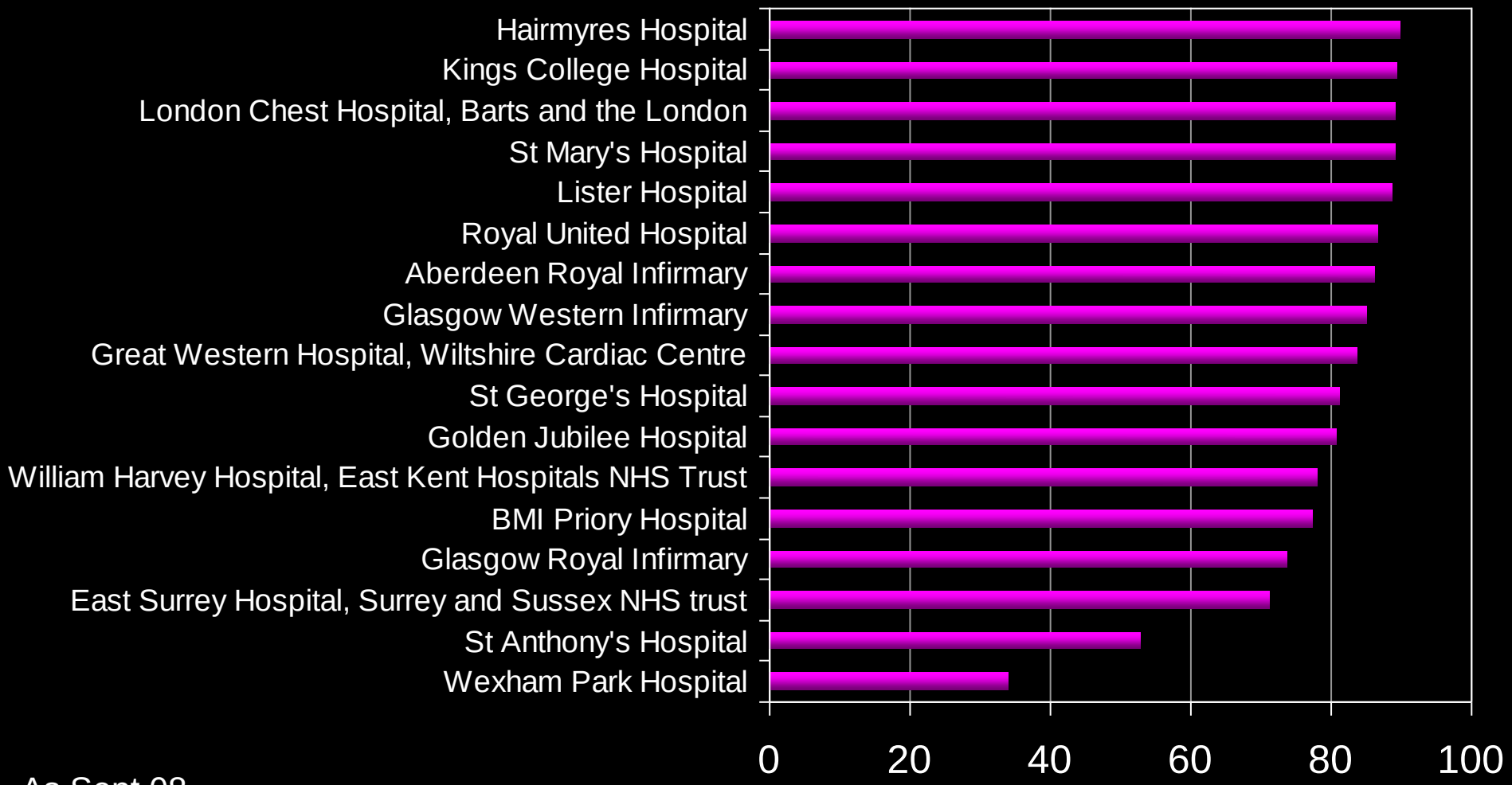
As Sept 08

CCAD data quality

PCI data in CCAD as % of Reported Totals

2007 data: Ludman

Centres with < 90% of their activity in CCAD



As Sept 08

CCAD data quality

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BCIS

2007 data: Ludman

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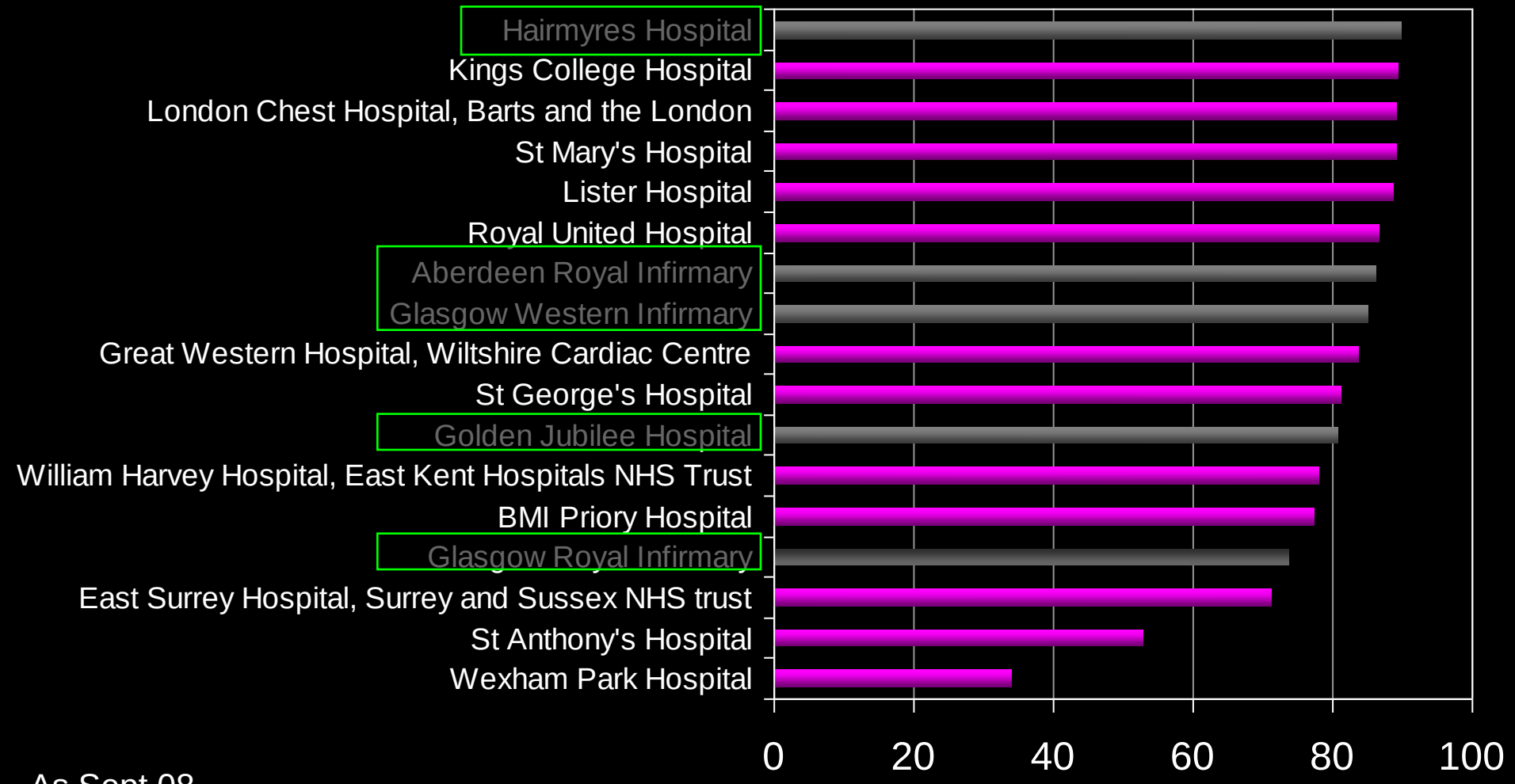
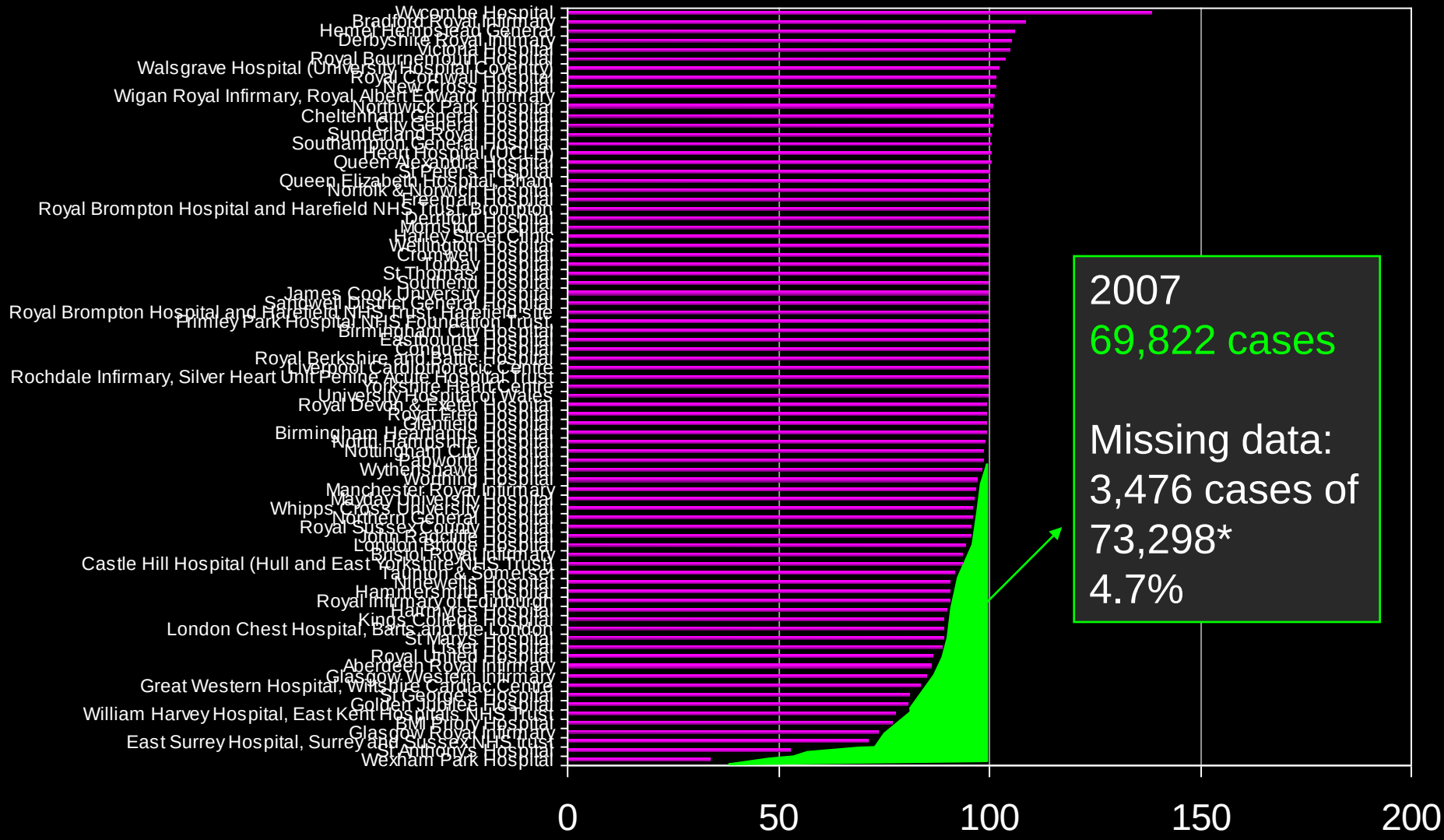


As Sept 08

CCAD data quality

PCI data in CCAD as % of Reported Totals

2007 data: Ludman



As Sept 08

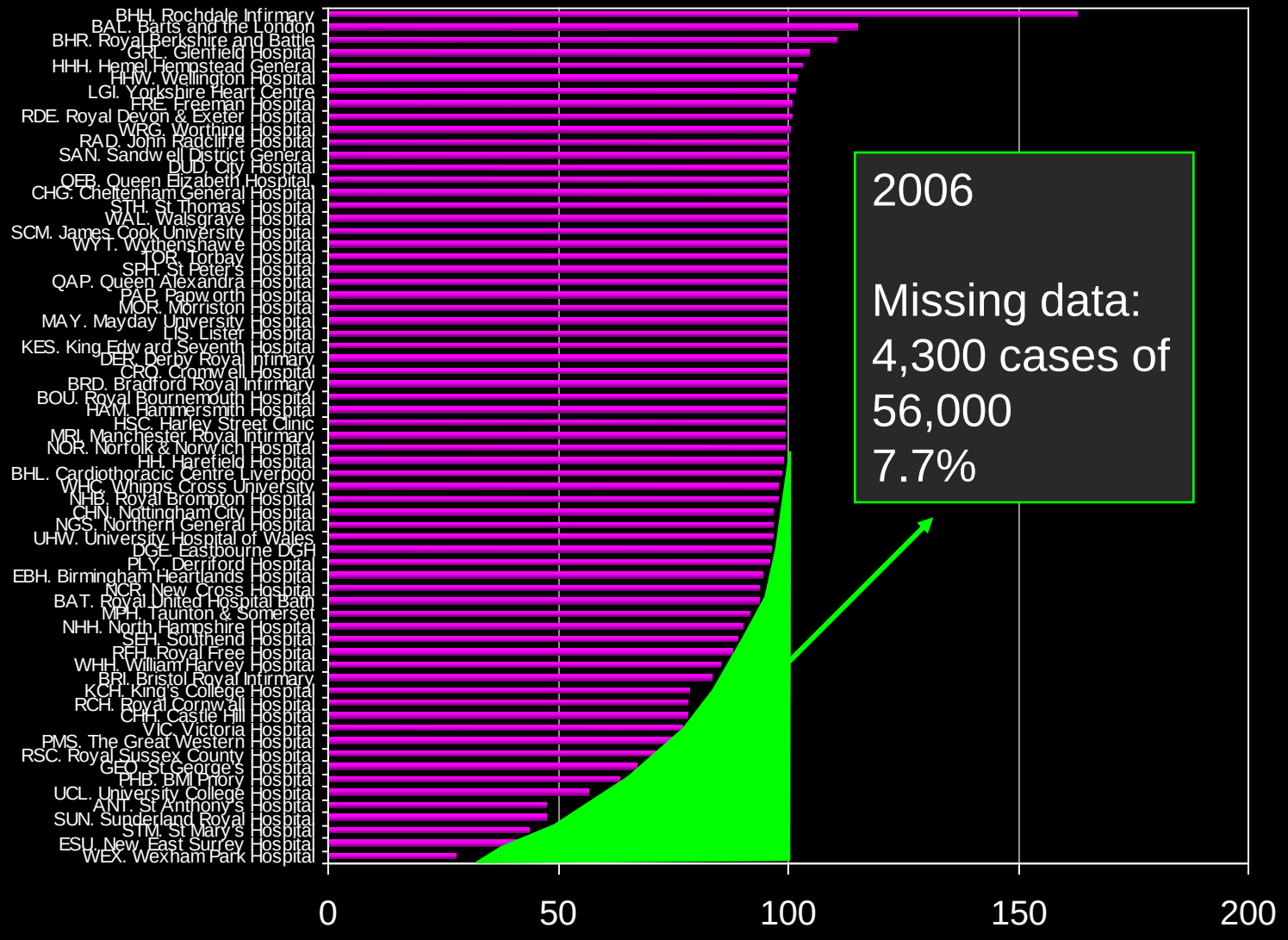
*total of cases performed by units uploading to CCAD

CCAD data quality

PCI data in CCAD as % of Reported Totals

BCIS

2006 data: Ludman



As Sept 07

Data Quality

Risk Stratified Outcome

A D Grayson et al Heart 2006;92:658–663

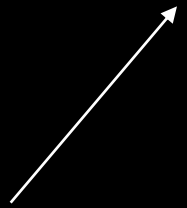
- NWQIP risk adjustment model

Age 70–79 years
Age ⩾80 years
Female sex
Cerebrovascular disease
Cardiogenic shock
Urgent PCI
Emergent PCI
LMS lesion treated
Graft lesion treated

% Completeness

12 fields required for risk adjusted outcome NWQIP

a	i	j	k	l	m	n	o	p	q	r	s	t	
Hospital	Date of Birt	Sex	Medical His	Pre-proced	Procedure	Vessels tre	Renal dise	Diabetes	Discharge	Discharge	PCI hospita	NHS numb	total
BAT. Royal United Hospital Bath	100	100	36.7	100	100	100	96.3	**74.3**	40.7	42	100	1	891
BHH. Rochdale Infirmary	100	100	27.3	**66.9**	100	99.7	**83.8**	93.6	100	100	100	99.5	1070.8
BHL. Cardiothoracic Centre Liverpool	100	100	99.8	100	100	100	100	100	100	100	100	99.8	1199.6
BHR. Royal Berkshire and Battle Hospital	100	100	100	100	100	100	100	100	100	100	100	99.8	1199.8
BOU. Royal Bournemouth General Hospital	100	100	90.2	100	100	100	96.3	96.1	49.3	100	100	99.6	1131.5
BRD. Bradford Royal Infirmary	100	100	99.6	100	100	92.2	96.4	96.8	93.5	94	99.2	97.2	1168.9
CGH. Conquest Hospital	100	100	100	100	100	100	100	100	100	100	100	100	1200
CHG. Cheltenham General Hospital	100	99.8	**76.4**	100	100	98.6	98.9	99.8	99.8	99.4	100	99.8	1172.5
CHH. Castle Hill Hospital	100	100	97.6	0	100	100	100	100	100	99.8	99.6	99.3	1096.3
CHN. Nottingham City Hospital	100	100	100	100	100	100	100	100	100	98.8	100	99.1	1197.9

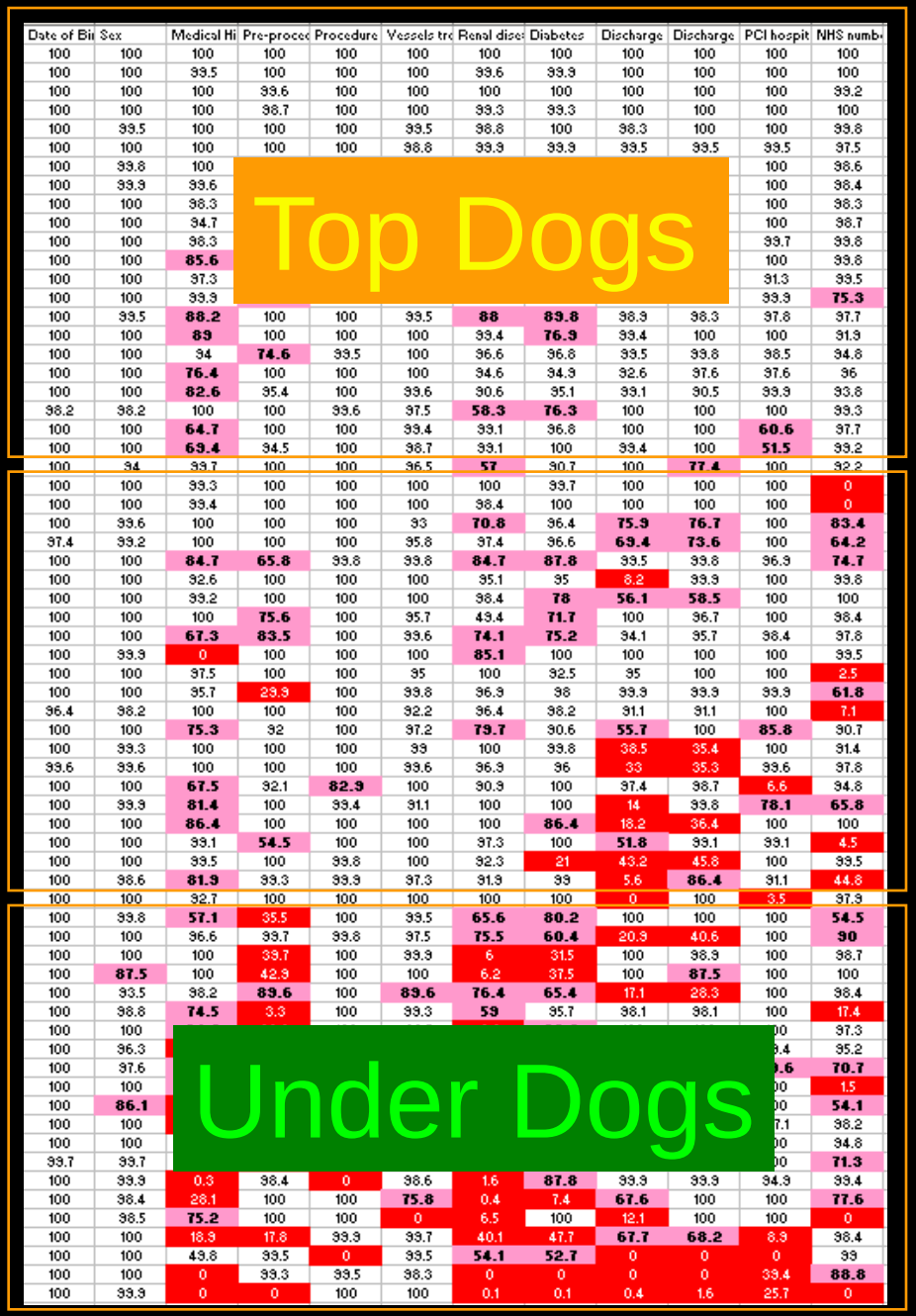


Top score potential = 1200

2006

Date of Bi	Sex	Medical Hi	Pre-proce	Procedure	Vessels tr	Renal disc	Diabetes	Discharge	Discharge	PCI hospit	NHS numb
100	100	100	100	100	100	100	100	100	100	100	100
100	100	99.5	100	100	100	99.6	99.9	100	100	100	100
100	100	100	99.6	100	100	100	100	100	100	100	99.2
100	100	100	98.7	100	100	99.3	99.3	100	100	100	100
100	99.5	100	100	100	99.5	98.8	100	98.3	100	100	99.8
100	100	100	100	100	98.8	99.9	99.9	99.5	99.5	99.5	97.5
100	99.8	100	100	100	98.6	98.6	99.1	99.5	99.5	100	98.6
100	99.9	99.6	100	100	97.6	98.8	98.9	99.7	99.5	100	98.4
100	100	98.3	95.6	100	100	100	99.4	100	100	100	98.3
100	100	94.7	100	100	98	95.4	99.3	100	100	100	98.7
100	100	98.3	99.7	100	100	**89.1**	98.9	100	100	99.7	99.8
100	100	**85.6**	99.5	100	98.4	98.8	97.2	100	100	100	99.8
100	100	97.3	98.8	100	97.6	98.7	95.2	100	100	91.3	99.5
100	100	99.9	**86.5**	100	100	99.5	99.5	99.8	99.8	99.9	**75.3**
100	99.5	**88.2**	100	100	99.5	**88**	**89.8**	98.9	98.3	97.8	97.7
100	100	**89**	100	100	100	99.4	**76.9**	99.4	100	100	91.9
100	100	94	**74.6**	99.5	100	96.6	96.8	99.5	99.8	98.5	94.8
100	100	**76.4**	100	100	100	94.6	94.9	92.6	97.6	97.6	96
100	100	**82.6**	95.4	100	99.6	90.6	95.1	99.1	90.5	99.9	93.8
98.2	98.2	100	100	99.6	97.5	**58.3**	**76.3**	100	100	100	99.3
100	100	**64.7**	100	100	99.4	99.1	96.8	100	100	**60.6**	97.7
100	100	**69.4**	94.5	100	98.7	99.1	100	99.4	100	**51.5**	99.2
100	94	99.7	100	100	96.5	**57**	90.7	100	**77.4**	100	92.2
100	100	99.3	100	100	100	100	99.7	100	100	100	0
100	100	99.4	100	100	100	98.4	100	100	100	100	0
100	99.6	100	100	100	93	**70.8**	96.4	**75.9**	**76.7**	100	**83.4**
97.4	99.2	100	100	100	95.8	97.4	96.6	**69.4**	**73.6**	100	**64.2**
100	100	**84.7**	**65.8**	99.8	99.8	**84.7**	**87.8**	99.5	99.8	96.9	**74.7**
100	100	92.6	100	100	100	95.1	95	8.2	99.9	100	99.8
100	100	99.2	100	100	100	98.4	**78**	**56.1**	**58.5**	100	100
100	100	100	**75.6**	100	95.7	93.4	**71.7**	100	96.7	100	98.4
100	100	**67.3**	**83.5**	100	99.6	**74.1**	**75.2**	94.1	95.7	98.4	97.8
100	99.9	0	100	100	100	**85.1**	100	100	100	100	99.5
100	100	97.5	100	100	95	100	92.5	95	100	100	2.5
100	100	95.7	29.9	100	99.8	96.9	98	99.9	99.9	99.9	**61.8**
96.4	98.2	100	100	100	92.2	96.4	98.2	91.1	91.1	100	7.1
100	100	**75.3**	92	100	97.2	**79.7**	90.6	**55.7**	100	**85.8**	90.7
100	99.3	100	100	100	99	100	99.8	38.5	35.4	100	91.4
99.6	99.6	100	100	100	99.6	96.9	96	33	35.3	99.6	97.8
100	100	**67.5**	92.1	**82.9**	100	90.9	100	97.4	98.7	6.6	94.8
100	99.9	**81.4**	100	99.4	91.1	100	100	14	99.8	**78.1**	**65.8**
100	100	**86.4**	100	100	100	100	**86.4**	18.2	36.4	100	100
100	100	99.1	**54.5**	100	100	97.3	100	**51.8**	99.1	99.1	4.5
100	100	99.5	100	99.8	100	92.3	21	43.2	45.8	100	99.5
100	98.6	**81.9**	99.3	99.3	97.3	91.9	99	5.6	**86.4**	91.1	44.8
100	100	92.7	100	100	100	100	100	0	100	3.5	97.9
100	99.8	**57.1**	35.5	100	99.5	**65.6**	**80.2**	100	100	100	**54.5**
100	100	96.6	99.7	99.8	97.5	**75.5**	**60.4**	20.3	40.6	100	**90**
100	100	100	99.7	100	99.9	6	31.5	100	98.9	100	98.7
100	**87.5**	100	42.9	100	100	6.2	37.5	100	**87.5**	100	100
100	99.5	98.2	**89.6**	100	**89.6**	**76.4**	**65.4**	17.1	28.3	100	98.4
100	98.8	**74.5**	3.3	100	99.3	**59**	95.7	98.1	98.1	100	17.4
100	100	**64.9**	20.9	100	90.7	0.3	**63.8**	100	100	100	97.3
100	96.3	26.2	**52.4**	100	98.8	41.7	36.9	**87.2**	97.9	99.4	95.2
100	97.6	**58.1**	32.9	99.4	98.8	**88**	**79.6**	**64.1**	**65.3**	**69.6**	**70.7**
100	100	**80.3**	100	100	100	97.5	**69.5**	36.5	37.9	100	1.5
100	**86.1**	3.6	16.3	99.8	100	**74.2**	**85.9**	99.8	99.8	100	**54.1**
100	100	47.9	25.9	99.9	98.3	1.3	47.1	100	96.5	97.1	98.2
100	100	100	1.3	100	100	0.3	14.4	100	99.5	100	94.8
99.7	99.7	100	9.5	100	100	0.4	11.9	100	96.6	100	**71.3**
100	99.9	0.3	98.4	0	98.6	1.6	**87.8**	99.9	99.9	94.9	99.4
100	98.4	28.1	100	100	**75.8**	0.4	7.4	**67.6**	100	100	**77.6**
100	98.5	**75.2**	100	100	0	6.5	100	12.1	100	100	0
100	100	18.9	17.8	99.9	99.7	40.1	47.7	**67.7**	**68.2**	8.9	98.4
100	100	49.8	99.5	0	99.5	**54.1**	**52.7**	0	0	0	99
100	100	0	99.9	99.5	98.3	0	0	0	0	99.4	**88.8**
100	99.9	0	0	100	100	0.1	0.1	0.4	1.6	25.7	0

2006



Date of Bi	Sex	Medical Hi	Pre-proce	Procedure	Vessels tr	Renal dise	Diabetes	Discharge	Discharge	PCI hospit	NHS numb
100	100	100	100	100	100	100	100	100	100	100	100
100	100	33.5	100	100	100	33.6	33.3	100	100	100	100
100	100	100	33.6	100	100	100	100	100	100	100	33.2
100	100	100	33.7	100	100	33.3	33.3	100	100	100	100
100	33.5	100	100	100	33.5	33.8	100	33.3	100	100	33.8
100	100	100	100	100	33.8	33.3	33.3	33.5	33.5	33.5	37.5
100	33.8	100								100	33.6
100	33.3	33.6								100	33.4
100	100	33.3								100	33.3
100	100	34.7								100	33.7
100	100	33.3								33.7	33.8
100	100	**85.6**								100	33.8
100	100	37.3								31.3	33.5
100	100	33.3								33.3	**75.3**
100	33.5	**88.2**	100	100	33.5	**88**	**89.8**	33.3	33.3	37.8	37.7
100	100	**89**	100	100	100	33.4	**76.9**	33.4	100	100	31.3
100	100	34	**74.6**	33.5	100	36.6	36.8	33.5	33.8	36.5	34.8
100	100	**76.4**	100	100	100	34.6	34.3	32.6	37.6	37.6	36
100	100	**82.6**	35.4	100	33.6	30.6	35.1	33.1	30.5	33.3	33.8
38.2	38.2	100	100	33.6	37.5	**58.3**	**76.3**	100	100	100	33.3
100	100	**64.7**	100	100	33.4	33.1	36.8	100	100	**60.6**	37.7
100	100	**69.4**	34.5	100	38.7	33.1	100	33.4	100	**51.5**	33.2
100	34	33.7	100	100	36.5	**57**	30.7	100	**77.4**	100	32.2
100	100	33.3	100	100	100	100	33.7	100	100	100	0
100	100	33.4	100	100	100	38.4	100	100	100	100	0
100	33.6	100	100	100	33	**70.8**	36.4	**75.9**	**76.7**	100	**83.4**
37.4	33.2	100	100	100	35.8	37.4	36.6	**69.4**	**73.6**	100	**64.2**
100	100	**84.7**	**65.8**	33.8	33.8	**84.7**	**87.8**	33.5	33.8	36.3	**74.7**
100	100	32.6	100	100	100	35.1	35	8.2	33.3	100	33.8
100	100	33.2	100	100	100	38.4	**78**	**56.1**	**58.5**	100	100
100	100	100	**75.6**	100	35.7	43.4	**71.7**	100	36.7	100	38.4
100	100	**67.3**	**83.5**	100	33.6	**74.1**	**75.2**	34.1	35.7	38.4	37.8
100	33.3	0	100	100	100	**85.1**	100	100	100	100	33.5
100	100	37.5	100	100	35	100	32.5	35	100	100	2.5
100	100	35.7	23.3	100	33.8	36.3	38	33.3	33.3	33.3	**61.8**
36.4	38.2	100	100	100	32.2	36.4	38.2	31.1	31.1	100	7.1
100	100	**75.3**	32	100	37.2	**79.7**	30.6	**55.7**	100	**85.8**	30.7
100	33.3	100	100	100	33	100	33.8	38.5	35.4	100	31.4
33.6	33.6	100	100	100	33.6	36.3	36	33	35.3	33.6	37.8
100	100	**67.5**	32.1	**82.3**	100	30.3	100	37.4	38.7	6.6	34.8
100	33.3	**81.4**	100	33.4	31.1	100	100	14	33.8	**78.1**	**65.8**
100	100	**86.4**	100	100	100	100	**86.4**	18.2	36.4	100	100
100	100	33.1	**54.5**	100	100	37.3	100	**51.8**	33.1	33.1	4.5
100	100	33.5	100	33.8	100	32.3	21	43.2	45.8	100	33.5
100	38.6	**81.3**	33.3	33.3	37.3	31.3	33	5.6	**86.4**	31.1	44.8
100	100	32.7	100	100	100	100	100	0	100	3.5	37.3
100	33.8	**57.1**	35.5	100	33.5	**65.6**	**80.2**	100	100	100	**54.5**
100	100	36.6	33.7	33.8	37.5	**75.5**	**60.4**	20.3	40.6	100	**90**
100	100	100	33.7	100	33.3	6	31.5	100	33.3	100	33.7
100	**87.5**	100	42.3	100	100	6.2	37.5	100	**87.5**	100	100
100	33.5	33.2	**89.6**	100	**89.6**	**76.4**	**65.4**	17.1	28.3	100	33.4
100	33.8	**74.5**	3.3	100	33.3	**59**	35.7	33.1	33.1	100	17.4
100	100									00	37.3
100	33.3									.4	35.2
100	37.6									.6	**70.7**
100	100									00	1.5
100	**86.1**									00	**54.1**
100	100									7.1	33.2
100	100									00	34.8
33.7	33.7									00	**71.3**
100	33.3	0.3	33.4	0	33.6	1.6	**87.8**	33.3	33.3	34.3	33.4
100	33.4	28.1	100	100	**75.8**	0.4	7.4	**67.6**	100	100	**77.6**
100	33.5	**75.2**	100	100	0	6.5	100	12.1	100	100	0
100	100	18.3	17.6	33.3	33.7	40.1	47.7	**67.7**	**68.2**	8.3	33.4
100	100	43.8	33.5	0	33.5	**54.1**	**52.7**	0	0	0	33
100	100	0	33.3	33.5	33.3	0	0	0	0	33.4	**88.8**
100	33.3	0	0	100	100	0.1	0.1	0.4	1.6	25.7	0

2006

Date of Bir	Sex	Medical Hi	Pre-proced	Procedure	Vessels tre	Renal disea	Diabetes	Discharge	Discharge	PCI hospit	NHS numb
100	100	100	100	100	100	100	100	100	100	100	100
100	100	99.5	100	100	100	99.6	99.9	100	100	100	100
100	100	100	99.6	100	100	100	100	100	100	100	99.2
100	100	100	98.7	100	100	99.3	99.3	100	100	100	100
100	99.5	100	100	100	99.5	98.8	100	98.3	100	100	99.8
100	100	100	100	100	98.8	99.9	99.9	99.5	99.5	99.5	97.5
100	99.8	100	100	100	98.6	98.6	99.1	99.5	99.5	100	98.6
100	99.9	99.6	100	100	97.6	98.8	98.9	99.7	99.5	100	98.4
100	100	98.3	95.6	100	100	100	99.4	100	100	100	98.3
100	100	94.7	100	100	98	95.4	99.3	100	100	100	98.7
100	100	98.3	99.7	100	100	**89.1**	98.9	100	100	99.7	99.8
100	100	**85.6**	99.5	100	98.4	98.8	97.2	100	100	100	99.8
100	100	97.3	98.8	100	97.6	98.7	95.2	100	100	91.3	99.5
100	100	99.3	**86.5**	100	100	99.5	99.5	99.8	99.8	99.3	**75.3**
100	99.5	**88.2**	100	100	99.5	**88**	**89.8**	98.9	98.3	97.8	97.7
100	100	**89**	100	100	100	99.4	**76.9**	99.4	100	100	91.9
100	100	94	**74.6**	99.5	100	96.6	96.8	99.5	99.8	98.5	94.8
100	100	**76.4**	100	100	100	94.6	94.9	92.6	97.6	97.6	96
100	100	**82.6**	95.4	100	99.6	90.6	95.1	99.1	90.5	99.9	99.8
98.2	98.2	100	100	99.6	97.5	**58.3**	**76.3**	100	100	100	99.3
100	100	**64.7**	100	100	99.4	99.1	96.8	100	100	**60.6**	97.7
100	100	**69.4**	94.5	100	98.7	99.1	100	99.4	100	**51.5**	99.2
100	94	99.7	100	100	96.5	**57**	90.7	100	**77.4**	100	92.2
100	100	99.3	100	100	100	100	99.7	100	100	100	0
100	100	99.4	100	100	100	98.4	100	100	100	100	0
100	99.6	100	100	100	99	**70.8**	96.4	**75.9**	**76.7**	100	**83.4**
97.4	99.2	100	100	100	95.8	97.4	96.6	**69.4**	**73.6**	100	**64.2**
100	100	**84.7**	**65.8**	99.8	99.8	**84.7**	**87.8**	99.5	99.8	96.9	**74.7**
100	100	92.6	100	100	100	95.1	95	8.2	99.9	100	99.8
100	100	99.2	100	100	100	98.4	**78**	**56.1**	**58.5**	100	100
100	100	100	**75.6**	100	95.7	93.4	**71.7**	100	96.7	100	98.4
100	100	**67.3**	**83.5**	100	99.6	**74.1**	**75.2**	94.1	95.7	98.4	97.8
100	99.9	0	100	100	100	**85.1**	100	100	100	100	99.5
100	100	97.5	100	100	95	100	92.5	95	100	100	2.5
100	100	95.7	29.9	100	99.8	96.9	98	99.9	99.9	99.9	**61.8**
96.4	98.2	100	100	100	92.2	96.4	98.2	91.1	91.1	100	7.1
100	100	**75.3**	92	100	97.2	**79.7**	90.6	**55.7**	100	**85.8**	90.7
100	99.3	100	100	100	99	100	99.8	98.5	95.4	100	91.4
99.6	99.6	100	100	100	99.6	96.9	96	93	95.3	99.6	97.8
100	100	**67.5**	92.1	**82.9**	100	90.9	100	97.4	98.7	6.6	94.8
100	99.9	**81.4**	100	99.4	91.1	100	100	14	99.8	**78.1**	**65.8**
100	100	**86.4**	100	100	100	100	**86.4**	18.2	96.4	100	100
100	100	99.1	**54.5**	100	100	97.3	100	**51.8**	99.1	99.1	4.5
100	100	99.5	100	99.8	100	92.3	21	43.2	45.8	100	99.5
100	98.6	**81.9**	99.3	99.9	97.3	91.9	99	5.6	**86.4**	91.1	**44.8**
100	100	92.7	100	100	100	100	100	0	100	3.5	97.9
100	99.8	**57.1**	35.5	100	99.5	**65.6**	**80.2**	100	100	100	**54.5**
100	100	96.6	99.7	99.8	97.5	**75.5**	**60.4**	20.9	40.6	100	**90**
100	100	100	99.7	100	99.9	6	91.5	100	98.9	100	98.7
100	**87.5**	100	42.9	100	100	6.2	97.5	100	**87.5**	100	100
100	99.5	98.2	**89.6**	100	**89.6**	**76.4**	**65.4**	17.1	28.3	100	98.4
100	98.8	**74.5**	3.3	100	99.3	**59**	95.7	98.1	98.1	100	17.4
100	100	**64.9**	20.9	100	90.7	0.3	**63.8**	100	100	100	97.3
100	96.3	26.2	**52.4**	100	98.8	41.7	96.9	**87.2**	97.9	99.4	95.2
100	97.6	**58.1**	32.9	99.4	98.8	**88**	**79.6**	**64.1**	**65.3**	**69.6**	**70.7**
100	100	**80.3**	100	100	100	97.5	**69.5**	96.5	97.9	100	1.5
100	**86.1**	3.6	16.3	99.8	100	**74.2**	**85.9**	99.8	99.8	100	**54.1**
100	100	47.9	25.9	99.9	98.3	1.3	47.1	100	96.5	97.1	98.2
100	100	100	1.3	100	100	0.3	14.4	100	99.5	100	94.8
99.7	99.7	100	9.5	100	100	0.4	11.9	100	96.6	100	**71.3**
100	99.9	0.3	98.4	0	98.6	1.6	**87.8**	99.9	99.9	94.9	99.4
100	98.4	28.1	100	100	**75.8**	0.4	7.4	**67.6**	100	100	**77.6**
100	98.5	**75.2**	100	100	0	6.5	100	12.1	100	100	0
100	100	18.9	17.8	99.9	99.7	40.1	47.7	**67.7**	**68.2**	8.9	98.4
100	100	49.8	99.5	0	99.5	**54.1**	**52.7**	0	0	0	99
100	100	0	99.9	99.5	98.3	0	0	0	0	99.4	**88.8**
100	99.9	0	0	100	100	0.1	0.1	0.4	1.6	25.7	0

2007

Date of Bir	Sex	Medical Hi	Pre-proced	Procedure	Vessels tre	Renal disea	Diabetes	Discharge	Discharge	PCI hospit	NHS numb
100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	99.8
100	100	100	100	100	99.9	100	100	100	100	100	99.8
100	100	99.8	100	100	100	100	100	100	100	100	99.8
100	100	99.6	100	100	100	99.9	99.9	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	99
100	100	99.9	100	100	100	98.7	99.8	100	100	100	99.6
100	100	100	100	100	100	100	100	100	98.8	100	99.1
99.9	99.9	99.7	99.9	100	100	99.9	99.7	99.4	99.4	99.5	98.5
100	100	100	100	100	100	96.8	99.5	99.8	99.8	100	99.4
100	100	100	100	100	97.7	98.7	99.5	99.5	100	100	99.7
100	100	98.7	100	100	100	97.7	99.3	100	100	100	99.3
100	100	100	100	100	97.4	98.9	99.3	100	100	99.6	98.5
100	100	99.4	100	100	96.2	100	99.7	100	99.8	99.7	97.5
100	99.9	100	100	100	97.8	97.4	98.8	99.1	99.1	99.1	99.9
100	99.4	100	100	100	99.6	98.7	98.8	100	100	100	99.3
100	100	99.3	100	100	100	100	100	96.6	96.6	97	100
100	98.2	99.1	97.2	100	100	99.4	99.4	97.3	98.8	100	100
100	100	99.2	100	100	100	99.6	99.8	99.9	99.8	100	90.9
100	100	100	100	100	98.6	98.7	98.8	98.7	98.7	94.3	96.8
100	100	100	100	100	99.4	99.8	99.2	100	100	91.7	98.5
100	100	100	100	100	100	97.9	98.2	97.6	97.9	100	94.9
100	100	94.8	100	100	100	97.9	95.8	100	99.9	99.9	98.1
100	99.9	97.8	99.9	100	97.2	97.7	96.9	99.9	100	98.7	98.6
100	100	97.5	99.2	100	100	97.7	98.4	99.8	99.8	99.9	91.5
99.9	99.9	94	100	100	99.9	94.7	96.8	98.7	98.8	97.6	99.1
100	100	91.8	100	100	93	100	99.4	99.8	99.8	94.2	99.8
99.4	98.5	99.9	100	100	96	99.5	97.4	98.9	98.5	100	94.9
100	100	97.9	100	95.6	100	90.7	94.3	99.5	99.5	97.8	100
100	100	100	91.5	99.8	99.5	92	92.8	100	99.9	100	99.2
100	99.9	96.3	98.3	100	99.9	97.3	97.6	94	98.4	98.3	99.9
100	100	93	97.1	99.9	99.7	95.6	97.3	96.5	98.7	99.4	95.7
100	99.8	**76.4**	100	100	98.6	98.9	99.8	99.8	99.4	100	99.8
100	100	99.6	100	100	92.2	96.4	96.8	99.5	94	99.2	97.2
100	99.8	**84.8**	100	100	98.6	100	100	100	99.6	96.9	**87.1**
100	100	99.4	100	100	100	**79.8**	91.3	100	100	100	94.7
100	99.8	**87.1**	98	99.8	99.4	**87.2**	96.4	99.9	99.9	99.9	95.5
100	99.3	**87.6**	100	100	98.9	91.5	91.7	99.2	100	100	94.1
100	100	**76.2**	100	100	100	90.5	**85.7**	95.2	95.2	100	100
100	100	**87**	100	100	100	**76.5**	**83.6**	98.5	99.5	100	99.6
100	100	90.2	100	100	100	96.3	96.1	49.3	100	100	99.6
100	100	100	100	100	100	98.7	100	100	100	100	0
100	100	97.6	0	100	100	100	100	100	99.8	99.6	99.9
100	100	98.7	100	100	100	98.7	98.5	99.7	100	99.5	0
100	100	100	100	100	94.9	**89.6**	100	100	100	100	8.3
100	100	100	**84**	100	98.7	94.1	**67.3**	100	98.9	100	96.8
100	100	100	**75**	100	100	100	100	100	100	100	0
99.6	100	**80.5**	100	100	99.1	94.1	100	**57.4**	**57.4**	99.5	99.2
100	100	27.3	**66.9**	100	99.7	**83.8**	99.6	100	100	100	99.5
100	99.3	**78.3**	100	100	99.3	94.1	**89.5**	99.3	97.9	100	**60.8**
99.2	90.4	99.8	100	100	97.3	98	98.1	**82**	**50.3**	43.9	99.7
100	100	98.2	99.8	100	99.3	99.3	99.8	99.4	99.1	9.3	99.6
100	99.3	97.1	99.1	99.9	96.1	96.3	99.6	13	**87.4**	97.6	**97.8**
100	100	98.9	100	100	100	**51.6**	**53.2**	**70.6**	99.8	92.4	100
100	100	9.8	94.3	97.6	99.9	**66**	**62.2**	100	100	100	98
100	96.8	100	**64.3**	100	100	29	30.6	100	96.8	100	**88.7**
100	99.7	94.4	**62.5**	99.7	92.1	**65.6**	**74.8**	98.7	99.3	92.8	95.8
100	100	**64.7**	100	100	100	**64.7**	100	17.6	**88.2**	**88.2**	**70.6**
99.9	99.8	100	98.9	100	99.4	95.5	91.8	100	99.2	100	**72.2**
100	99.7	**64.6**	96.8	100	99.1	**86.9**	**86.9**	94.5	96.2	98.8	97.2
100	100	99.1	**70.3**	100	96.6	99.9	97.2	**74.3**	98	99.3	95.9
100	100	100	94.1	100	100	0.3	91.7	100	99.7	100	99.1
100	100	96.7	100	100	100	96.3	**74.3**	90.7	92	100	1
100	99.7	**77**	100	100	0	94.4	100	94.7	100	100	90.1
99.4	99.8	90.2	100	100	0	99.6	100	98.4	98.2	0	92.7

Demographics

2007 data: Ludman

n=69,677

Age (mean)	64.3 yrs
Diabetic	17.5%
Previous CABG	8.5%
Previous PCI	18.6%
Previous MI	29.5%

Demographics

2007 data: Ludman

n=43,929

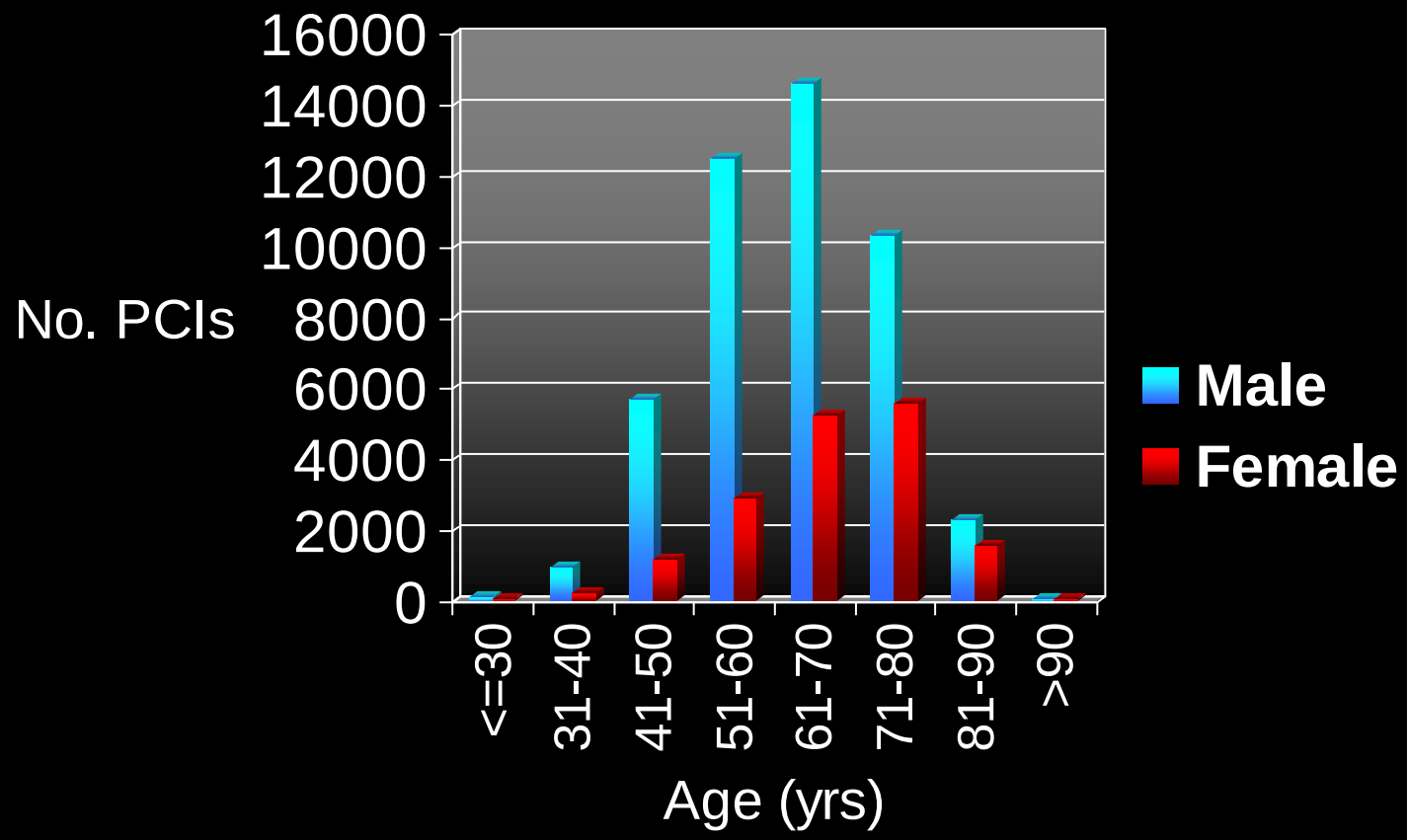
Ethnic Origin	
Caucasian	92.3%
Asian	6.7%
Black	0.83%
Oriental	0.2%

Demographics - Age

Male: mean = 63.1

Female: mean = 67.7

2007 data: Ludman

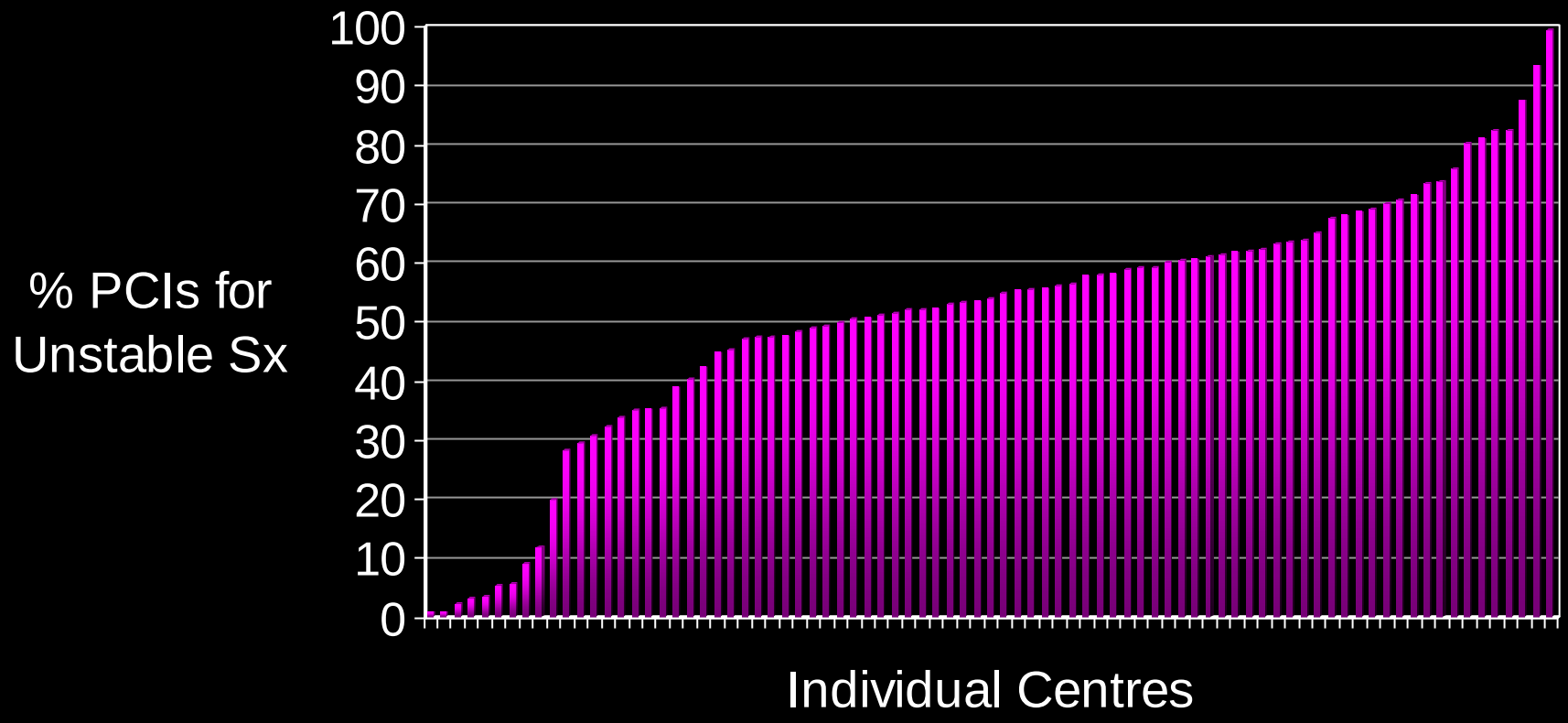


CCAD

Clinical Syndrome

- 47% Stable
- 53% Unstable

2007 data: Ludman

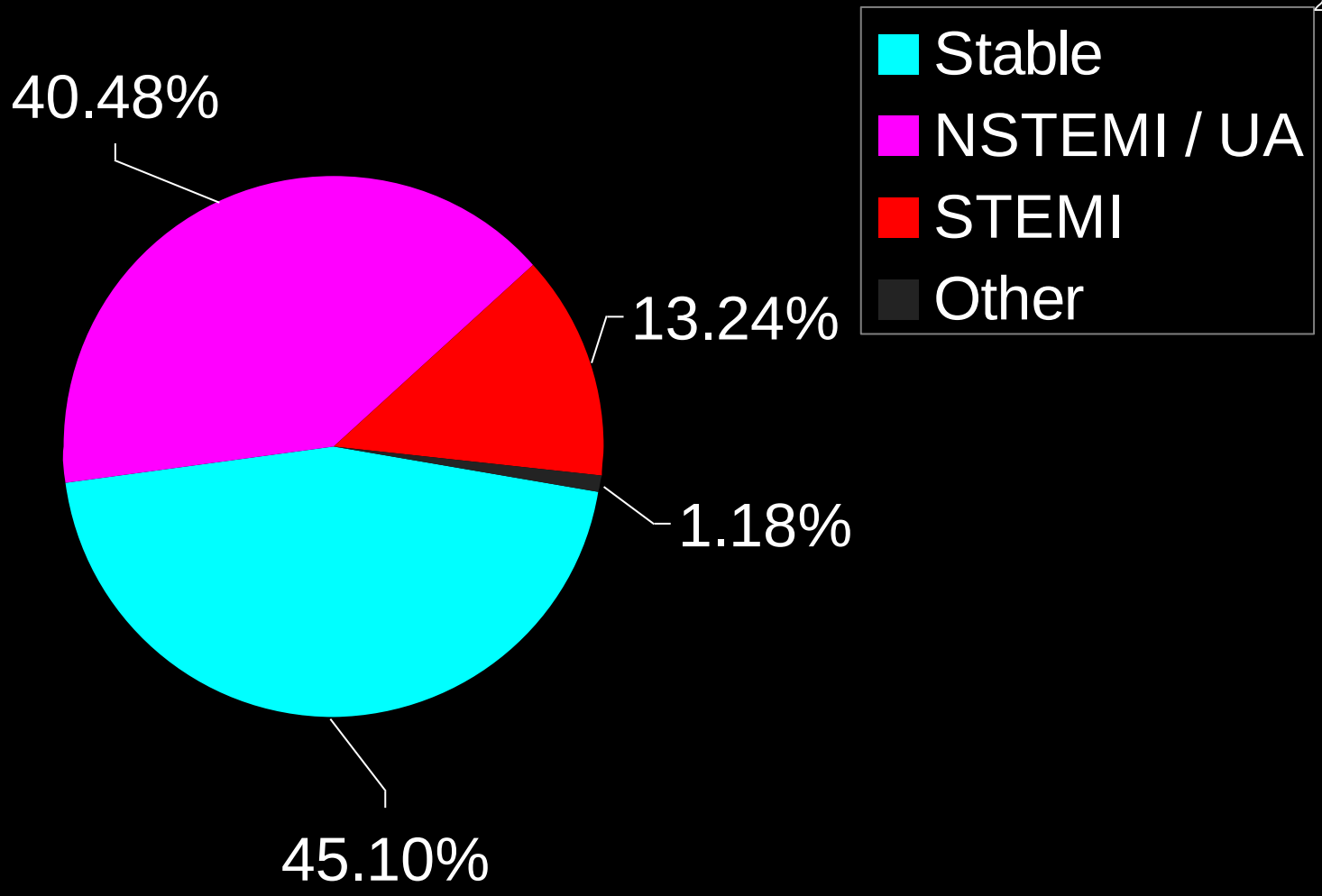


Clinical Syndrome

2007 data: Ludman

Indication for PCI

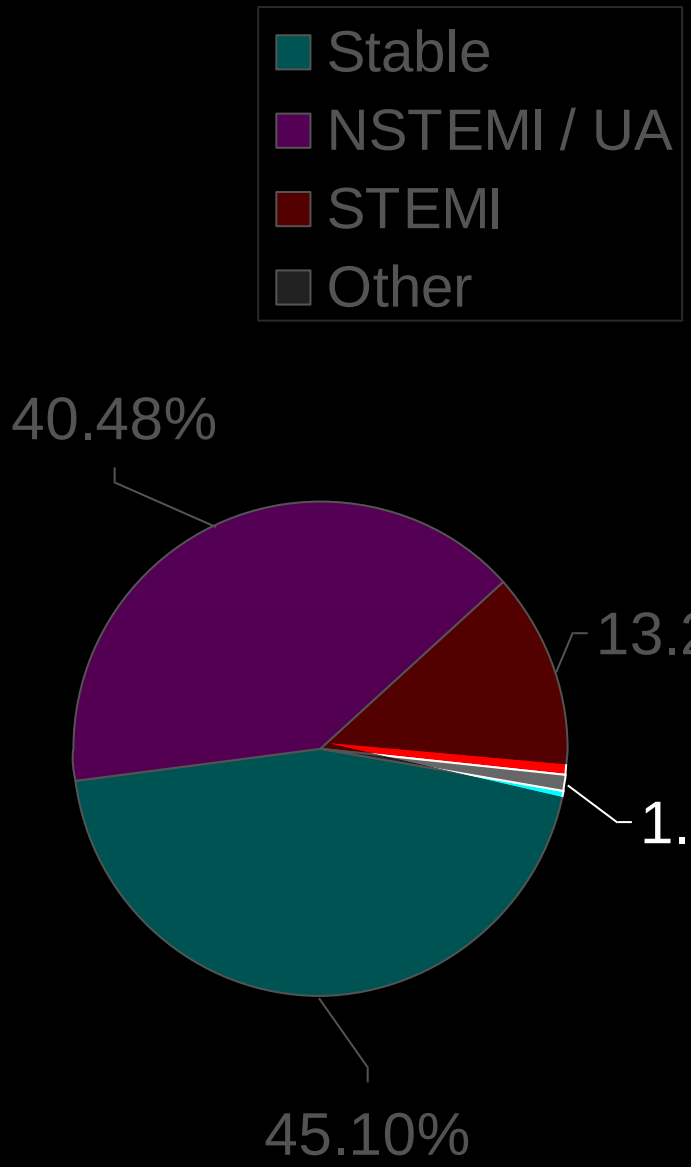
2007 data: Ludman

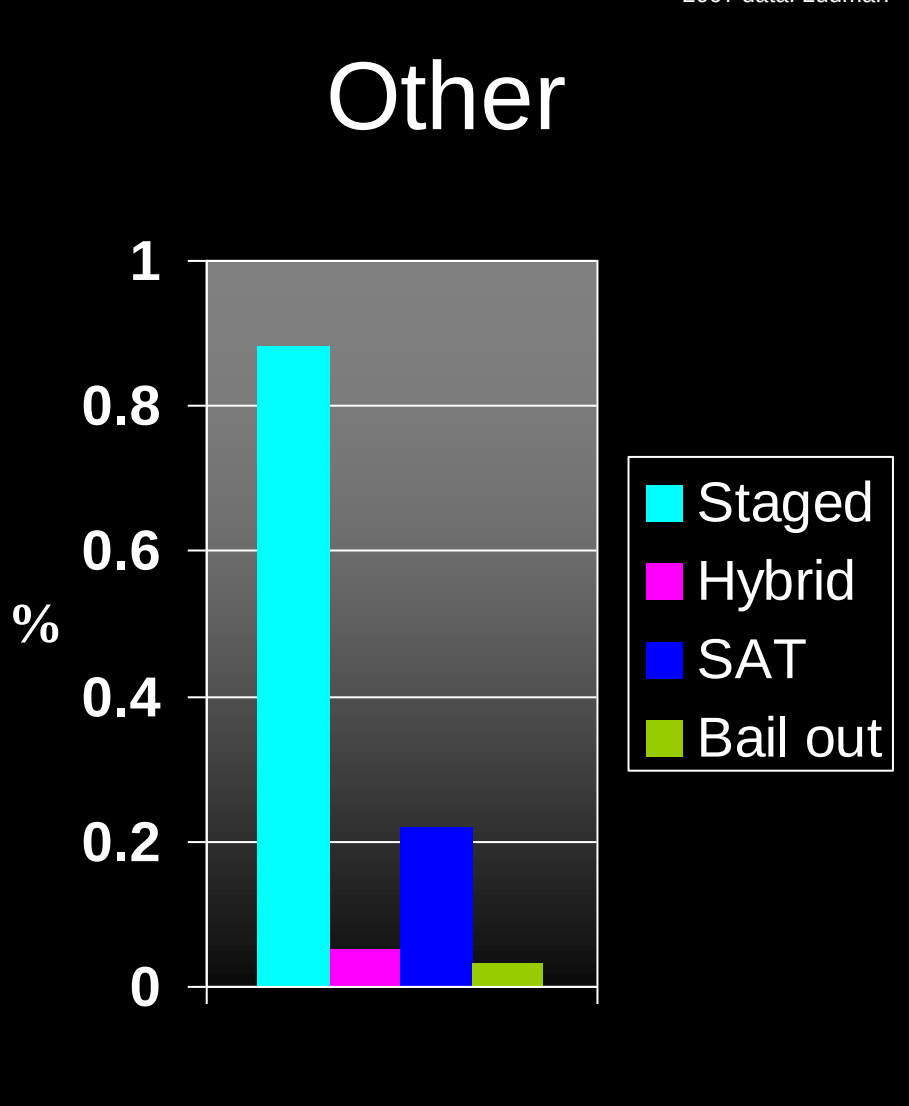


Indication for PCI

BCIS

2007 data: Ludman

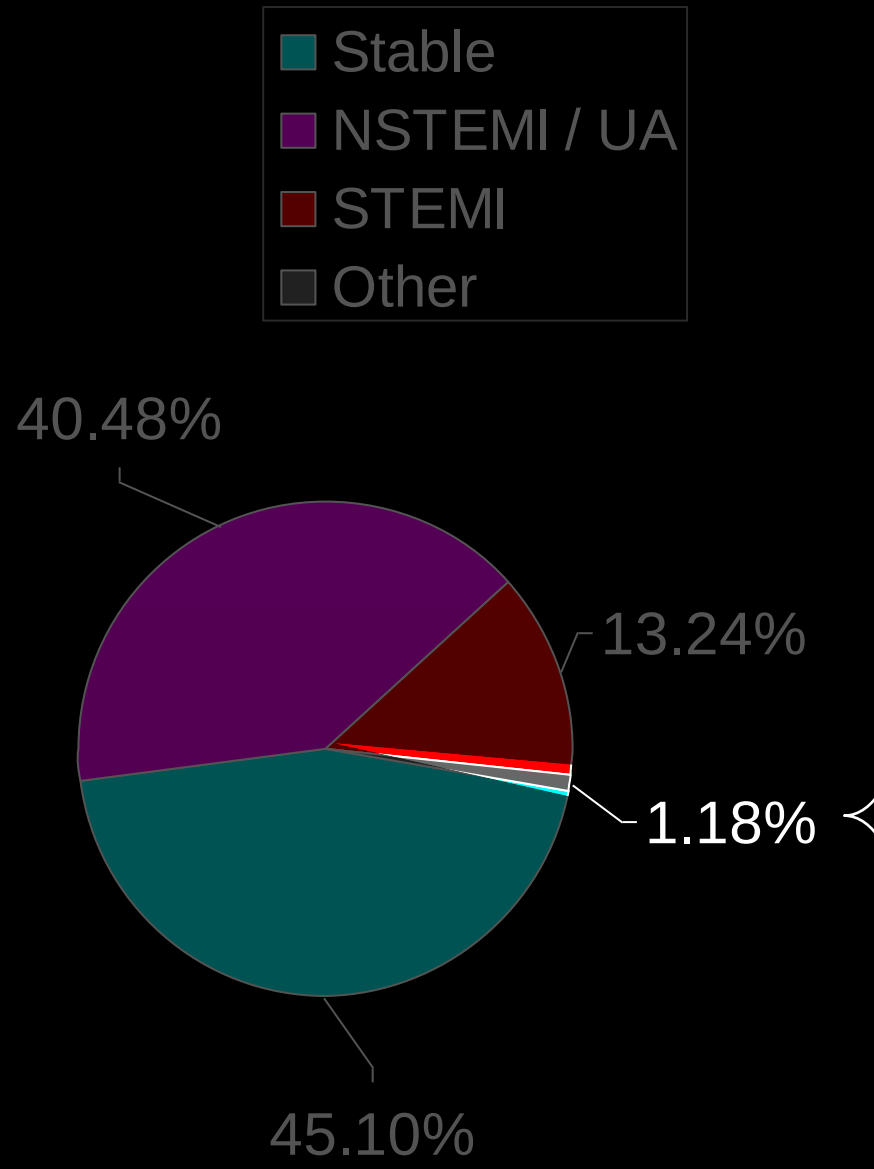




CCAD

Indication for PCI

2007 data: Ludman



Other

PCI for Stent Thrombosis:

144 of 64,266

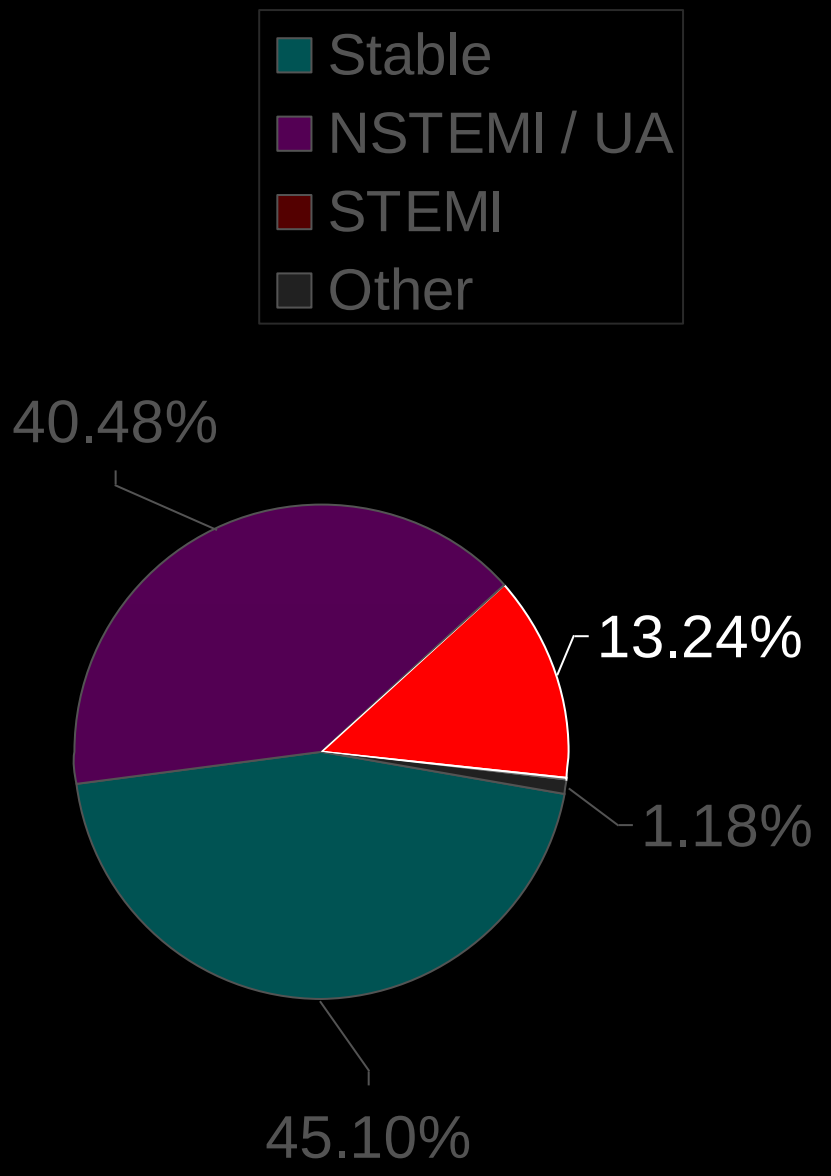
0.22%

(2006 = 0.22%)

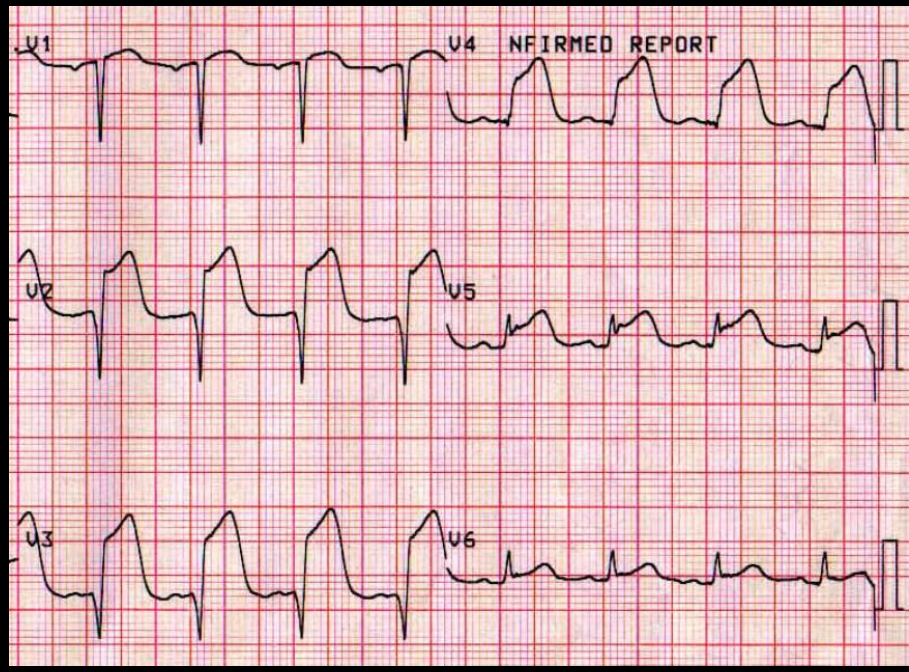
CCAD

Indication for PCI

2007 data: Ludman



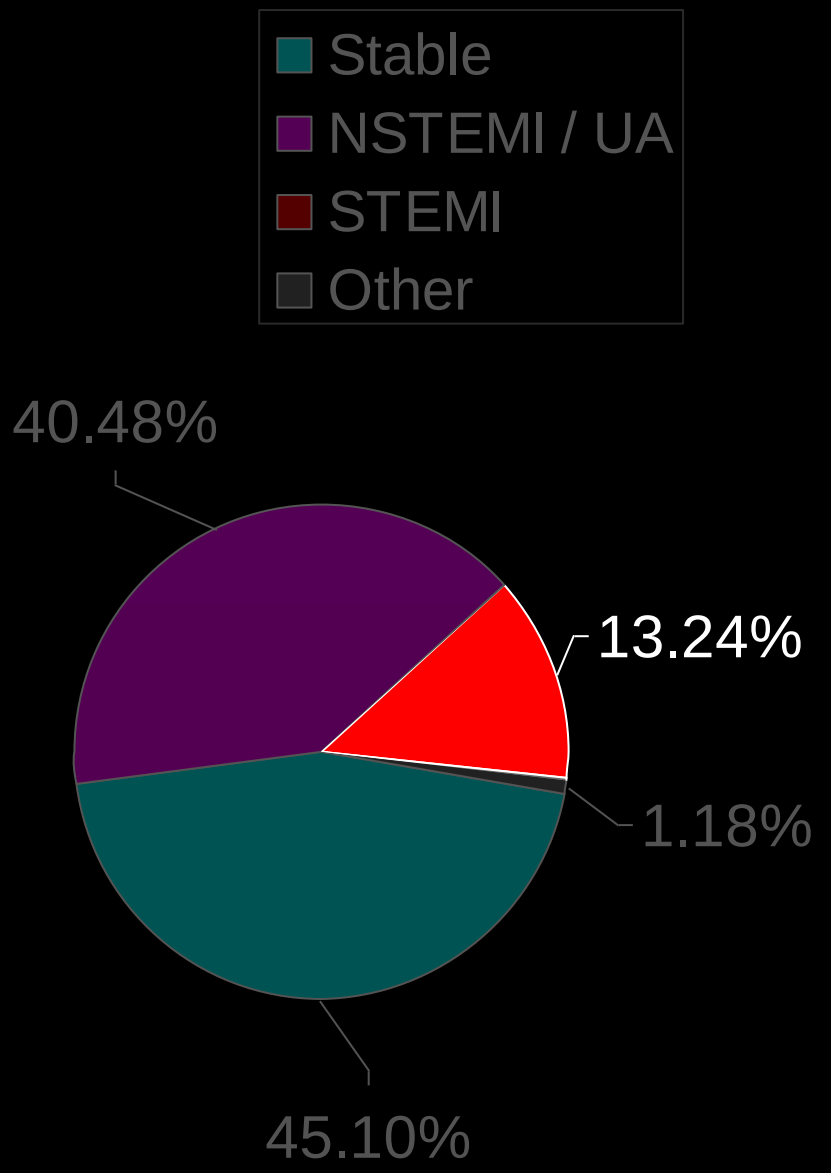
STEMI

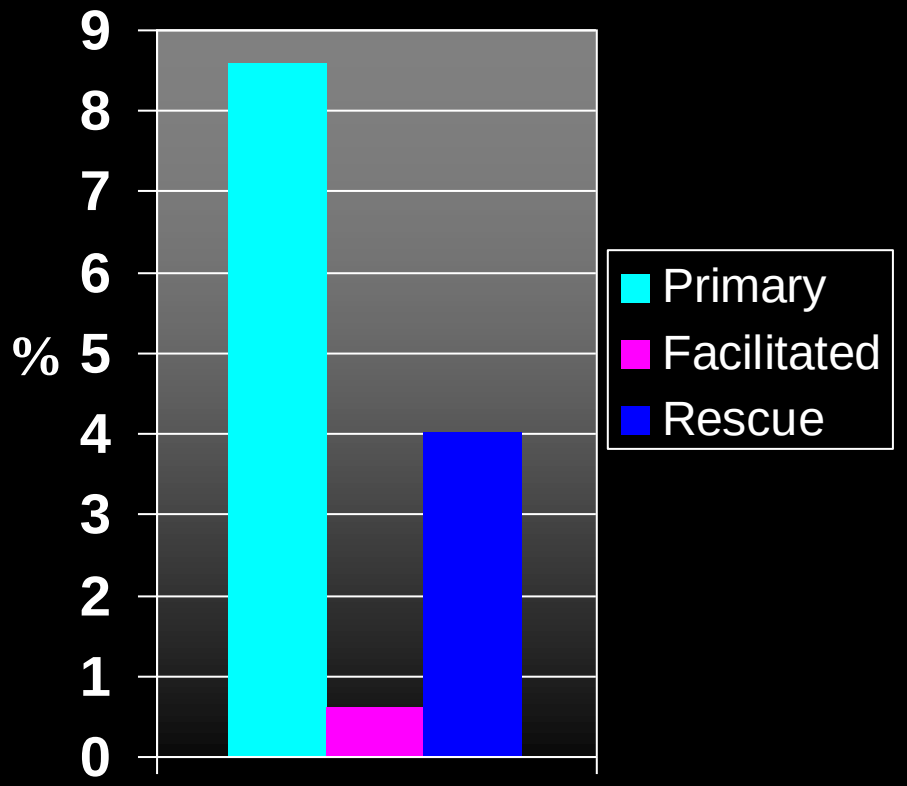


CCAD

Indication for PCI

2007 data: Ludman

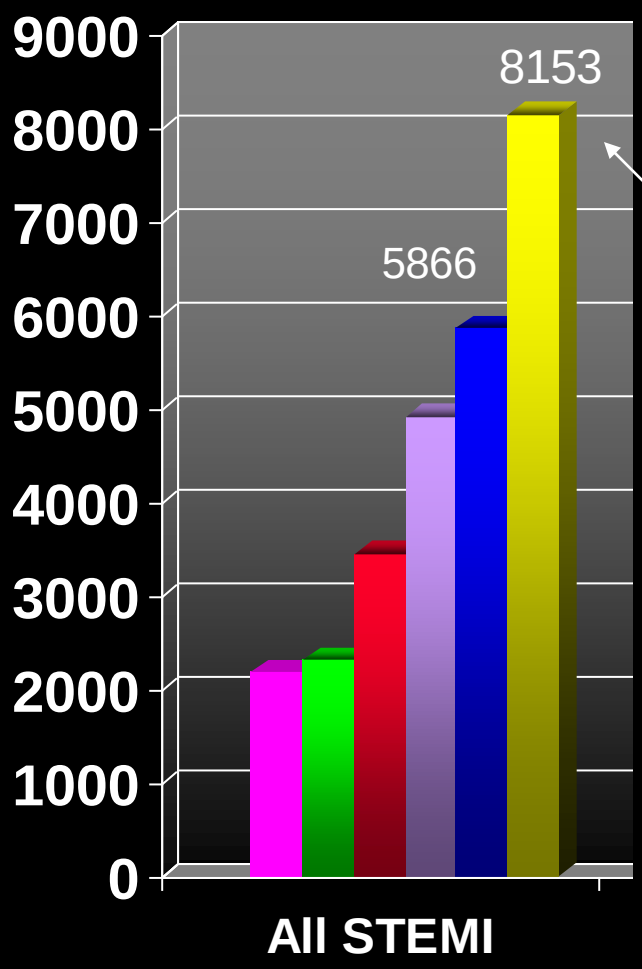




CCAD

PCI for STEMI

2007 data: Ludman



13.24% of UK PCI

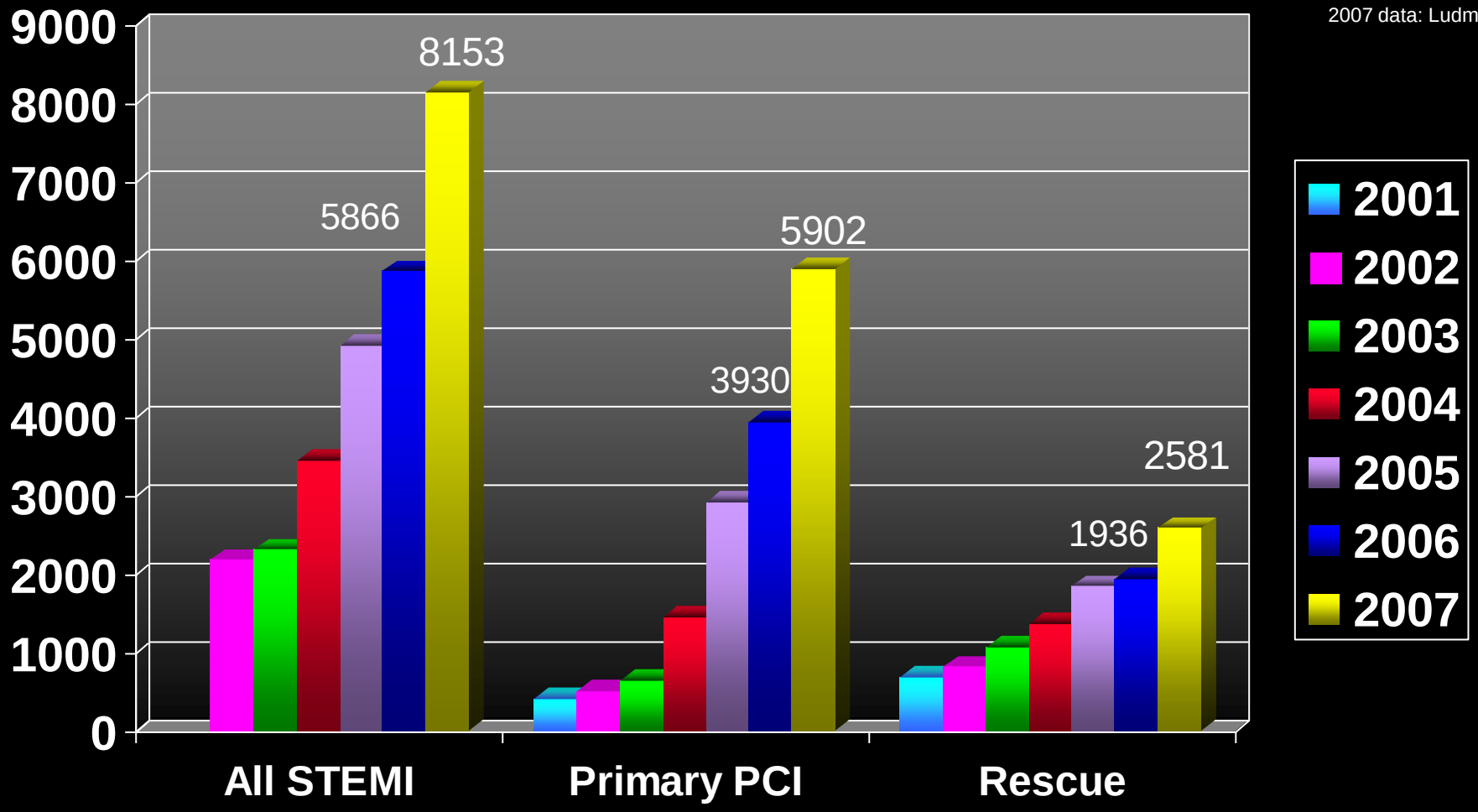
2001
2002
2003
2004
2005
2006
2007

CCAD

PCI for STEMI

BCIS

2007 data: Ludman



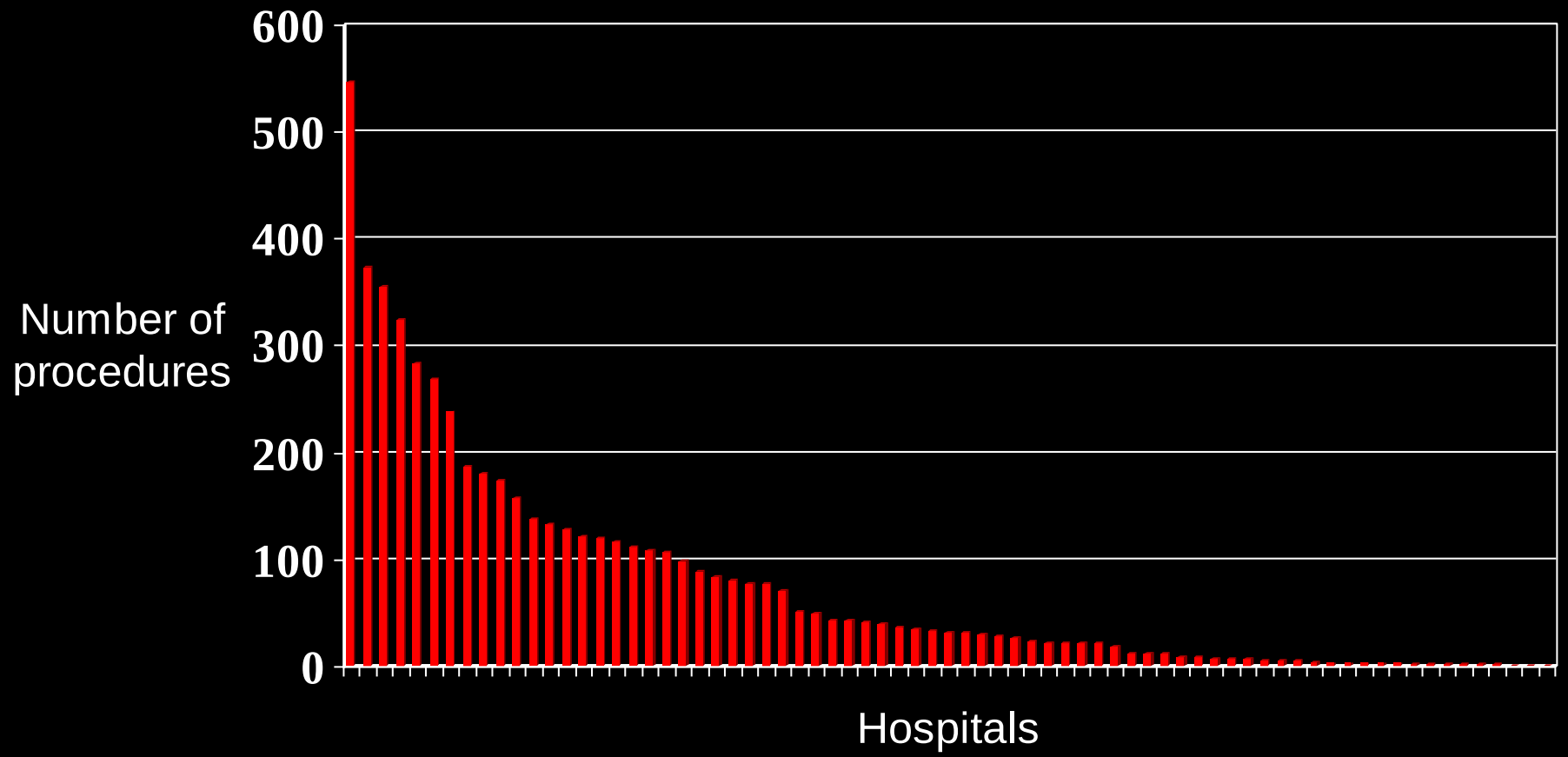
Primary PCI for STEMI

2007 data from NHS Centres

Total 5902 procedures 2007

BCIS

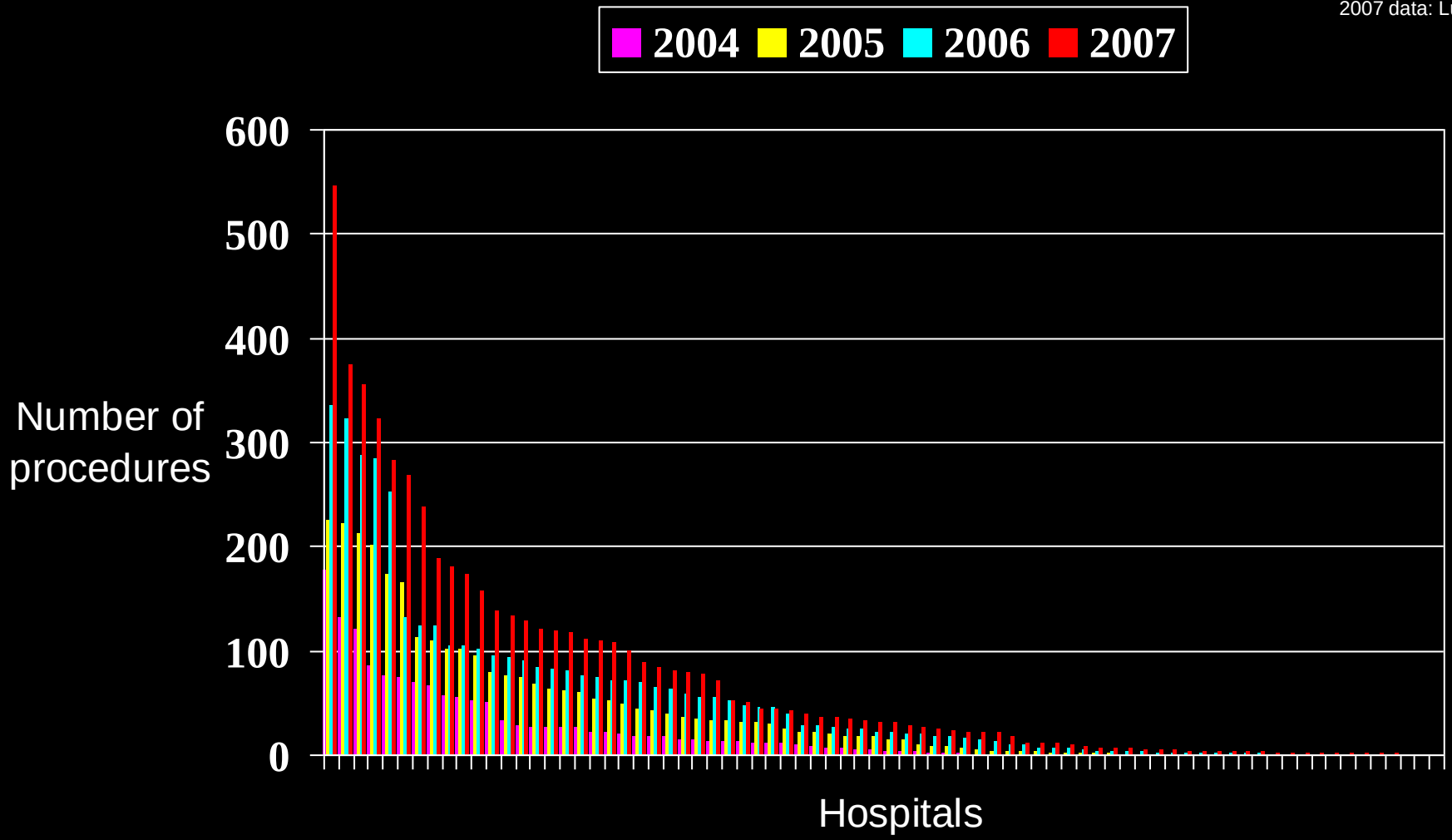
2007 data: Ludman



CCAD

Primary PCI for STEMI

2007 data: Ludman



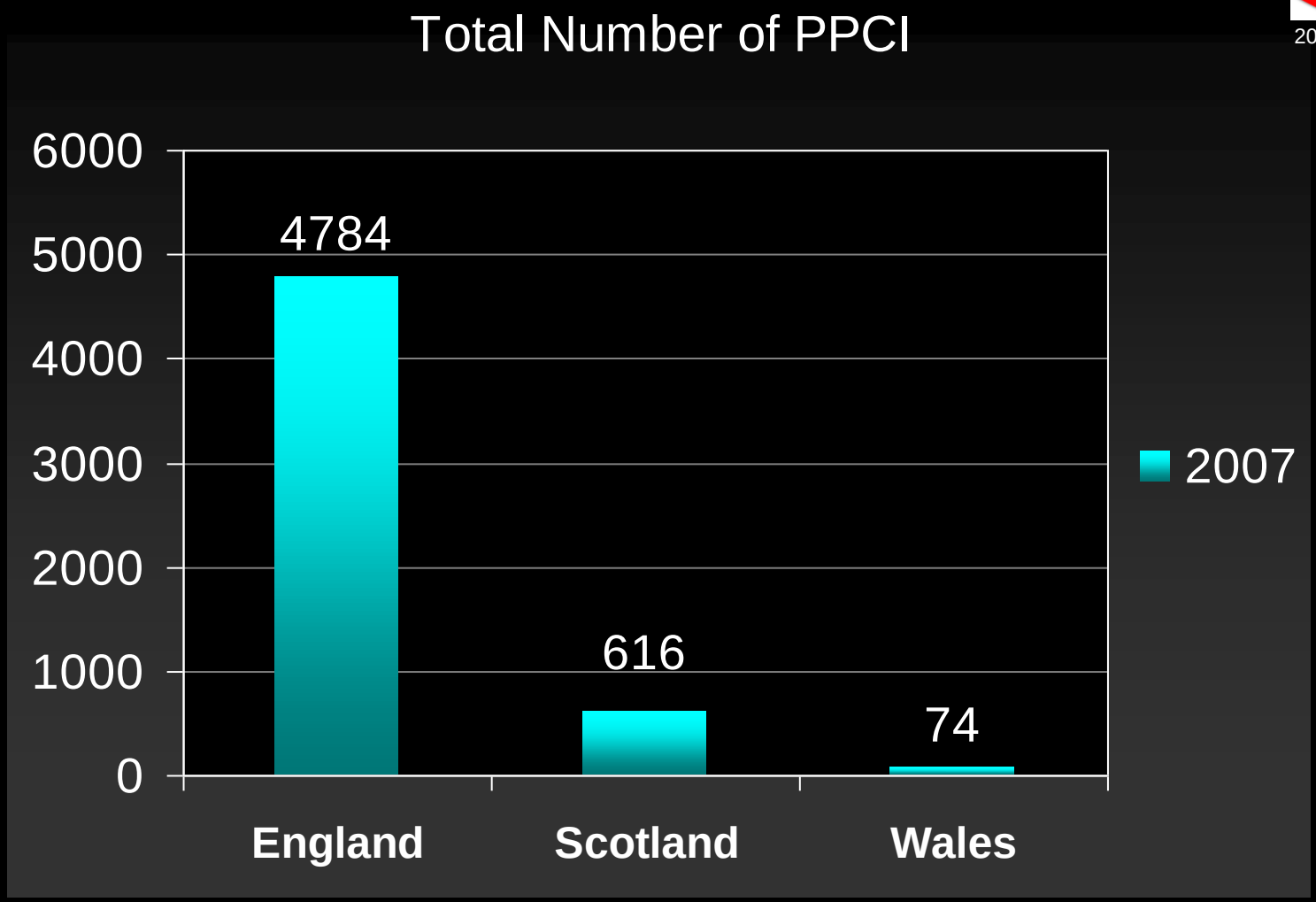
CCAD E&W + Scot

Primary PCI

UK Countries

BCIS

2007 data: Ludman



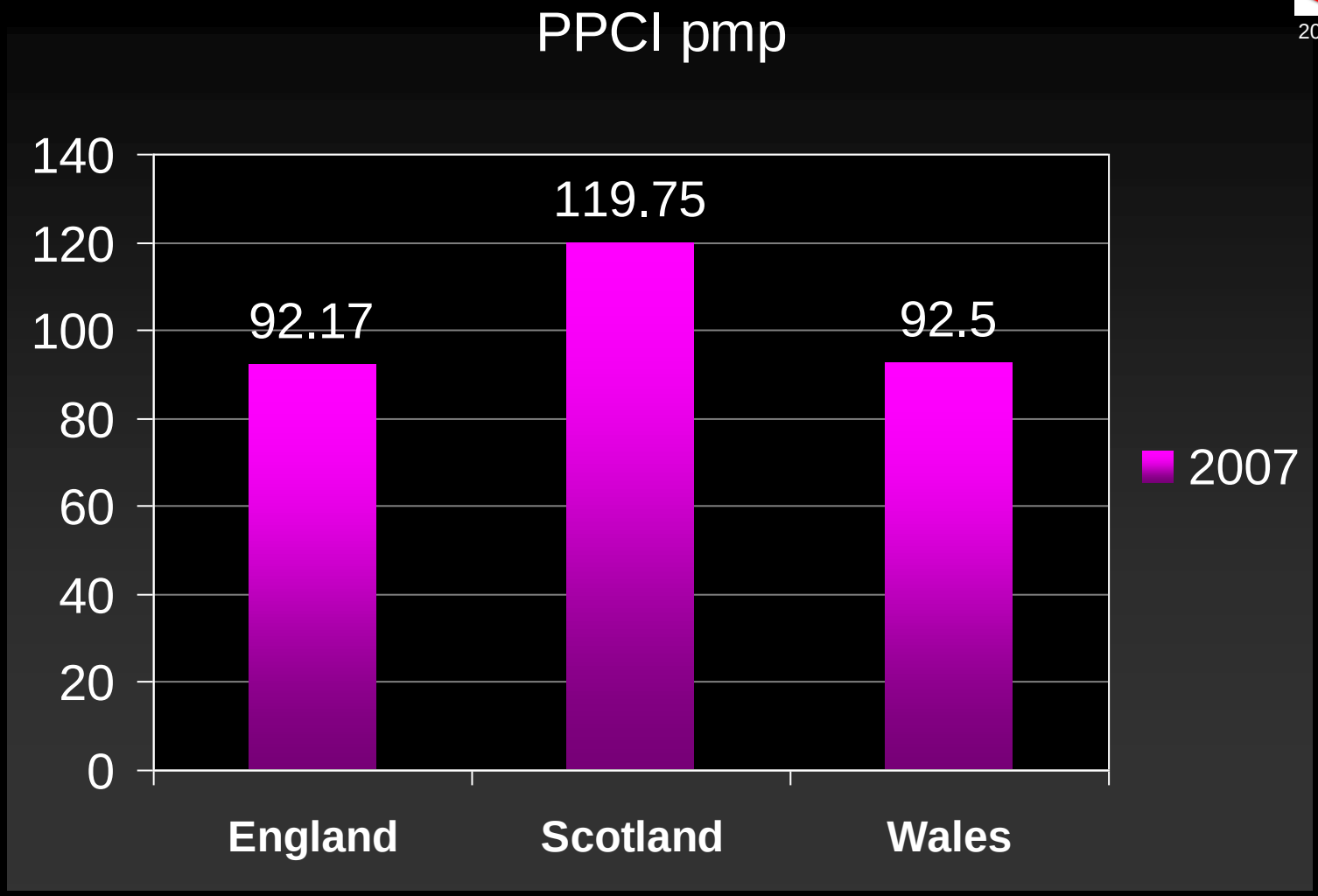
MINAP records 4228 E&W 2007

CCAD

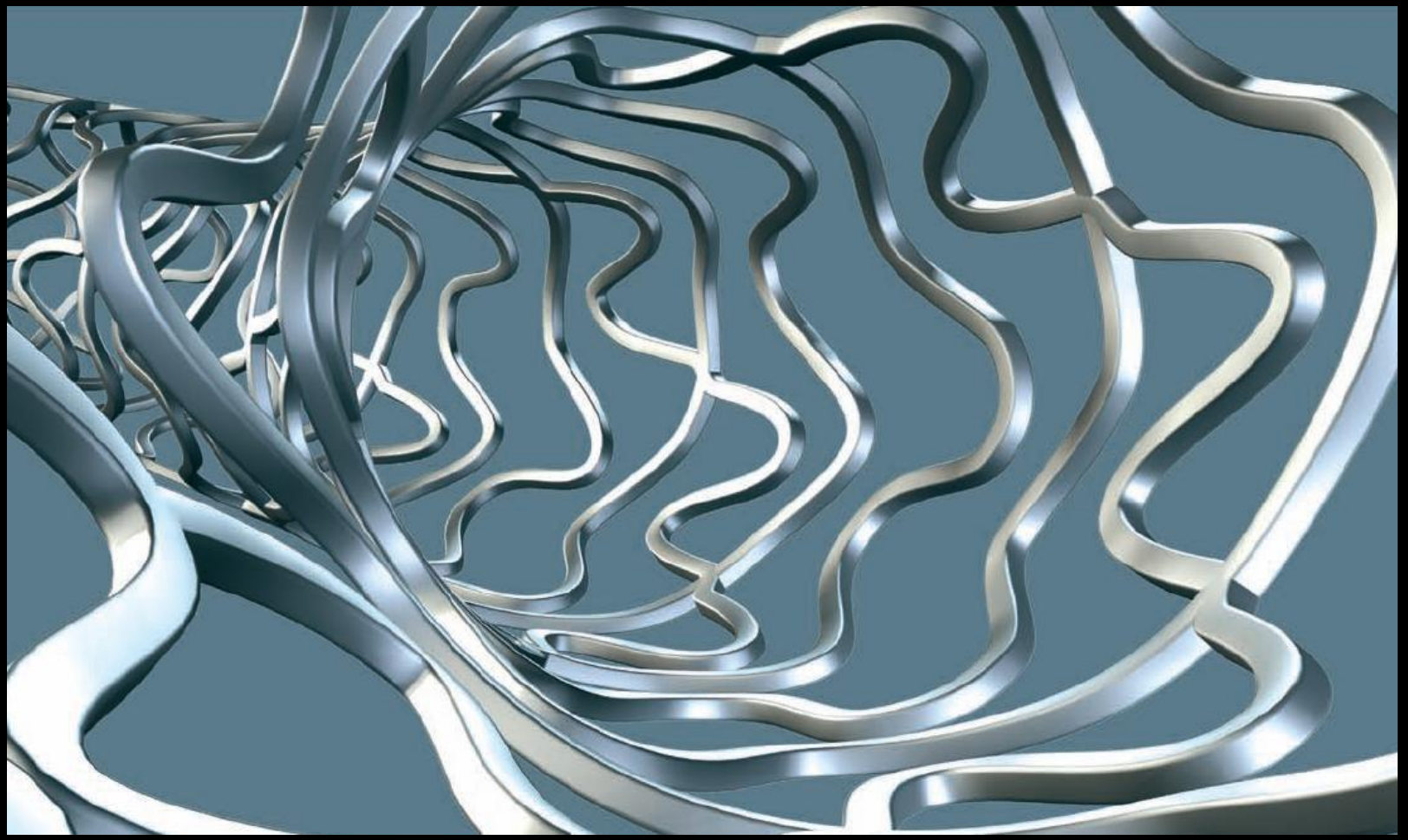
Primary PCI

UK Countries

2007 data: Ludman



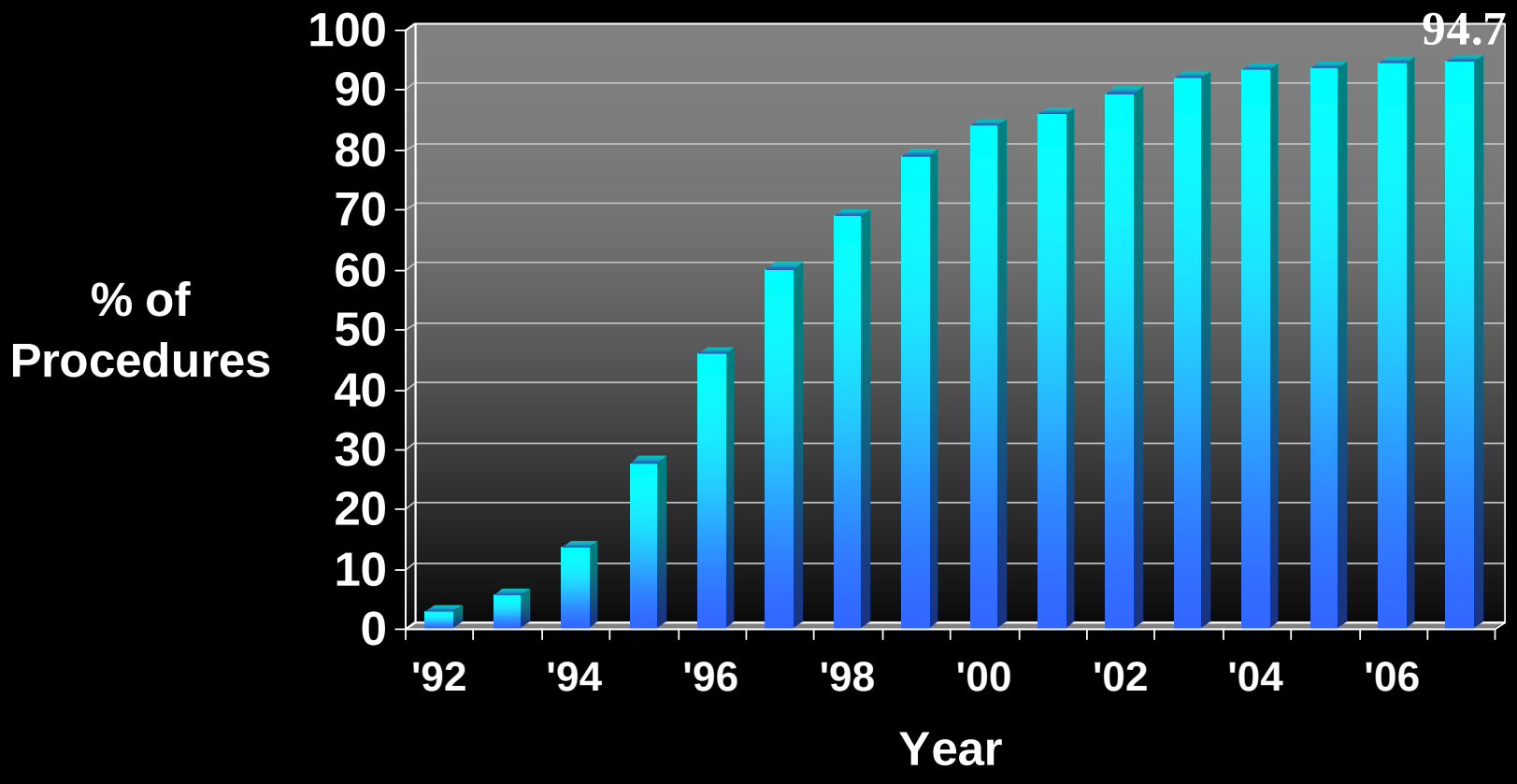
Stents



Procedures using Stents

BCIS

2007 data: Ludman

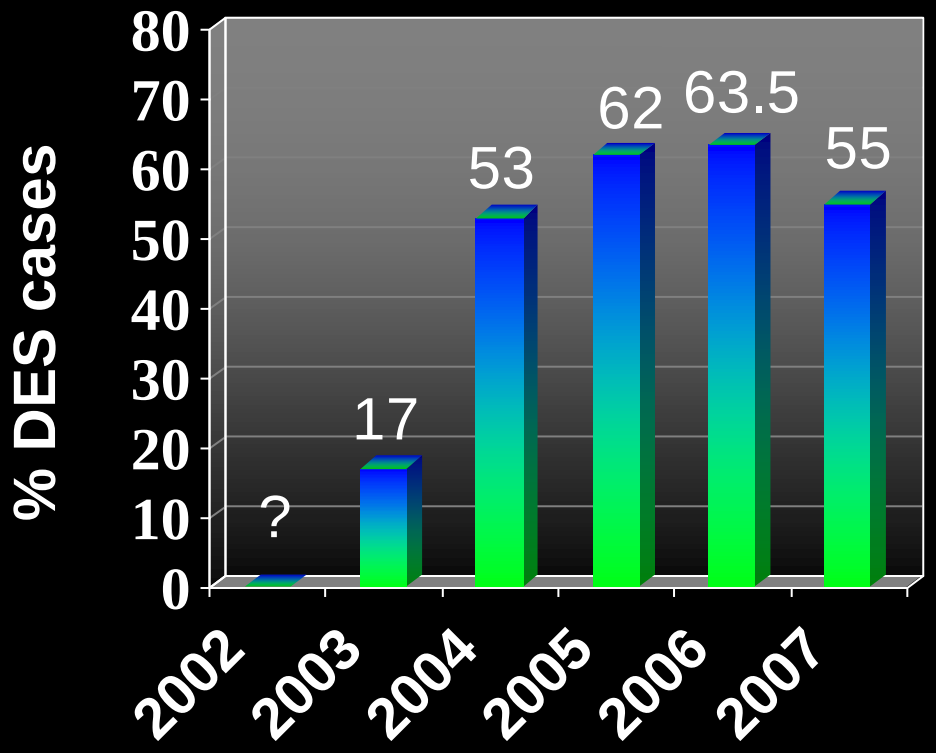


CCAD

Drug Eluting Stent cases

2007 data: Ludman

Mean of % use by Centres

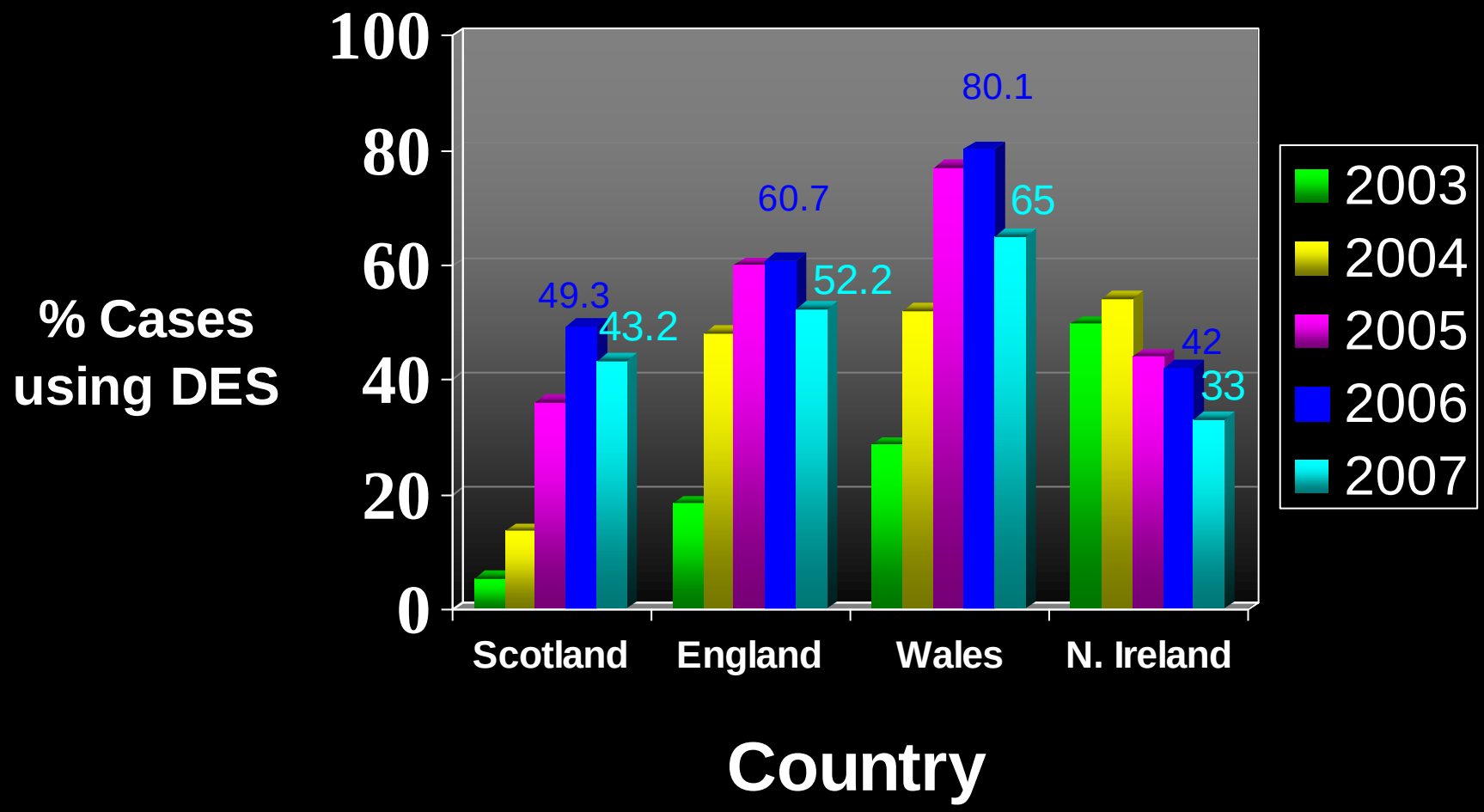


NHS and private

Drug Eluting Stent cases - NHS

BCIS

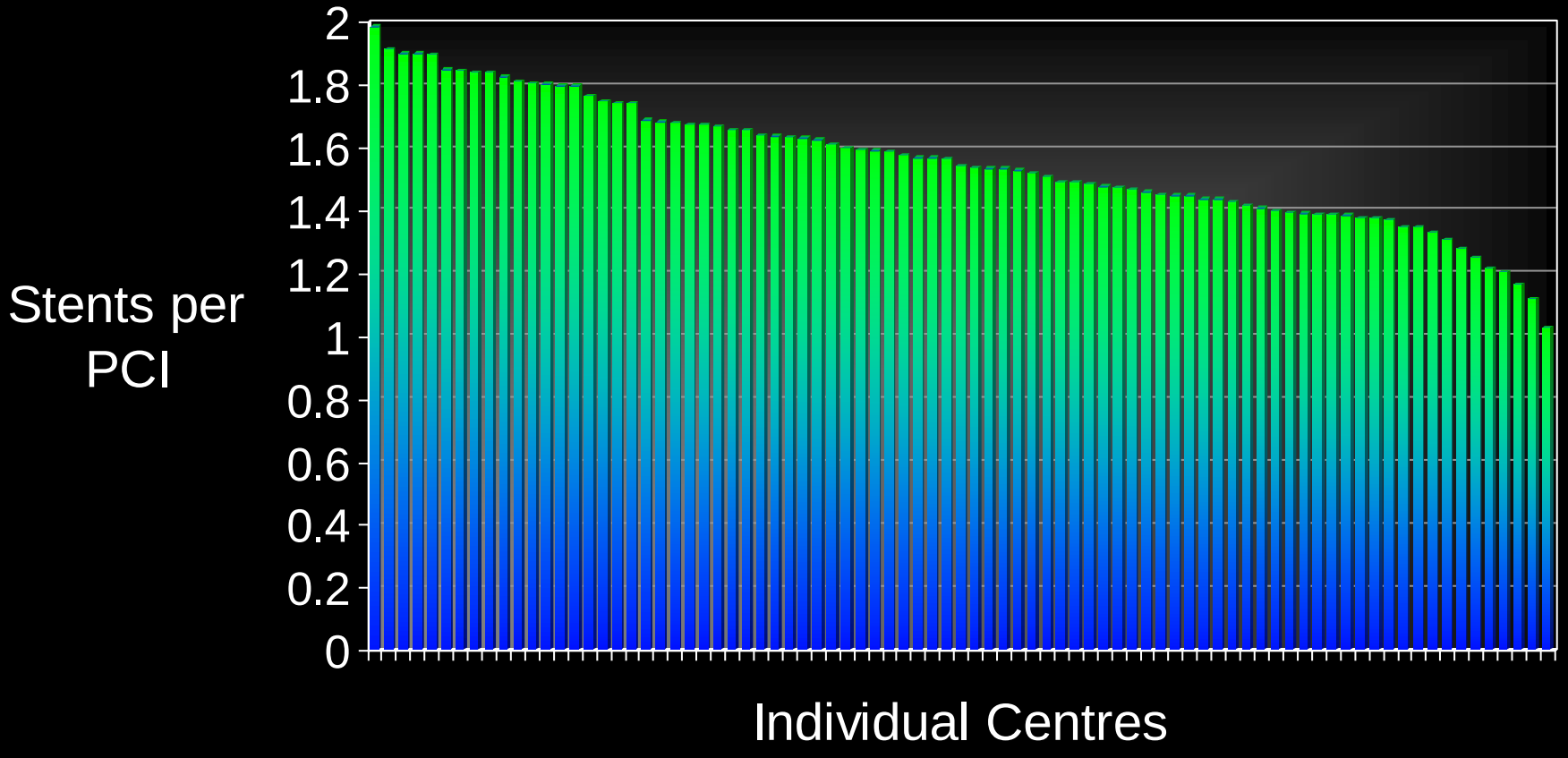
2007 data: Ludman



Stents per Case

Mean stents per case 2005 = 1.62
2006 = 1.63
2007 = 1.55

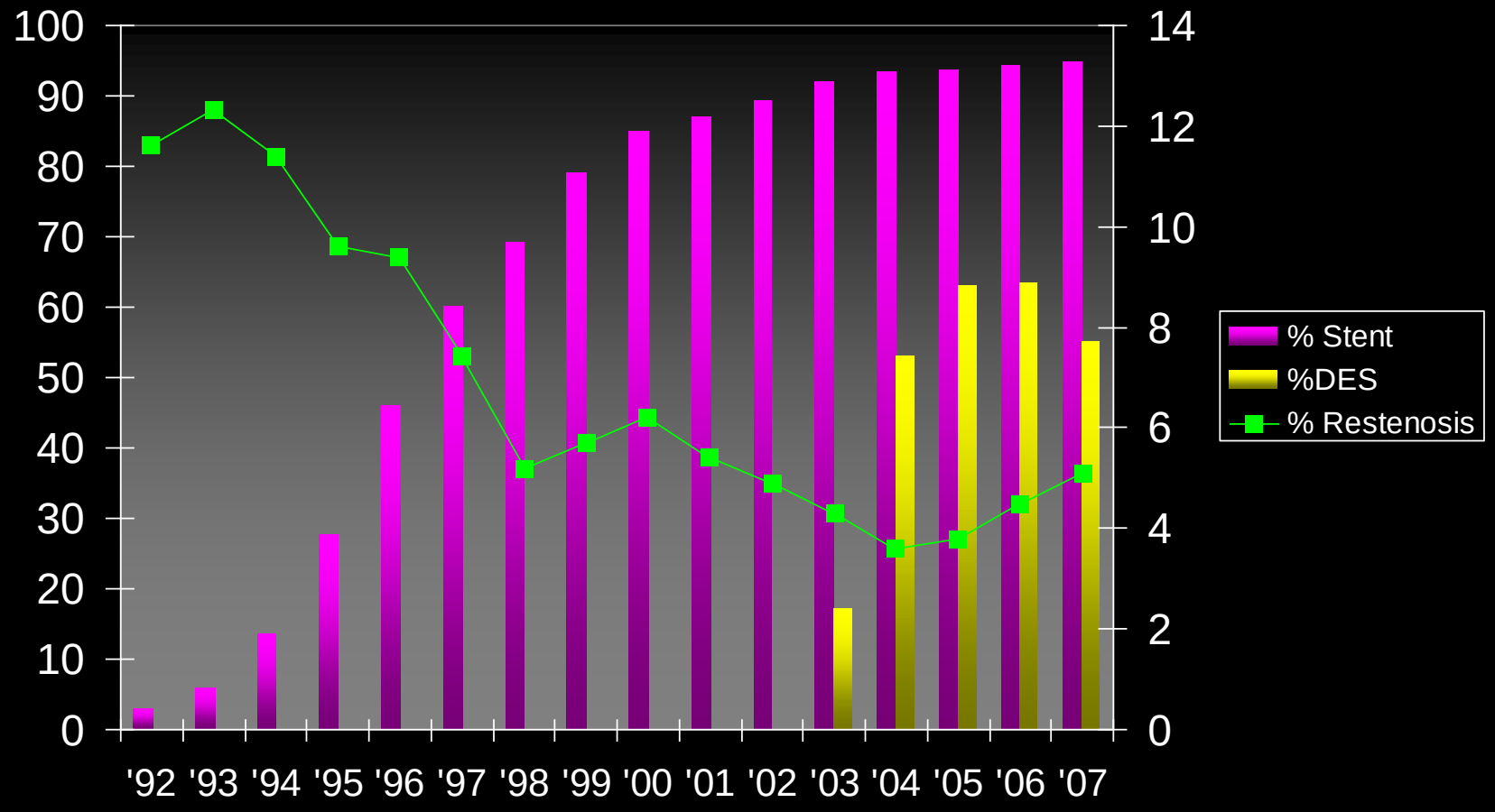
BCIS
2007 data: Ludman



CCAD

BMS and DES use v PCI for Restenosis

2007 data: Ludman

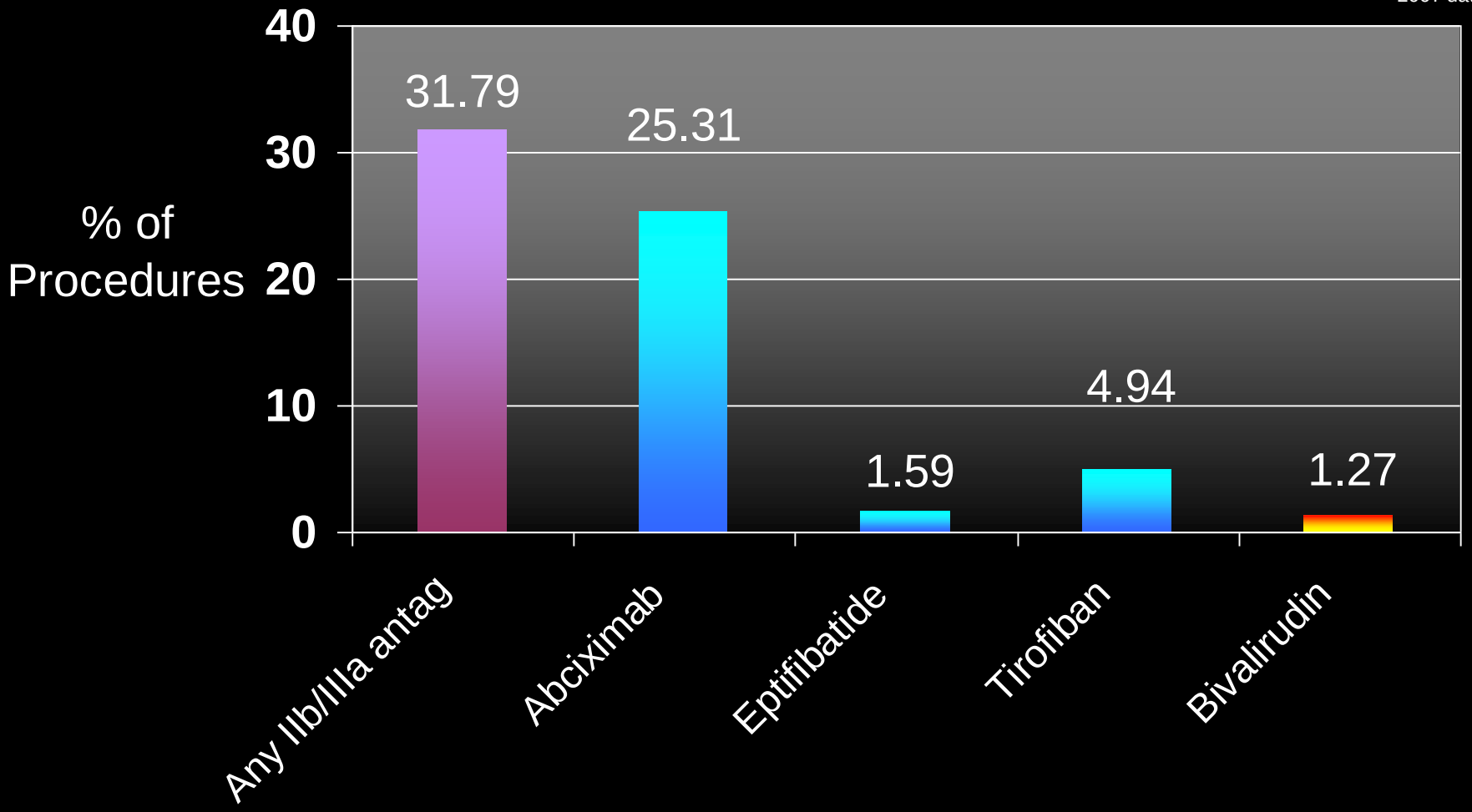


PCI for re-stenosis from CCAD

Adjunctive therapy

Use by Type

2007 data: Ludman



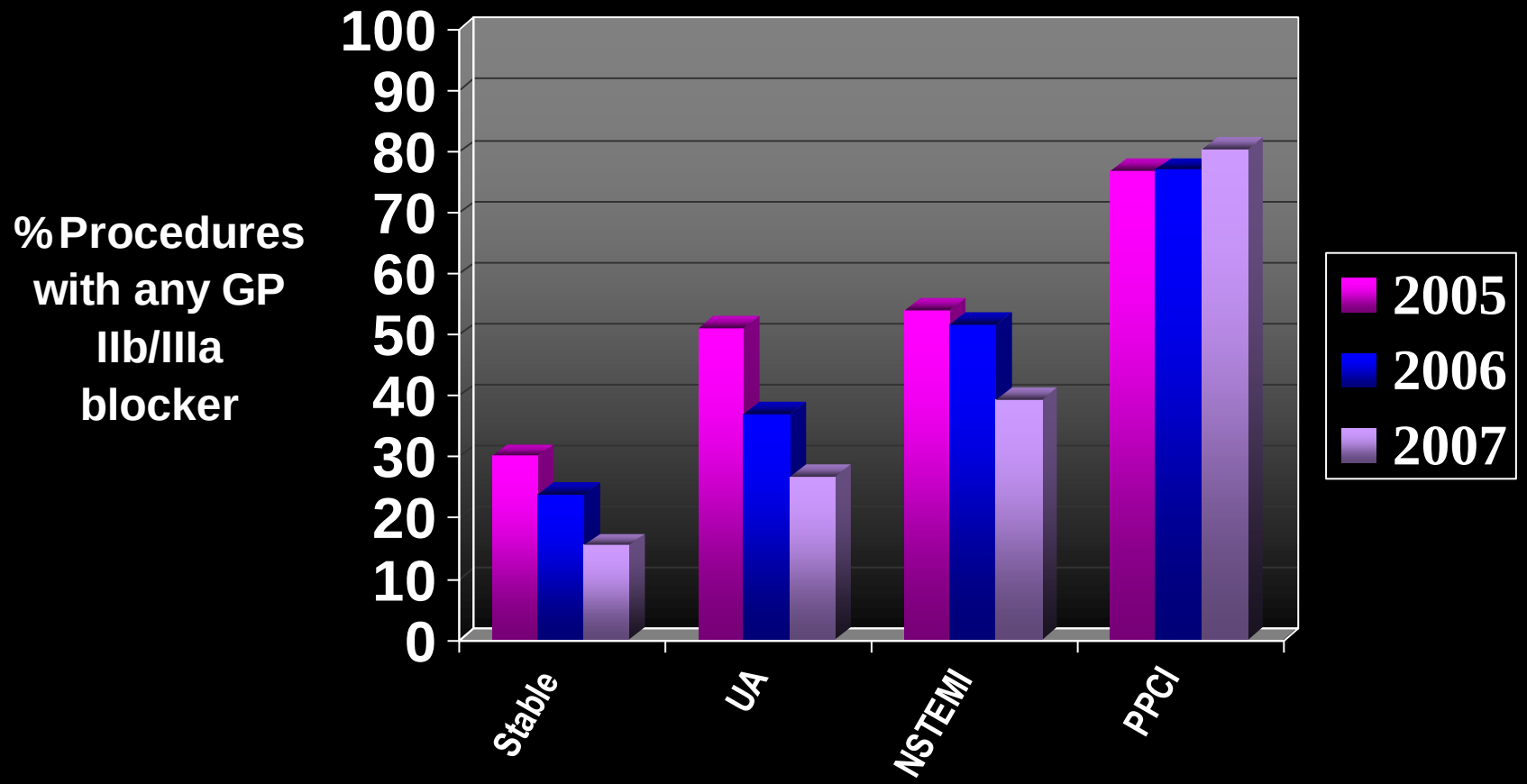
CCAD

GP IIb/IIIa Antagonists

Use by Presentation

BCIS

2007 data: Ludman



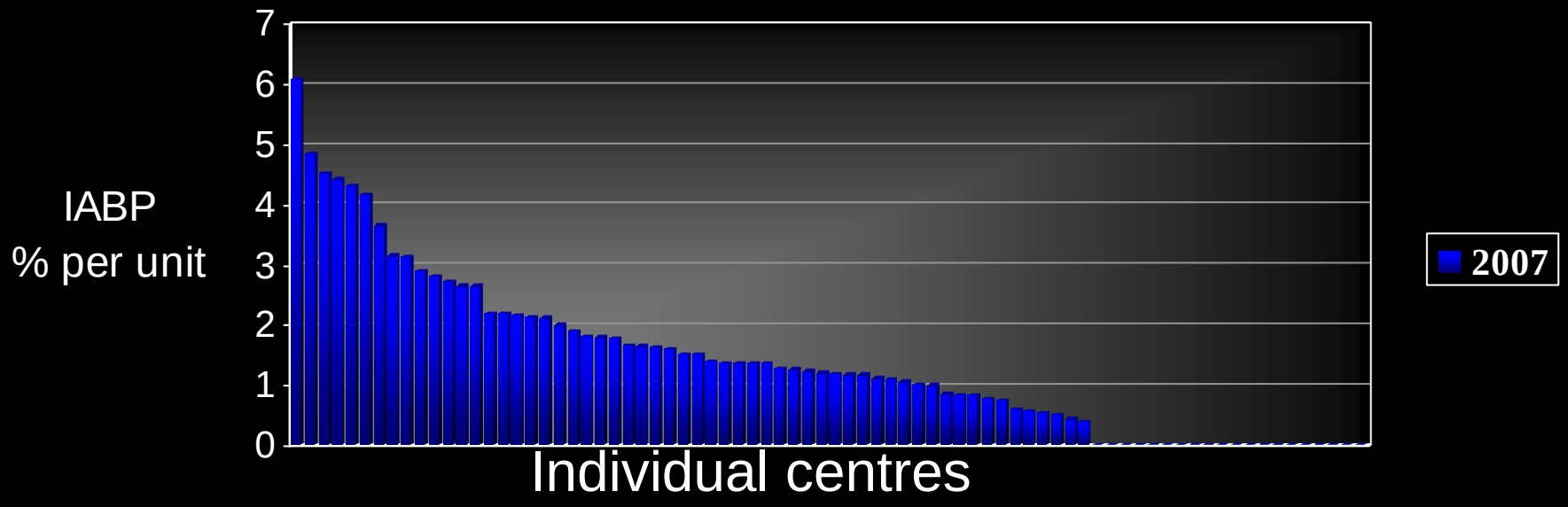
CCAD

LV Support

Data available for 56,737 procedures, 868 shock cases

BCIS
2007 data: Ludman

LV Support	Number	%
Inotropes	322	0.57 %
IABP	983	1.73 %

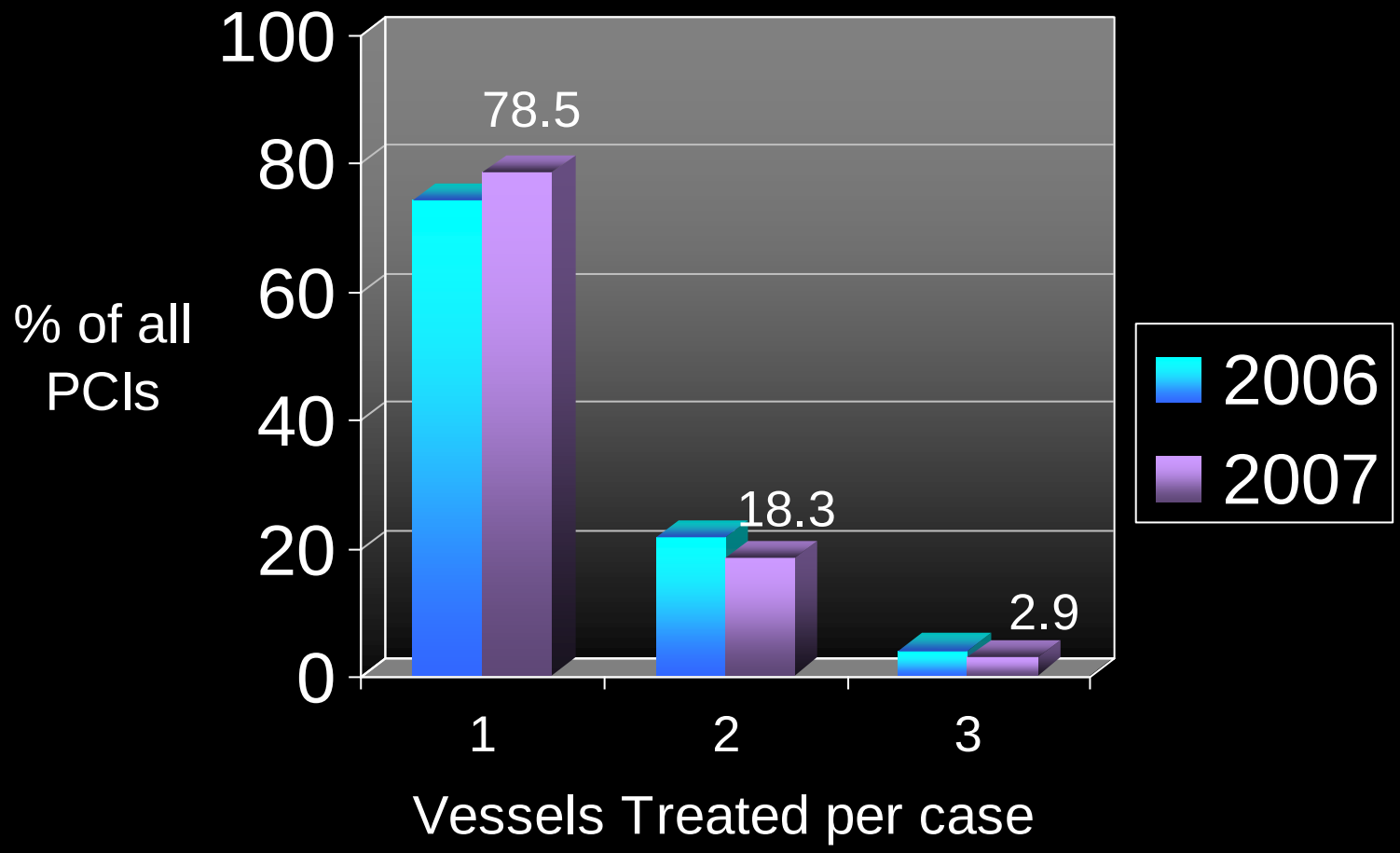


Multi-vessel Disease

Multi-vessel Treatment

2007 data: Ludman

Mean vessels per case 2007 = 1.25
2006 = 1.31



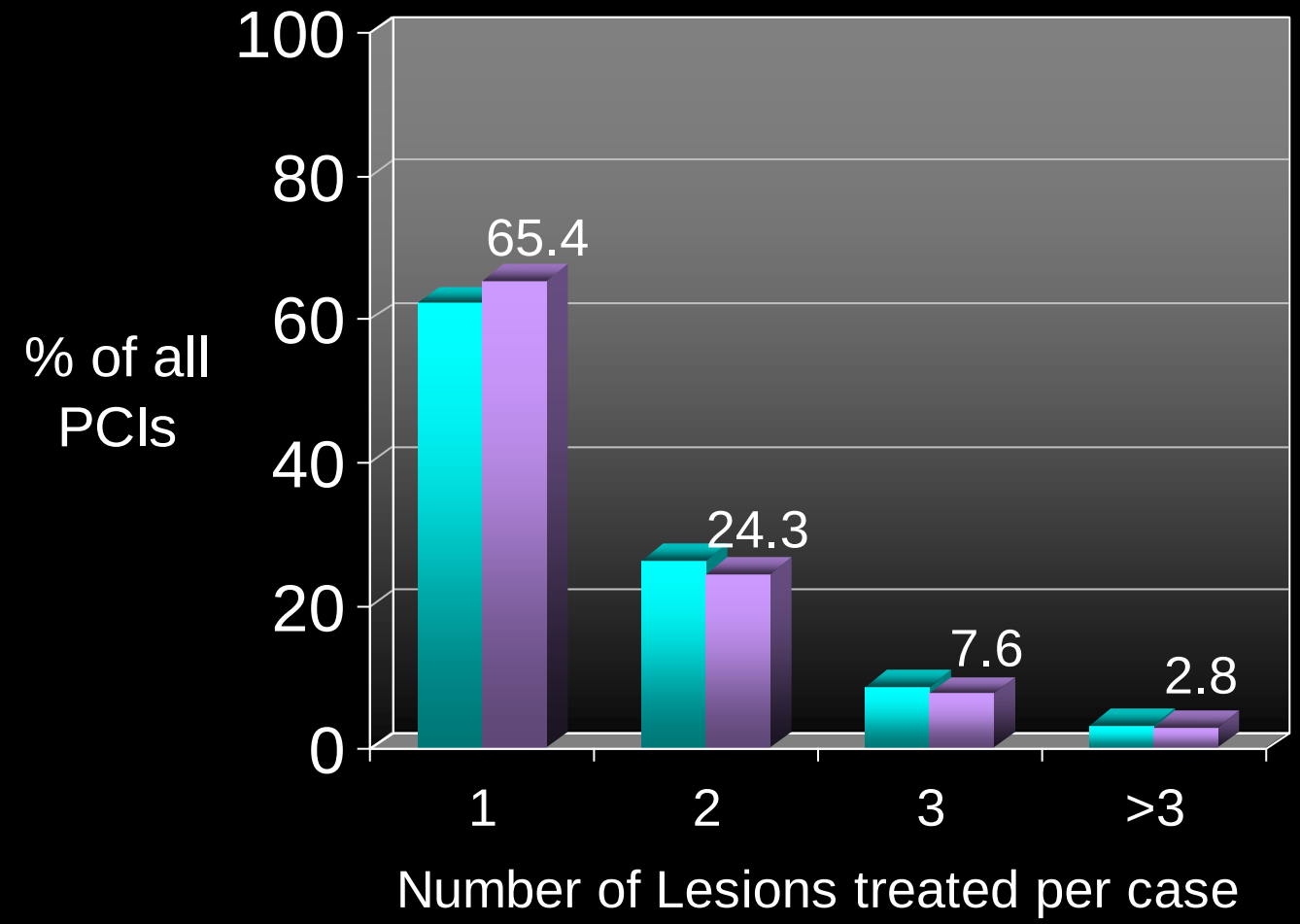
Multi-Lesion Treatment

BCIS

2007 data: Ludman

Mean lesions per case 2006 = 1.53

2007 = 1.49

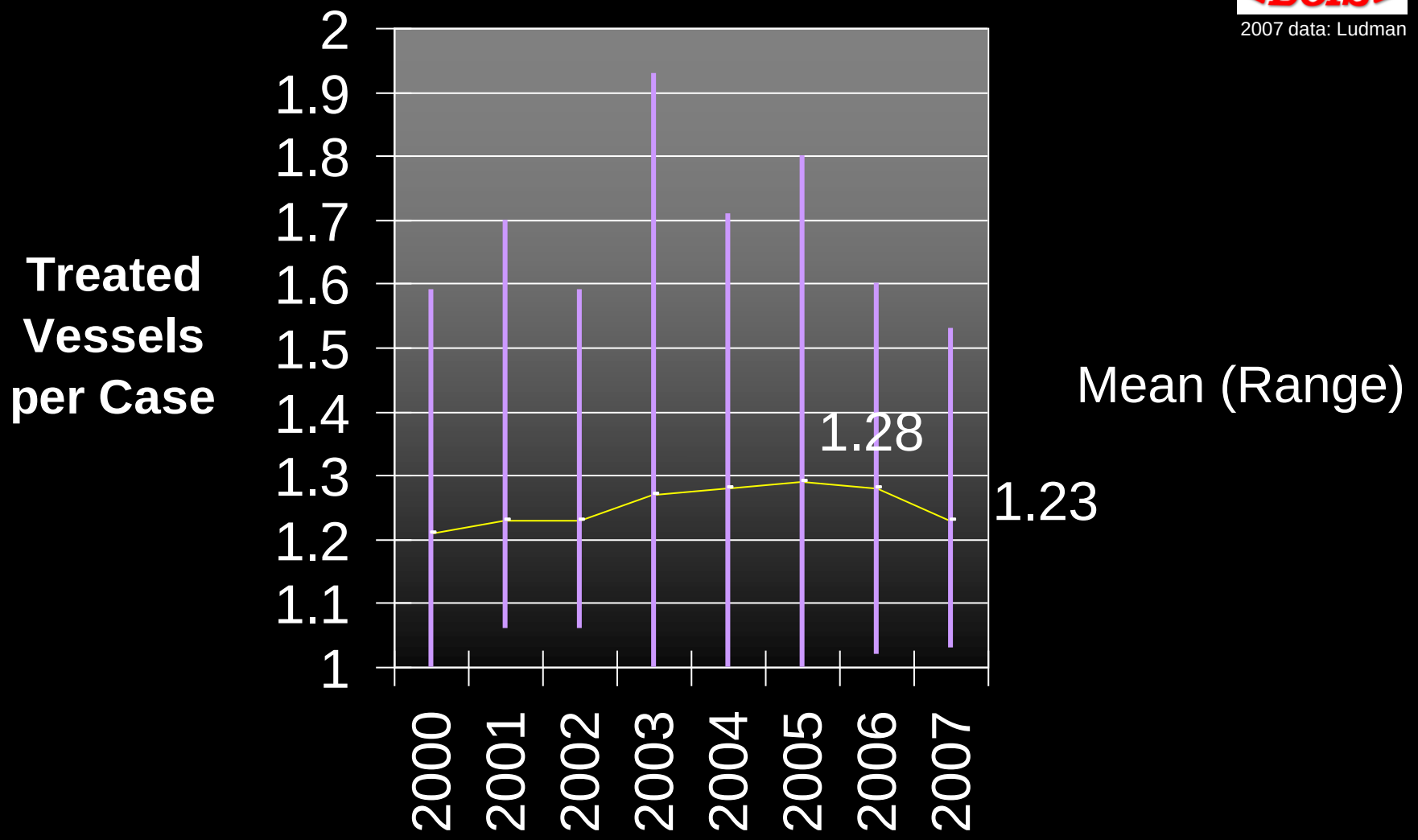


CCAD E&W

Multi-vessel Treatment

BCIS

2007 data: Ludman



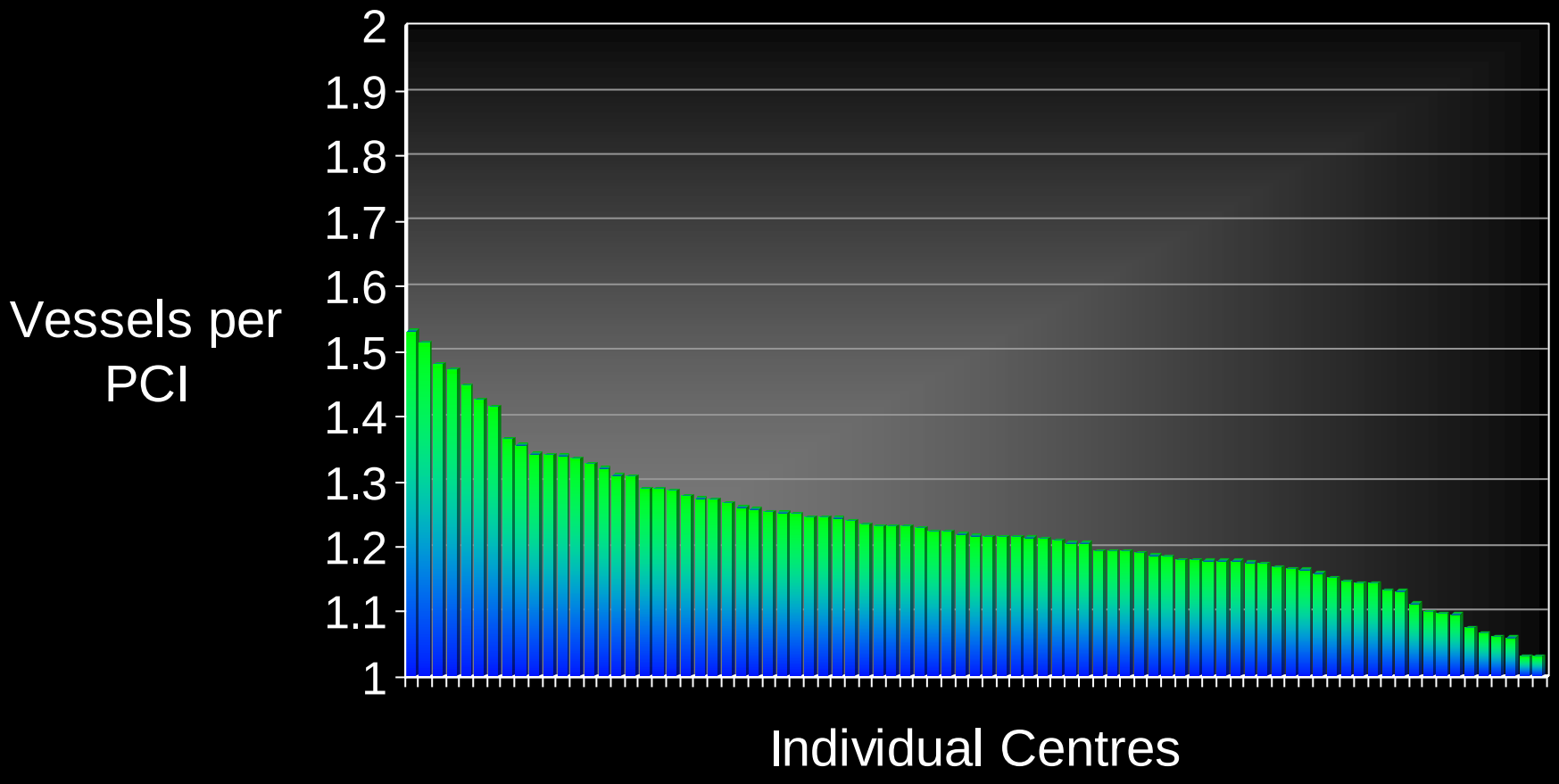
CCAD

Multi-vessel Treatment

By centre - 2007

BCIS

2007 data: Ludman



CCAD

Additional Interventional Coronary Techniques

BCIS

2007 data: Ludman

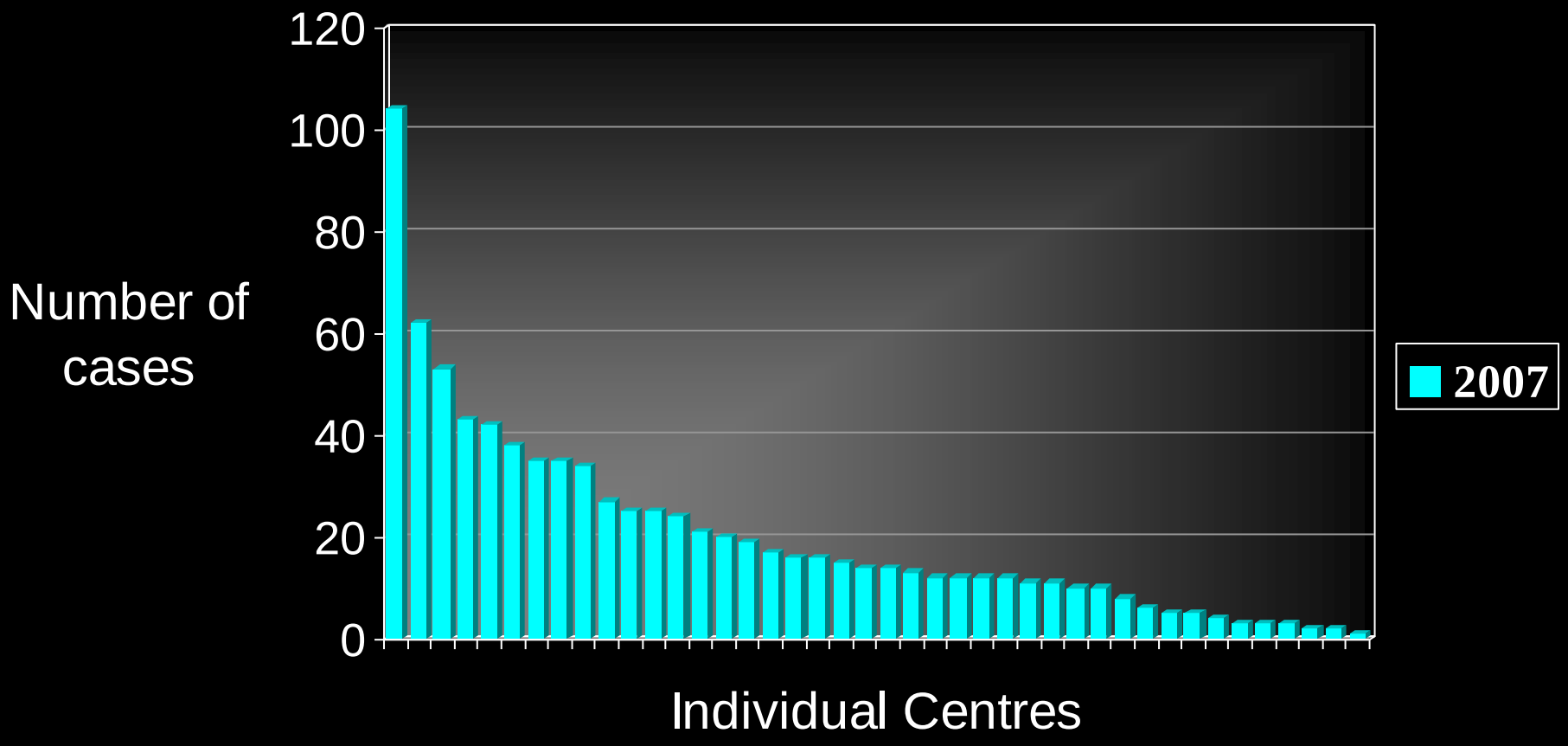
	Units	No	Δ % cf 2006	Mean*	Range
Rotablation	42	844	+34%	20	1-104
Laser	9	82	+290%	9	2-24
Cutting balloon	65	1050	+40%	16	1-170
Thrombectomy	52	1483	+98 %	29	1-236
Distal protection	59	738	+43%	13	1-88

*Mean number in units using the technique

Aggregate data

Rotablation

2007 data: Ludman



Aggregate data

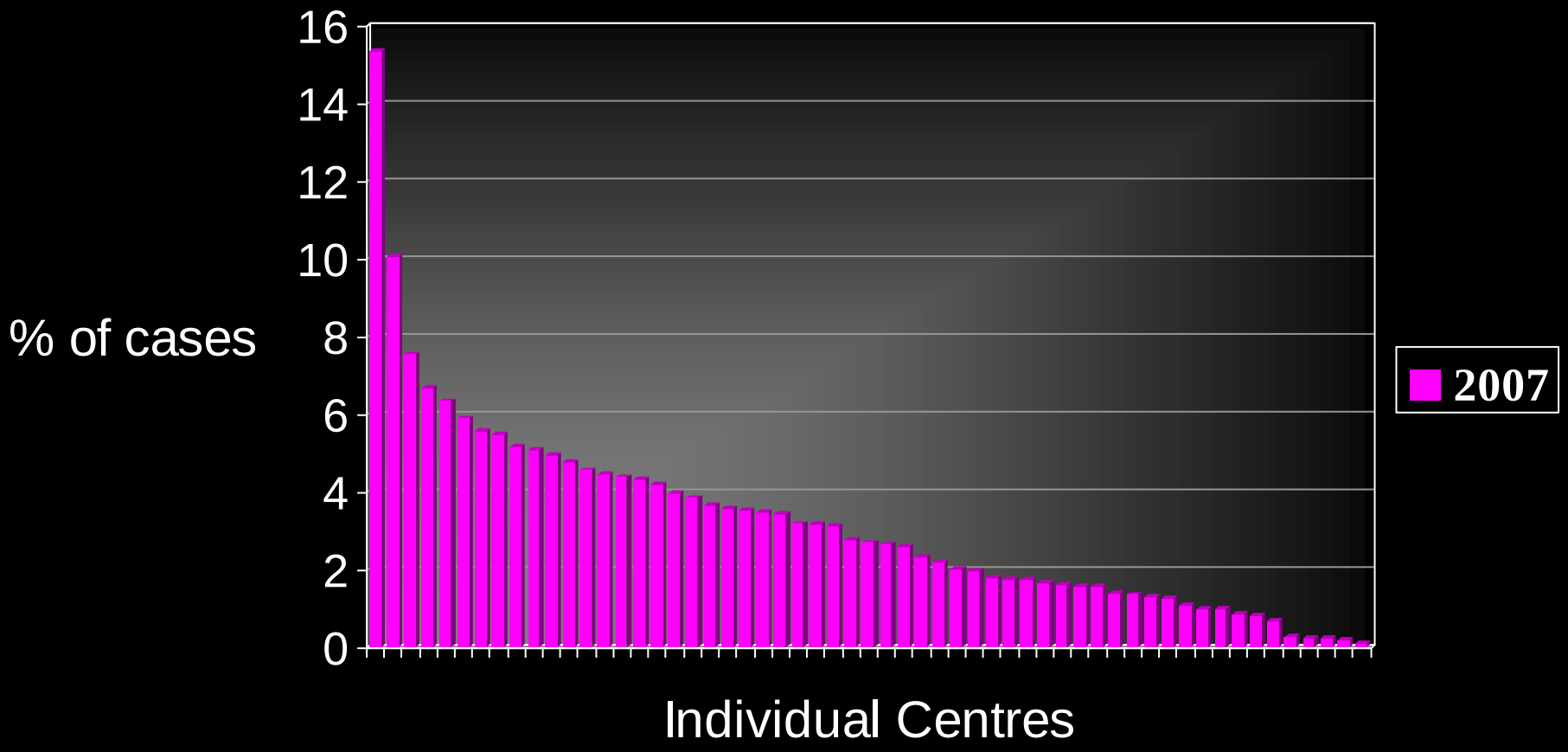
Other Diagnostic Techniques

2007 data: Ludman

	Units	No	Δ cf 2006	Mean	Range
IVUS	57	2068	+ 88%	36	2-250
Press wire	72	3903	+ 38%	54	1-267

IVUS

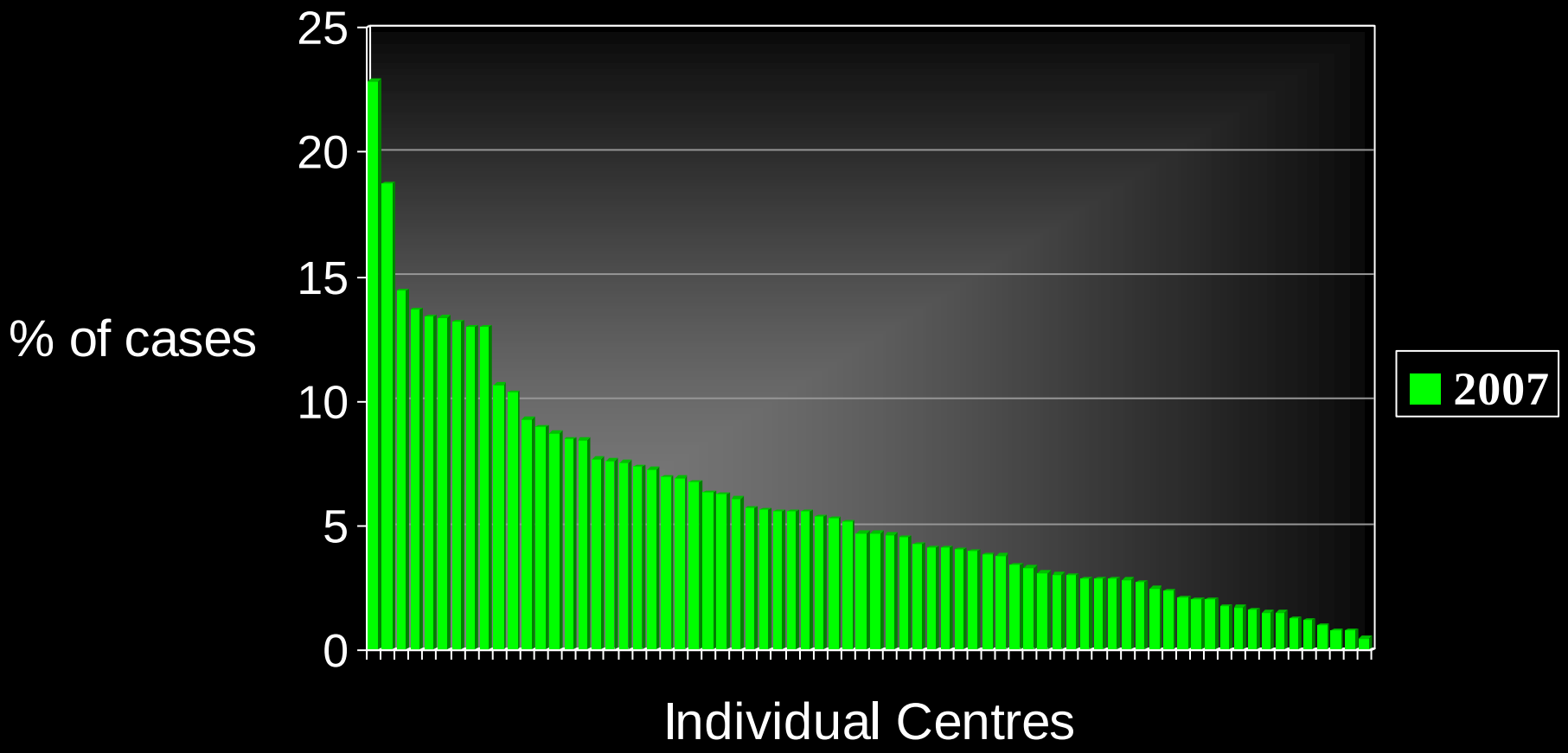
2007 data: Ludman



Aggregate data

Pressure Wire

2007 data: Ludman

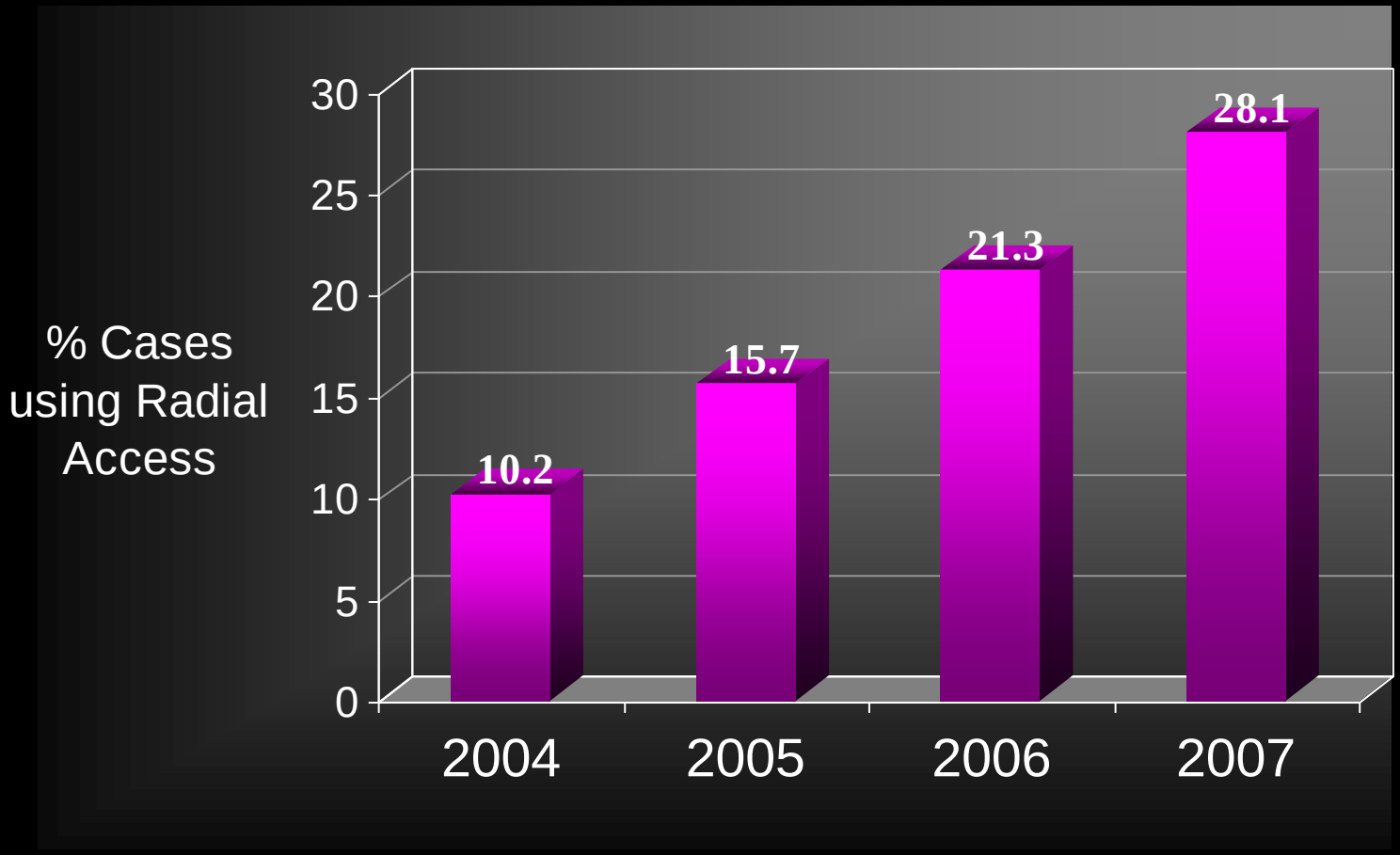


Aggregate data

Radial Artery Access

BCIS

2007 data: Ludman

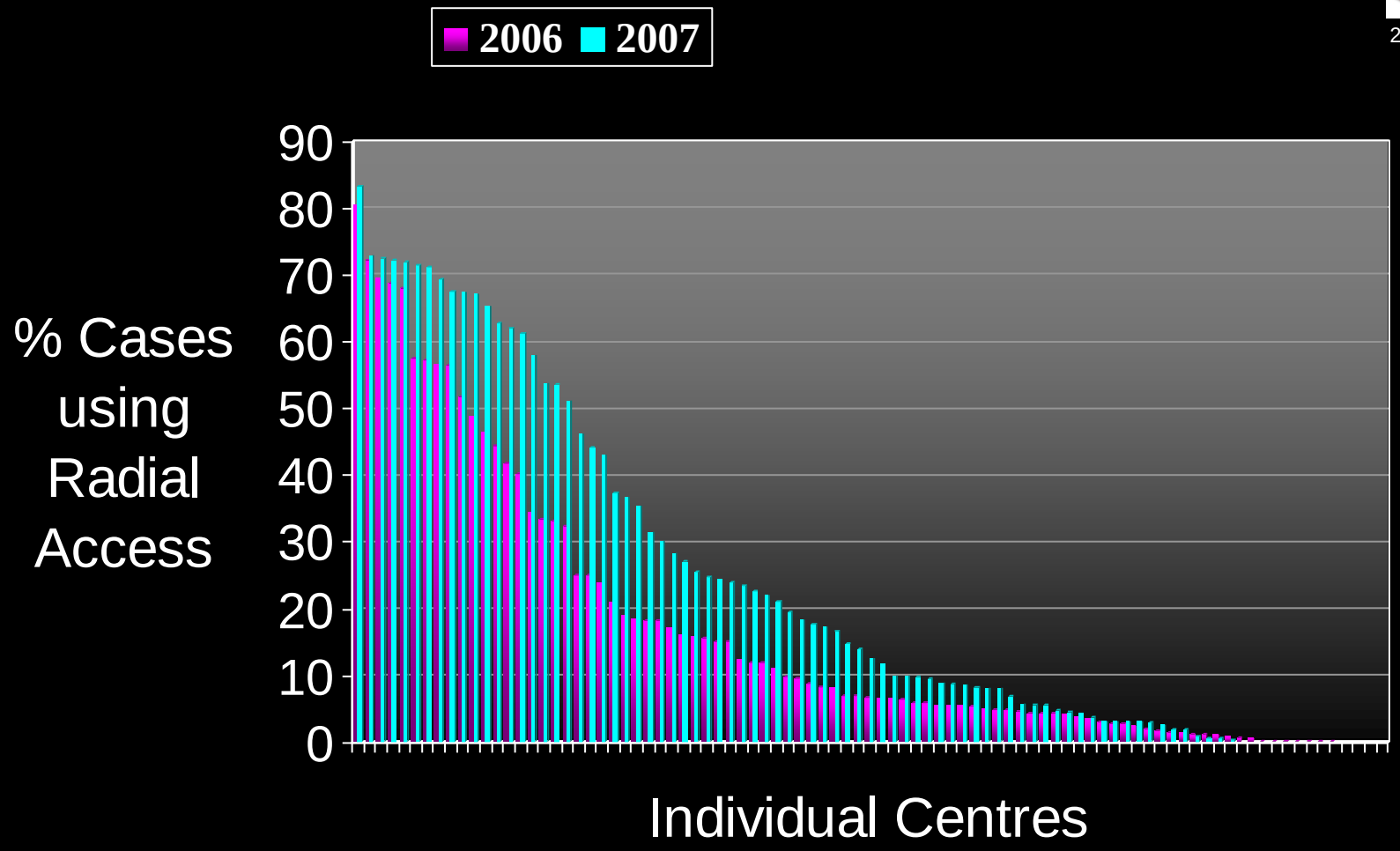


Aggregate data to 2006, CCAD 2007

Radial Artery Access

BCIS

2007 data: Ludman

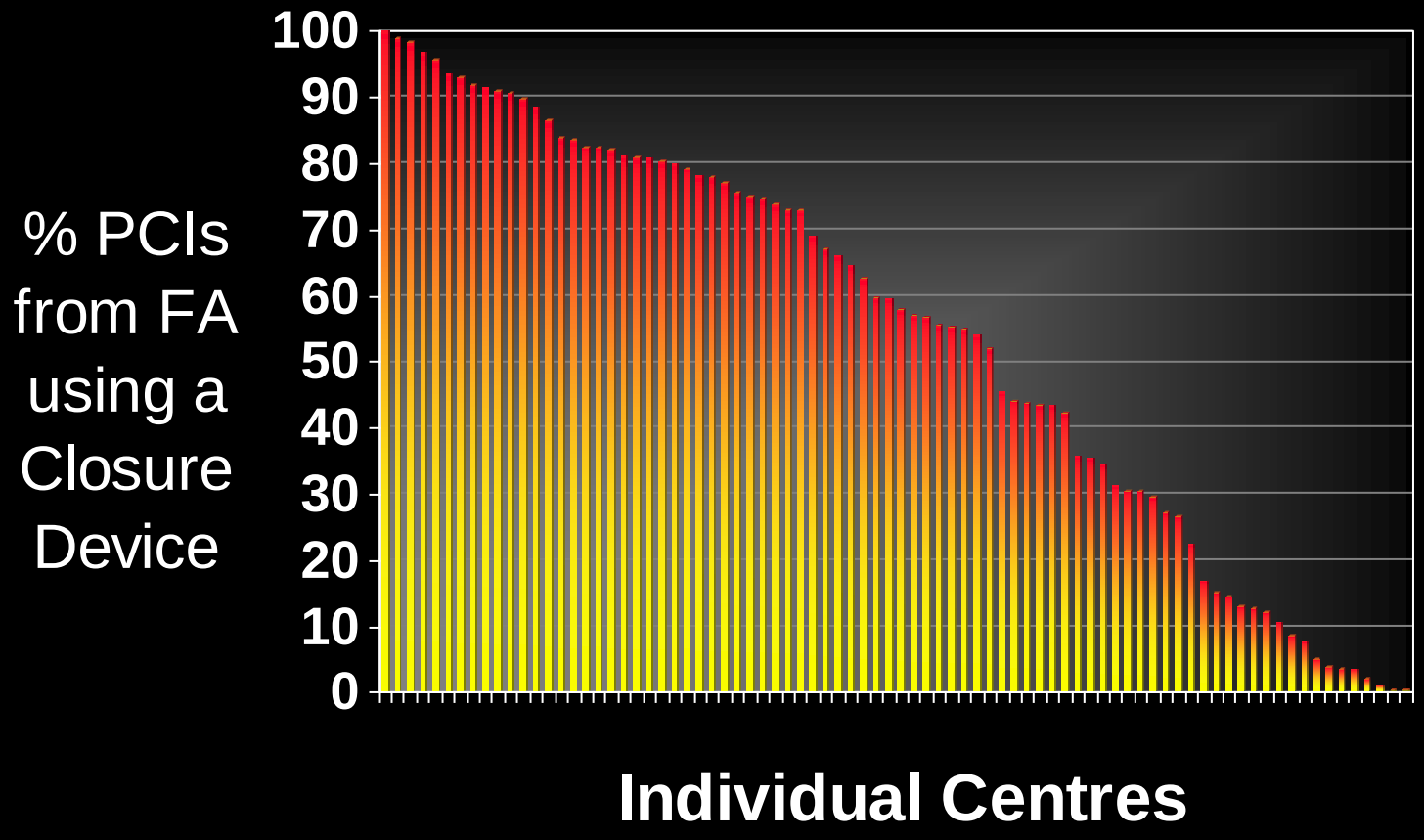


CCAD

Femoral artery closure devices

FA closure (PCI from FA) 2006 = 39.6%
2007 = 50.7%

BCIS
2007 data: Ludman



CCAD

Complication by Access route

Complications to hospital Dx:

2007 data: Ludman

False aneurysm

Haemorrhage (retroperitoneal, delay Dx, surgery)

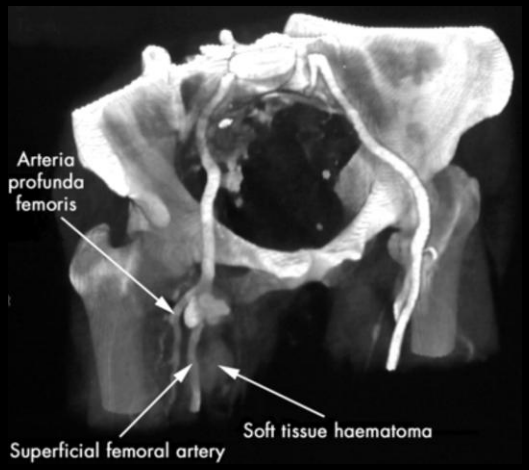
Art occlusion

Art dissection

Any need for surgery

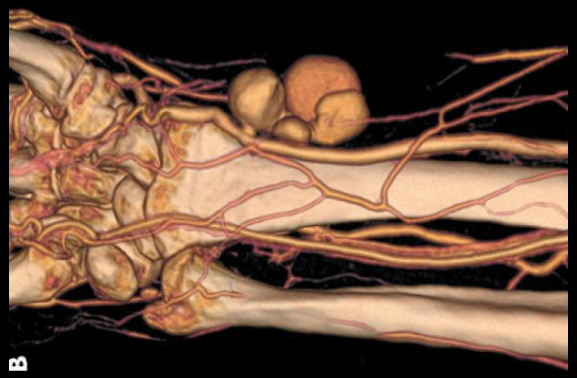
FA: 1.1%

432 of 37,444



RA: 0.6%

70 of 12,127



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  - Mortality by coronary syndrome
  - Mortality for PCI of bypass grafts, CTO, LMS
  - Models for risk adjusted outcome
  - Cumulative funnel plots

Time Delays to Treatment

BCIS

2007 data: Ludman

Dataset Updates

BCIS

2007 data: Ludman

Symptom

Call

Door 1

Door 2

Door 1

Balloon

Home

Dataset Updates

BCIS

2007 data: Ludman

Symptom

Call

Door 1

Door 2

Door 1

Balloon

Home

Dataset Updates

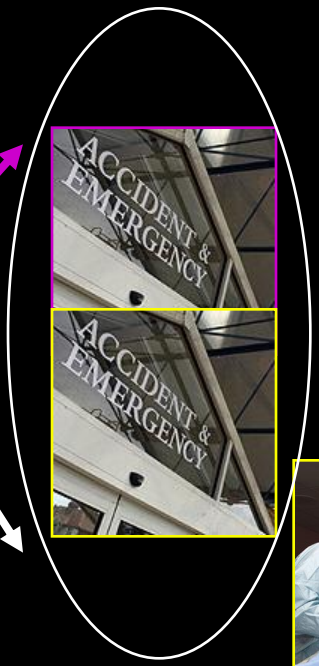
BCIS

2007 data: Ludman

Single data point
? Door 1 or Door 2

Symptom

Call



Balloon

Home

Dataset Updates to 5.4.4

BCIS

2007 data: Ludman

Data point added
Jan 09

Symptom

Call

Door 1

Door 2

Data point added
June 08

Door 1

Balloon

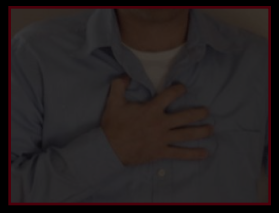
Home

Dataset Updates to 5.4.4

BCIS

2007 data: Ludman

Data point added
Jan 09



Symptom

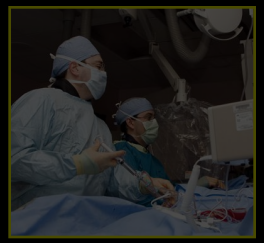
Call

Door 1

Door 2

Data point added
June 08

Door 1



Balloon

Home

Call to PCI time
Door to PCI time (all admission routes)

Time fields
Data completeness
For Healthcheck 08/09

BCIS Field No.	Patients treated for STEMI by Primary PCI	MINAP Field No.
2.07	Date/time of symptom onset	3.01
2.08	Date/time of arrival at first hospital	3.06
5.26	Date/time of arrival at PCI hospital	
3.26	Date/time of first balloon inflation	3.09
4.04	Discharge date	4.01

→ > 90% completeness in each

Top Dogs

	Summary of completeness of key data fields					
a	i	j	k	l	m	
Hospital	2.07 Date/time of symptom onset	2.08 Date/time of arrival at first hospital	5.2a Date/time of arrival at PCI hospital	3.2a Date/time of first balloon inflation	4.04 Discharge date	
AMG. Wycombe General Hospital	100	100	100	100	100	
BRD. Bradford Royal Infirmary	100	100	100	100	100	
HSC. Harley Street Clinic	100	100	100	100	100	
QEB. Queen Elizabeth Hospital, Edgbaston	100	100	100	100	100	
SUN. Sunderland Royal Hospital	100	100	100	100	100	
WRG. Worthing Hospital	100	100	100	100	100	
SCM. James Cook University Hospital	100	100	100	99	100	
DUD. City Hospital	100	99	99	100	100	
SAN. Sandwell District General Hospital	96.8	97.9	97.9	96.8	98.9	
BHR. Royal Berkshire and Battle Hospital	100	100	**87.5**	100	100	
RCH. Royal Cornwall Hospital	**82.4**	100	94.1	100	100	
STH. St Thomas' Hospital	99.2	100	**75.4**	100	100	
DER. Derby Royal Infirmary	100	100	**88.9**	**77.8**	100	
HHW. Wellington Hospital	**66.7**	100	100	100	100	
MPH. Taunton & Somerset	100	100	100	100	**66.7**	
MOR. Morriston Hospital	100	100	**75**	90.6	100	
BOU. Royal Bournemouth General Hospital	100	100	97	100	**61.2**	
HH. Harefield Hospital	97.2	99.2	**67.6**	93.5	100	
STO. North Staffordshire Hospital	**80**	95	95	**90**	95	
BAT. Royal United Hospital Bath	100	100	100	100	**50**	
NCR. New Cross Hospital	95.4	97.1	**71**	92.2	93.5	
SGH. Southampton General Hospital	100	**80.9**	**64.9**	97.9	98.9	
QAP. Queen Alexandra Hospital	**87.8**	**82.9**	**82.9**	**87.8**	100	
HHH. Hemel Hempstead General Hospital	100	93.3	93.3	100	**53.3**	
GRL. Glenfield Hospital	98.6	98.6	**60.3**	**82.2**	100	
UCL. University College Hospital	100	100	38.3	100	96.5	
WHH. William Harvey Hospital	100	100	100	**66.7**	**66.7**	
MAY. Mayday University Hospital	100	100	100	33.3	100	

Under Dogs

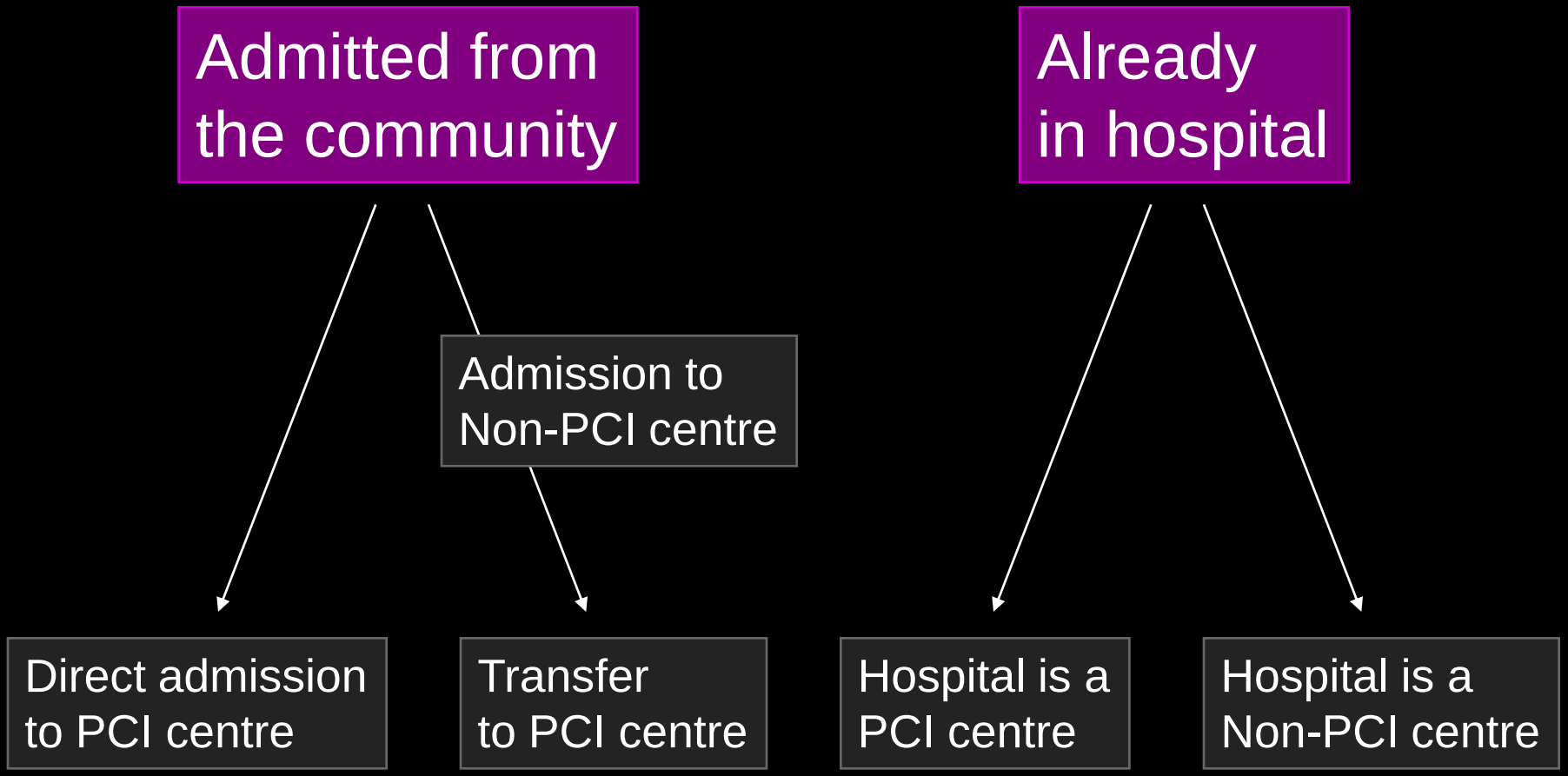
Summary of completeness of key data fields

a	i	j	k	l	m
Hospital	2.07 Date/time of symptom onset	2.08 Date/time of arrival at first hospital	5.28 Date/time of arrival at PCI hospital	3.28 Date/time of first balloon inflation	4.04 Discharge date
WDH. Dorset County Hospital	100	100	100	33.3	100
EBH. Birmingham Heartlands Hospital	85.7	78.2	77.4	91.7	98.5
LGI. Yorkshire Heart Centre	87.2	85.9	57.3	97.4	99.2
HRI. Hull Royal Infirmary	91.7	94.4	88.9	50	100
NOR. Norfolk & Norwich Hospital	100	100	100	100	0
PMS. The Great Western Hospital	100	100	100	0	100
RDE. Royal Devon & Exeter Hospital	100	100	0	100	100
TOR. Torbay Hospital	100	85.7	71.4	42.9	100
RAD. John Radcliffe Hospital	0	100	100	92.6	100
KCH. King's College Hospital	97.4	100	75.6	98.1	15.4
RFH. Royal Free Hospital	37	82.6	80.4	73.9	100
FRE. Freeman Hospital	100	100	9.5	61.9	100
WAL. Walsgrave Hospital	65.9	78	68.3	46.3	100
WYT. Wythenshawe Hospital	0	100	100	50	100
SPH. St Peter's Hospital	75	75	75	0	100
BAL. Barts and the London	67.4	76.4	47.2	41.6	90.6
MRI. Manchester Royal Infirmary	50	50	15.6	96.9	100
NGS. Northern General Hospital	70	70	50	0	100
BRI. Bristol Royal Infirmary	58.3	60.4	60.4	2.1	100
LIS. Lister Hospital	64.7	58.8	58.8	58.8	29.4
UHW. University Hospital of Wales	58.8	58.8	47.1	11.8	88.2
CHG. Cheltenham General Hospital	50	50	0	50	100
GEO. St George's Hospital	16.6	16.6	14	97.5	100
PLY. Derriford Hospital	5.6	5.6	5.6	16.7	94.4
NHB. Royal Brompton Hospital	0	0	0	0	100
NPH. Northwick Park Hospital	0	0	0	0	100

PCI for Acute Sx
Four admission scenarios

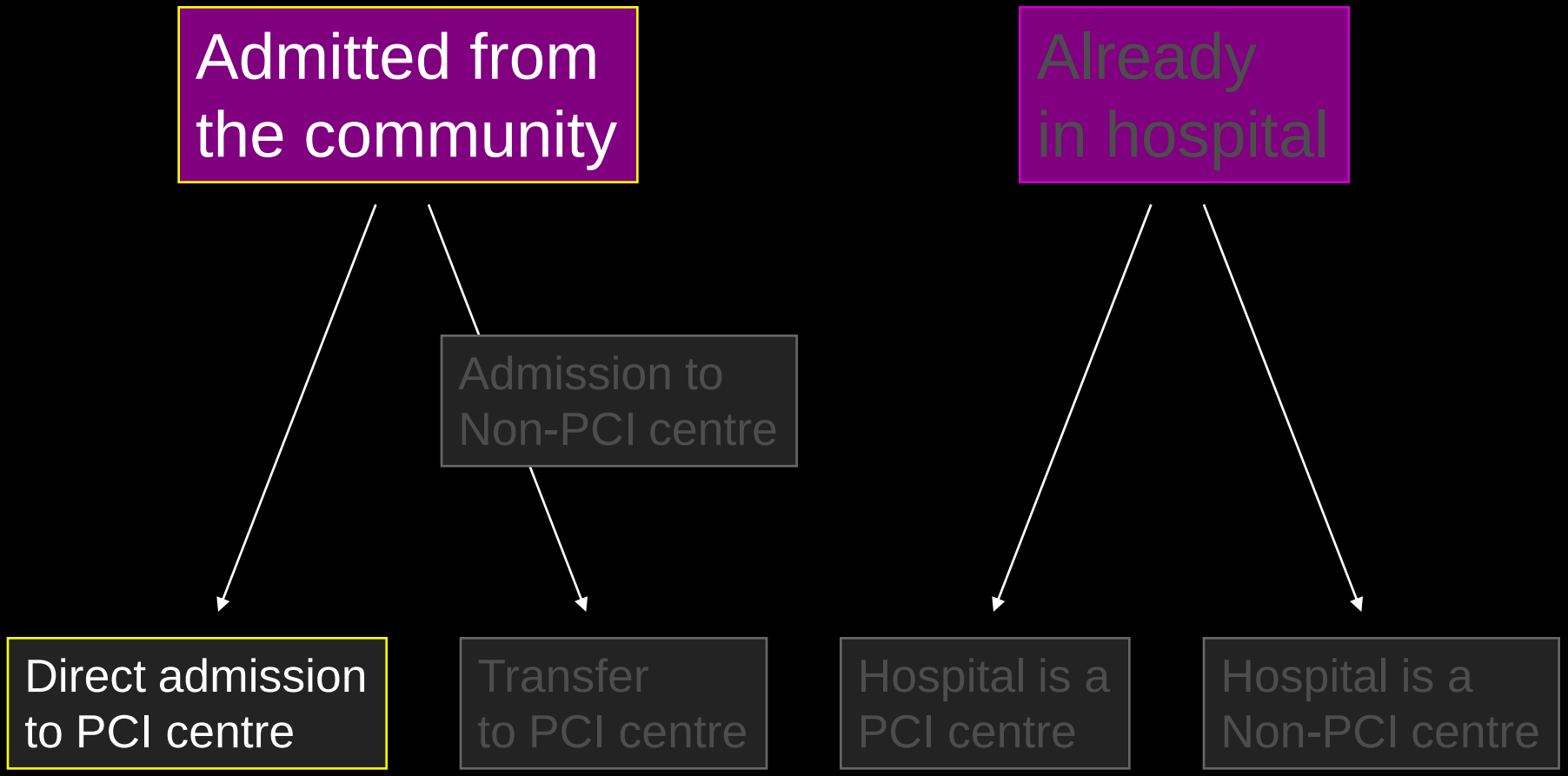
BCIS

2007 data: Ludman



PCI for Acute Sx
Four admission scenarios

2007 data: Ludman



NSTEMI / UA / Convalescent STEMI

Direct admission to PCI centre - 2007

BCIS

2007 data: Ludman

64,266 cases with admit route data
26,028 Rx for NSTEMI / UA / Convst STEMI
6,473 direct admissions
3,317 with time delay data

Excluded data from units with > 5 cases

n=3,317	Time Mean of units' median times	Units
Symptom to arrival	4.85	Hours
Door to PCI	3.2	Days
PCI to discharge	1.2	Days
Length of Stay	4.9	Days

PPCI for STEMI

Direct admission to PCI centre - 2007

Units with PPCI as default strategy for Rx of STEMI
(day time or 24/7, exclude units with < 5 cases)

BCIS
2007 data: Ludman

	Time Mean of units' median times	Units	
Symptom to arrival	2.46	Hours	n=1792
Door to Balloon	61.7	Min	n=1758
PCI to discharge	3.15	Days	n=2197
Length of Stay	3.28	Days	n=1821

PPCI for STEMI

Direct admission to PCI centre - 2007

Units with PPCI as default strategy for Rx of STEMI

(day time or 24/7, exclude units with < 5 cases)

2007 data: Ludman

	Time Mean of units' median times	Units	
Symptom to arrival	2.46	Hours	n=1792
Door to Balloon	61.7	Min	n=1758
PCI to discharge	3.15	Days	n=2197
Length of Stay	3.28	Days	n=1821

Door to Balloon Time

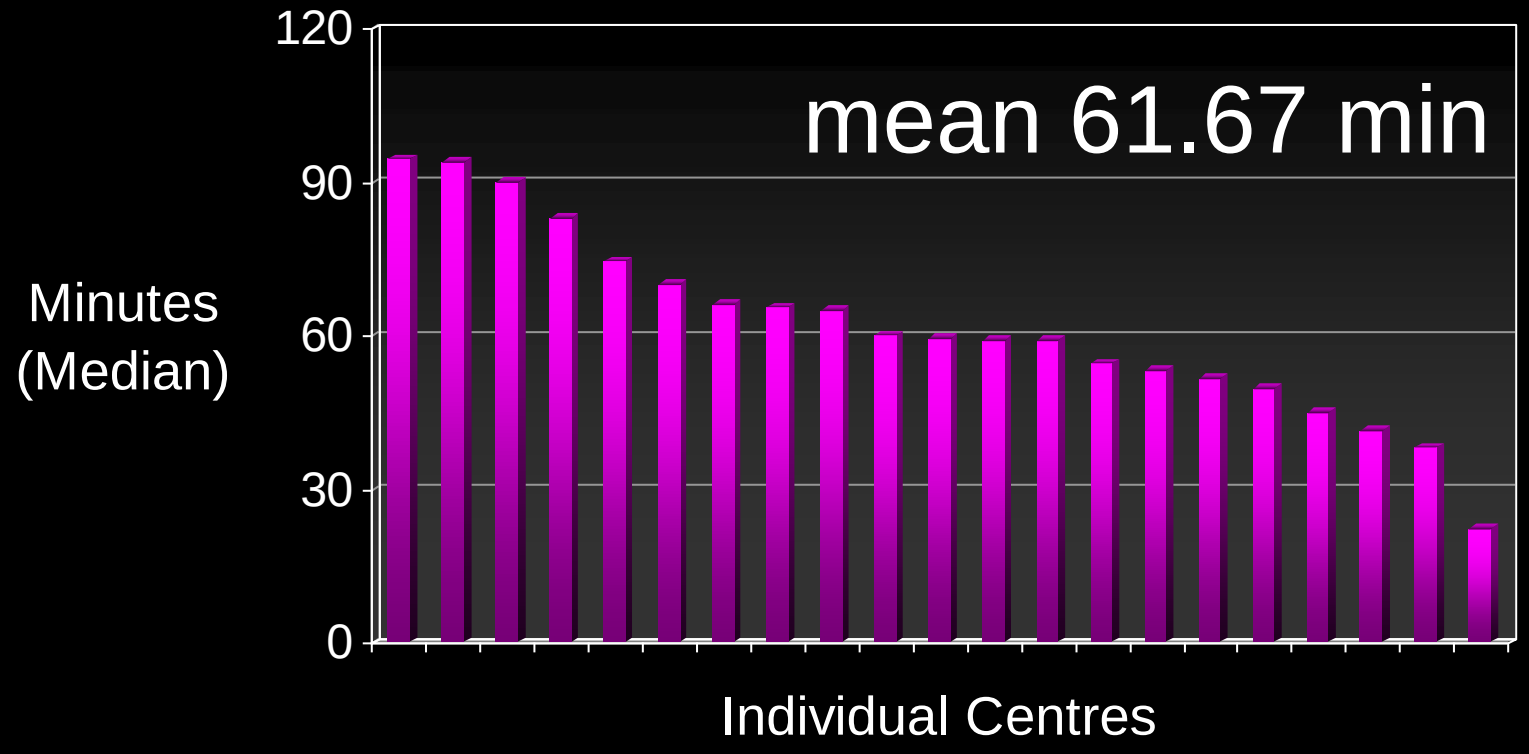
From Community direct to PCI centre 2007

2007 data: Ludman

Units with PPCI as default strategy for Rx of STEMI

(Day time or 24/7)

n=1758



Data from 21 of 38 units

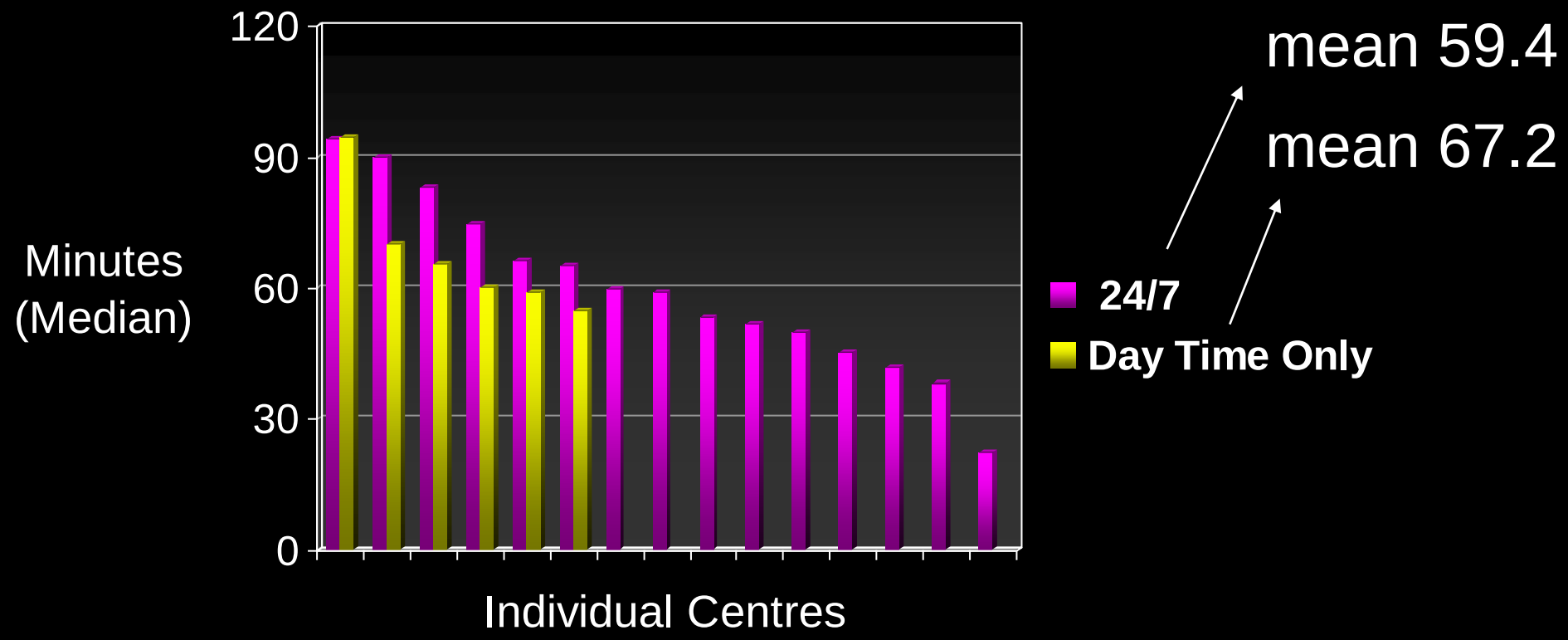
Door to Balloon Time

From Community direct to PCI centre 2007

BCIS

2007 data: Ludman

Units with PPCI as default strategy for Rx of STEMI
n=1758



Data from 6 of 16 day only units
15 of 22 24/7 units

Door to Balloon Time

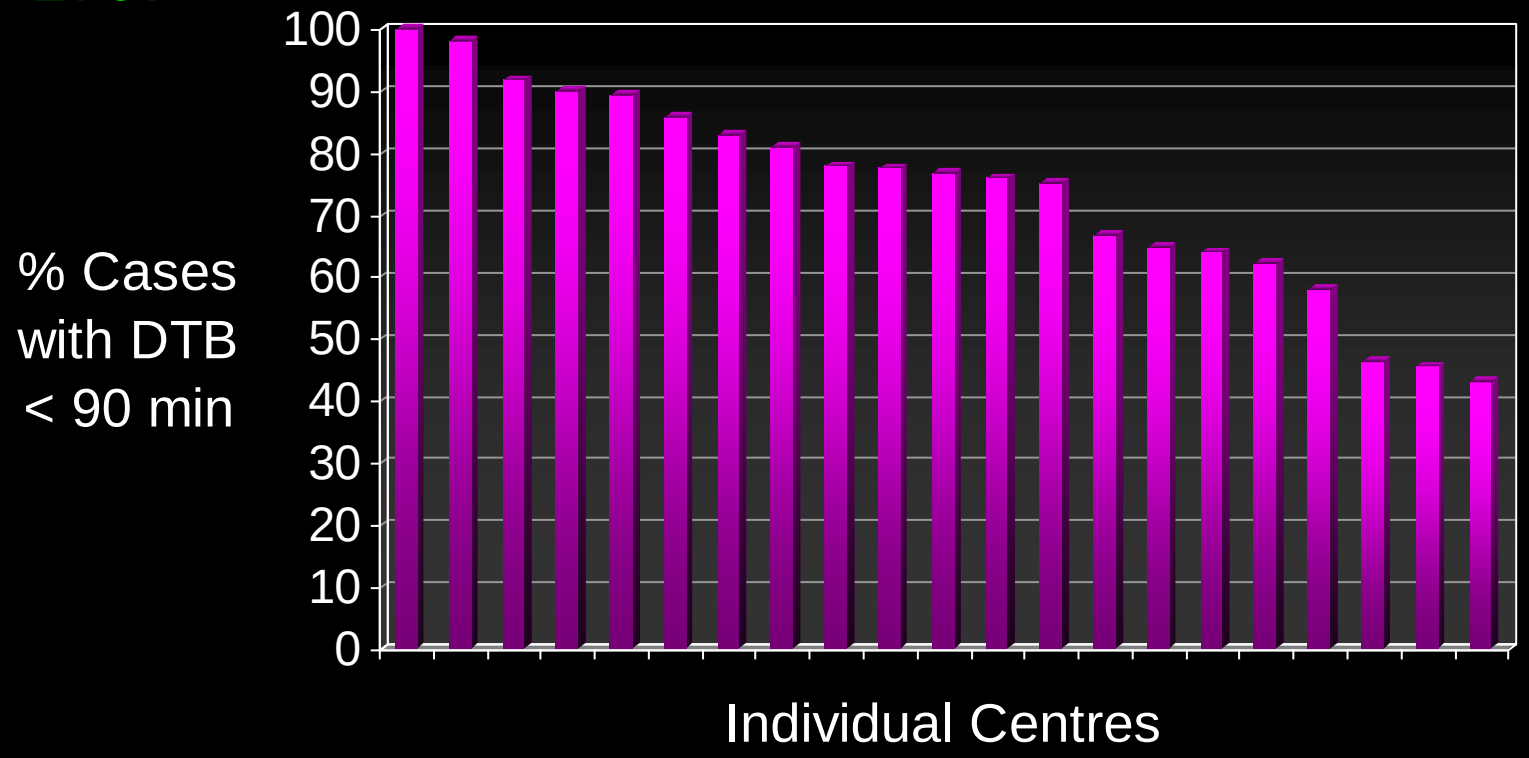
From Community direct to PCI centre 2007

2007 data: Ludman

Units with PPCI as default strategy for Rx of STEMI

(Day time or 24/7)

n=1767



Data from 21 of 38 units

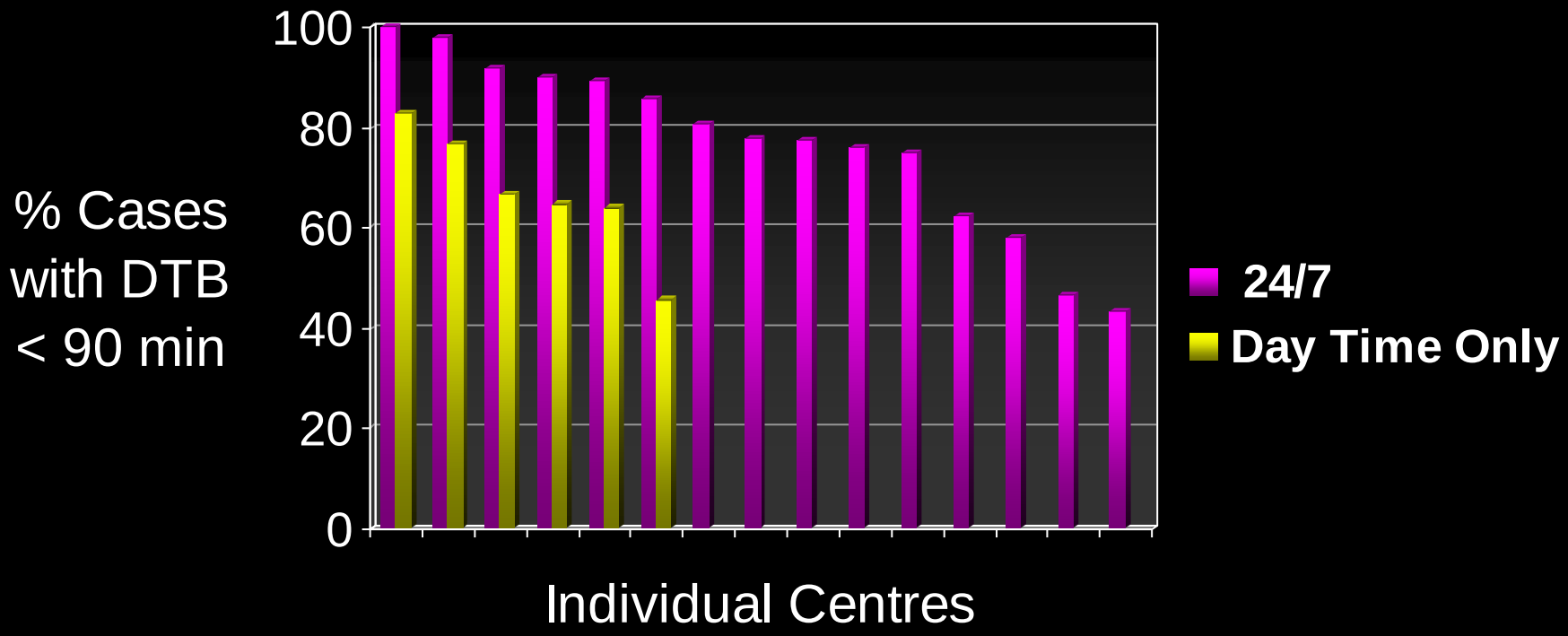
Door to Balloon Time

From Community direct to PCI centre 2007

BCIS

2007 data: Ludman

Units with PPCI as default strategy for Rx of STEMI
n=1767



Data from 6 of 16 day only units
15 of 22 24/7 units

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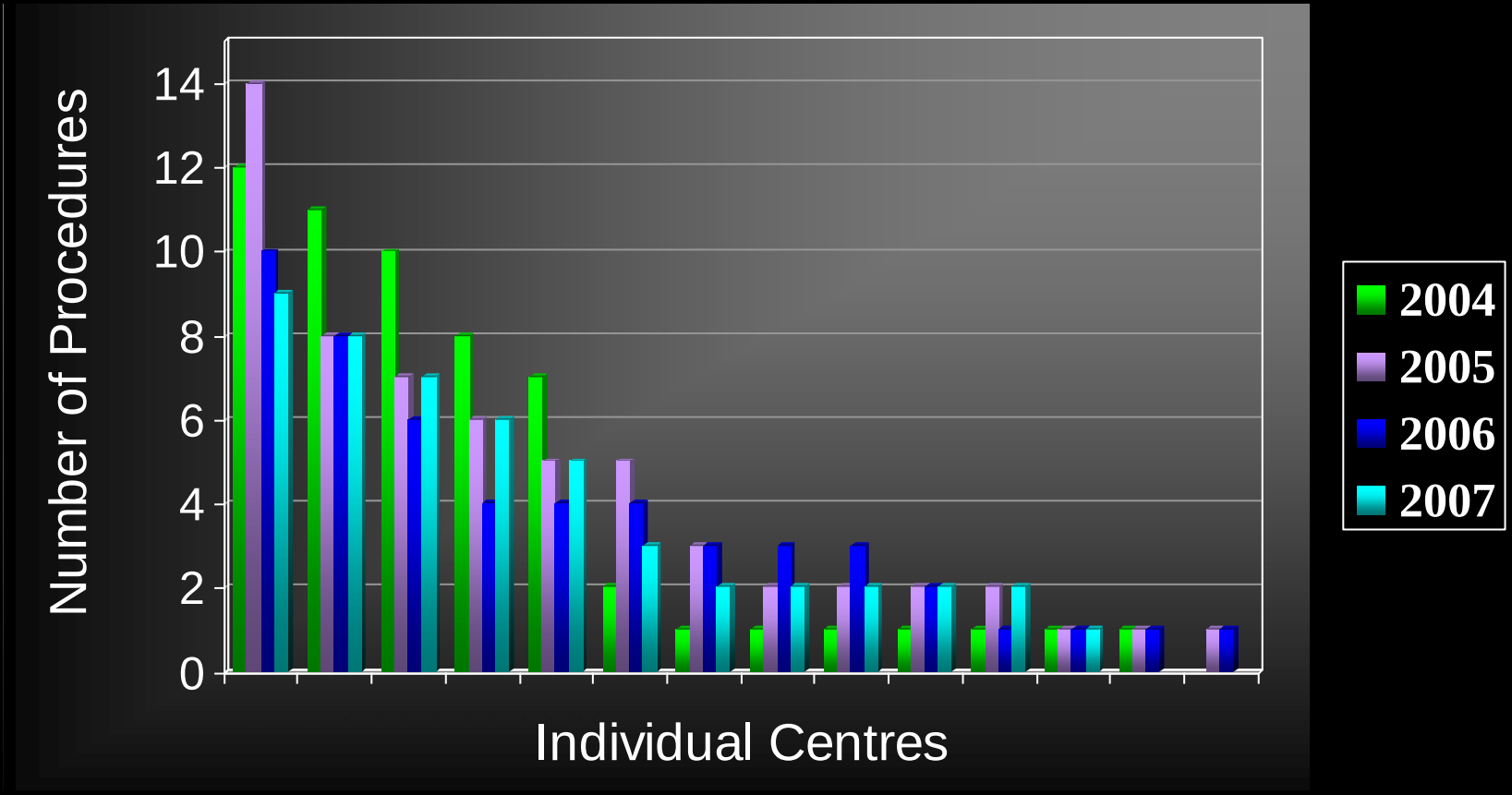
Adult Non Coronary Intervention

Alcohol Mediated Septal Ablation

	Units	No	Δ cf 2006	Mean	Range
Septal ablation	12	49	-3.9%	4.1	1-9

BCIS

2007 data: Ludman



Adult non coronary intervention

BCIS

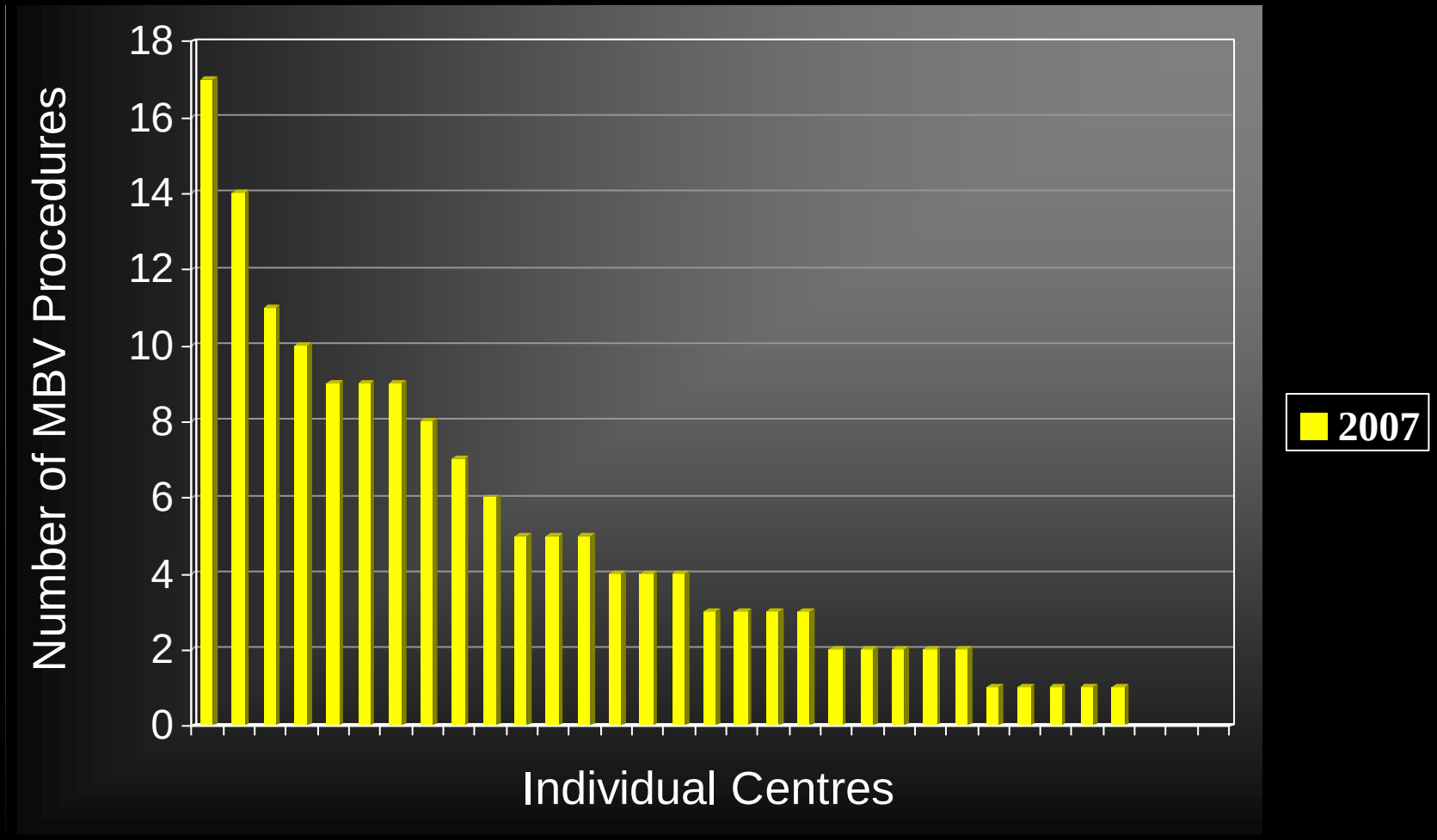
2007 data: Ludman

	Units	No.	Δ cf 2006	Mean	Range
MV plasty	30	154	+11 %	5.1	1-17
AV plasty	6	26	+13%	1	1-10
PV plasty	7	27	+125%	3.9	1-27
TV plasty	1	1	0%	1	1
PDA	12	98	+113%	8.2	1-45
ASD	33	573		17	1-78
PFO	35	791		22.6	1-83

Mitral Balloon Valvuloplasty

Total 154

2007 data: Ludman



Adult non coronary intervention

2007 data: Ludman

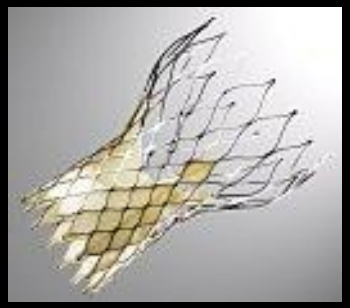
	Units	No	Δ cf 2006	Mean	Range
VSD congen	7	21	-9%	3	1-6
VSD post MI	9	19	+12%	2	1-5
LAA occlusion	0	0		0	0

Adult great vessel intervention

2007 data: Ludman

	Units	No	Δ cf 2005	Mean	Range
Coarct / Re-coart	10	82	+19%	8.2	1-16
Carotid	4	61	-3%	15	1-41
Aorta	2	62	+417%	31	11-51
Pulm art	8	29	+38%	3.6	1-9

Transcatheter Valves



BCIS

2007 data: Ludman

	Units	No	Δ % cf 2006	Mean	Range
Transcatheter Aortic Valve Implantation (TAVI)					
CoreValve	5	55		11	2-28
Edwards: Femoral	2	11		5.5	1-10
Edwards: Apical	1	6		6	6
Total = 72					

Transcatheter Valves

- TAVI Dataset agreed
  - Collection via CCAD
  - Web browser interface
  - Version: 3.5
  - Available from BCIS web site (www.bcis.org.uk)

2007 data: Ludman

Transcatheter Aortic Valve Implantation (TAVI) Dataset

Domain	CCAD Seq	Field Name	Short Code	Short code and Rubric
1. Patient identifier and Demographics	1.01	Hospital Identifier		
	1.02	Local Patient Identifier		
	1.03	NHS Number		
	1.04	Patient Name (Surname)		
	1.05	Patient Name (Forename)		
	1.06	Birth Date		dd/mm/yyyy
	1.07	Sex	0	1. Not known
			1	2. Male
			2	3. Female
			9	9. Not specified
	1.08	Ethnic origin	1	1. Caucasian
			2	2. Black
			3	3. Asian
			4	4. Oriental
			8	8. Other
			9	9. Unknown
	1.09	Postcode Of Usual Address		Full postcode (or use ZZ pseudo-
2. MDT Meeting	2.01	MDT Meeting	0	0. No
			1	1. Yes
			9	9. Unknown
	2.02	MDT Meeting Date		dd/mm/yyyy
	2.03	MDT Decision	0	0. Conservative (Continued medic
			1	1. Transcatheter Aortic Valve Impla
			2	2. Surgical Aortic Valve Operation
	2.04	Primary reason for TAVI	0	0. Formally turned down for surger

Percutaneous Valves

2007 data: Ludman

	Units	No	Δ % cf 2006	Mean	Range
Other					
Pulmonary Valve	3	30	-21%	10	1-26
Mitral Valve Repair	0				

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  - Cumulative funnel plots

Data sources

- Success, Mortality and Emergency CABG
  - CCAD
  - Aggregate forms (Some England pp, NI)
- QMI
  - CCAD
  - Denominator: Total PCI procedures except PCI for STEMI

    (only tiny numbers of STEMI treated in units not submitting to CCAD)
- NQMI
  - CCAD
  - Denominator: Total PCIs for stable symptoms

Mortality - All PCIs

All Data from CCAD + private + N Ireland

BCIS

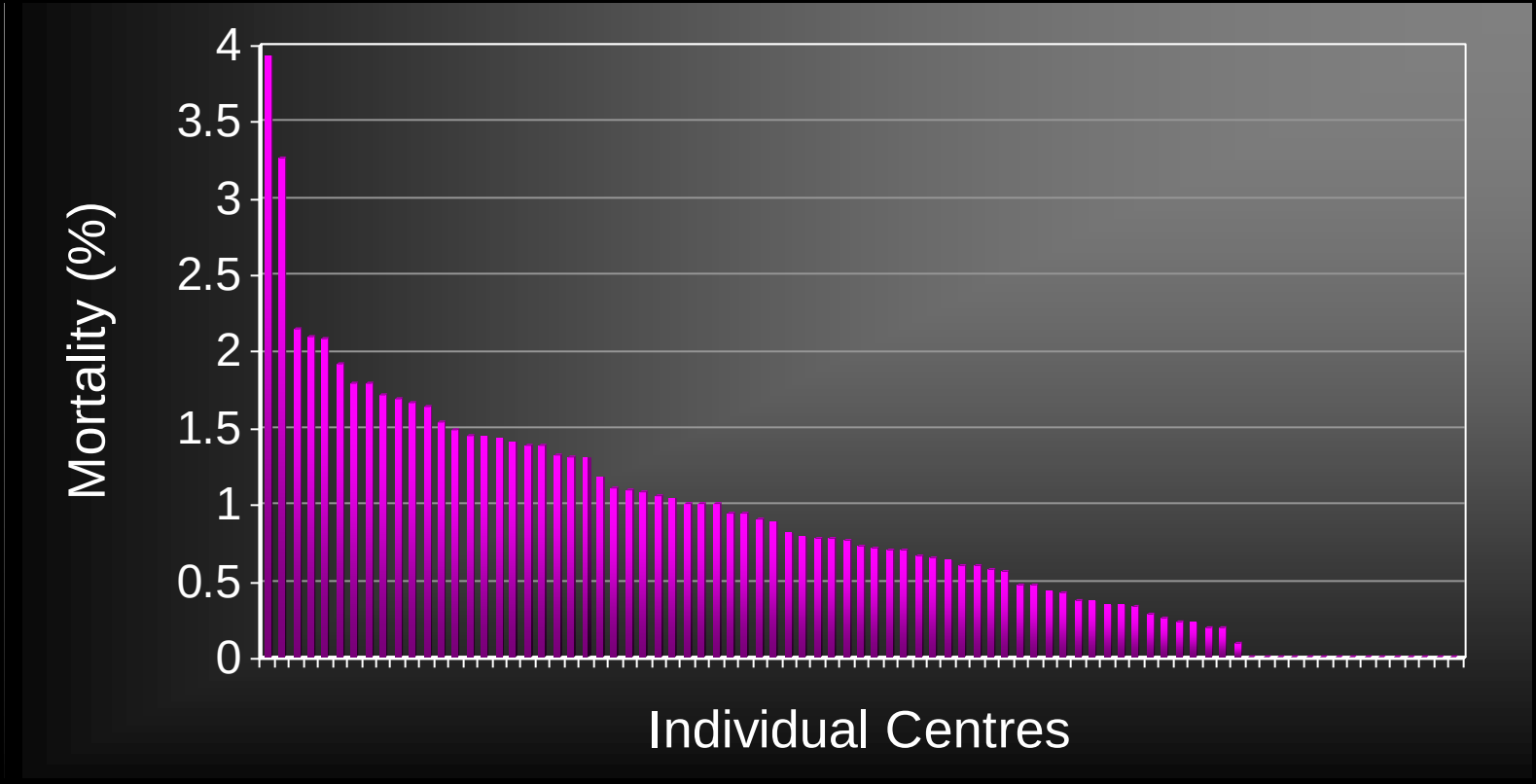
2007 data: Ludman

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
2005	81/83	61,037 (70,142)	0.59	0-3.6
2006	83/91	69,151 (73,692)	0.74	0-3.0
2007	All 98 units	77,373	0.89	0-3.9

Total Mortality

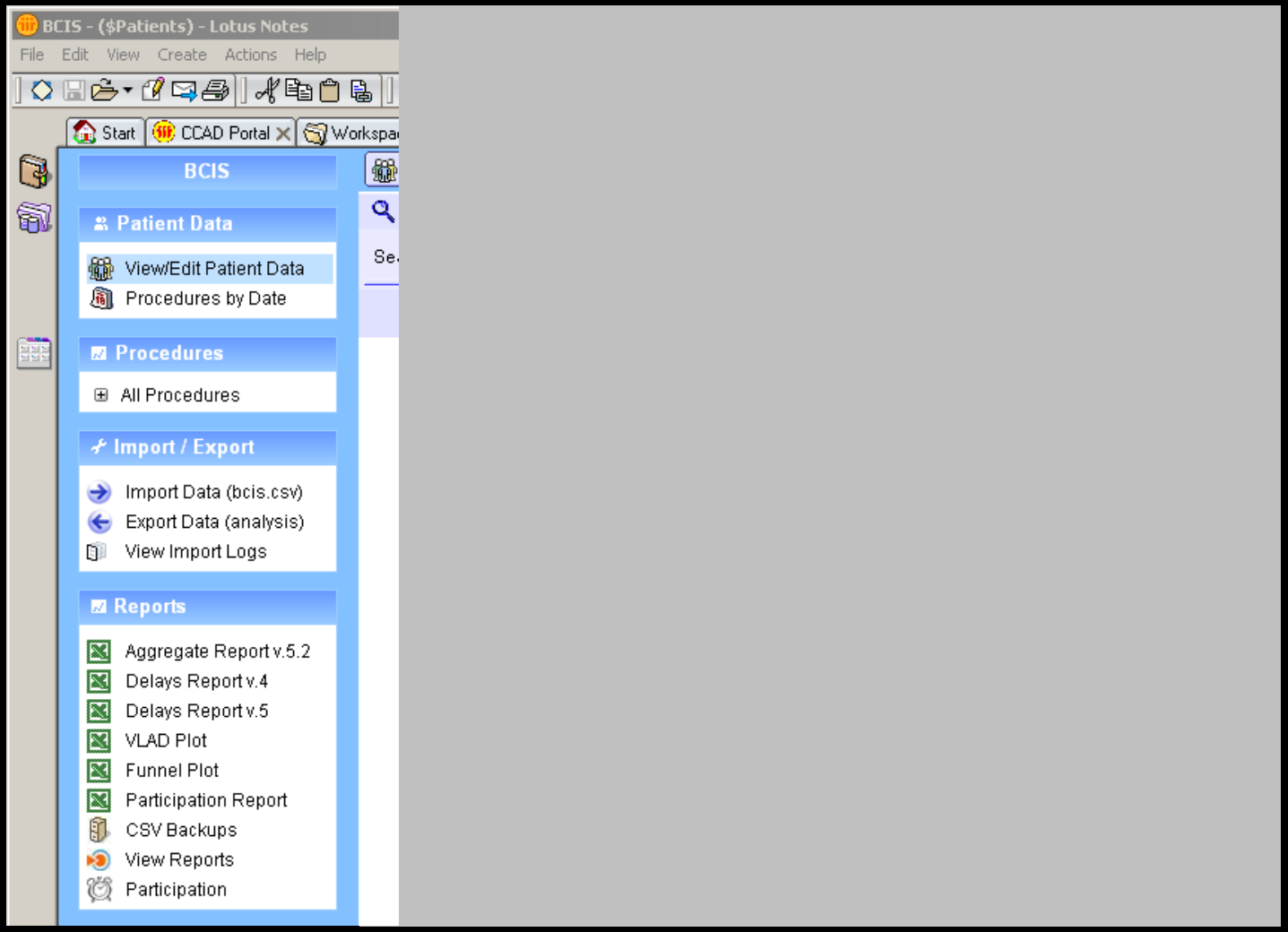
2007 data: Ludman

Mean all PCI = 0.89%



Mortality Validation

ONS Tracking



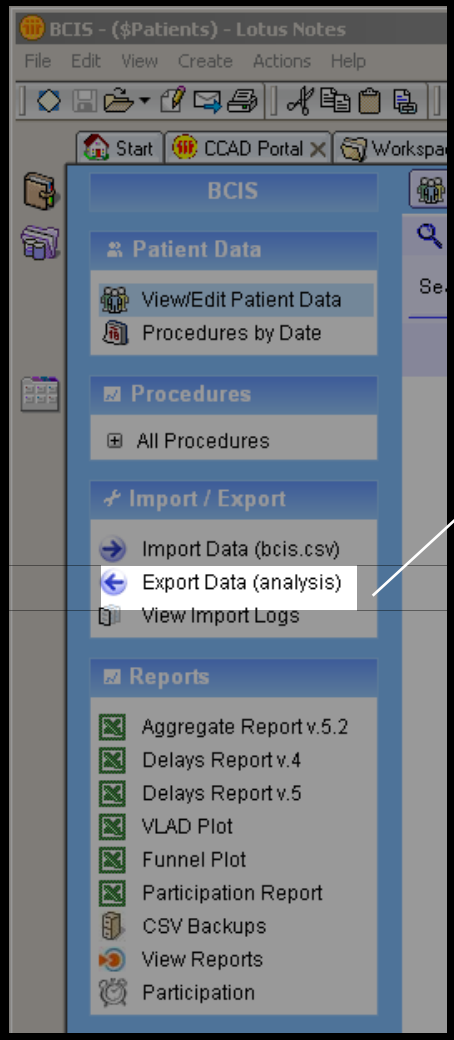
BCIS

2007 data: Ludman

Mortality Validation

ONS Tracking

2007 data: Ludman



Mortality Validation

ONS Tracking

BCIS

2007 data: Ludman

CV	CW	CX	CY	C	DA	DB	DC	DD
22 Why No IIb/IIIA During Proc	5.23 Indication For Sten	5.24 Surgical Cover	5.25 Left Main Stem Protected A		Status	Date Of Death Or Census Date	Cause Of Death	Information Source
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
GP IIB/IIIA drug used	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
GP IIB/IIIA drug used	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
GP IIB/IIIA drug used	1. Stent used - Elective	2. Informal on site	0. No					
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
GP IIB/IIIA drug used	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
GP IIB/IIIA drug used	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS
Good result in low risk patient	1. Stent used - Elective	2. Informal on site	0. No		Dead	27/12/2006		3. ONS
GP IIB/IIIA drug used	1. Stent used - Elective	2. Informal on site	0. No		Alive	21/02/2008		3. ONS

Not tracked
(missing NHS No.)

Died 27-12-06, 20 days post PCI

Mortality Validation

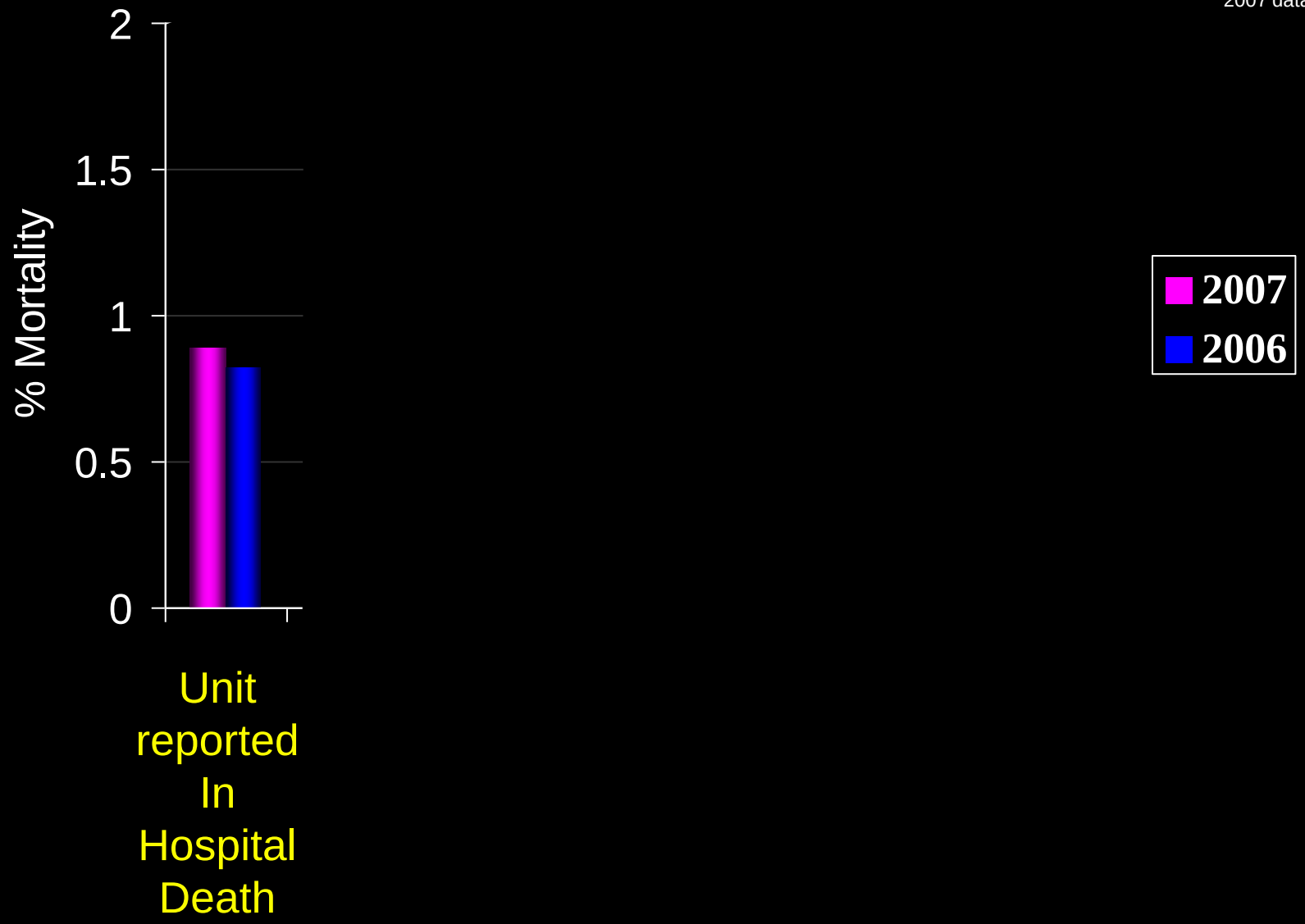
ONS track as 21-2-2008

2007 data: Ludman

2006	2007
PCI in CCAD 50,666	PCI in CCAD 64,224
Tracked 48,495 95.7%	Tracked 39,392 61%

Mortality Validation

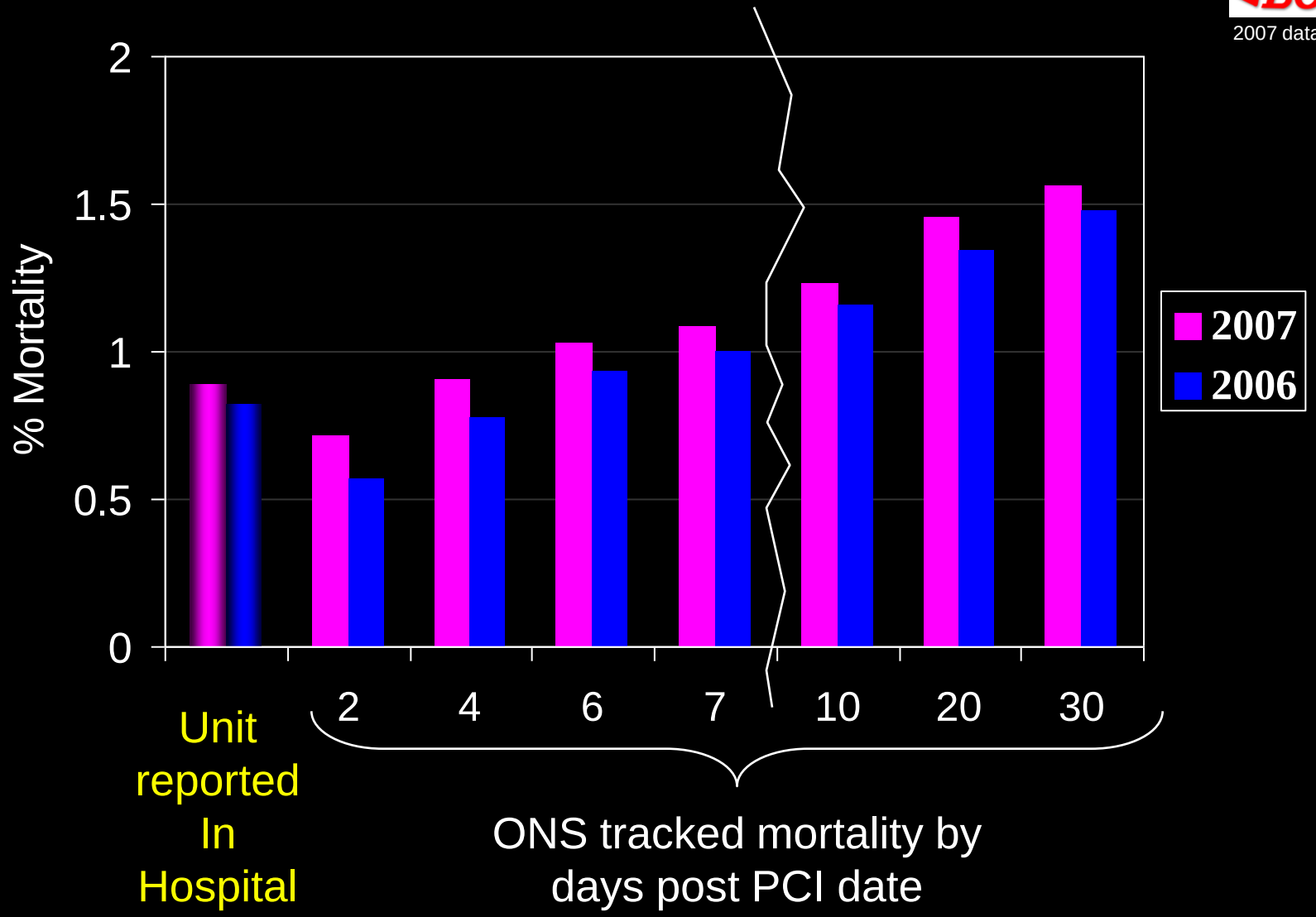
2007 data: Ludman



Mortality Validation

BCIS

2007 data: Ludman



MACE - All PCIs

BCIS

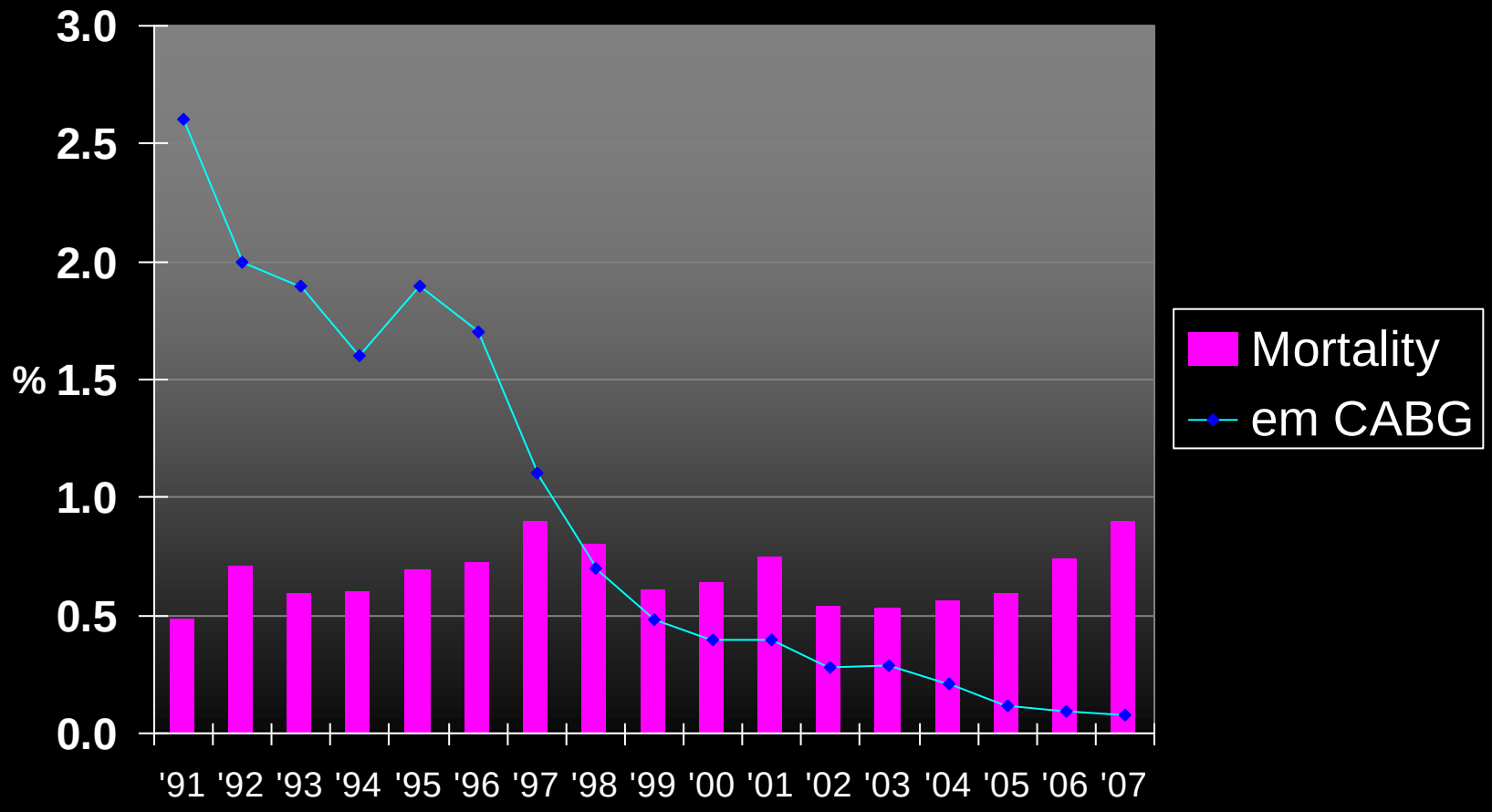
2007 data: Ludman

Year	% Procedure Success	% QMI	% NQMI (stable)	% Em. CABG	Mortality (%)
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)		0.28 (53 of 64)	0.54 (53 of 64)
2003	92 (62 of 73)	0.36 (56 of 73)		0.29 (64 of 73)	0.53 (64 of 73)
2004	93.5 (63 of 78)	0.30 (57 of 78)		0.21 (64 of 78)	0.56 (66 of 78)
2005	90.2	0.24		0.12	0.59
2006	95.5	0.15	0.74	0.09	0.74
2007	92.1	0.14	0.62	0.08	0.89

All Procedures: Outcome

BCIS

2007 data: Ludman



Outcome 2007

Elective Patients

BCIS

2007 data: Ludman

All as %	No. cases	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	Death
Stable SV (no CTO)	17,205	95.8		3.1	0.29	0.15	0.06	0.09
MV (no CTO)	5165	92.9	5.8	0.71	0.13	0.29	0.08	0.25
SV CTO	2470	66.8		30.6	0.16	0.04	0.08	0.2
MV CTO	805	71.1	25.8	2.7	0.12	0	0.25	0.25

Overall Stable

ALL	25,645	91.6%			0.24	0.16	0.07	0.14

Outcome 2007

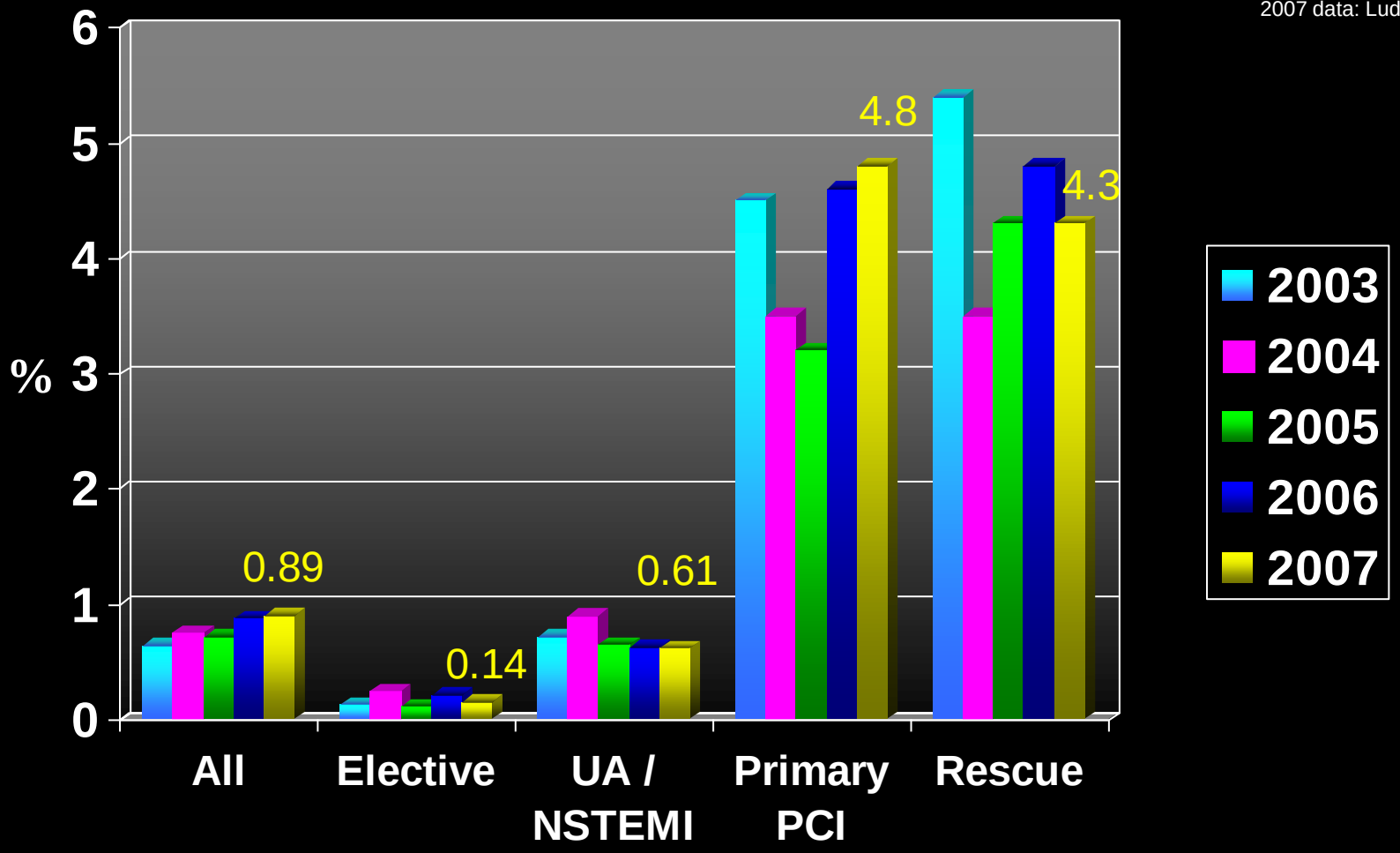
2007 data: Ludman

All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	Death
NSTEMI / UA no shock	24103	93.4	2.6	3.2	0.3	0.2	0.08	0.61
All STEMI no shock	7485	92.8	1.9	2.7	0.6		0.09	2.6
Primary PCI	5330	90.1	2.0	2.4	0.5		0.19	4.8
Rescue PCI	2161	90.5	2.1	3.1	0.8		0.05	4.3
Shock	868	67.1	4.1	2.1	0.5		0.50	27.8

Summary: Mortality

Risk Stratified by Syndrome

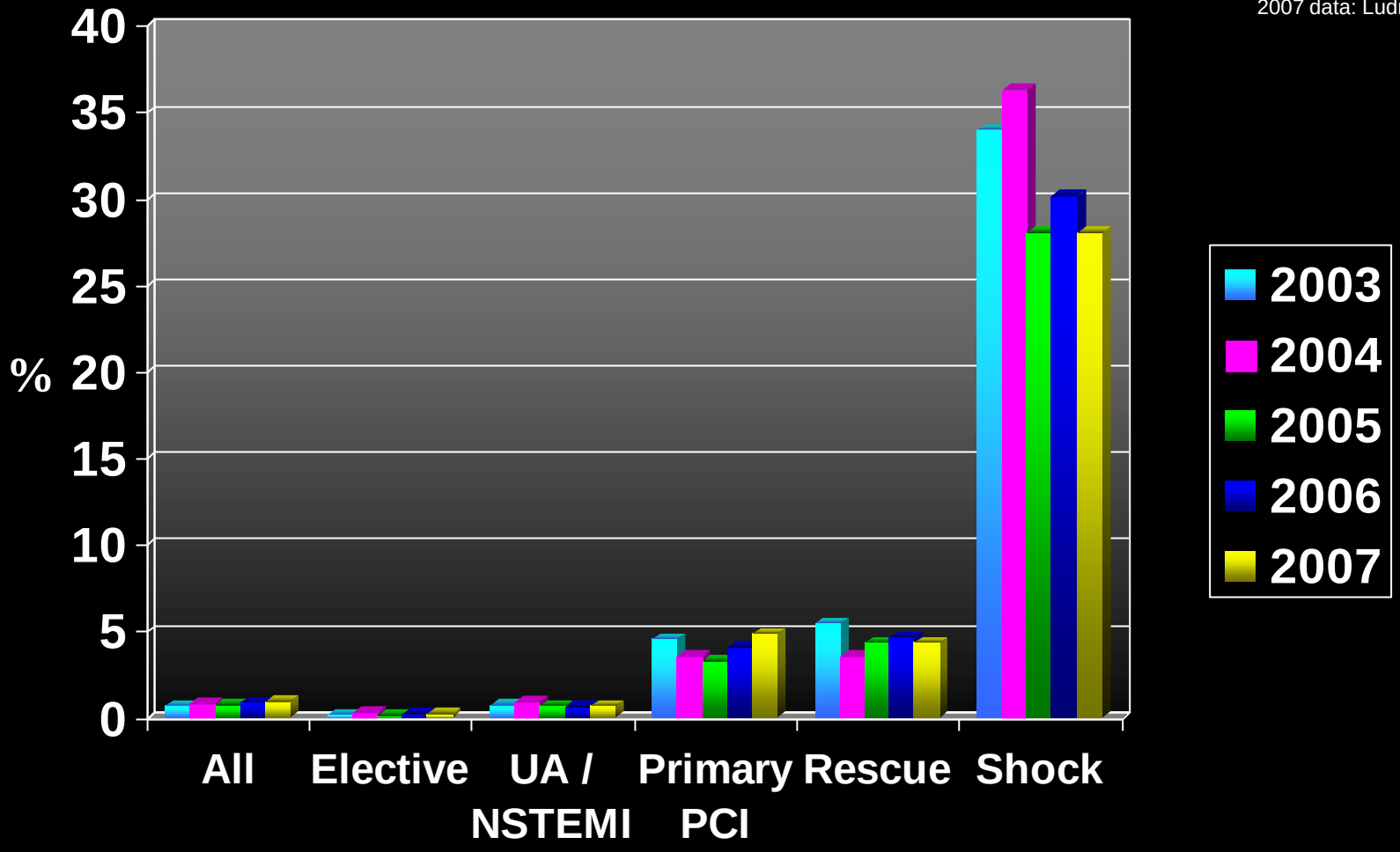
2007 data: Ludman



Mortality by Syndrome

BCIS

2007 data: Ludman



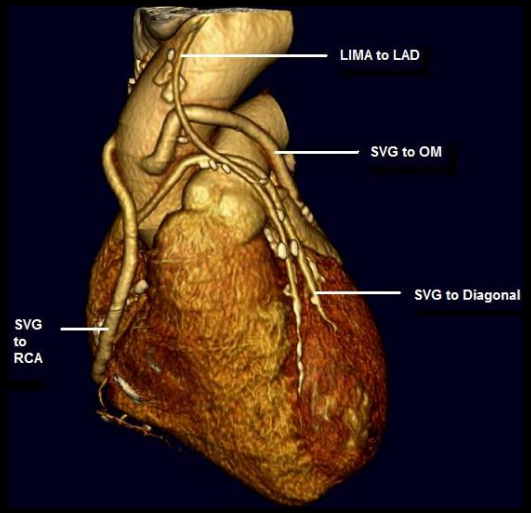
Bypass grafts

PCI of SVG and Arterial 2007

BCIS

2007 data: Ludman

All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	Death
Bypass Grafts	5008	89.6	2.6	6.8	0.2	0.18	0	0.90



Chronic Total Occlusions

2007

BCIS

2007 data: Ludman

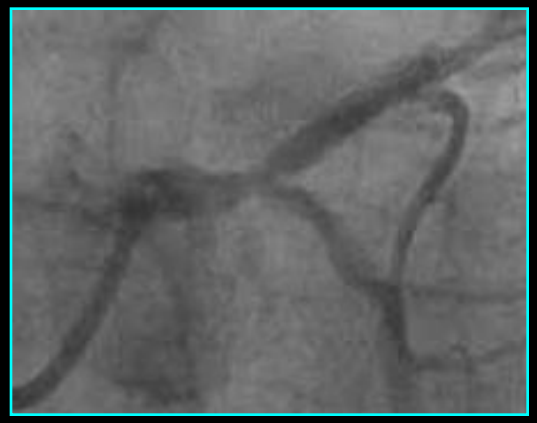
All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	Death
Chronic Total Occlusion	5092	67.5	9.3	20.7	0.4	0.2	0.16	1.2

Unprotected LMS

2007

2007 data: Ludman

All as %	No.	Success	Partial success	Fail no comp	Re-PCI	QMI	Em CABG	Death
Unprotected LMS	842	83.8	7.4	2.6	0.1	0.48	0.7	7.0



N.B.
Includes all clinical presentations (including shock)
In hospital outcome

PCI Risk Adjustment Models

Author	Database / patient source	Date PCIs were performed	N	Outcome assessed	Outcome time point
Hannan[22]	New York	1991	5,827	Death	In Hospital
Hannan[23]	New York	1991-1994	62,670	Death	In Hospital
Kimmel[24]	SCAI registry	1992-1993	10622	Death / MI / emCABG	In Hospital
Ellis[25]	6 Hospitals in the United States	1993-1994	12,985	Death / MI / CABG	In Hospital
O'Connor[26]	NNE	1994-1996	15,331	Death	In Hospital
DeBelder[27]	Single centre, London UK	1995-1996	1500	Death / MI / emCABG	In Hospital
Ellis[13]	Cleveland Clinic	1995-1997	6327	Death / MI / emCABG	In Hospital
Qureshi[28]	William Beaumont Hospital, Michigan	1996-1998	9,954	Death	In Hospital
Singh[29]	Mayo Clinic	1996-1999	5463	Death / MI / emCABG / urCABG / CVA	In Hospital
Moscucci[30]	8 Michigan Hospitals	1997-1999	10,729	Death	In Hospital
Resnic[31]	Brigham and Women's Hospital, Boston	1997-1999	2,804	Death / MI / emCABG	In Hospital
Shaw[32]	ACC-NCDR	1998-2000	50,123	Death	In Hospital
De Luca[33]	Zwolle	1994-2001	1791	Death	30 day
Grayson[11]	4 hospitals in North West England	2001-2003	9914	Death / MI / emCABG / CVA	In Hospital
Wu[34]	NewYork	2002	46,090	Death	In Hospital
Valgimigli[16]	Patient from the ARTS II trial[35]	2003	306	Death / MI /CVA / revasc	30/7, and 300/7

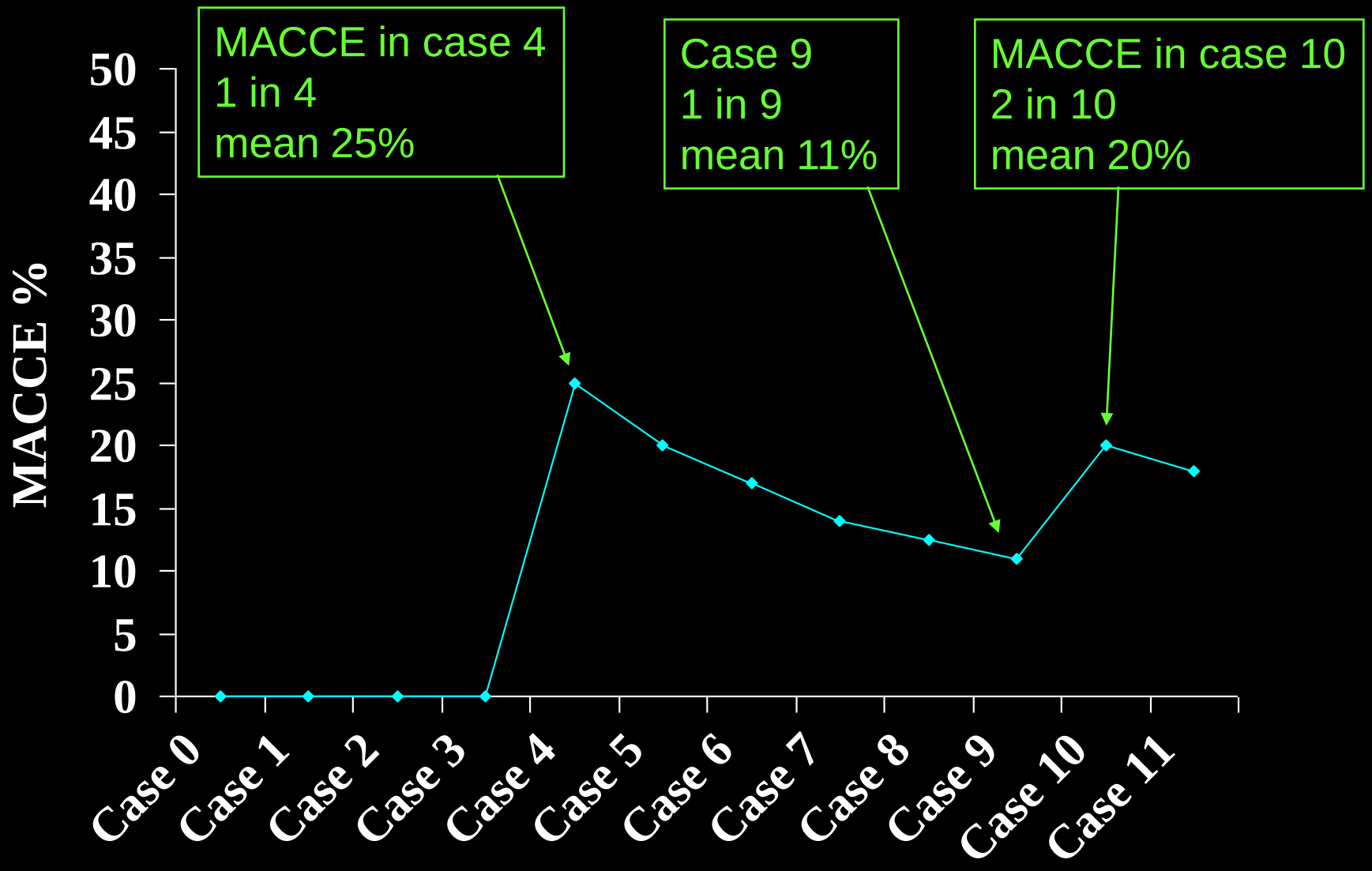
Variable
Life
Adjusted
Display……

VLAD the Impaler

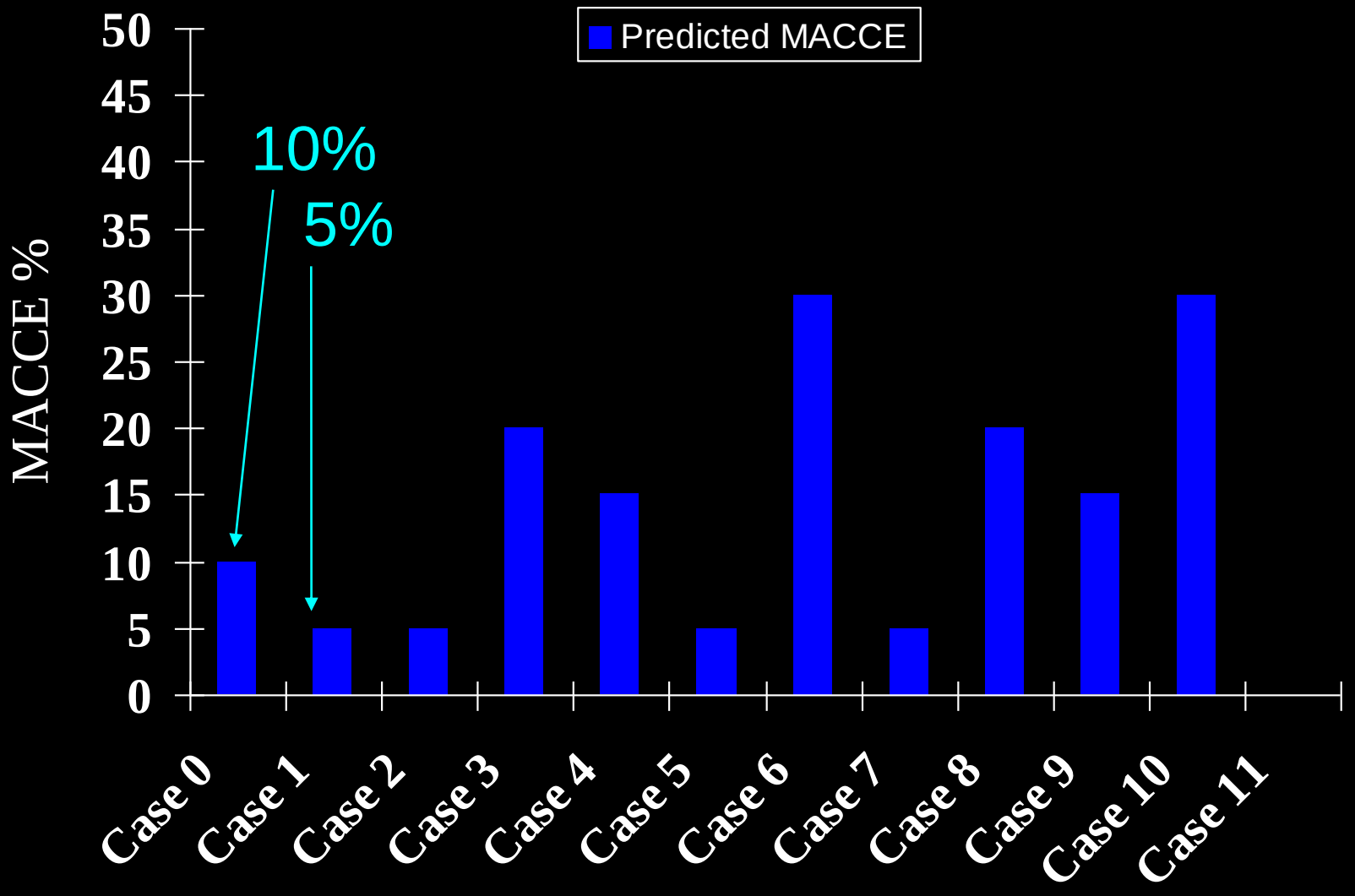
Cumulative Funnel plots

Babu Kunadian, Joel Dunning, Anthony P Roberts, Robert Morley, Darragh Twomey, James A Hall, Andrew G C Sutton, Robert A Wright, Douglas F Muir and Mark A de Belder BMJ 2008;336:931-4

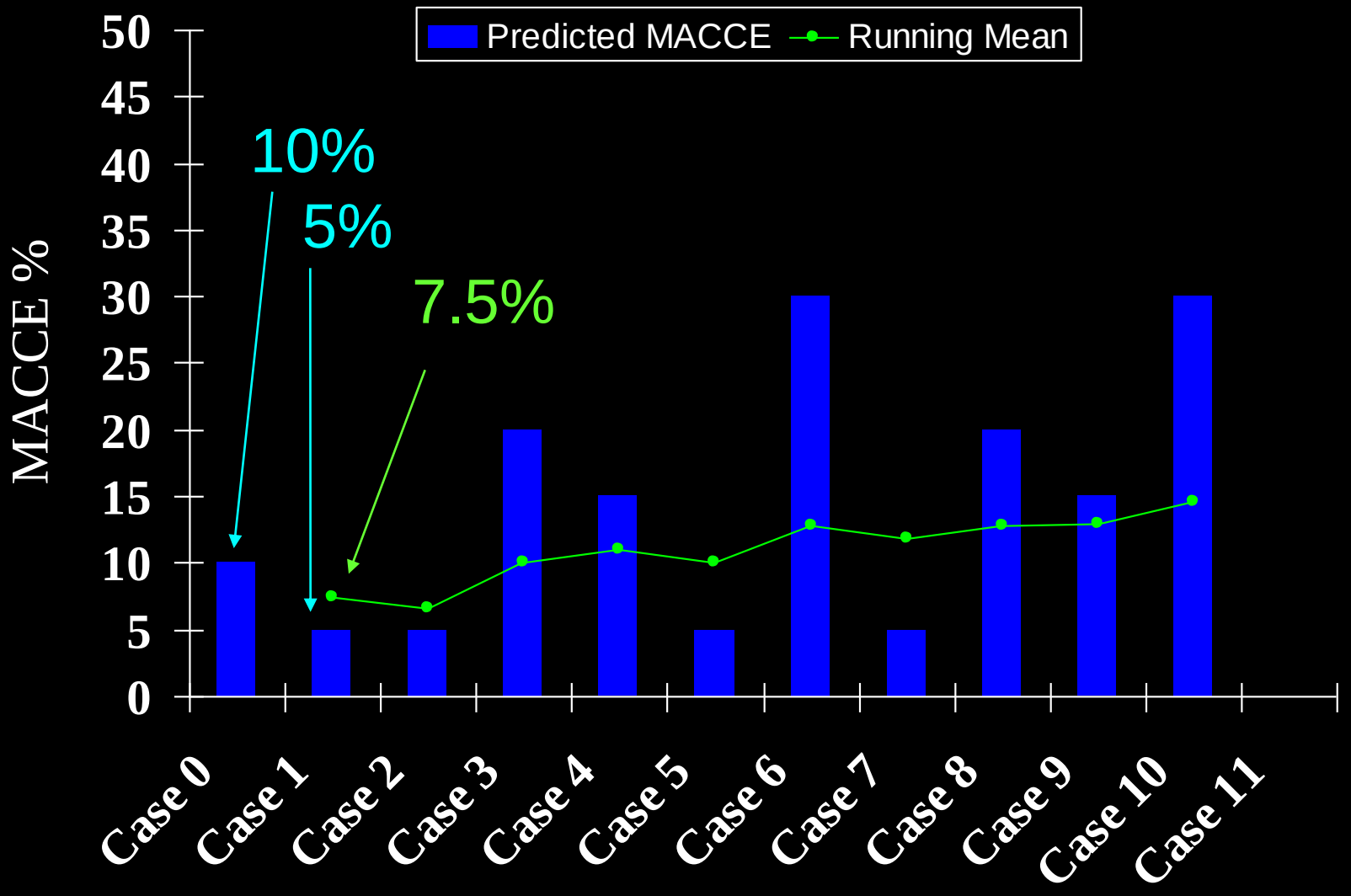
Cumulative MACCE



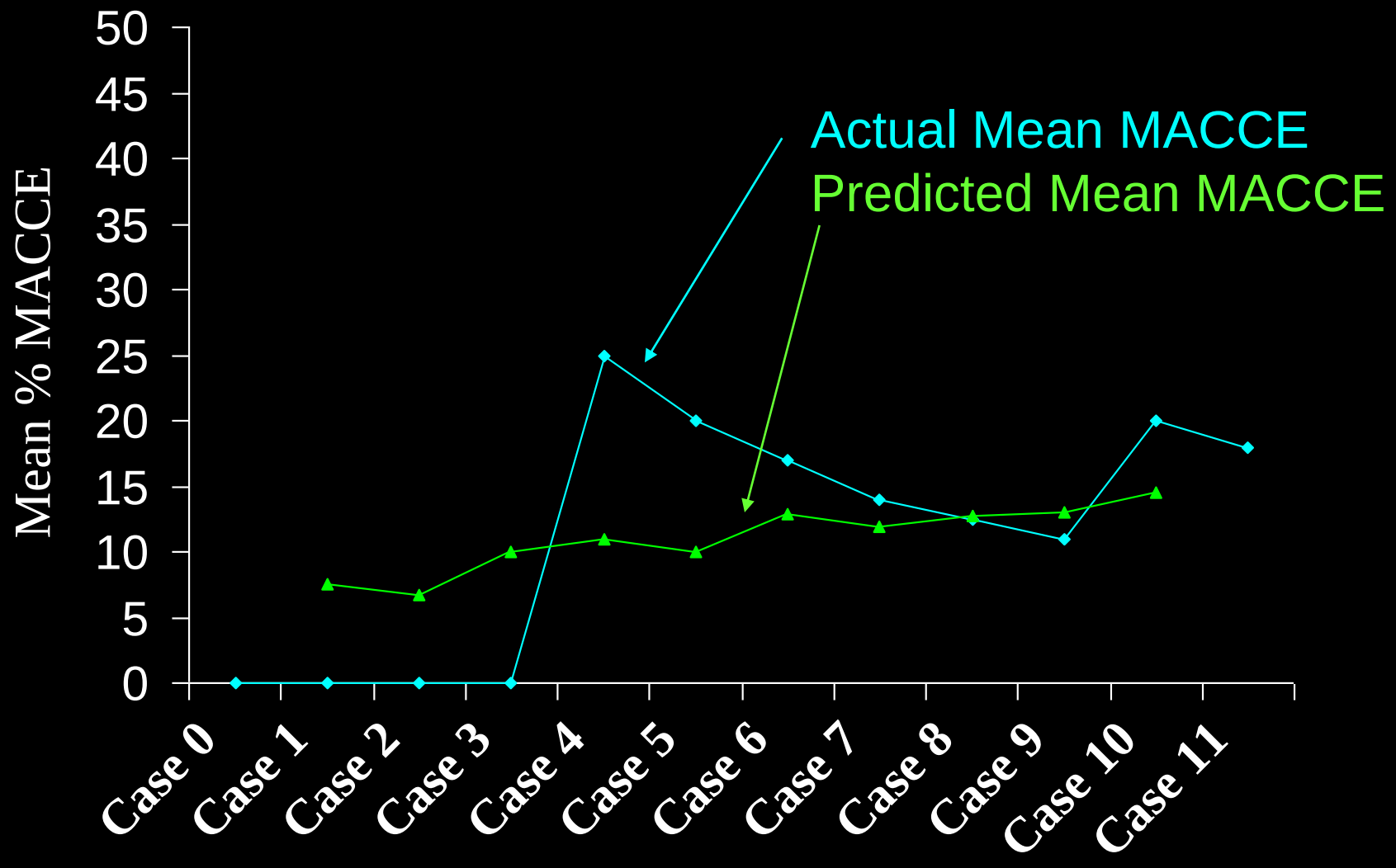
Cumulative MACCE



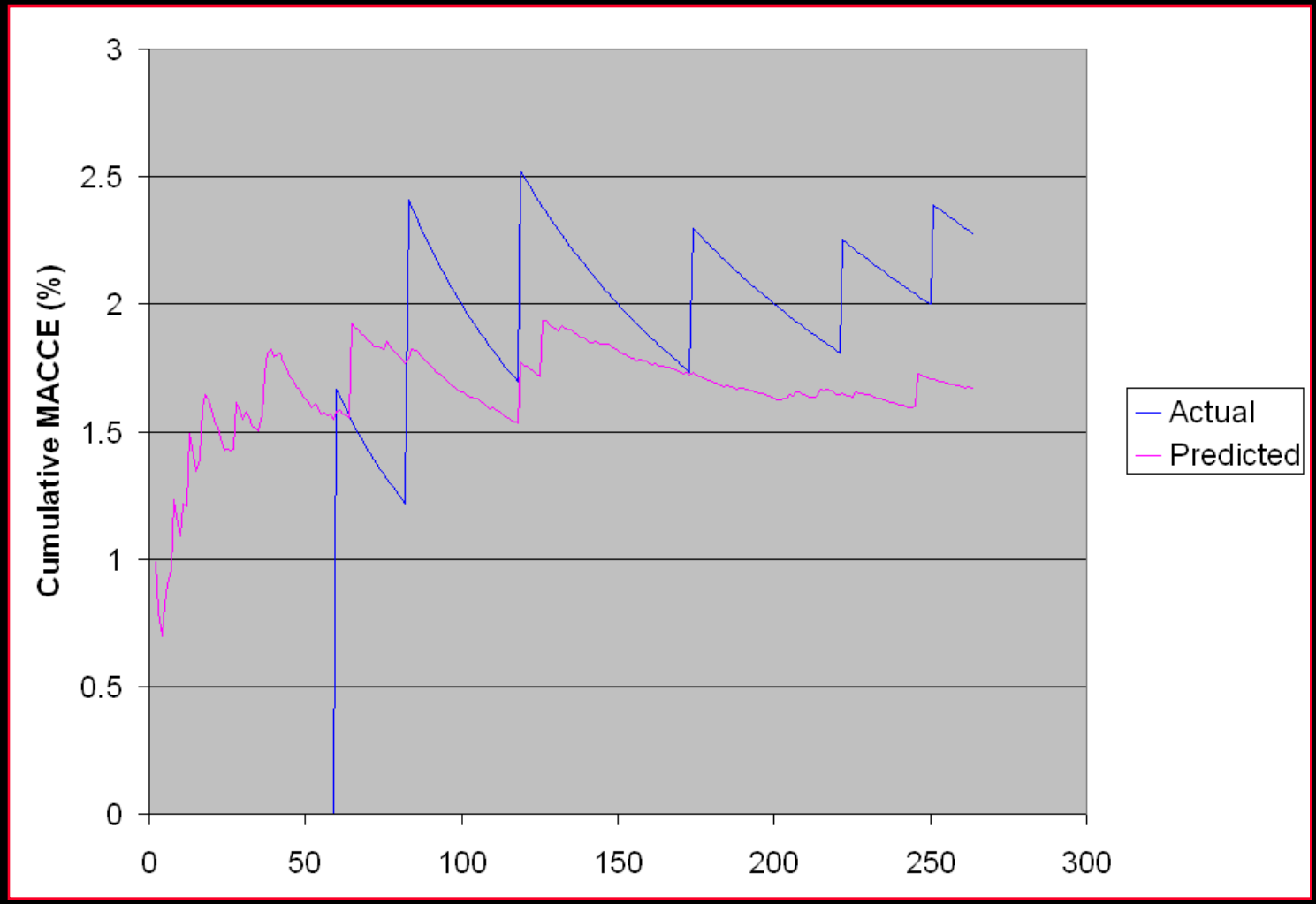
Cumulative MACCE



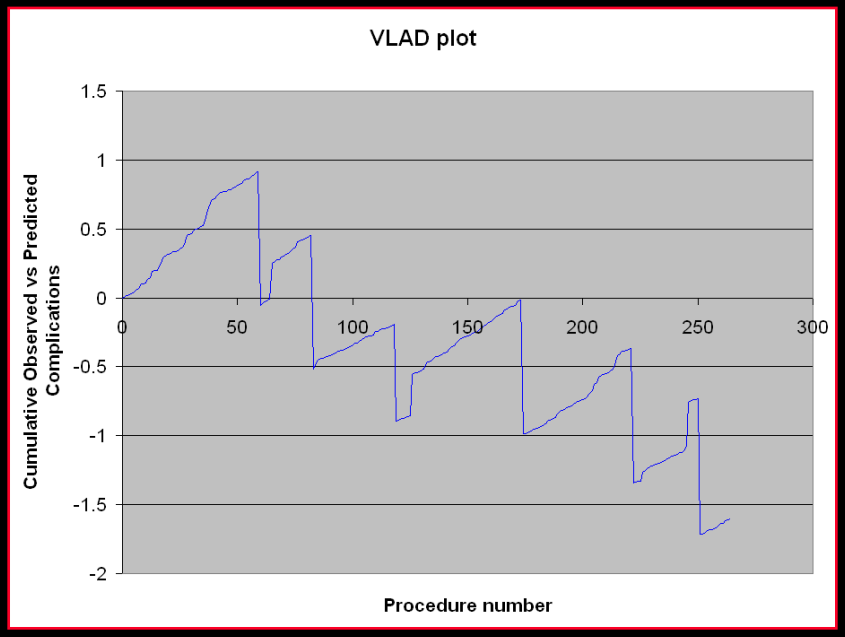
Cumulative MACCE



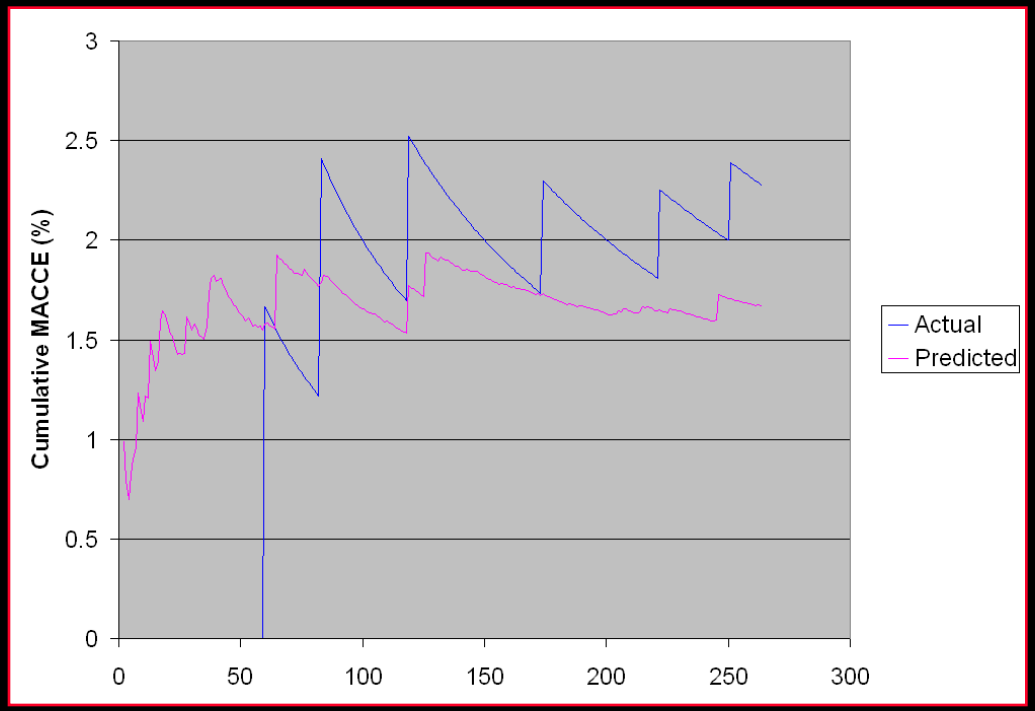
Cumulative MACCE plots



Worse

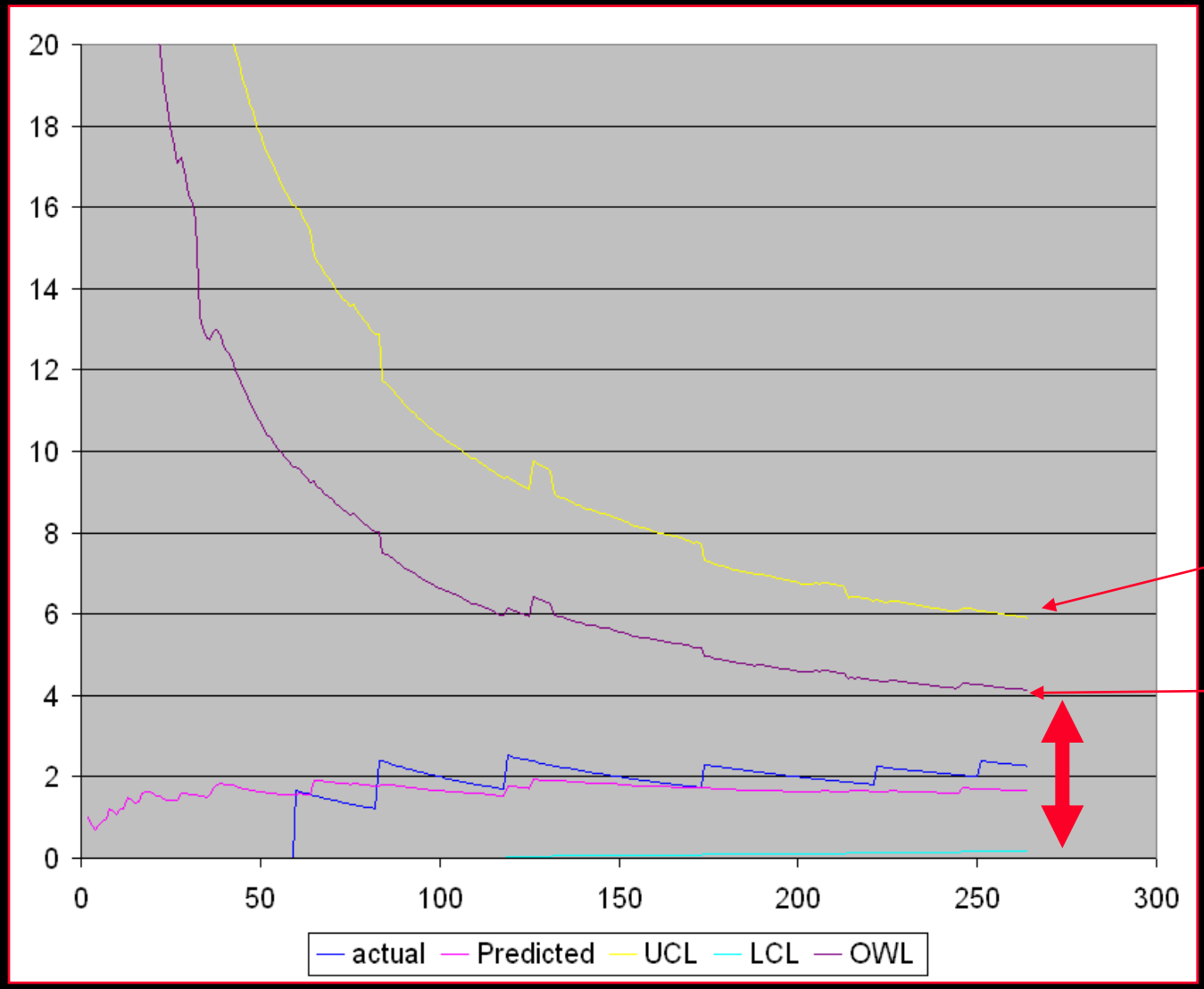

VLAD plot
Cumulative Observed vs Predicted Complications
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
50
100
150
200
250
300
Procedure number

Worse

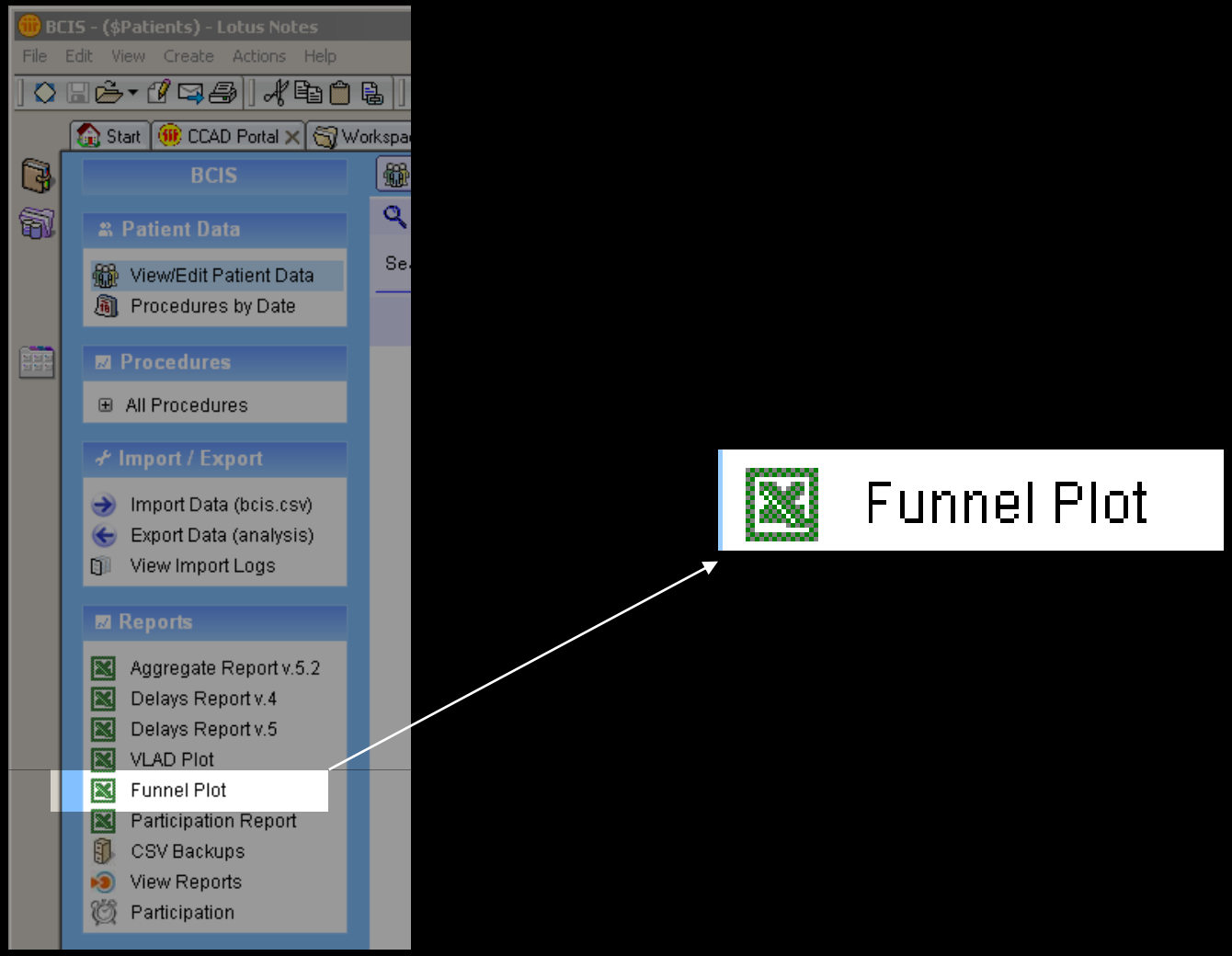

Cumulative MACCE (%)
3
2.5
2
1.5
1
0.5
0
0
50
100
150
200
250
300
Actual
Predicted

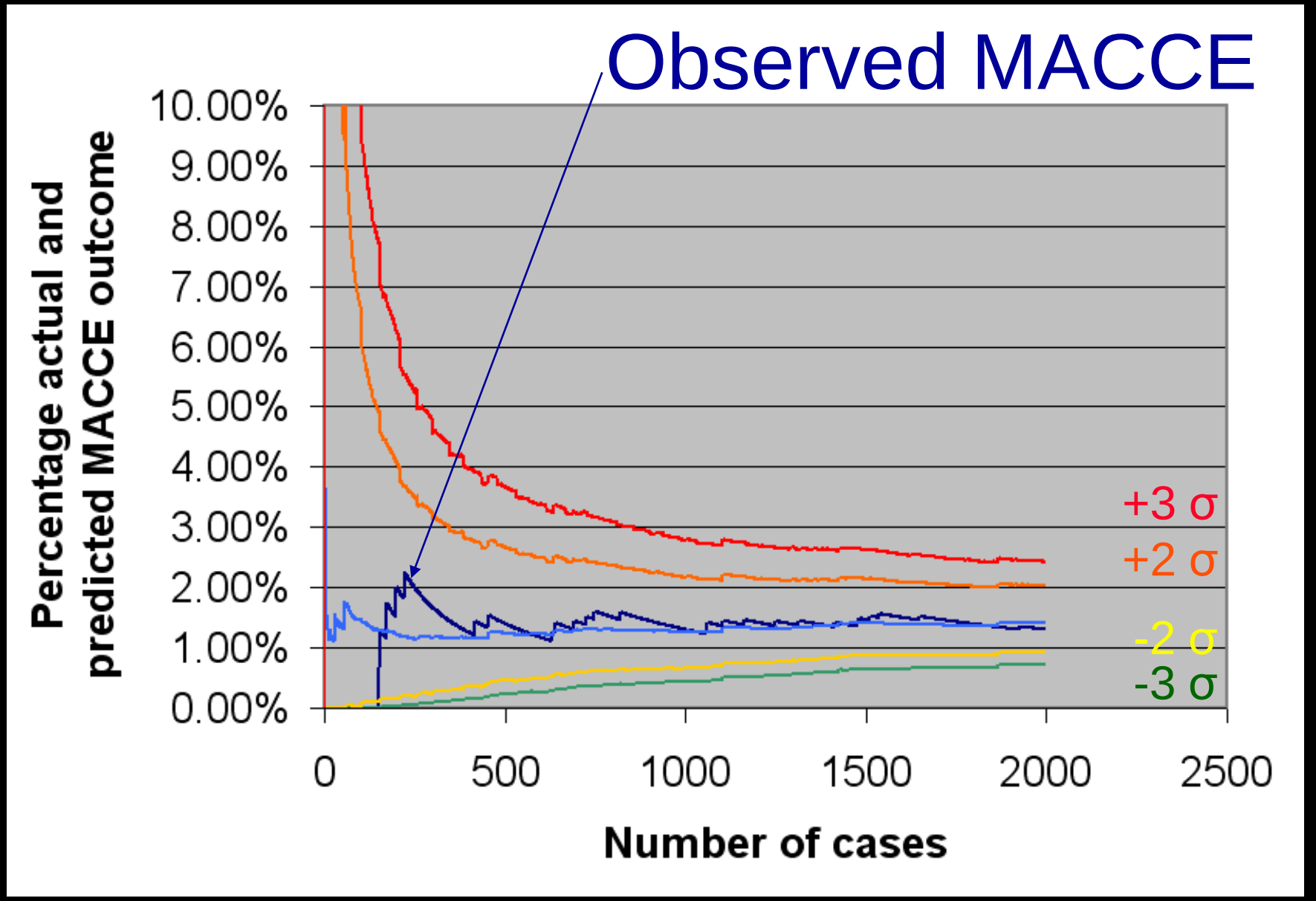
Should we be concerned?

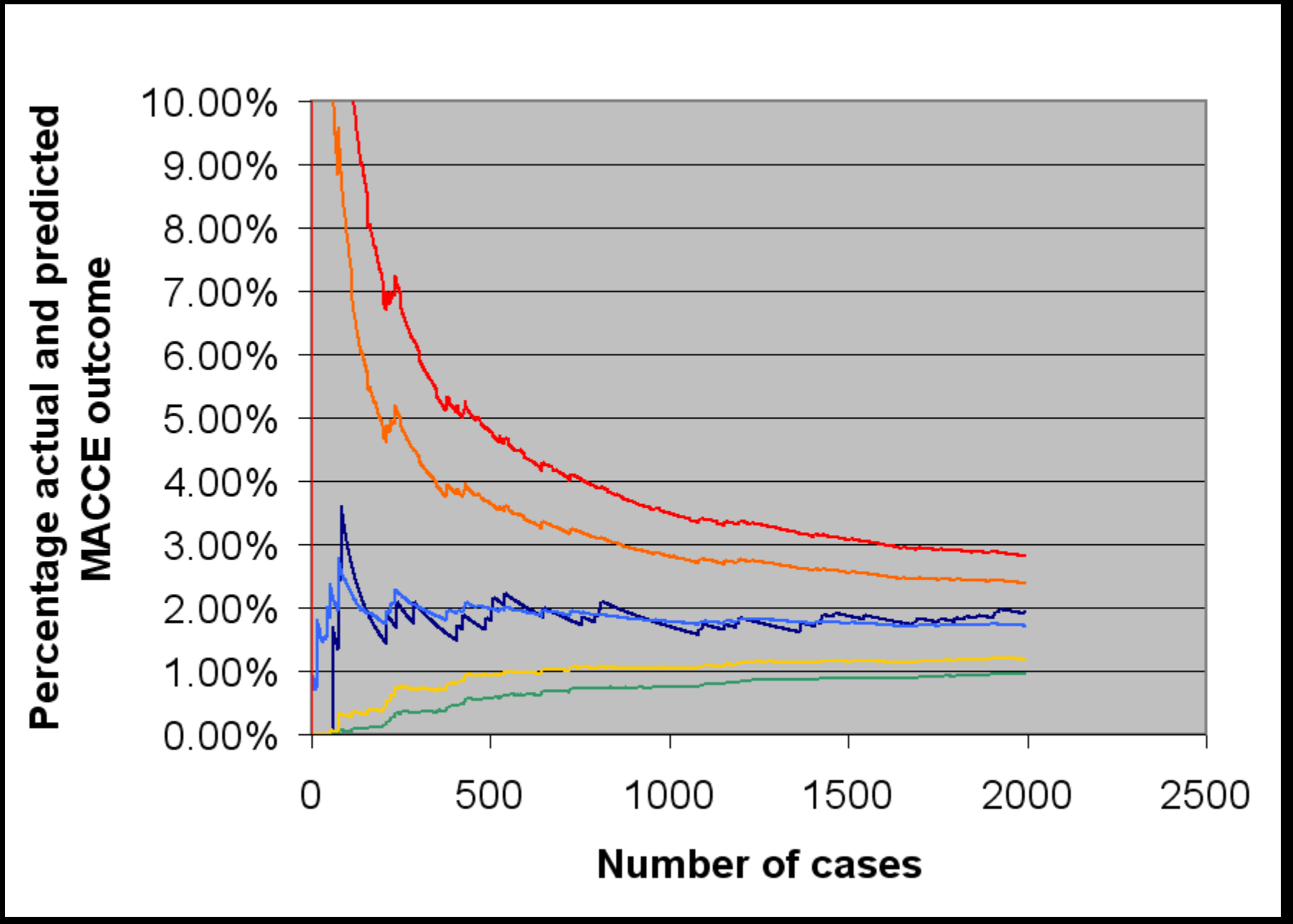
Statistical Control Limits

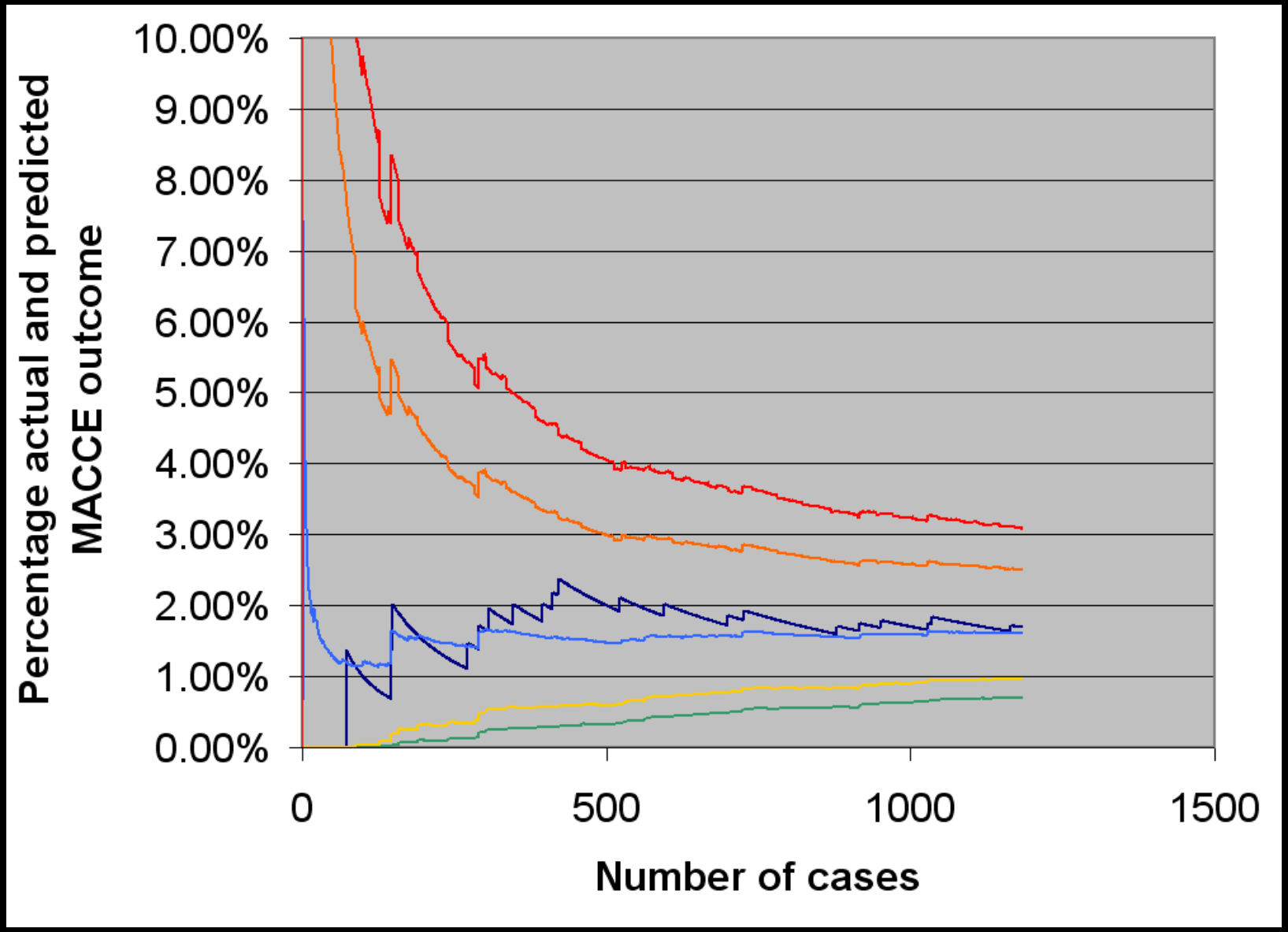


Risk Adjusted Outcome




Observed MACCE
Percentage actual and predicted MACCE outcome
10.00%
9.00%
8.00%
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
+3 σ
+2 σ
-2 σ
-3 σ
0
500
1000
1500
2000
2500
Number of cases


Percentage actual and predicted MACCE outcome
10.00%
9.00%
8.00%
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
0
500
1000
1500
2000
2500
Number of cases


Percentage actual and predicted MACCE outcome
10.00%
9.00%
8.00%
7.00%
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0.00%
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500
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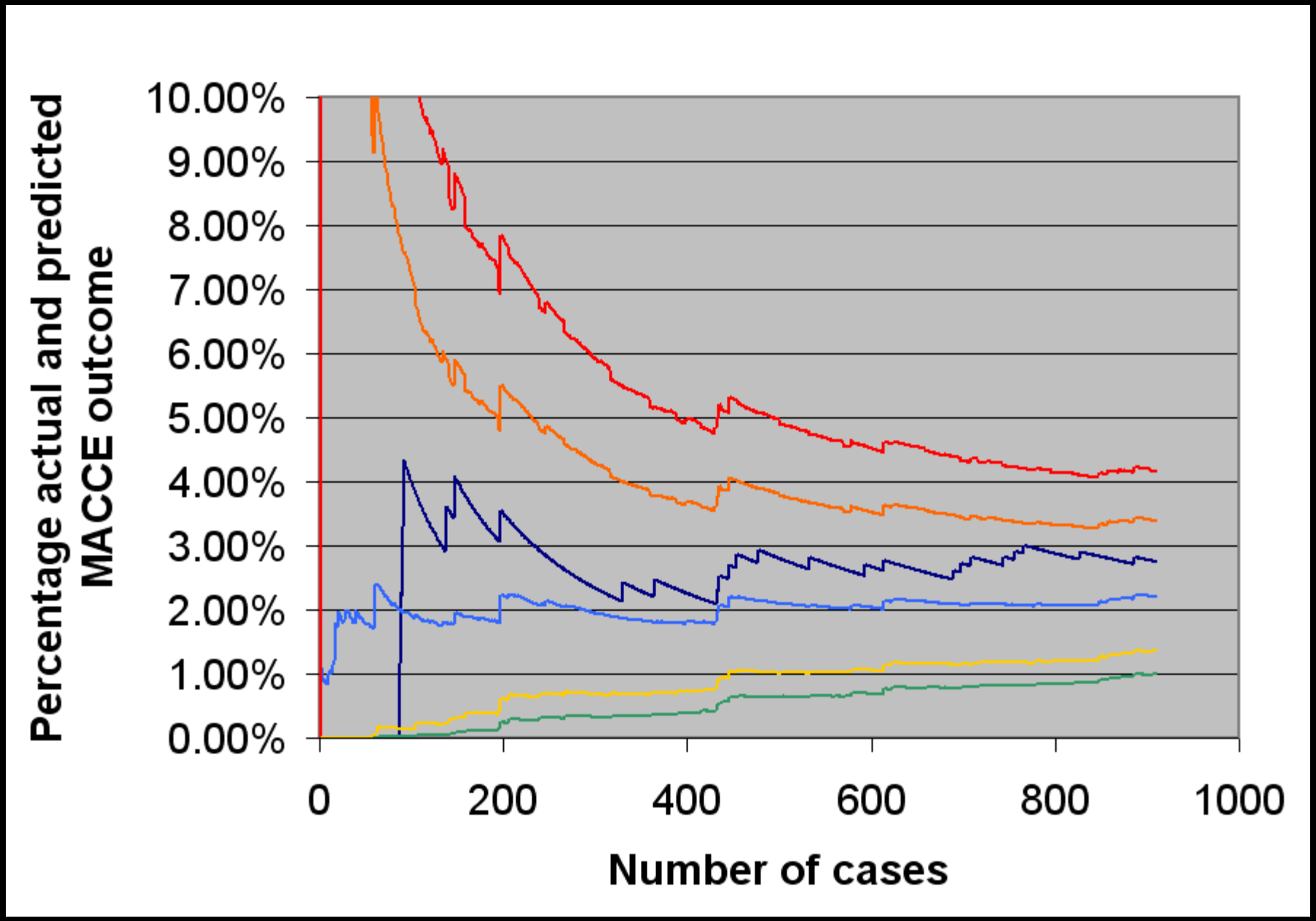
1500
Number of cases


Percentage actual and predicted MACCE outcome
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200
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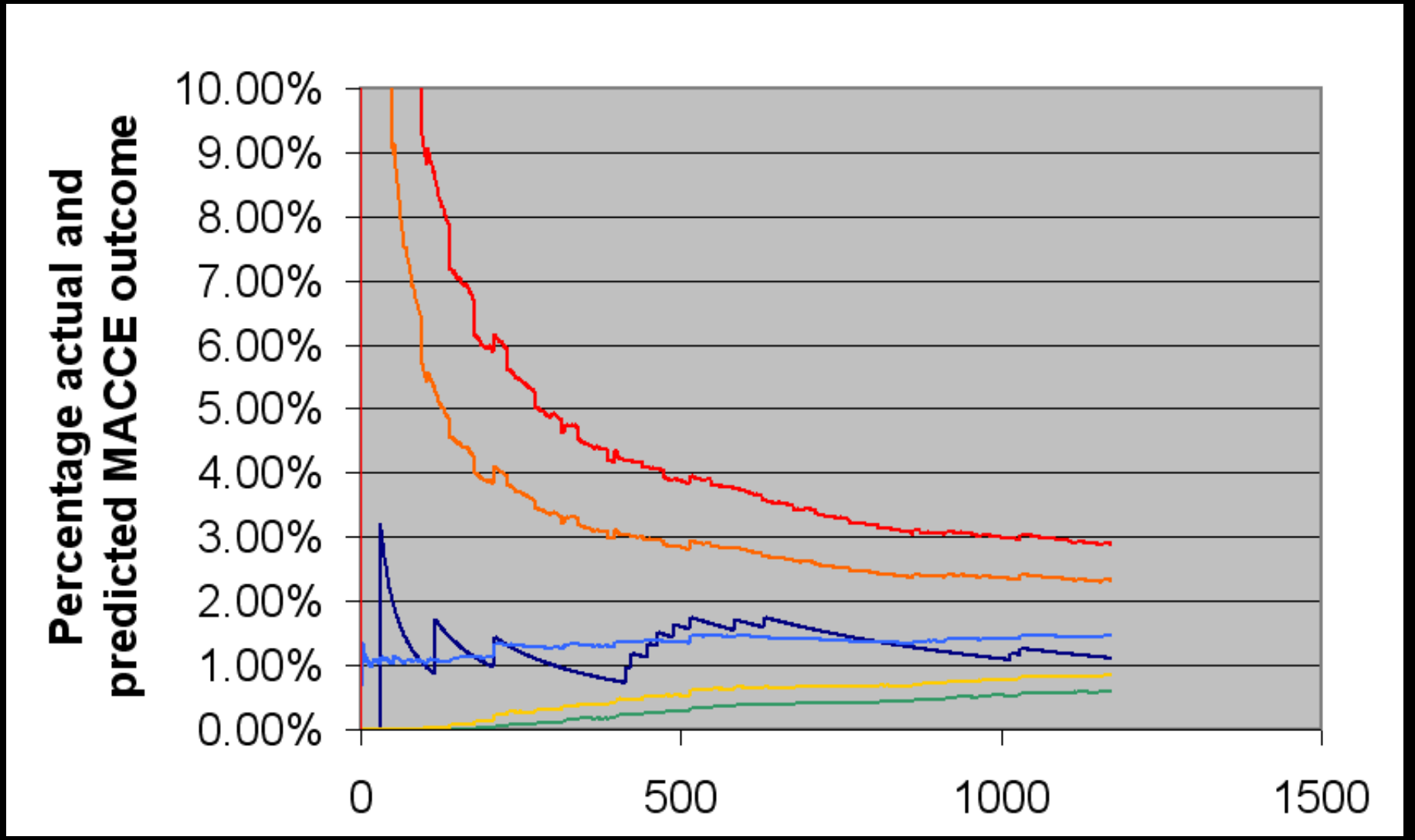
600
800
1000
Number of cases


Percentage actual and predicted MACCE outcome
10.00%
9.00%
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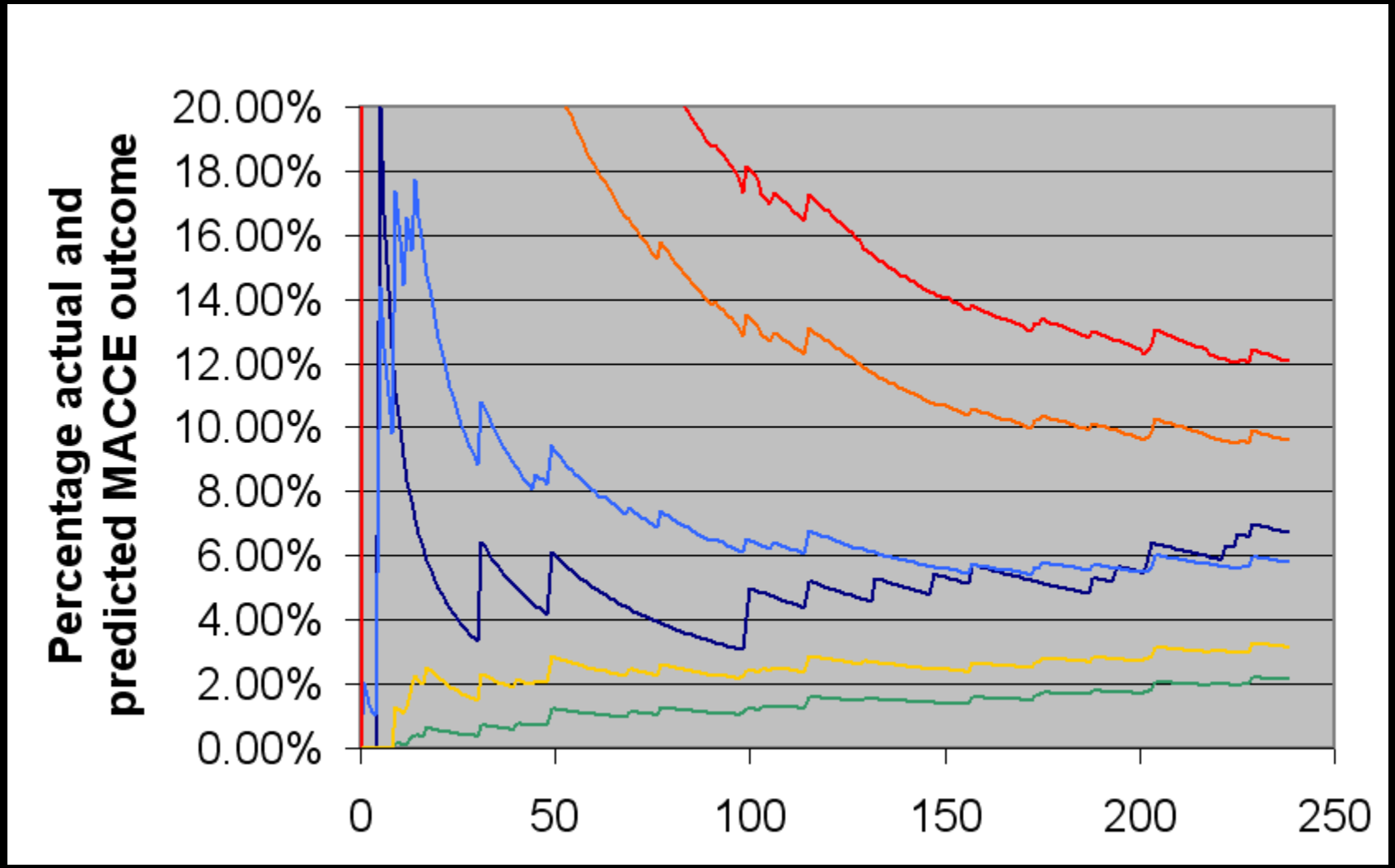
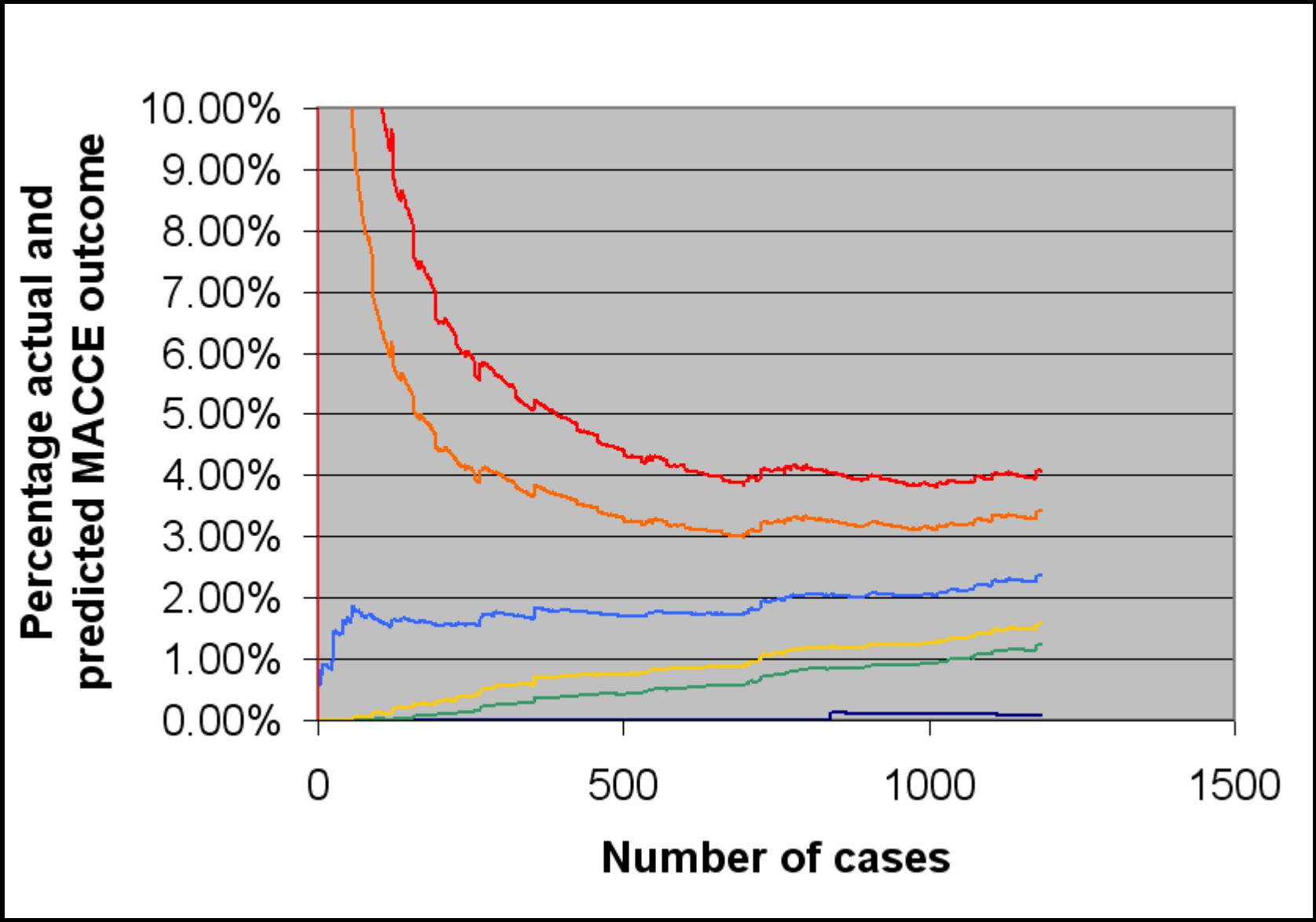

Percentage actual and predicted MACCE outcome
20.00%
18.00%
16.00%
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
0
50
100
150
200
250


Percentage actual and predicted MACCE outcome
10.00%
9.00%
8.00%
7.00%
6.00%
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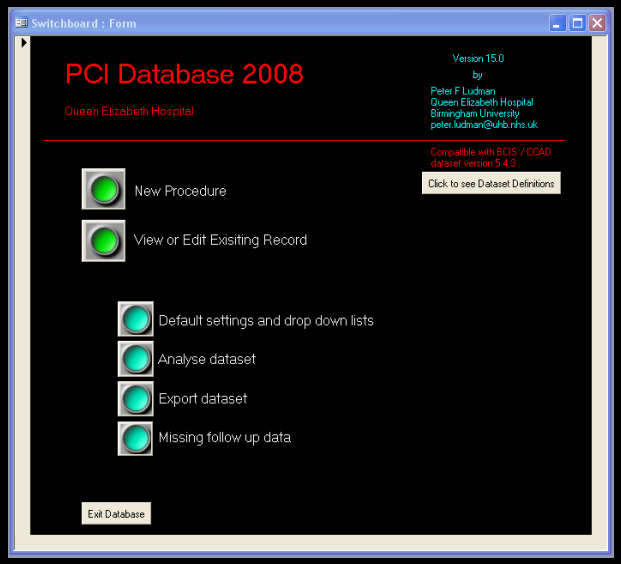
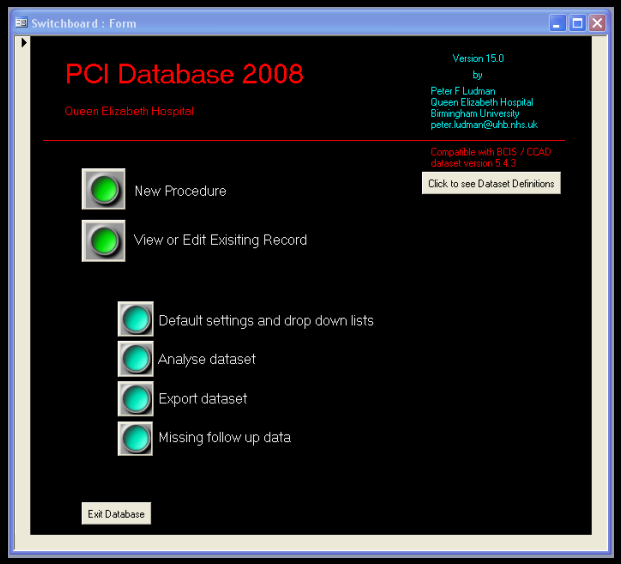
Number of cases


Switchboard : Form
PCI Database 2008
Queen Elizabeth Hospital
Version 15.0
by
Peter F Ludman
Queen Elizabeth Hospital
Birmingham University
peter.ludman@uhb.nhs.uk
Compatible with BCIS / CCAD dataset version 5.4.3
Click to see Dataset Definitions
New Procedure
View or Edit Exisiting Record
Default settings and drop down lists
Analyse dataset
Export dataset
Missing follow up data
Exit Database

CCAD


Switchboard : Form
PCI Database 2008
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Peter F Ludman
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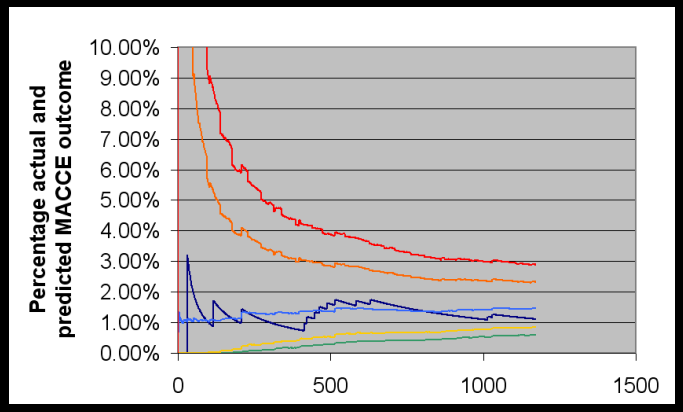
Click to see Dataset Definitions
New Procedure
View or Edit Exisiting Record
Default settings and drop down lists
Analyse dataset
Export dataset
Missing follow up data
Exit Database

CCAD

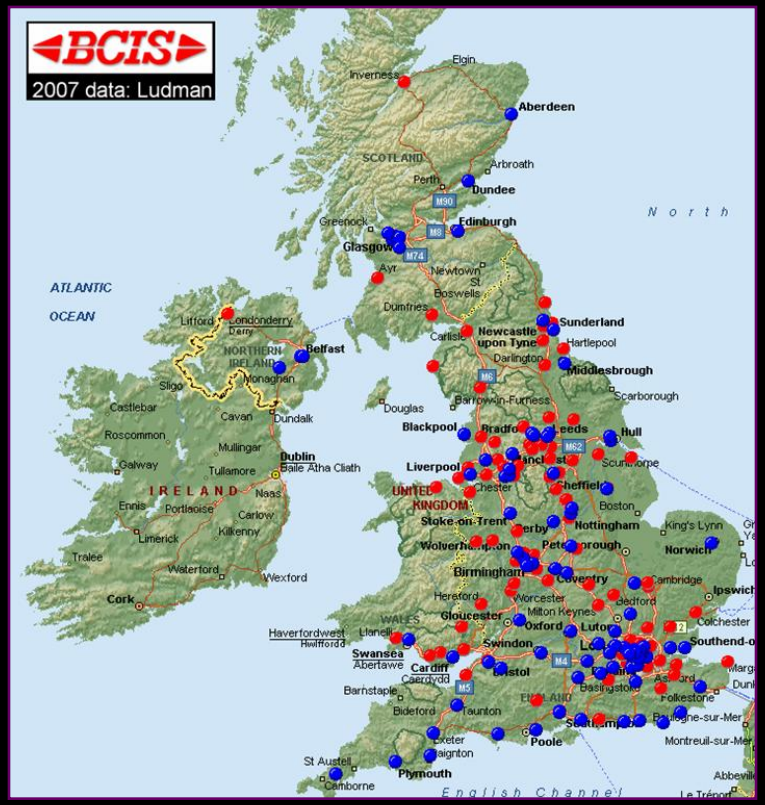
email


Percentage actual and predicted MACCE outcome
10.00%
9.00%
8.00%
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
0
500
1000
1500

Summary 2007 (UK)

- 98 PCI centres in UK
- 1,269 PCI pmp in UK
- Rise in PCI remains small
- CCAD a successful tool
- Outcomes similar to 2006
- Plans
  - Improve delays to PPCI reporting
  - Risk adjusted outcome

    BUT beware the pitfalls
  - In depth analysis of the CCAD dataset
- Additional data on the web site



The End

Acknowledgments

- Andrew Donald
  - Programmer at CCAD
- Tony Roberts and Robert Morley
  - Statistical process control chart development
- Owen Nicholas
  - Statistician at NICOR
- Rachel Slack, Jill Pell, Keith Oldroyd
  - Scottish database contacts

Appendix

- Modifications to slides since presentation:
  - Slide 25: Change to a hospital name on slide
  - Slide 59: Corrected errors in calculation of unit specific ratio of acute to stable coronary syndromes