

Acute Pain – a 10 year audit

Colm Lanigan and
The Acute Pain Team
University Hospital Lewisham

Acknowledgements

- Nikki Luffingham
- Dee Condon
- Tamzin Bunton
- Consultant colleagues
 Silvia Leonardi
- Surgical colleagues
- Trainees
- Nurses, Physiotherapists, Pharmacists, secretaries
- managers



Objectives

- Review data collected over a decade by one Acute Pain Team
- Review factors affecting outcomes seen
- Compare with published data
- Conclusions
- Future concerns

University Hospital Lewisham

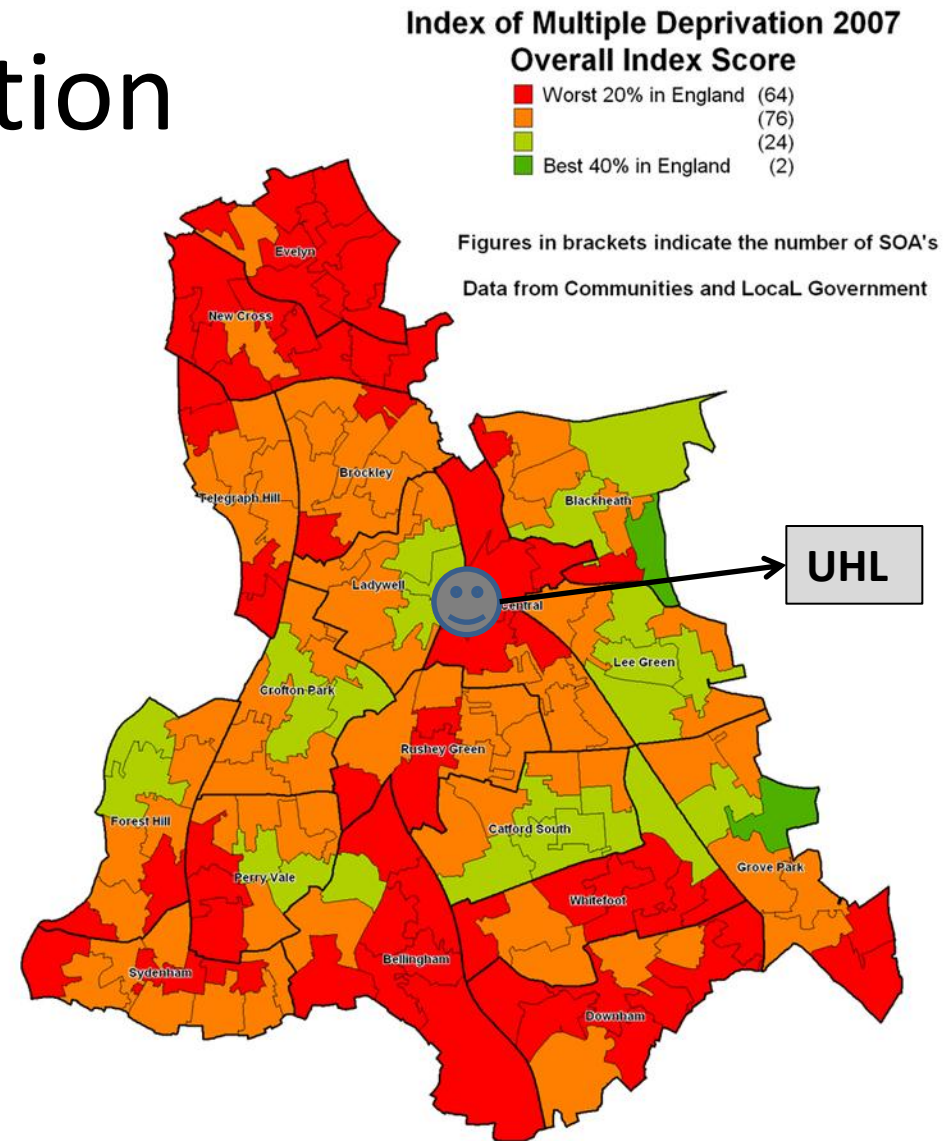
- A* DGH in SE London
- Serves about 300,000
- Surgical wards: 11 → 6
- 10 theatres, ~14K ops pa
- Busy Emergency Department
- Gynae, Gen Sx, Ortho + Trauma, Vasc, Paed, ENT

- 22 consultant anaesthetists, 2 Chronic Pain consultants
- 3 CNS, 1 HCA, 1 Con PA pw
- 5 day acute pain ward rounds per wk
- After hours anaesthetic support

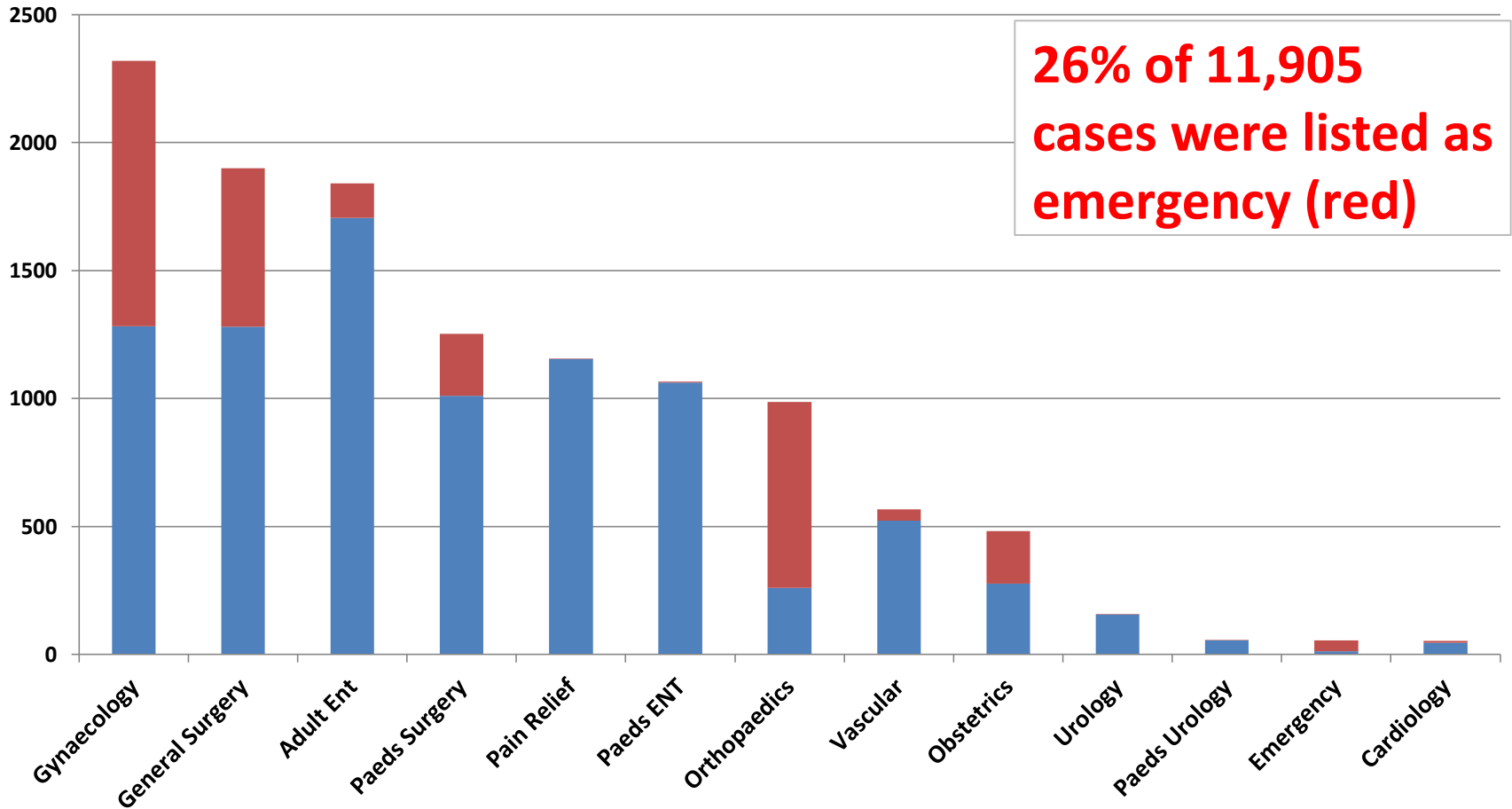


Lewisham population

- 3% ↑ 2001 to 2008, but forecast ↑ by 25% between 2006 & 2013
- Average age 34.7 years
 - 25% 0-19 yrs old
 - 5% over 75 years old
- BME has risen from 39% to 49.4% in 2007
- 39th of 400 most deprived local authority area in England



UHL theatre activity 2010



Hospital statistics 2010

	UHL	DVH	SLH	KCH	GSTT
Doctors per 100 beds	82	61	74	174	129
Nurses per 100 beds	208	167	174	319	311
3 yr mortality*	99	108	106	97	86
1 yr mortality*	97	106	107	96	91
Deaths after surgery	78	154	102	97	102

Hospital Standardised Mortality Ratio (National = 100)
<http://www.drfoosterhealth.co.uk/qualityreports/trust>

Methods

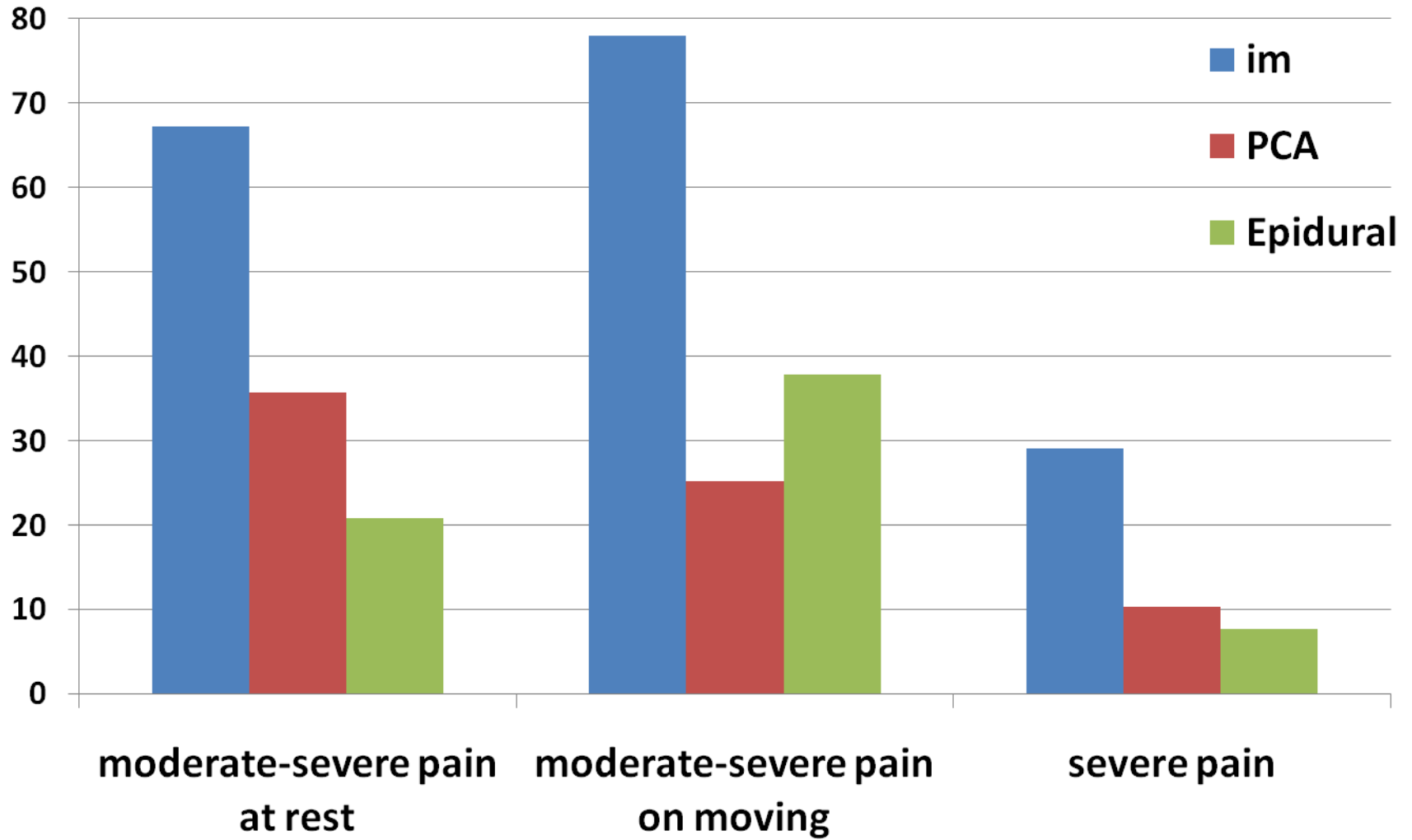
- APS started 1996 with Nikki Luffingham & me
- PCA, Epi, PCEA patients only seen daily by CNS
- Data entry by CNS & HCA
- Database since 1998
(Dr Maher Michel, BSUH)
- Data analysis by CL
- Yearly from 1/8/2001

Methods

- APS started 1996 with Nikki Luffingham & me
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- Data analysis by CL
- Yearly from 1/8/2001
- **Pain Score on movement**
 - 0=none
 - 1=mild
 - 2=moderate
 - 3=severe
- Severe PONV
- Severe Itching
- $RR \leq 8$
- complications

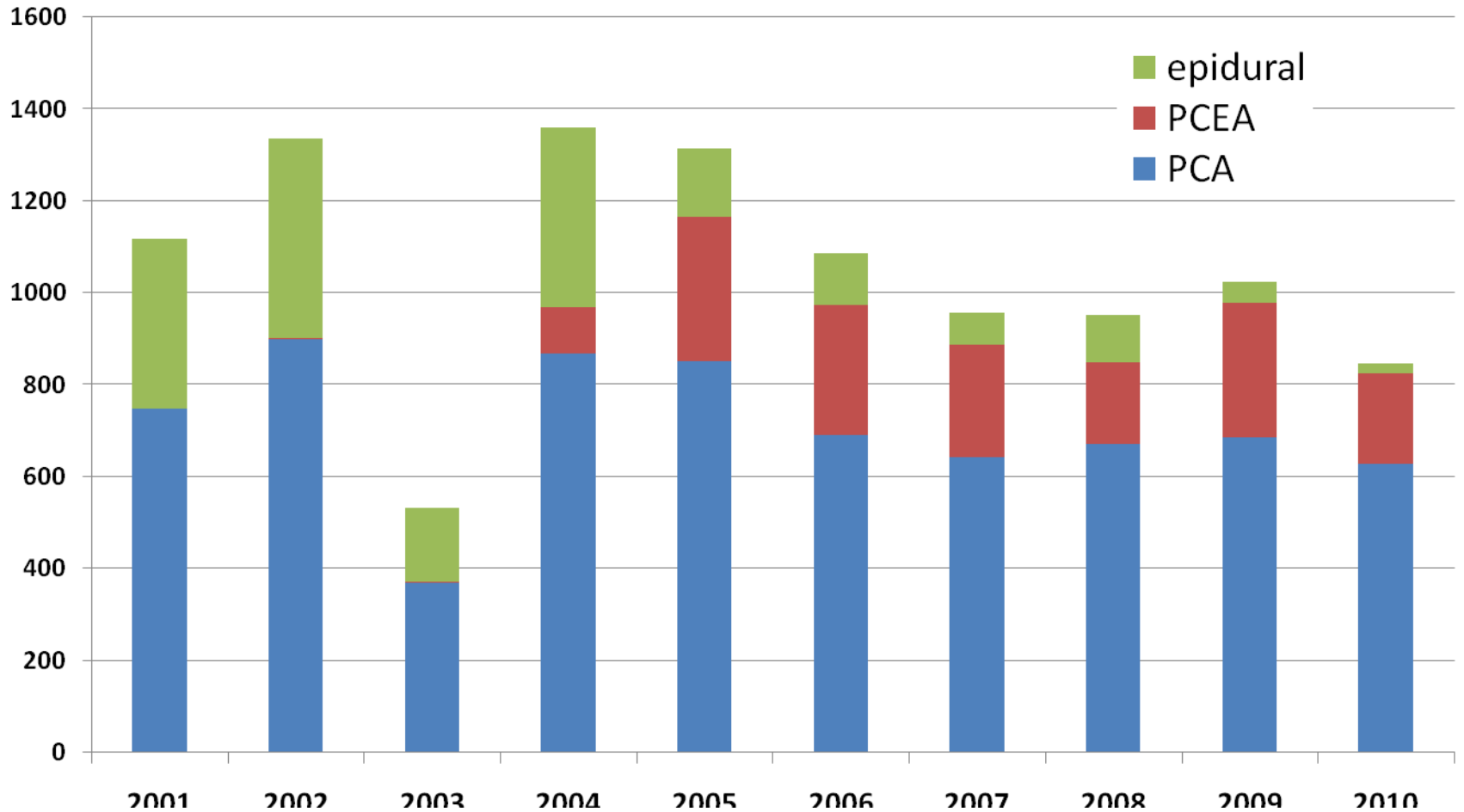
~ 20-25% of inpatients get Epidurals / PCA

What standard to use? (patients reports %)



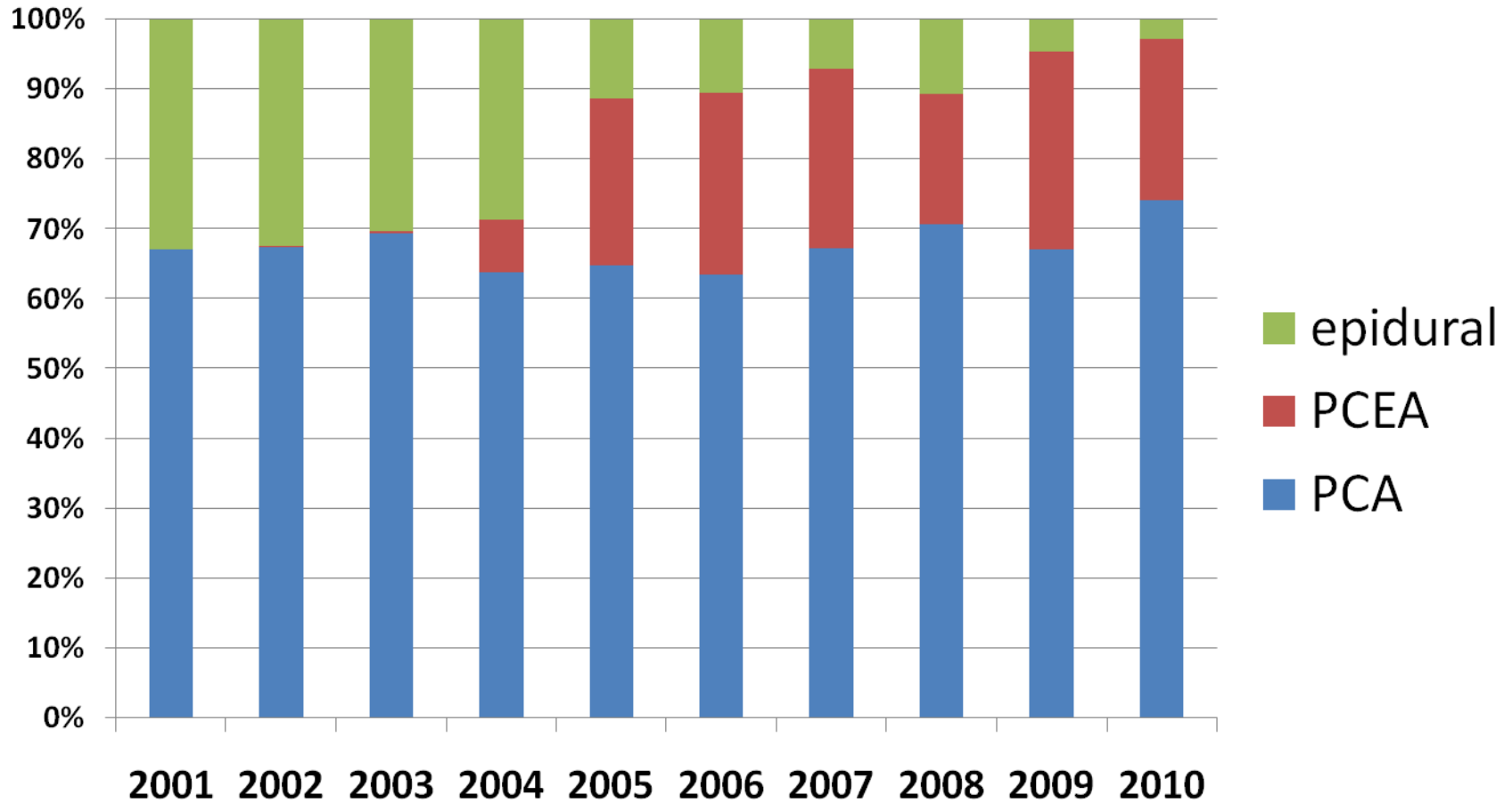
Dolin S et al. Effectiveness of acute postoperative pain management: Evidence from published data. Br J Anaesth 2002;89:409–423.

Acute Pain Patients seen in 10 yrs

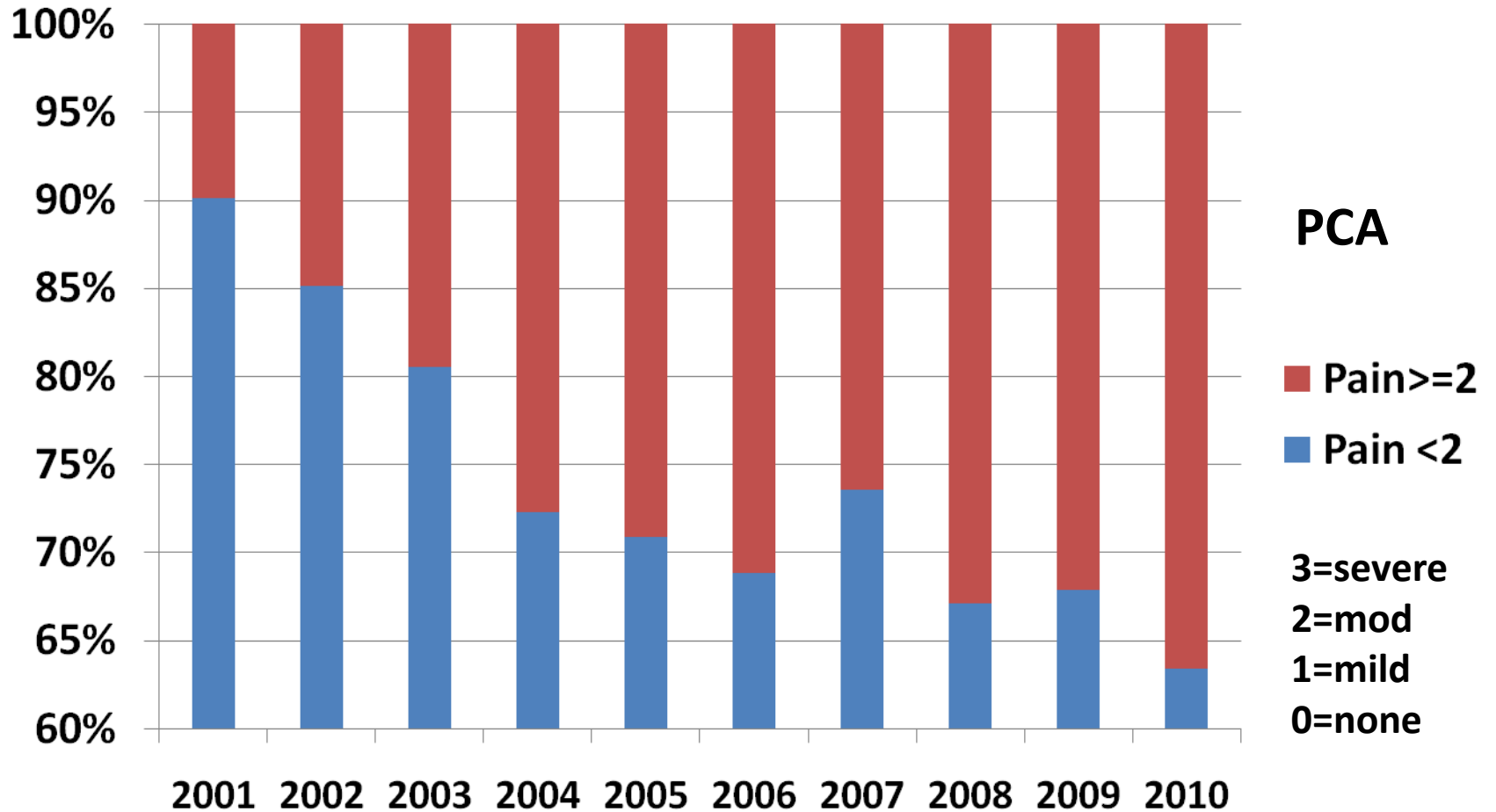


Data loss in 2003; PCEA introduced in 2004

Percentage usage by technique



PCA: day 1 pain severity on movement (%)

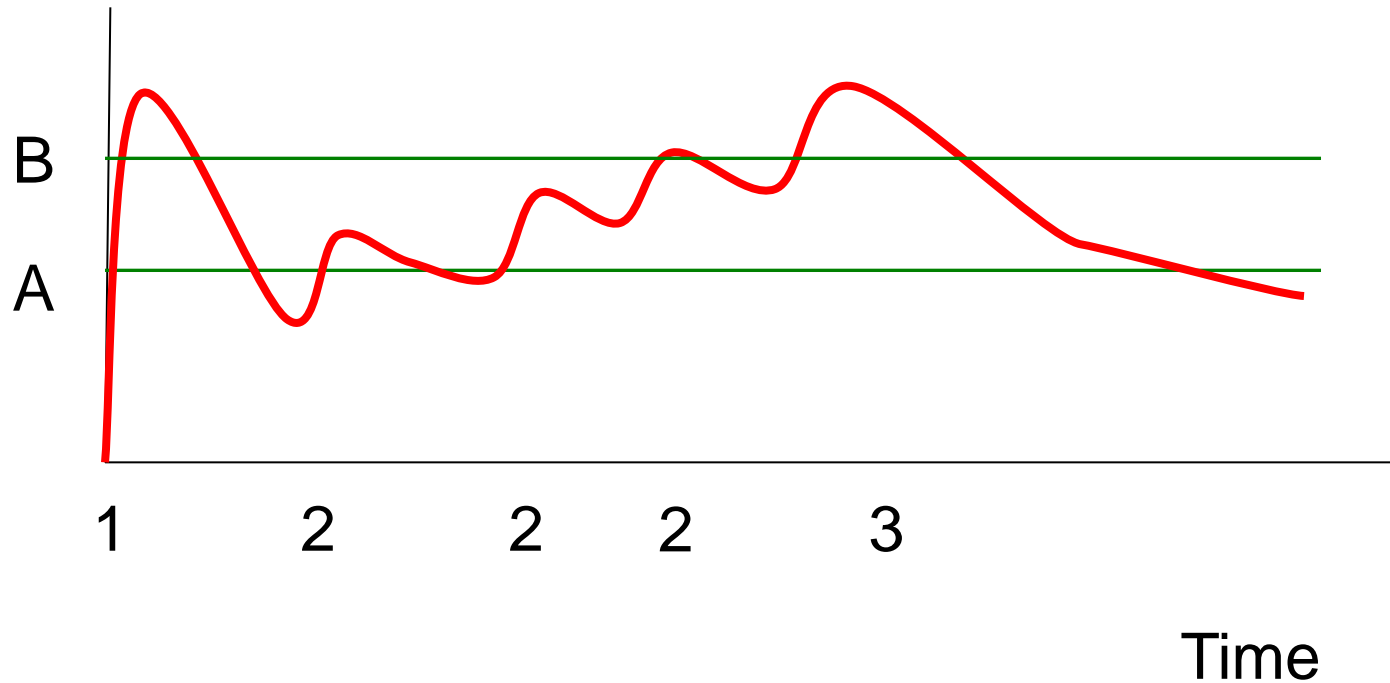


Why are the results so bad?

- Patient?
- Surgeon and surgery?
- Anaesthetist & anaesthetic technique?
- Nursing?
- Other?



Patient Controlled Analgesia (PCA)



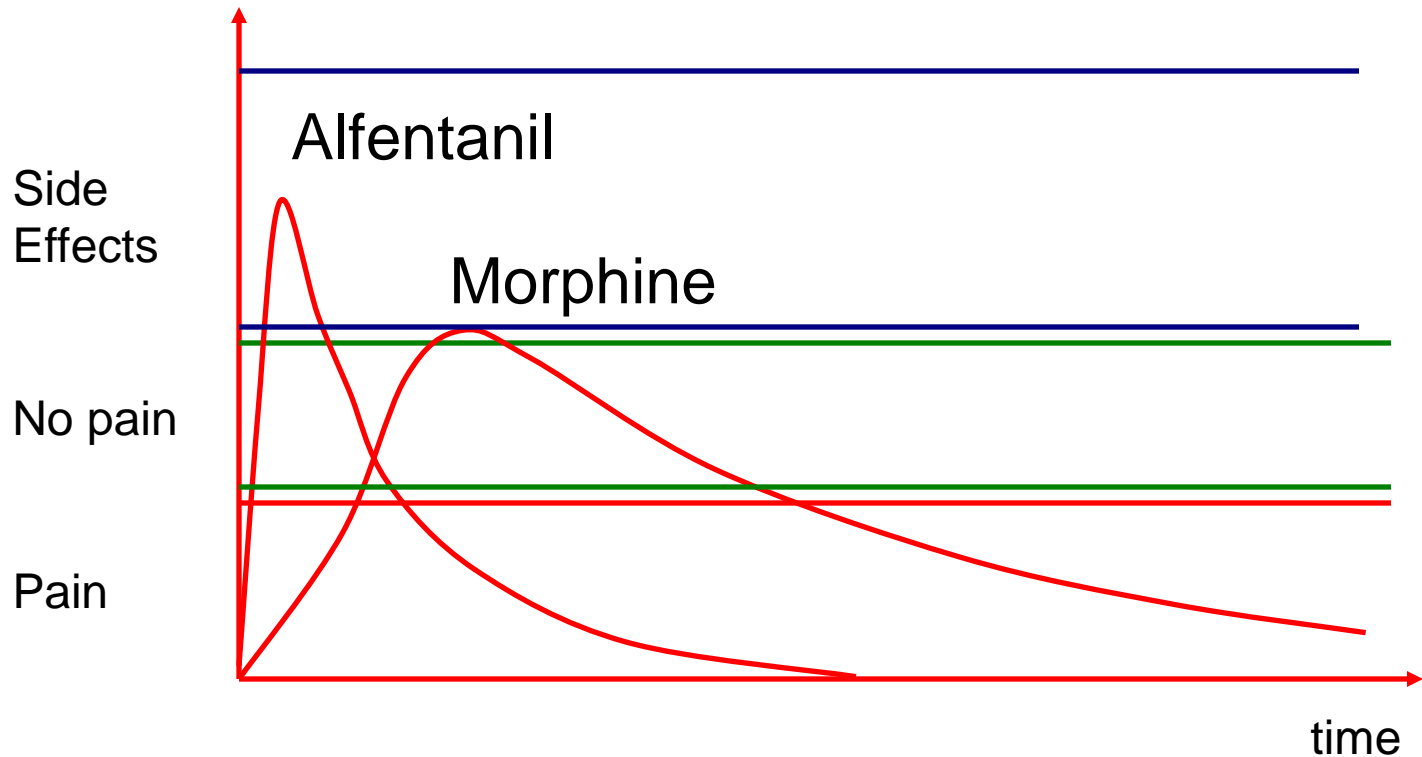
PCA

A-B = analgesic corridor; below A = pain; above B = side effects

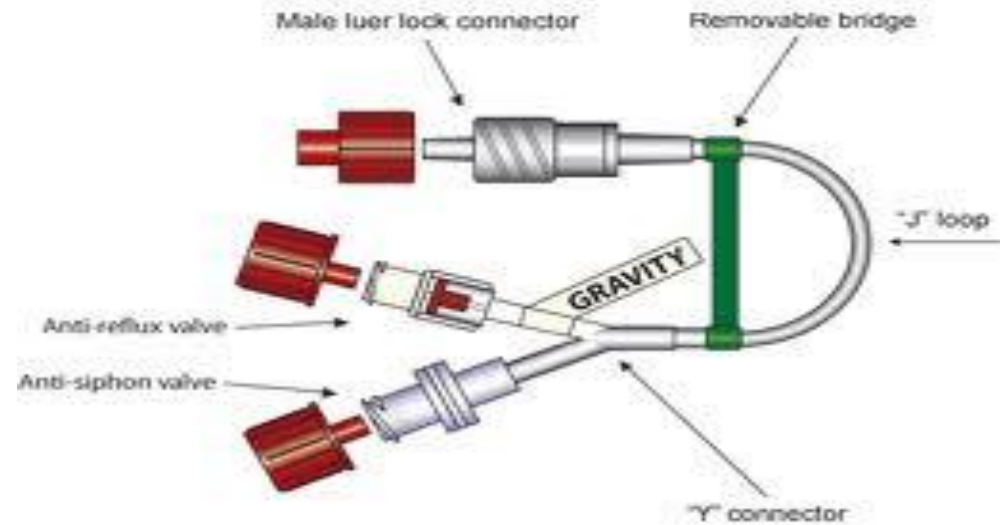
ALFINE =

Alfentanil 1mg + Morphine 10 mgs in 10 mls

Titrate 0.5 - 2 ml iv q 4 mins and check response

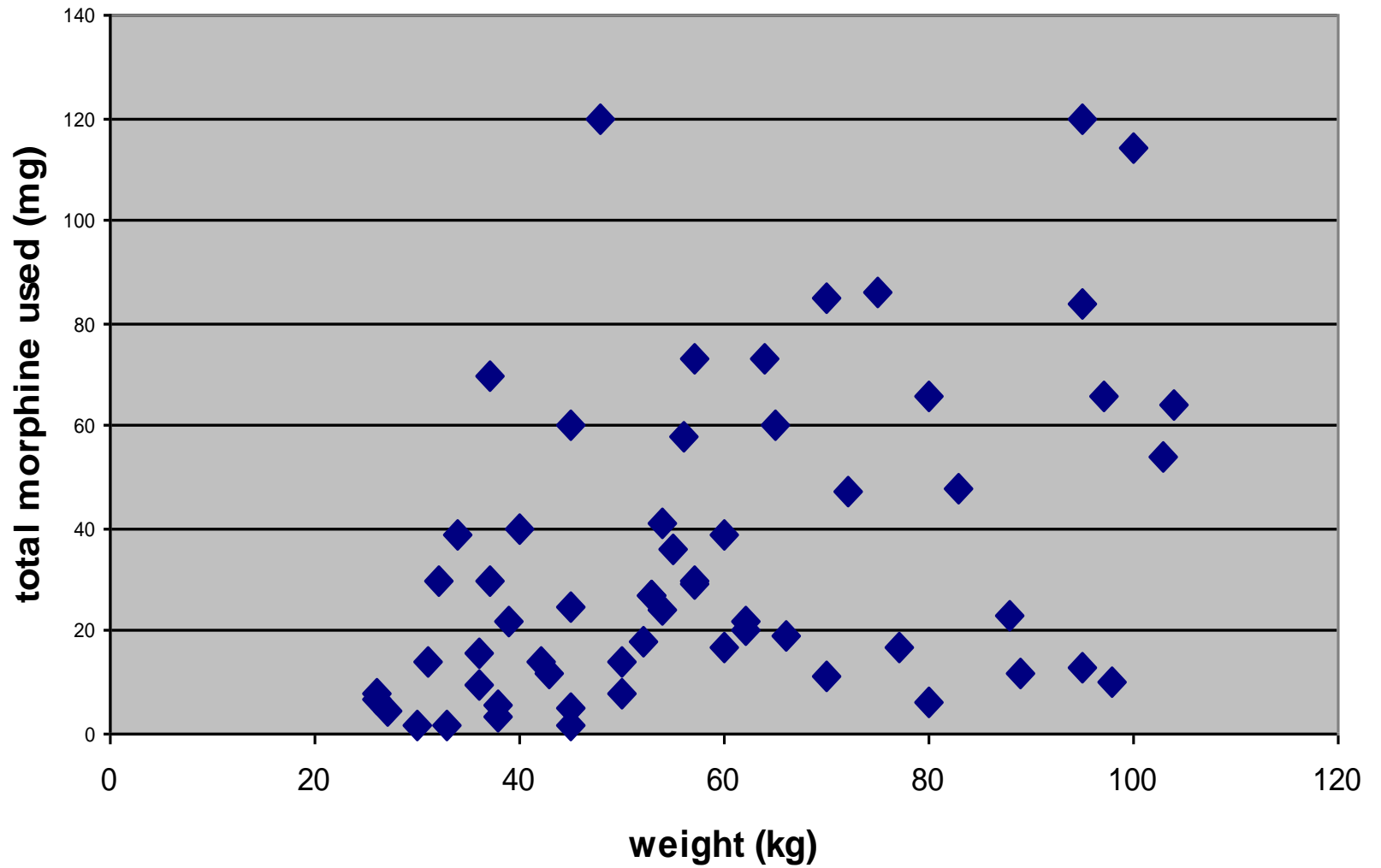


PCA



- Site of iv / sc
- Bolus dose:
Stat vs **1 min**
- Lockout period
- No 4 hour max
- No background infusion
- Other agents Rx
- **100-age (= mg/1st day)**
- “Press it every 5 mins”
- Paracetamol
- Antiemetics
regular + rescue

Variation in PCA morphine usage for appendicetomy, n=60



Average PCA use for Joint surgery

n = 128

155

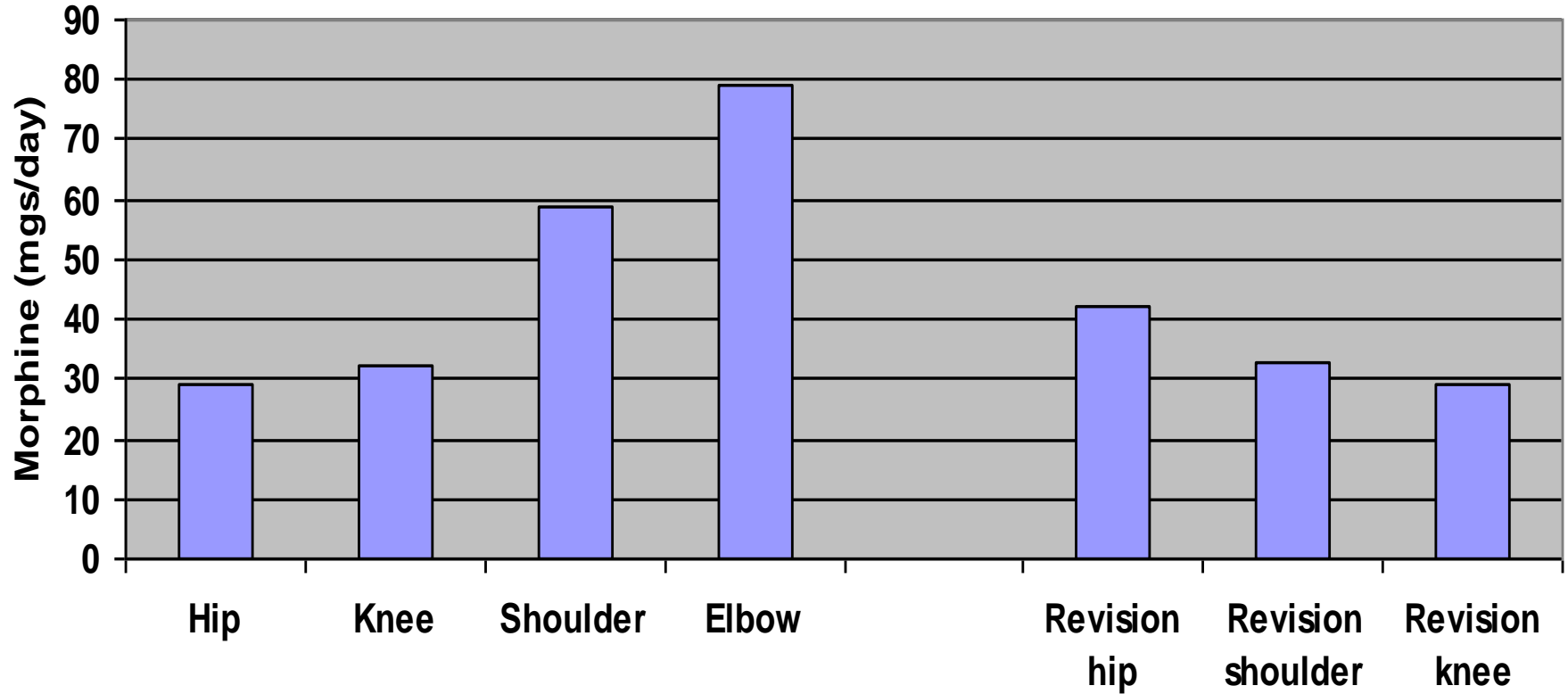
19

5

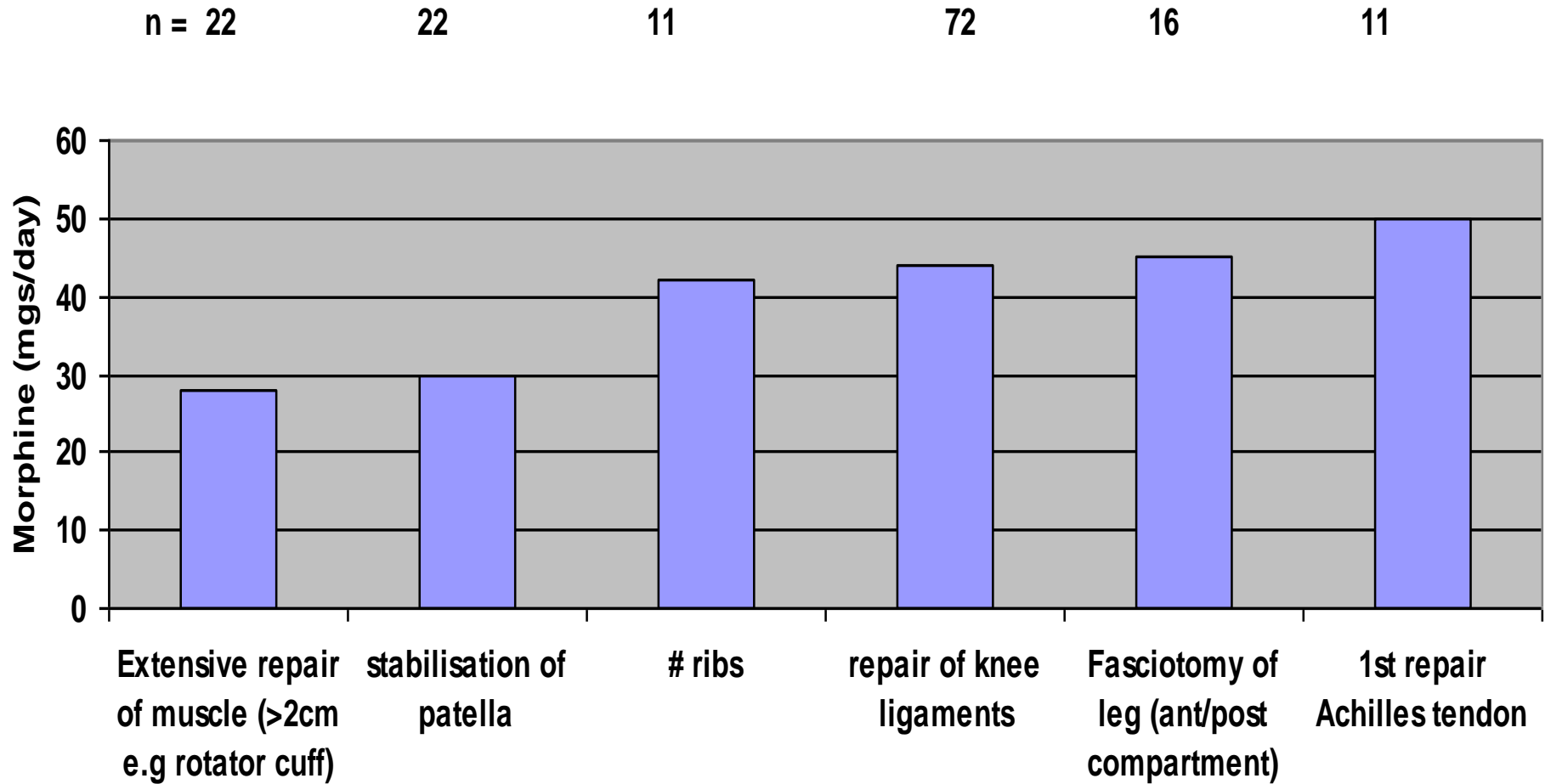
15

27

15



Average PCA use for soft tissue injury



Average PCA use for

n = 104

15

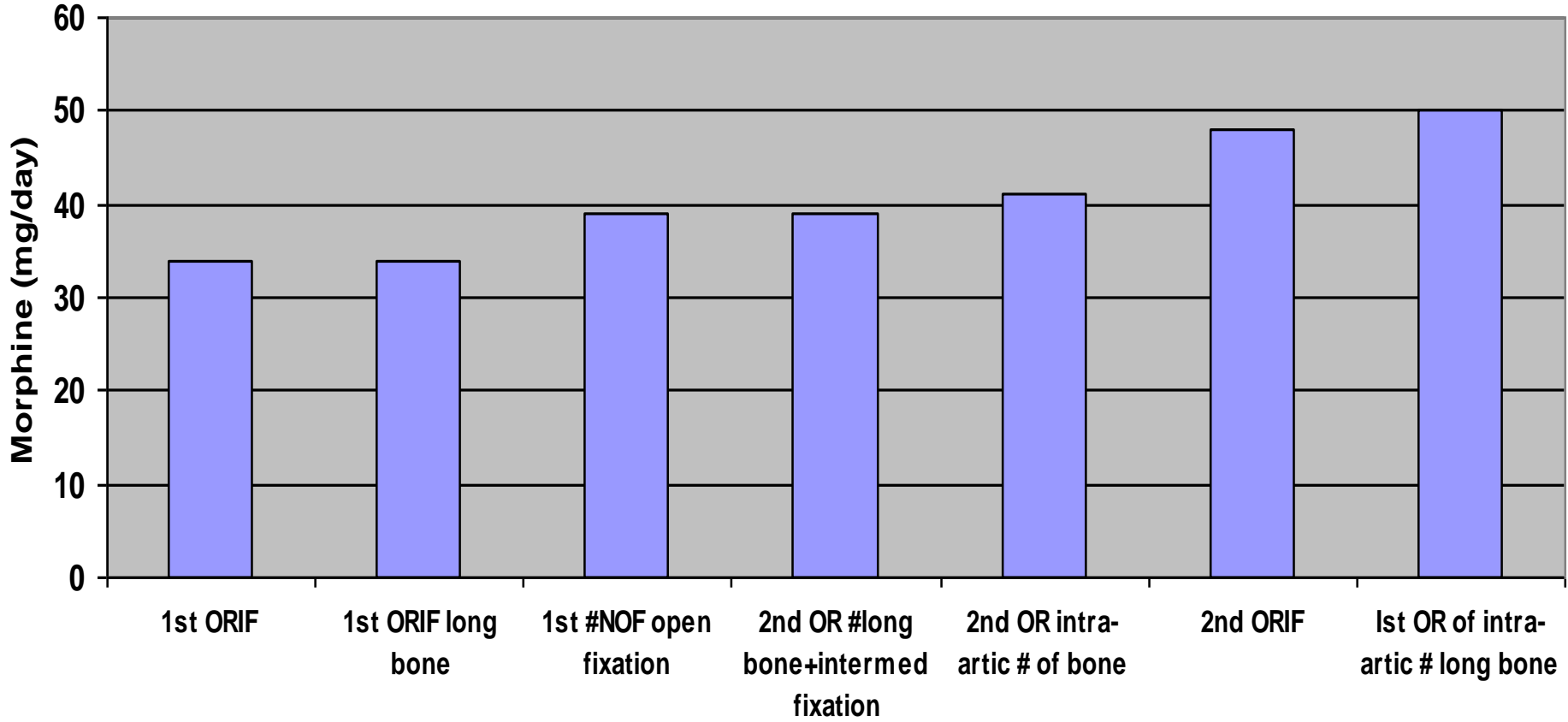
71

30

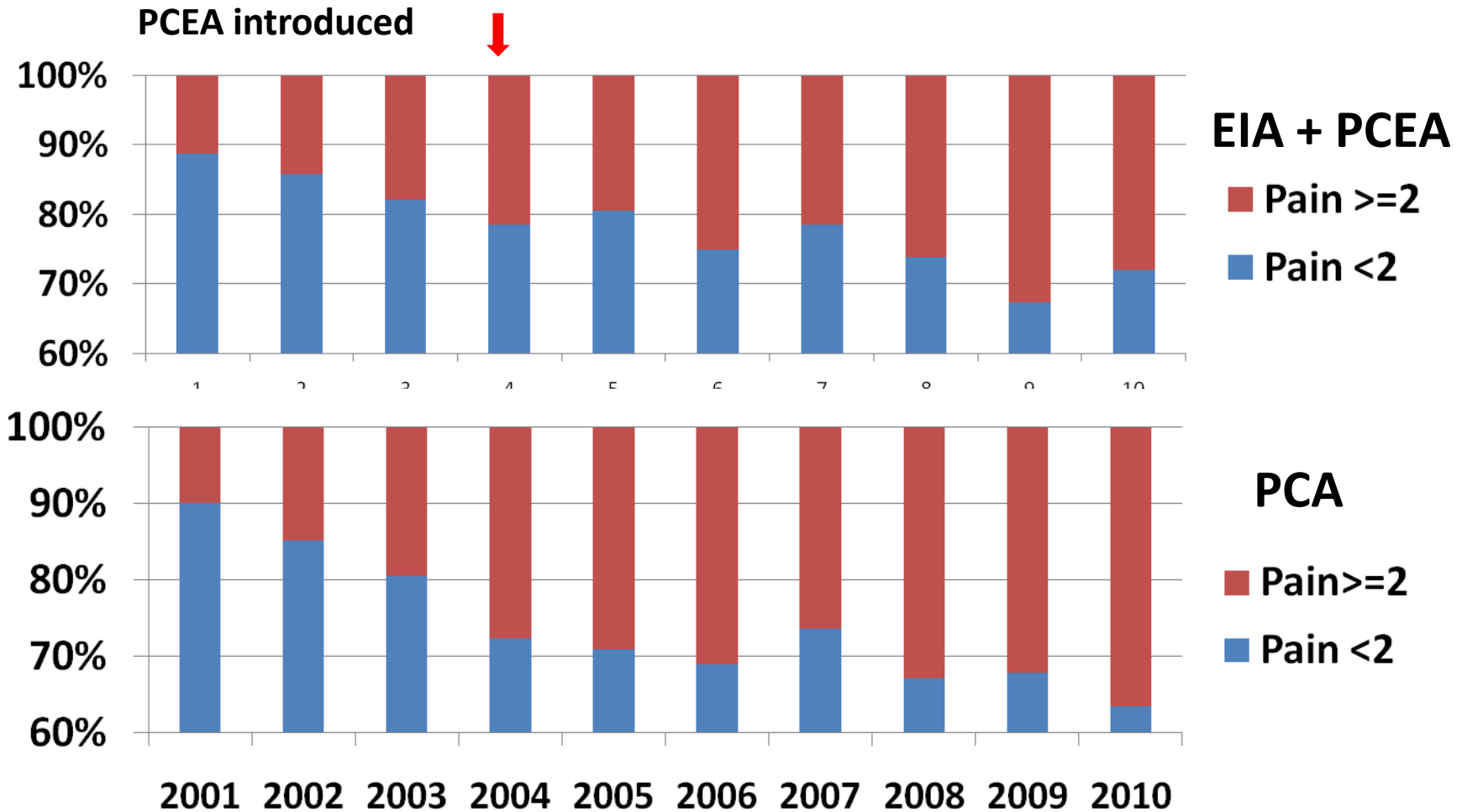
234

11

29



Epidurals vs PCA: pain on movement **day 1**: (%)

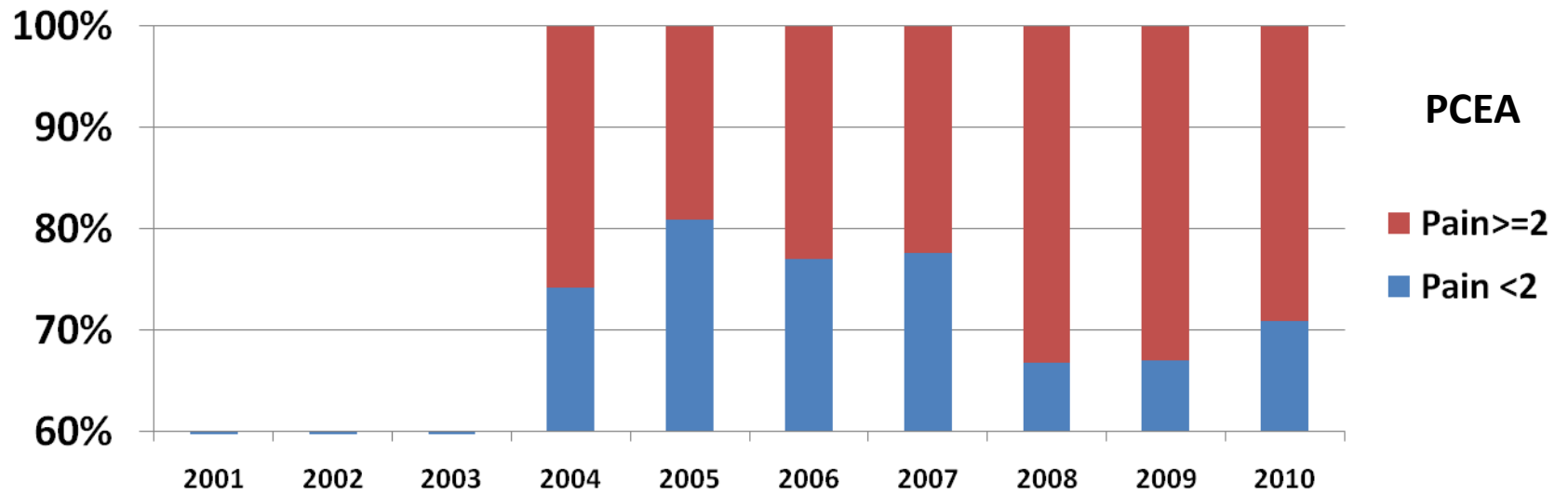
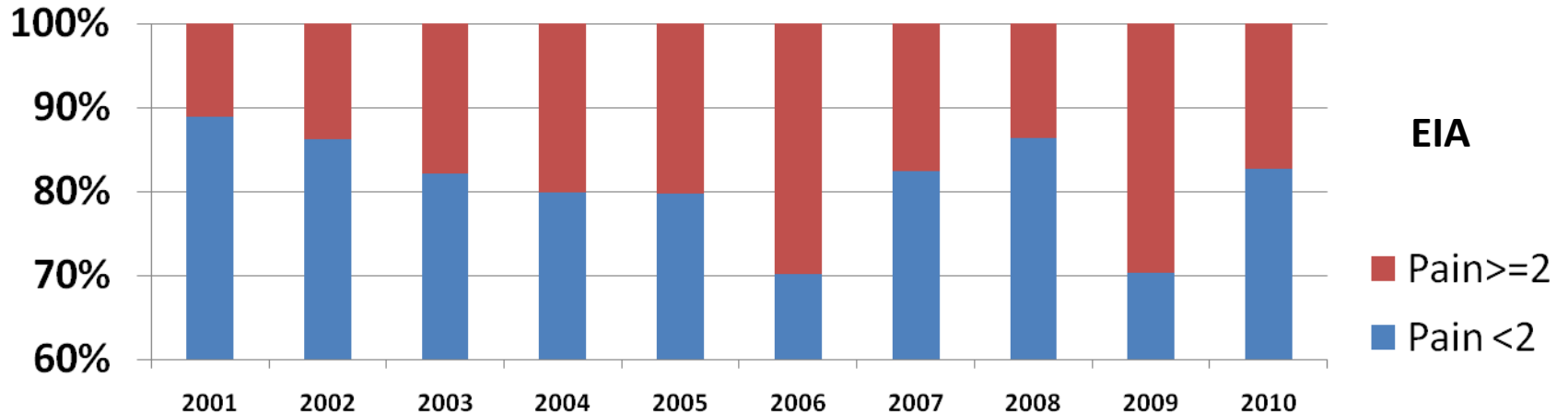


Epidural analgesia – better than parenteral opioid administration regardless of

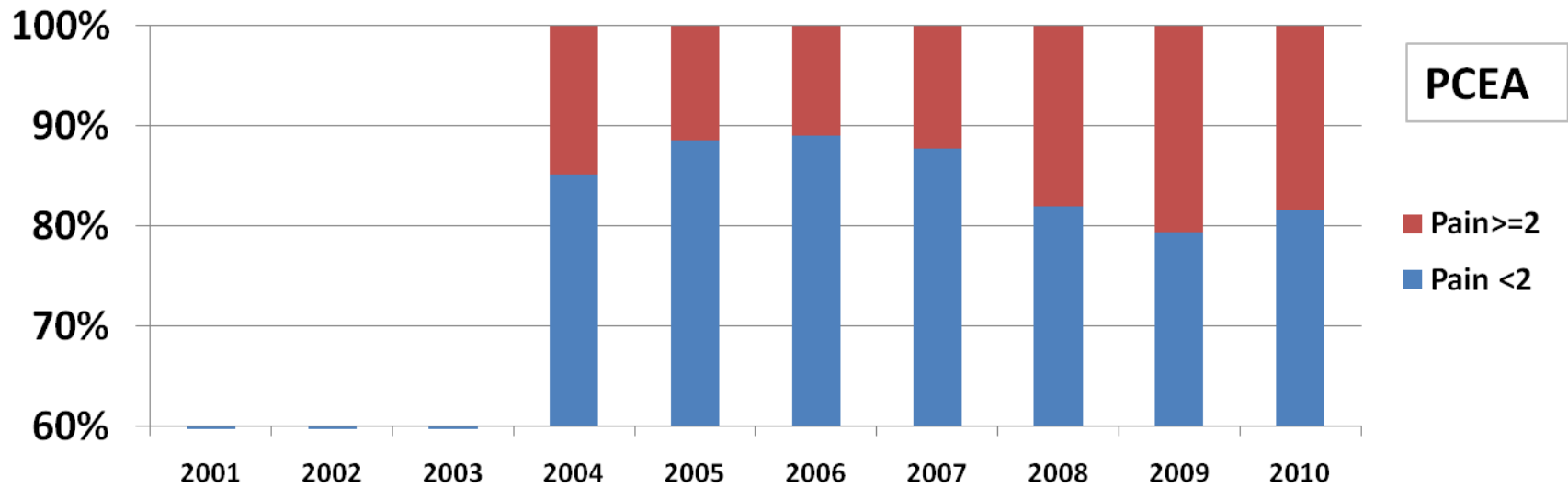
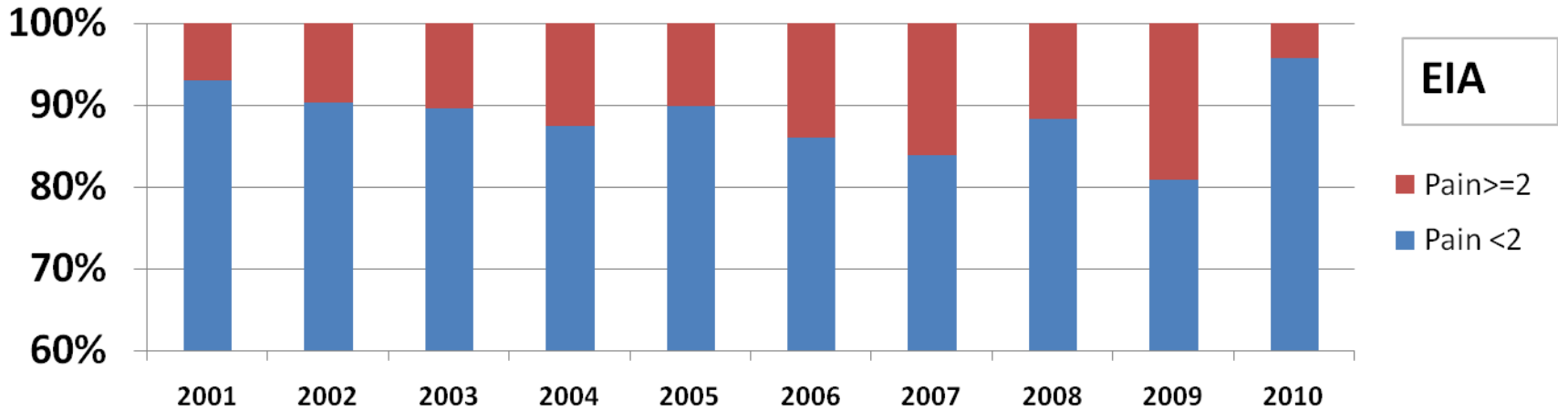
- analgesic agent used
- location of catheter
- type of surgery
- type of pain
- time of pain

1. Werawatganon & Charuluxanun, 2005 Level I
2. Wu et al, 2005 Level I
3. Guay, 2006 Level I
4. Nishimori et al, 2006 Level I
5. Marret et al, 2007 Level I

Epidural vs PCEA: day 1



Epidural vs PCEA: day 2



Summary of pain outcomes: EIA vs PCEA

% Pain ≥ 2	Day 1		Day 2	
	EIA	PCEA	EIA	PCEA
Average 2001-3*	13	21	9	11
Average 2008-10	19	32	13	19

All outcomes are worse now than before & PCEA is worse than Epidural Infusion Analgesia

*PCEA 2005-7

EIA vs PCEA

EIA better than PCEA

- Analgesia

PCEA better than EIA:

- Nausea
- Vomiting
- Motor block

(Wu et al, 2005 Level I)

PCEA better than EIA

- Pain control
 - Need for top-ups
 - Need for systemic analgesia
 - Patient satisfaction
- (Nightingale et al, 2007 Level II)

EIA+PCEA vs PCEA

Gastrectomy:

- better dynamic pain scores ↑ total doses
- ↑ pruritus

(Komatsu et al, 1998 Level II)

- better sleep

Komatsu et al, 2001 Level II

Lower abdominal surgery:

- ↔ pain scores
- ↑ total cumulative doses
- ↑ side effects
- PCEA ropivacaine & fentanyl (Wong et al, 2000 Level II)

Pelvic reconstruction:

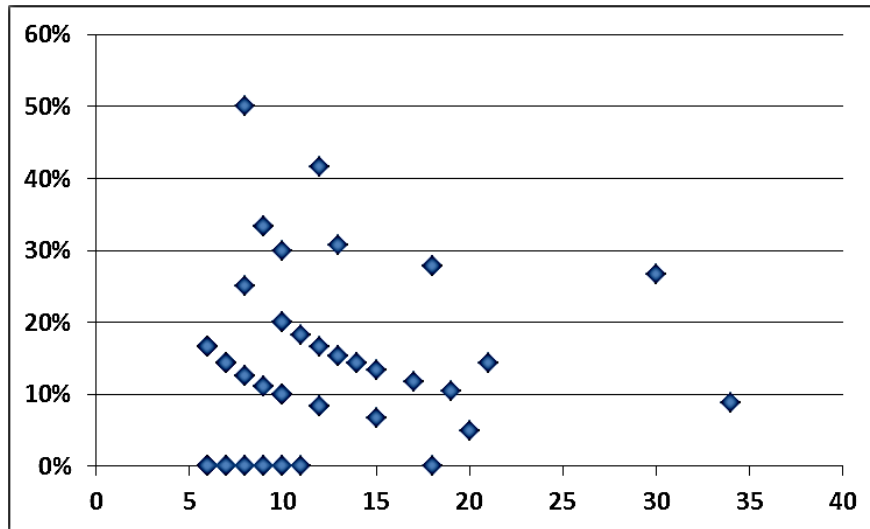
- ↔ pain scores
- bupivacaine-fentanyl PCEA (Nolan et al, 1992 Level II)

Why is PCEA worse?

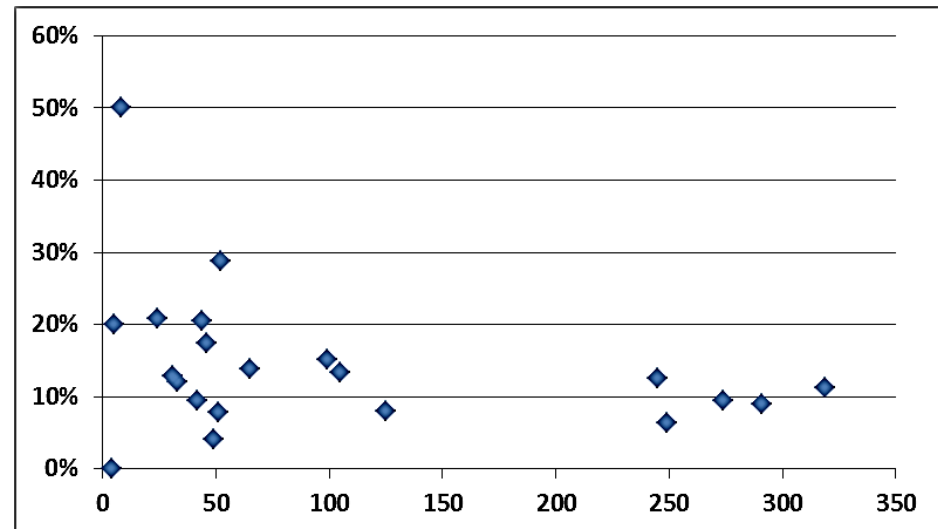
- Epidural failures?
- Wrong site?
- Wrong infusion rate?
- Wrong bolus dose?
- Neither adjusted?
- Wrong concentration?
- More side effects?
- Or something else?

Epidural numbers vs failure rate *

Trainee



Consultant



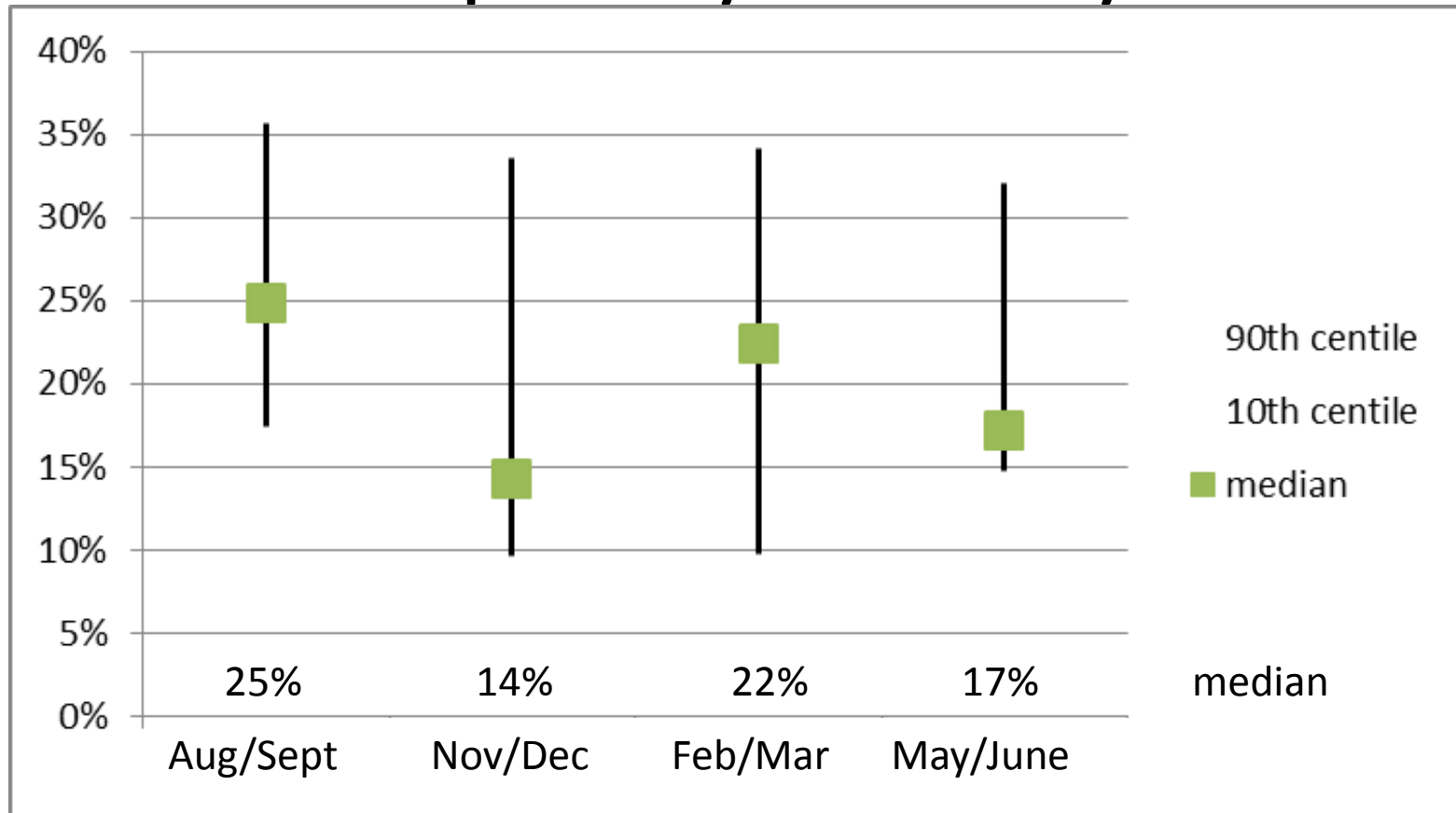
	Trainee		Consultant	
Epidural	52/367	14%	144/1178	12%
PCEA	40/314	13%	99/983	10%

***Need to convert to alternative analgesic technique**

Excludes failure to insert epidural

Excludes those with < 6 epidurals

Epidural patients with moderate to severe pain by time of year



6 week periods analyzed over the 10 yrs by season linked to arrival of trainees

Technical causes of epidural failure:

53 catheter migration

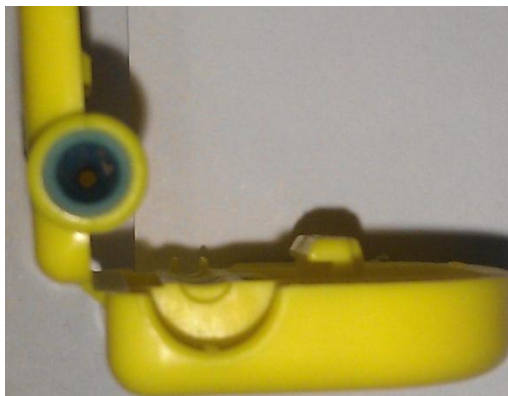
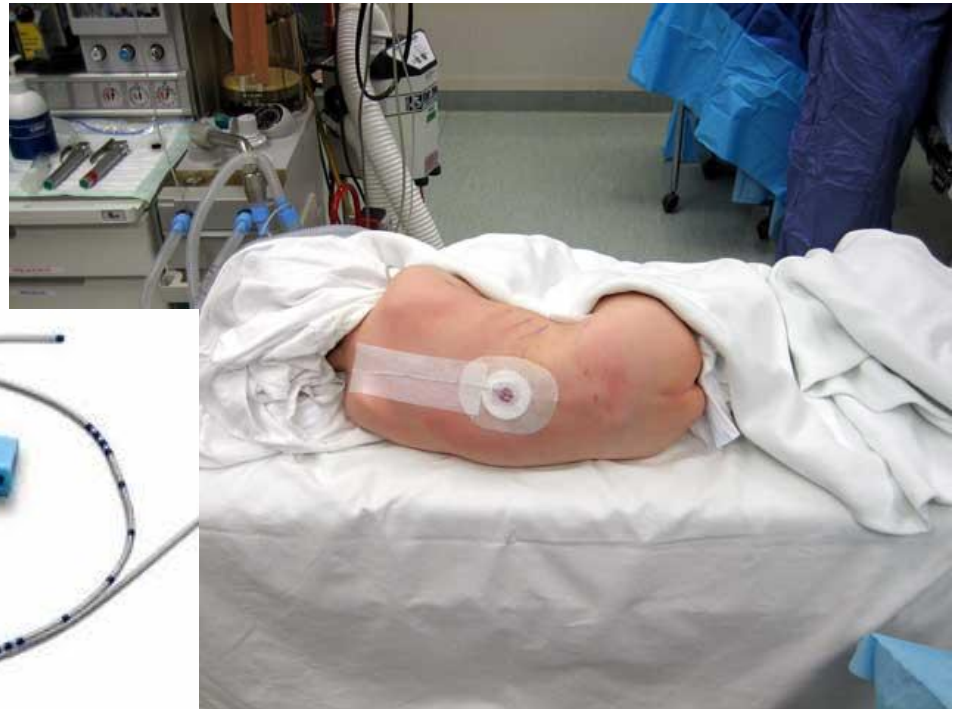
44 catheter disconnection

21 leaking

14 not stated

5 occlusion

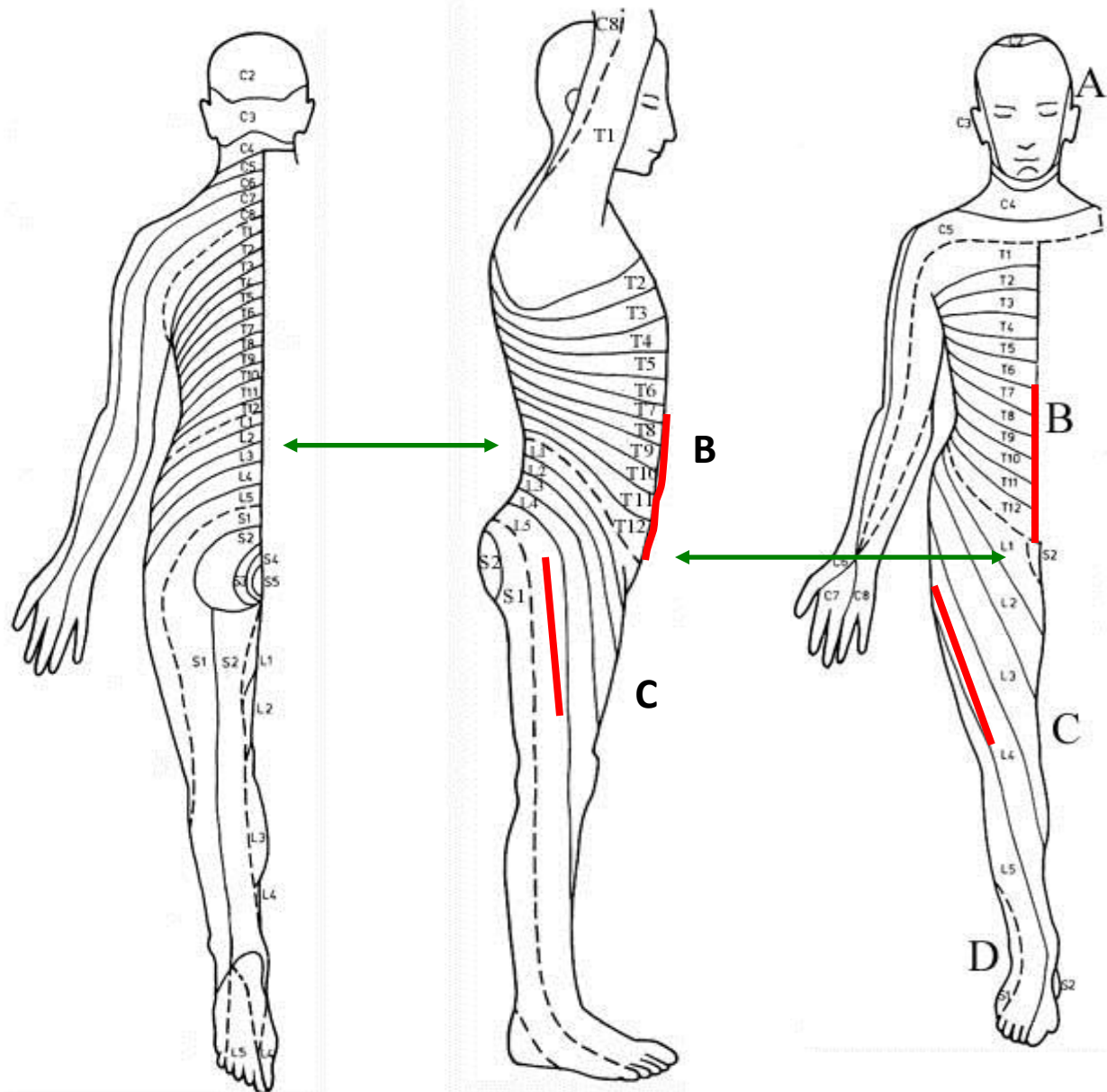
- **Lockit device**
- Loop it
- Stress loop
- Tape filter and catheter



“Epifix”

Wrong site?

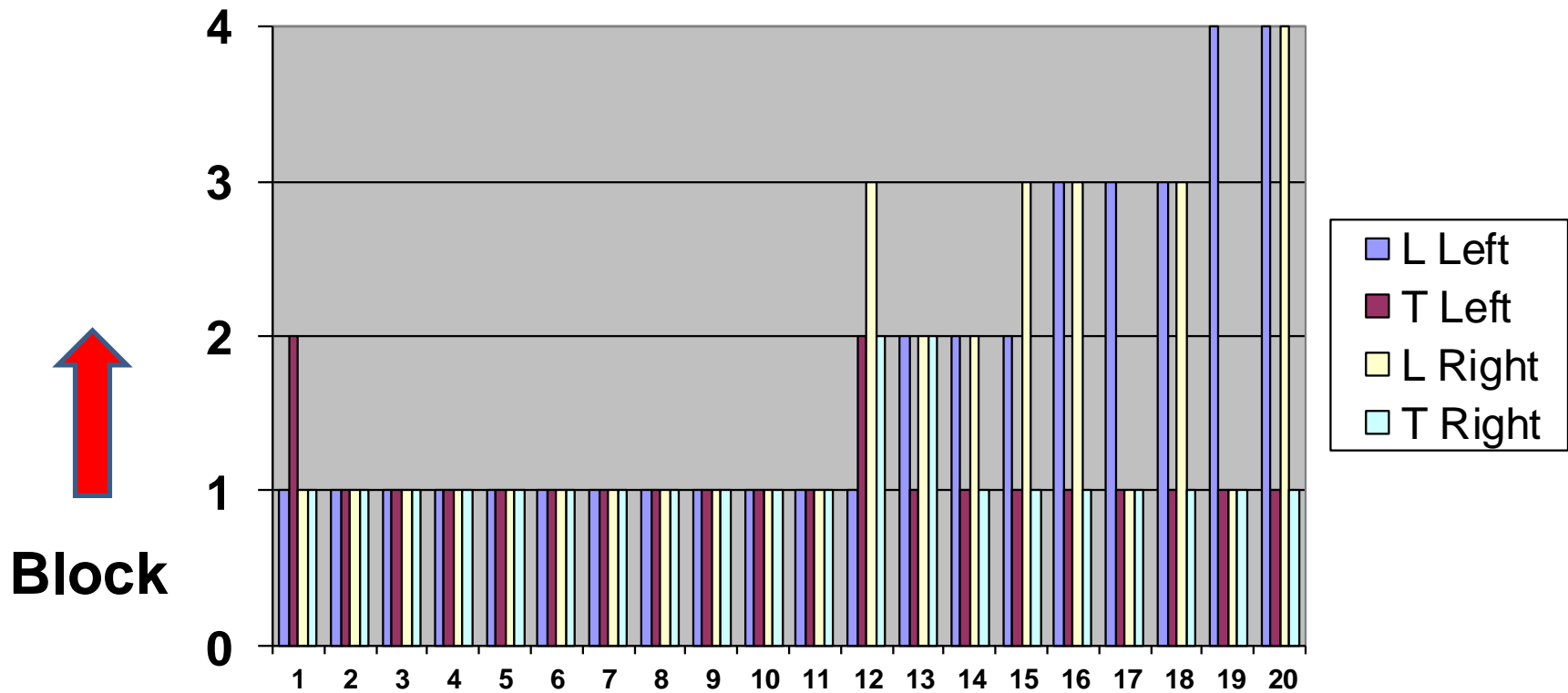
Supra-umbilical incisions need thoracic epidurals!



Motor Block with lumbar or thoracic epidurals

n=20, Lumbar (yellow/blue), Thoracic (red/green), left & right legs

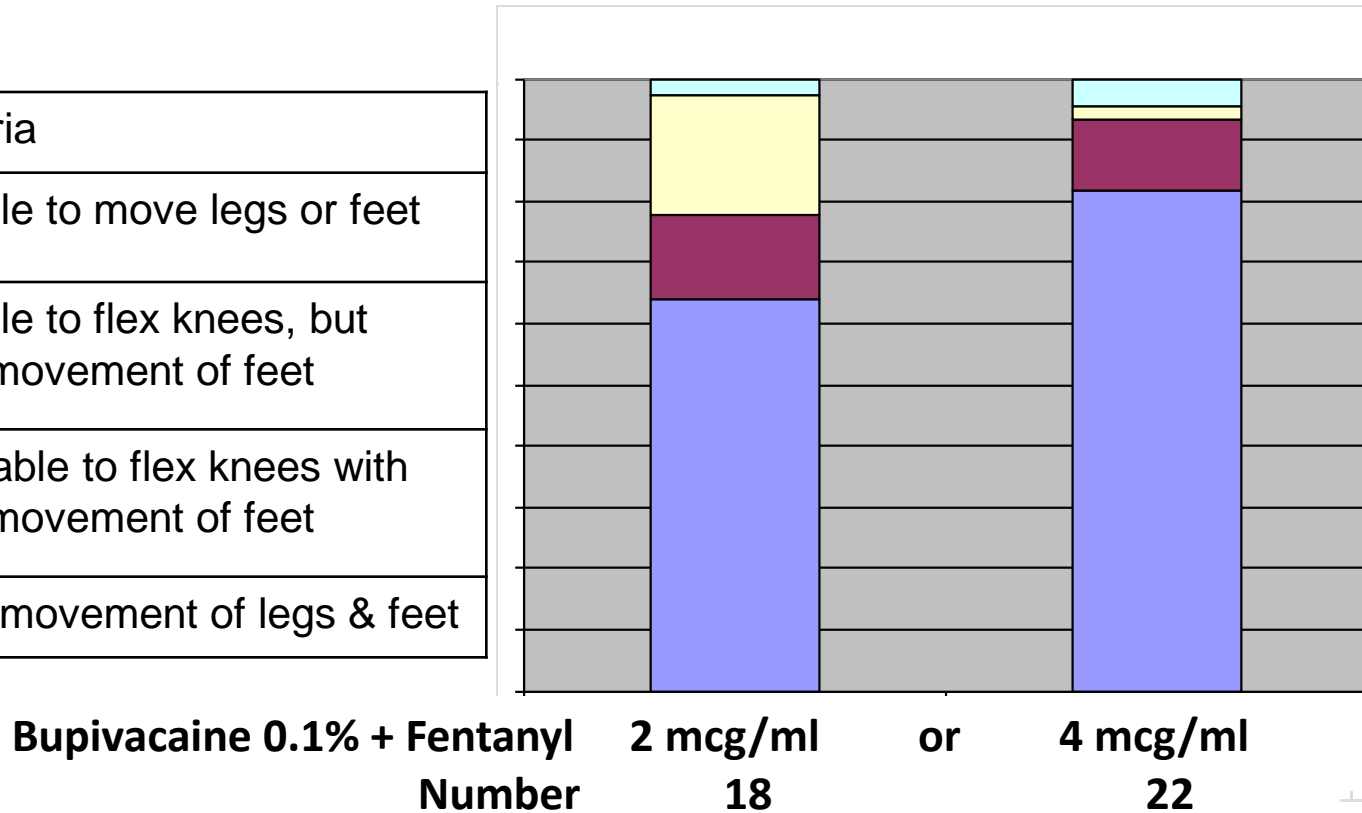
1=no block; 2=flex knees, 3=no flexion; 4=no movement



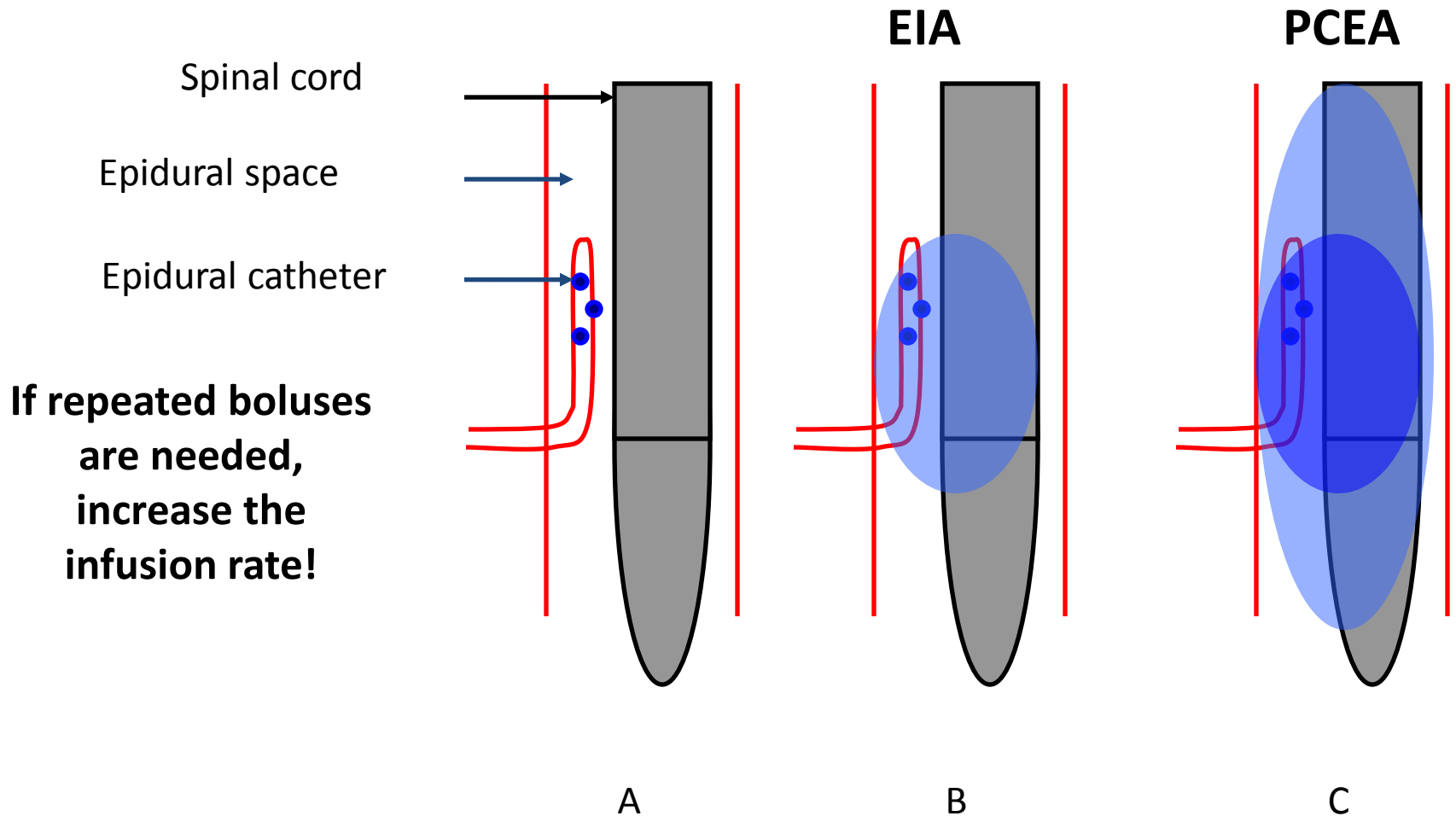
Patients with thoracic epidurals had significantly less motor block using 0.1% bupivacaine / Fentanyl 2mcg/ml

Effect of Fentanyl concentration on Motor block (Bromage scale) with lumbar epidurals

Grade	Criteria
4	Unable to move legs or feet
3	Unable to flex knees, but free movement of feet
2	Just able to flex knees with free movement of feet
1	Free movement of legs & feet



Wrong settings? PCEA pressure effects



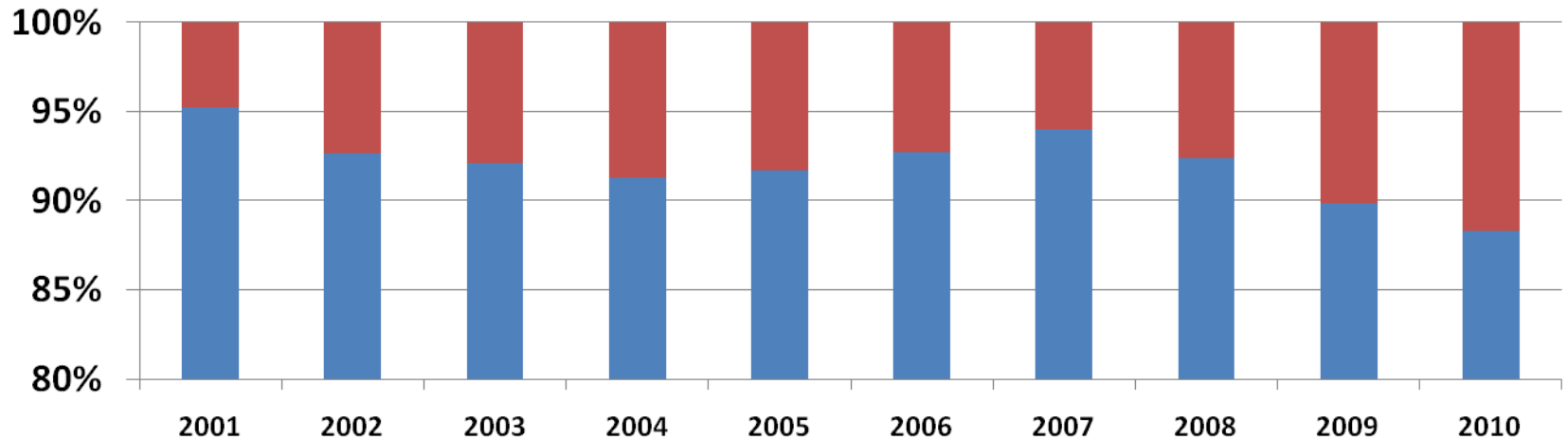
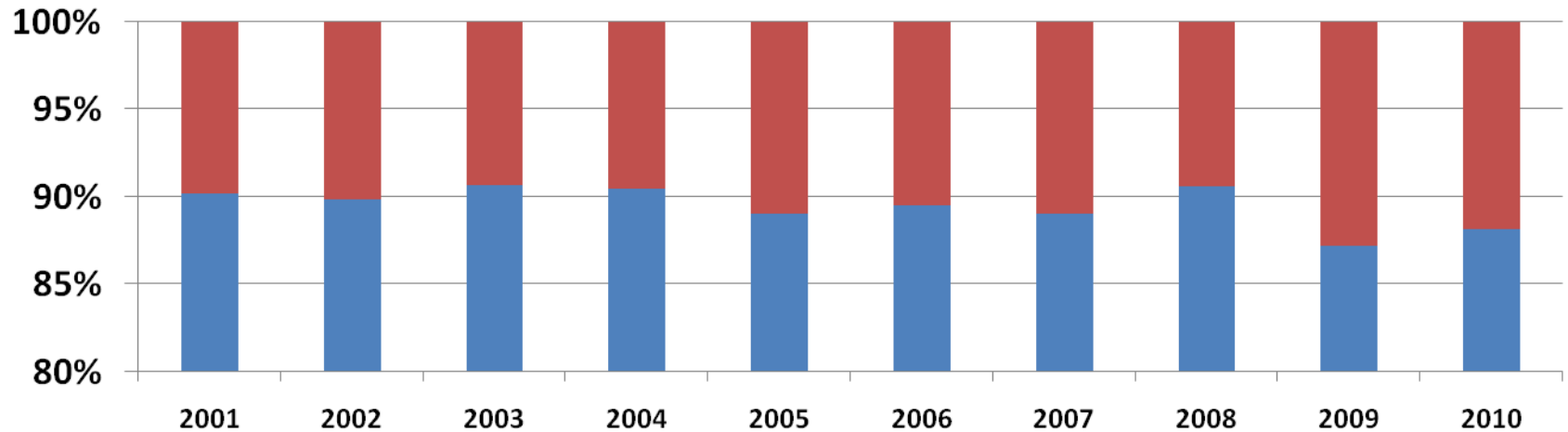
Severe PONV

%	EIA	PCEA	PCA
N	1857	1610	7059
Day 1	7.6%	10%	12%
Day 2	3.5%	4.8%	4.2%

Little clinical difference between techniques
approx 10% on Day 1

Incidence halves by Day 2

PONV day 1: PCA(top) vs EIA+PCEA



Severe pruritus

	EIA	PCEA	PCA
N	1857	1610	7059
Day 1	9.4%	12%	10%
Day 2	3.7%	4.0%	2.5%

Little clinical difference between techniques
approx 10% on Day 1

Incidence more than halves by Day 2

Severe sedation

	EIA	PCEA	PCA
N	1857	1610	7059
Day 1	1.3%	0.5%	1.7%
Day 2	0.7%	0.5%	0.5%

Small differences between techniques

approx 1.5% on Day 1

Incidence more than halves by Day 2

RR < 8/min

	EIA	PCEA	PCA
N	1857	1610	7059
Day 1	0.2%	0.0%	0.2%
Day 2	0.1%	0.0%	0.0%

Little clinical difference between techniques
approx 0.2% on Day 1

Incidence more than halves by Day 2

Complications of epidural analgesia

Reported incidence (%)

Related to catheter insertion

Dural puncture	0.32--- 1.23
Neurological damage (transient)	0.016-- 0.56

Related to catheter in situ

Epidural haematoma	0.0004-- 0.03
Epidural abscess	0.01-- 0.05
Catheter migration	0.15-- 0.18

Related to epidural drugs

Drug errors	Not known
Respiratory depression	0.13-- 0.4
Hypotension	3-- 30
CNS toxicity	0.01-- 0.12
Motor block	3

Wheatley RG, Schug SA, Watson D.

Safety and efficacy of postoperative epidural analgesia.

Br J Anaesth 2001;87(1):47–61.

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NAP3

**Perioperative
Epidural:**

Overall harm
1/5,800 – 1/12k

Paraplegia or
death:
1/16k – 1/98k

Wheatley RG, Schug SA, Watson D.
Safety and efficacy of postoperative epidural analgesia.
Br J Anaesth 2001;87(1):47–61.

Br J Anaesth 2009:
102 (2): 179-190.

Epidural infection

0.015% to **0.05%**

- Kindler et al, 1996 Level IV
- Rygnestad et al, 1997 Level IV
- Wang et al, 1999 Level IV

Long duration ↑ risk:

- X=11/7, none if < 2/7
- Immunocompromised
- Wang et al, 1999 Level IV

- 71% initial back pain
- 66% febrile
 - Reihsaus et al, 2000 Level IV
- 13% back pain, fever & neurological change

Recommend

- 6/8210 patients with epidural catheters over 16 years got abscesses
- 5/6 had fever & epidural site infection
- conservative treatment (antibiotics only) may be effective if no neurological deficit
Cameron et al, 2007

Consider MRI if

- Fever + site infection

URGENT MRI if

- Fever + site infection
- PLUS one other sign (back pain / neuro deficit)

Changes in 10 years

	2000	2011
Consultants	17 (8 + 9)	24 (8 + 16)
Trainees	12	18
Nurses	1 solo	3 shared
PCA	1mg bolus	Often 1.5 mgs
Drugs		
Fentanyl	none	occasional
Gabapentin	none	frequent
Ketamine	none	recently introduced
Ephedrine	none	30 mg po pre-mobilisation
Epidural regimes	7	3 (0.1%LB+F2/4; 0.125%B)
PCEA	none	79% of all epidurals
LA blocks	occasional	frequent, variable success

Future challenges

- Maximise analgesia
- Minimise harm
- Realistic expectations
- LA infusions / blocks
- Non-luer lock connectors
- Anticoagulants
- ERAS

