# Remifentanil PCA in labour

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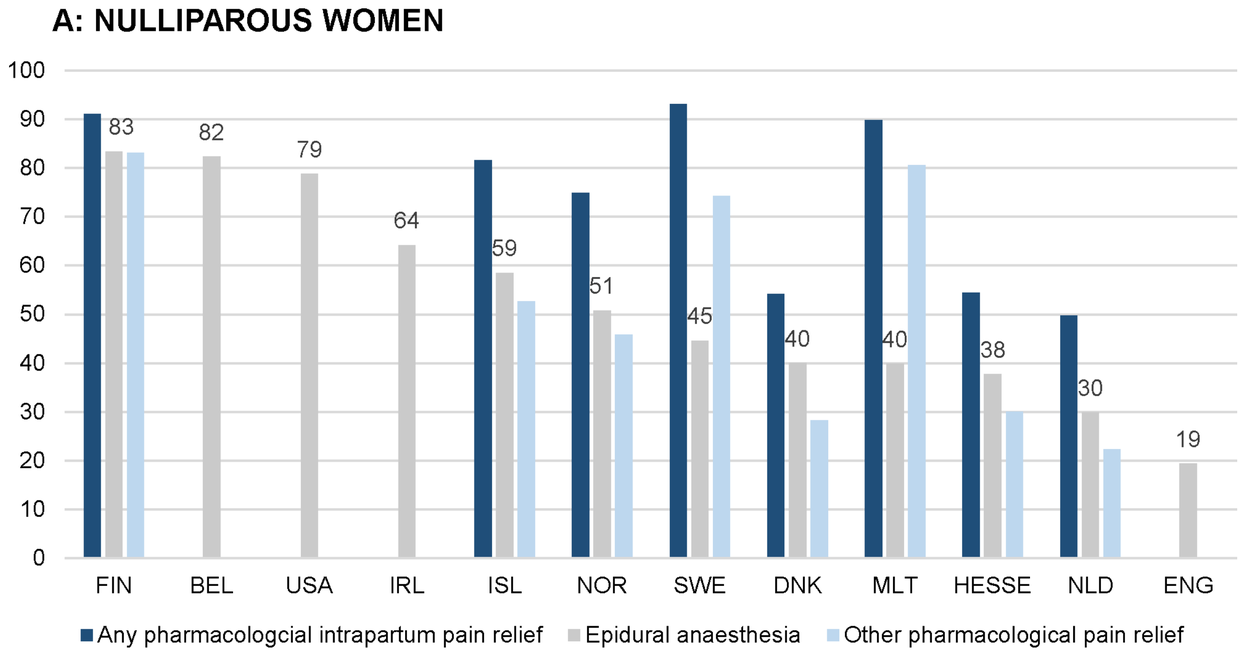
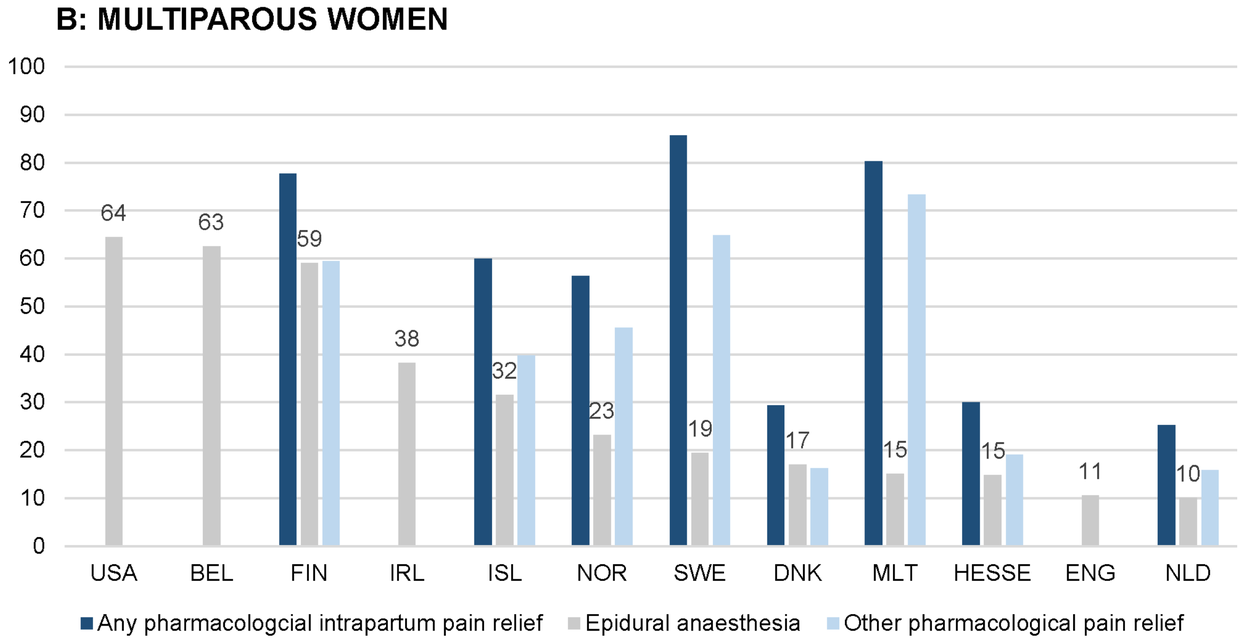
# Labour analgesia

- Neiraxial analgesia - gold standard
- Nitrous oxide (N2O)
- Opioids IM (pethidine, diamorphine)
- Opioids IV (fentanyl, **remifentanil PCA**)

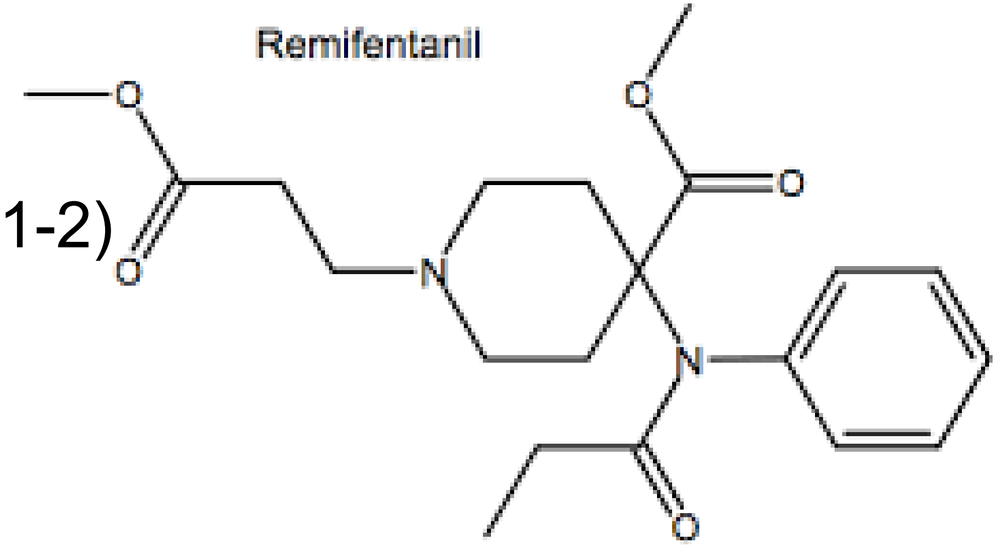
# Pain relief in labour



# Remifentanil

- Ultrashot-acting synthetic opioid
- Rapid onset ~1min (peak effector site 1-2)
- Degraded by non-specific tissue and plasma esterases
- Does not accumulate
- Context sensitive half-time ~ 3 min



# Indications

- Remifentanil PCA considered when epidural analgesia is contraindicated or not wanted, and pethidine is unsuitable
- Coagulopathy, thrombocytopenia or full anticoagulation
- Metalwork or anatomical deformity of the lumbar spine
- Sepsis
- Neurological diseases e.g. demyelination
- Morbid obesity when epidural may be technically difficult

# Contraindications

- Allergy to opioid drugs
- Other parenteral opioid administration within preceding four hours
- Adequate monitoring and staffing unavailable

# Remifentanil vs Epidural

❖ 2014 meta-analysis (886)

❖ 2015 multi-centre equivalence trial (1.358)

- Adverse-effect profiles (nausea, vomiting, pruritus) show no significant difference
- Apgar scores - no difference (UA pH higher in remi group)
- Remifentanil provide inferior analgesia in first hour
- Efficacy of epidural more pronounced after first hour
- Modes of delivery similar

# Remifentanil vs N2O

- Very small study (15)
- Pain intensity difference score favoured remifentanil (1.5 vs 0.5)
- Sedation scores higher for remifentanil

# Remifentanil vs pethidine

- ❖ Multiple RCTs
- ❖ RESPITE trial
- Conversion to epidural was higher with pethidine
- Remifentanil had greater reduction in pain scores after 1 hour
- More NVD in remifentanil group
- Caesarian section rate was the same
- Maternal non-respiratory adverse effects similar , more sedation with remi
- Apgar scores similar

# Remifentanil vs Fentanyl

❖ Several studies

- Better pain relief with remifentanil
- Higher sedition scores and desaturations in remifentanil group
- Apgar scores lower and greater need for ventilation in fentanyl group

NHS
Royal Surrey County Hospital
NHS Foundation Trust

# Remifentanil PCA – Where are we now? A national survey

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## Background

Over the last fifteen years, remifentanil patient controlled analgesia (PCA) has become an increasingly recognised method of providing labour analgesia.

In 2014, 50% of units offered the technique.[1] Since then, a Cochrane review has highlighted the paucity of evidence both for and against remifentanil PCA and a narrative review of the literature has suggested the technique should not be used routinely.[2,3]

We sought to clarify the current state of practice in the UK with a particular focus on the reasons for non-adoption.

## Methods

We conducted an OAA approved, national survey of 186 lead obstetric anaesthetists in the UK. The survey was sent electronically by email and was open for completion for a period of three months. 85/186 (48%) responded.

## References

1. Clark A, Junkin R. Consent and documentation for remifentanil PCA in labour. *Int J Obstet Anesth* 2015; **24**: S44
2. Weibel S, Jelting Y, Afshari A et al. Patient-controlled analgesia with remifentanil versus alternative parenteral methods for pain management in labour. *Cochrane Database Syst Rev.* 2017; **13**(4): CD011989
3. De Velde V, Carvalho B. Remifentanil for labor analgesia: an evidence-based narrative review. *Int J Obstet Anesth* 2016; **25**: 66-74

**54%** of units now offer remifentanil PCA

**22%** of units have plans to introduce

STOP

**8%** units have withdrawn remifentanil PCA as an option for labour analgesia altogether

**71%** Lack of trained staff

**43%** Poor uptake

Why units don't offer remifentanil PCA...

ABC

**75%**
Safety concerns

**44%**
Lack of training

?

**38%**
Unfamiliar

## Results

54% (46/85) of units offered remifentanil PCA. Of those that did not, 22% (7/32) had plans to introduce. Interestingly, 8% (7/85) reported the technique was previously available but had been withdrawn; only 1 unit reported any significant complications prior to withdrawal.

Of the units in which remifentanil PCA is available, 41% (19/46) offer it on maternal request to all labouring women, 67% (31/46) make it available when epidural analgesia is contraindicated and 17% (8/46) offer it in the management of intra-uterine fetal demise.

In those units who had withdrawn the technique, the predominant reasons cited were lack of appropriately trained staff (71%) and poor uptake (43%).

In those units which have never offered remifentanil PCA, the top three reasons cited for non-uptake were safety concerns (75%), lack of training (44%) and unfamiliarity with the technique (38%).

Of the 46 units in which remifentanil PCA is currently available, 17% (8/46) were aware of complications. Of these, 63% (5/8) reported respiratory arrest, 50% (4/8) significant desaturation <85%, 25% (2/8) loss of consciousness. There were no incidences of cardiac arrest.

## Conclusion

It would appear that the uptake of remifentanil PCA for labour analgesia in the UK has begun to plateau with 54% now offering the technique – an increase of just 4% in the last 4 years. Safety concerns appear to be the main factor preventing more widespread adoption. Training issues are also cited as a concern and are the main reason some units have withdrawn the technique.

These findings would indicate that robust training and clear protocols are imperative to ensure successful delivery of a remifentanil PCA service.

# Criteria for use

- Correct patient selection
- Midwife for one to one care.
- More than **36** completed weeks gestation and be in established labour.
- Considered at less than 36 weeks gestation in intrauterine death or termination for foetal abnormality.
- Entonox and/or TENS may be used in addition
- $SpO_2$ monitoring established before and monitored continuously throughout

# Maternal effects

- Respiratory depression (5- 93%) (32% recent)
- Apnoe events (>20s resp pause, hypoventilation of <8 bpm) (26%)
- Desaturation ($SaO_2$ < 94%),  incidence 26%
- Suplemental $O_2$ required, but does not prevent apnoea
- Use 1:1 midwifery care decrease serious adverse events
- Pulse oximetry and capnography use, apnoea before desaturation
- No haemodynamic effects seen
- All incidences need reporting and auditing

# Neonatal effects

- No difference in 1 and 5 min Apgar scores in remifentanil compare to neuraxial analgesia
- Remifentanil PCA associated with better neonatal outcome compare with pethidine
- Freely crosses placenta but respiratory compromise rare
- Need for paediatrician, oxygen, naloxone and paediatric resuscitation trolley

# Use it (safely)

- **Swiss Association of Obstetric Anaesthesia RemiPCA SAFE Network since 2009 (www.remipca.org)**
- 11,000 data sets, open to international centres since 2016
- SOP amended according to SAEs (e.g. reduction in bolus dose*)
- Data 2010-2015 (5740 uses, 31 centres)
- Neonatal Outcomes: SAEs 0.3% (CPR directly attributable to RemiPCA)
  - 7.6% supplemental oxygen (declined year by year to 5.0% by 2015)
  - 4.0% BVM ventilation
- Maternal Outcomes: No SAES
  - 1 equipment error led to apnea (responded to stimulation)
  - hypoxia < 94%in 25% (*previously 40% with higher bolus dose)
- 21% required conversion to epidural analgesia (=RESPITE)

- **Ulster, NI - routinely available since 2004.**
- Epidural rate reduction 41% to 25%
- Retrospective observational study 10 years experience 2005-14
- 35,000 deliveries, 25,500 requiring analgesia: RemiPCA 32% (>8000 uses)
- Same rates instrumental and caesarean deliveries between groups
- Not less safe or associated with poorer outcomes than other groups
- 52% women required supplemental oxygen to keep Sp02 >95%

- **SAEs in Netherlands, SOP implemented by Dutch Healthcare Inspectorate since 2014**
- 21,000 uses in 2016-17
- 27 SAEs over 10 years reported retrospectively (maternal desaturation, apneas, bradycardias, 1 cardiac arrest due to pump error, 2 neonatal respiratory depression). No long term poor outcomes.

# Doses and preparation

Preparation:  5mg remifentanil in 250ml 0.9% Sodium Chloride (20mcg/ml)

Weight <60 kg - 1ml bolus  (20 mcg)

Weight 60-90 kg - 1.5ml bolus (30 mcg)

Weight >90 kg - 2 ml bolus (40 mcg)

Lockdown 2 min

# Points of safety

- Dedicated cannula
- Always flush the cannula after the PCA is removed
- Do not give any other drugs via the PCA cannula
- Only the patient is to use the PCA button
- The PCA button is not to be pressed by midwifery staff or the patient's relatives
- The PCA can be used during delivery and for the repair or tears and episiotomies

# Safe use summary

- Standardised SOP - amend over time in response to SAEs
- Continuous 1:1 midwifery care by trained and experienced staff
- Consider bolus dose reduction to 10-30 mcg
- Lockout 2 minutes
- No background infusion
- Continuous pulse oximetry
- Threshold for maternal supplemental oxygen SpO2 < 94-95%
- Interval to starting RemiPCA after other opioids > 4 hours
- Ideally no nitrous oxide, no other analgesics
- Consider stopping RemiPCA 5-10 min prior to cord clamping

# New labour pain drug may reduce need for epidurals – UK study

**Calls for rethink on childbirth pain relief as research shows remifentanil works better than pethidine**

▲ Women using remifentanil were half as likely to end up asking for an epidural than those given pethidine. Photograph: Lionel Wotton / Alamy/Alamy

A new drug to relieve pain during labour works better than pethidine, which has been in widespread use since the 1950s even though it has long been known it does not help all women, say researchers.

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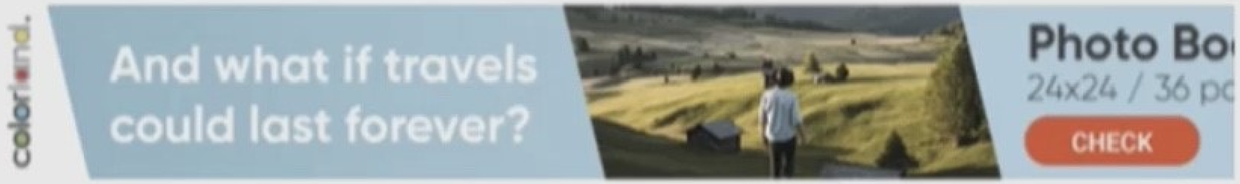



# Pregnant women could be spared epidurals if doctors switched to a more effective painkiller barely used by the NHS

- **Experts say remifentanil is more effective than injection pethidine during labour**
- **Forty per cent of women end up needing an epidural after the pain relief**
- **If remifentanil was used, it could halve the number of women who have one**

# Conclusion

- Avalibitity of systemic opioids for labour analgesia expands maternal options
- Remifentanil PCA appears most effective non-neuraxial analgesia
- Safety considerations important due to respiratory depression/arrest
- Need for one to one continuous care
- Requires training