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# Preventing persistent postsurgical pain: what can we do?

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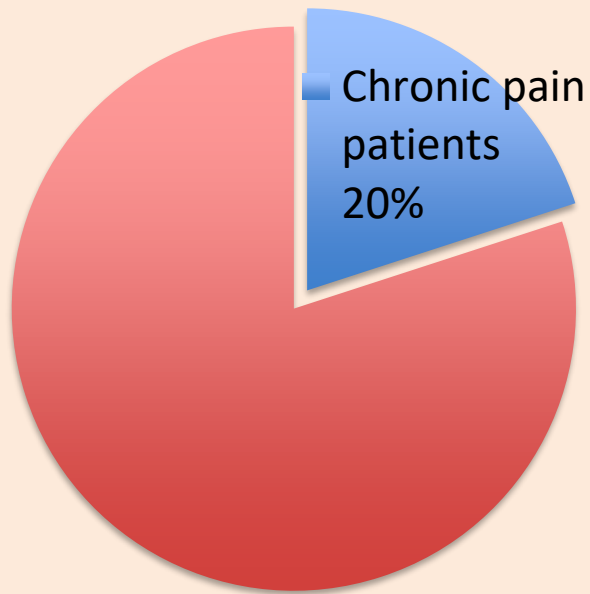


# Definition

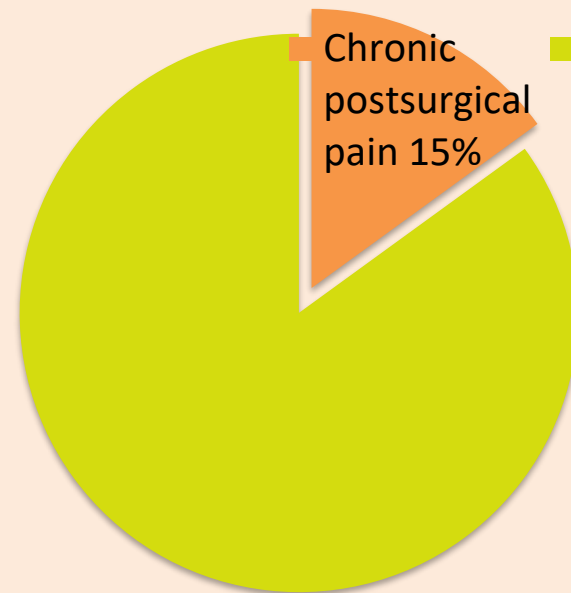
- Chronic postsurgical pain is pain developing or increasing in intensity after a surgical procedure
- at least 3 months after surgery
- Pain is localized in the surgical field or in referred area
- A continuation of acute post-surgery pain or develops after an asymptomatic period
- Exclusion of other possible causes for the pain (infection, cancer recurrence ...)

# Chronic Post-Surgical Pain (CPSP) prevalence

**World population**



**Chronic pain patient  
population**



# Incidence of persistent postsurgical pain according surgical procedure

Surgery	Moderate to Severe Pain beyond 3 Months
Amputation <sup>94</sup>	30 to 81%
Cesarean section <sup>178</sup>	15.4%
Cholecystectomy <sup>17</sup>	3 to 56%
Hernia repair <sup>8</sup>	5 to 35%
Hysterectomy <sup>179</sup>	5 to 32%
Mastectomy <sup>8</sup>	20 to 50%
Hip replacement <sup>180</sup>	7 to 23%
Thoracotomy <sup>17</sup>	61 to 70%

# Classification post-operative pain

## NOCICEPTIVE

- Activation of high threshold peripheral sensory neurons
- Peripheral sensitisation

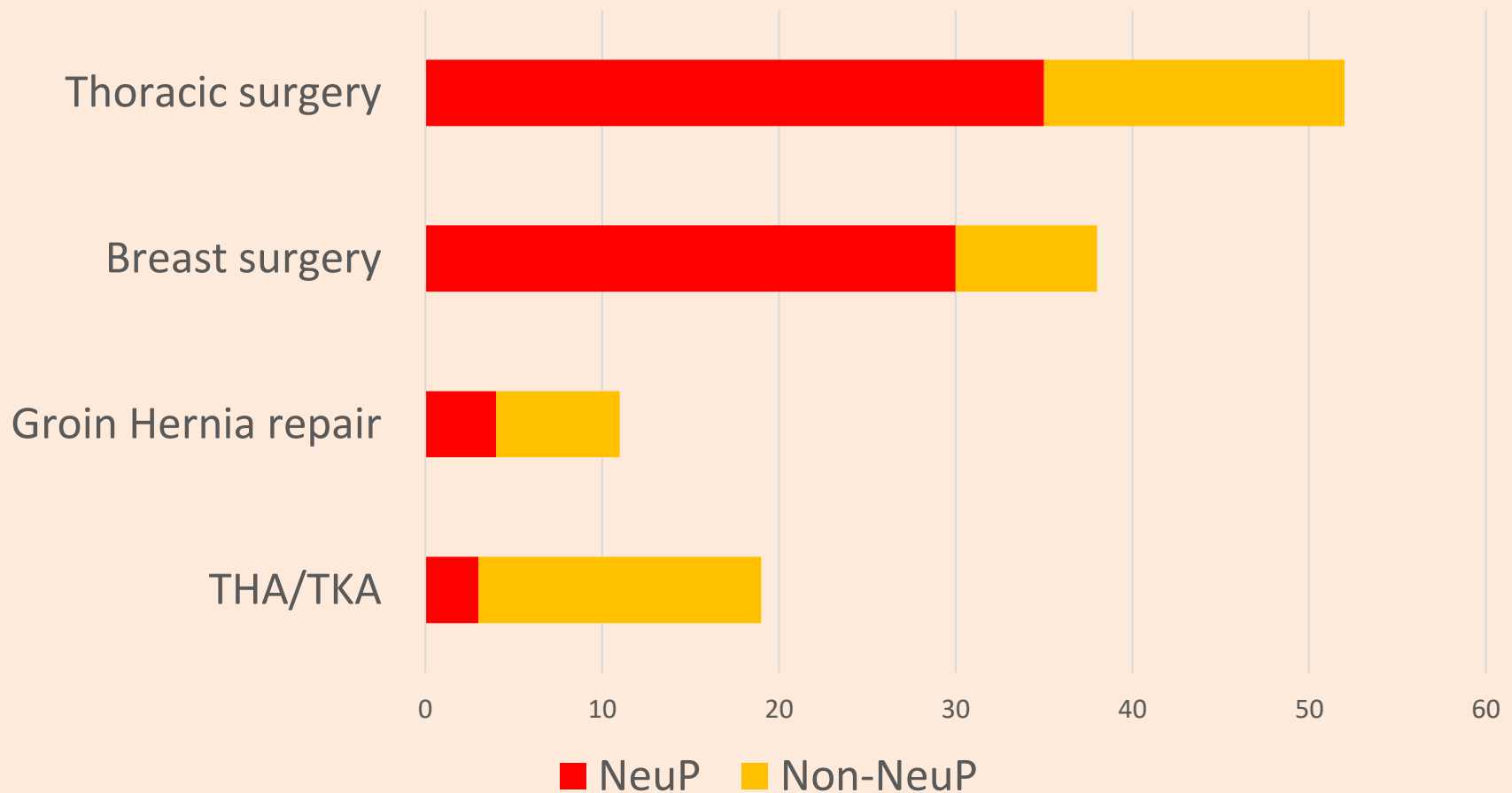
## INFLAMMATORY

- Activation of local or infiltrating immune or stromal cells, release of inflammatory mediators in response to nonneuronal injury
- Peripheral and central sensitisation

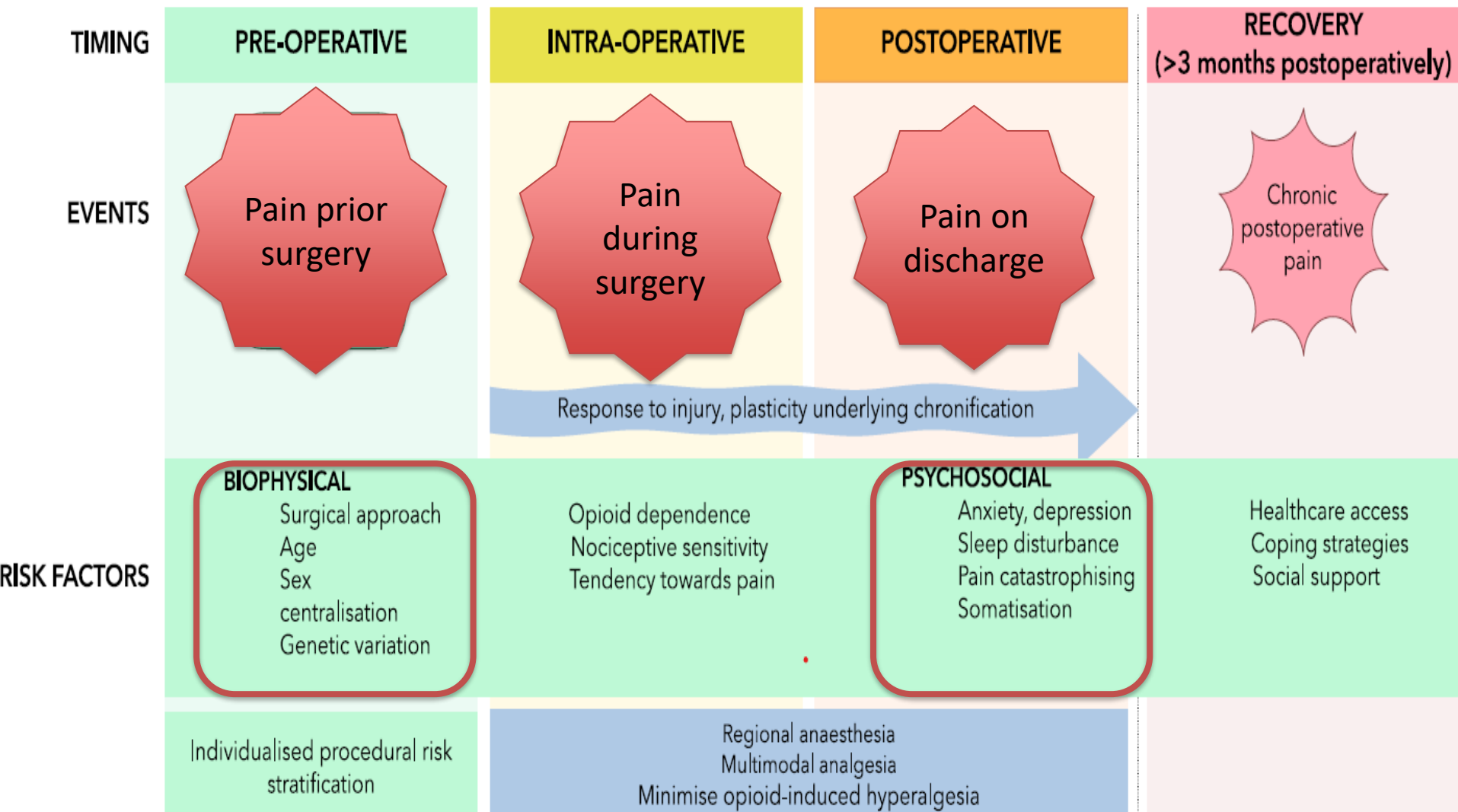
## NEUROPATHIC

- Injury to neuronal structures
- Peripheral and central sensitisation

# The neuropathic component in persistent postsurgical pain



# Risk factors contributing to the development of chronic postoperative pain



# Surgical factors



SIZE, SITE AND NUMBER  
OF INCISIONS  
(INTRAOPERATIVE  
NERVE DAMAGE, TISSUE  
ISCHEMIA)



INCREASED DURATION (>3H)



OPEN SURGERY



REPEAT SURGERY



# Prevention

Multimodal pain regimens might include combinations of gabapeptinoids, ketamine, IV lidocaine, NSAIDs, acetaminophen, and regional anesthesia with the conventional analgesia technique

# ANESTHESIOLOGY

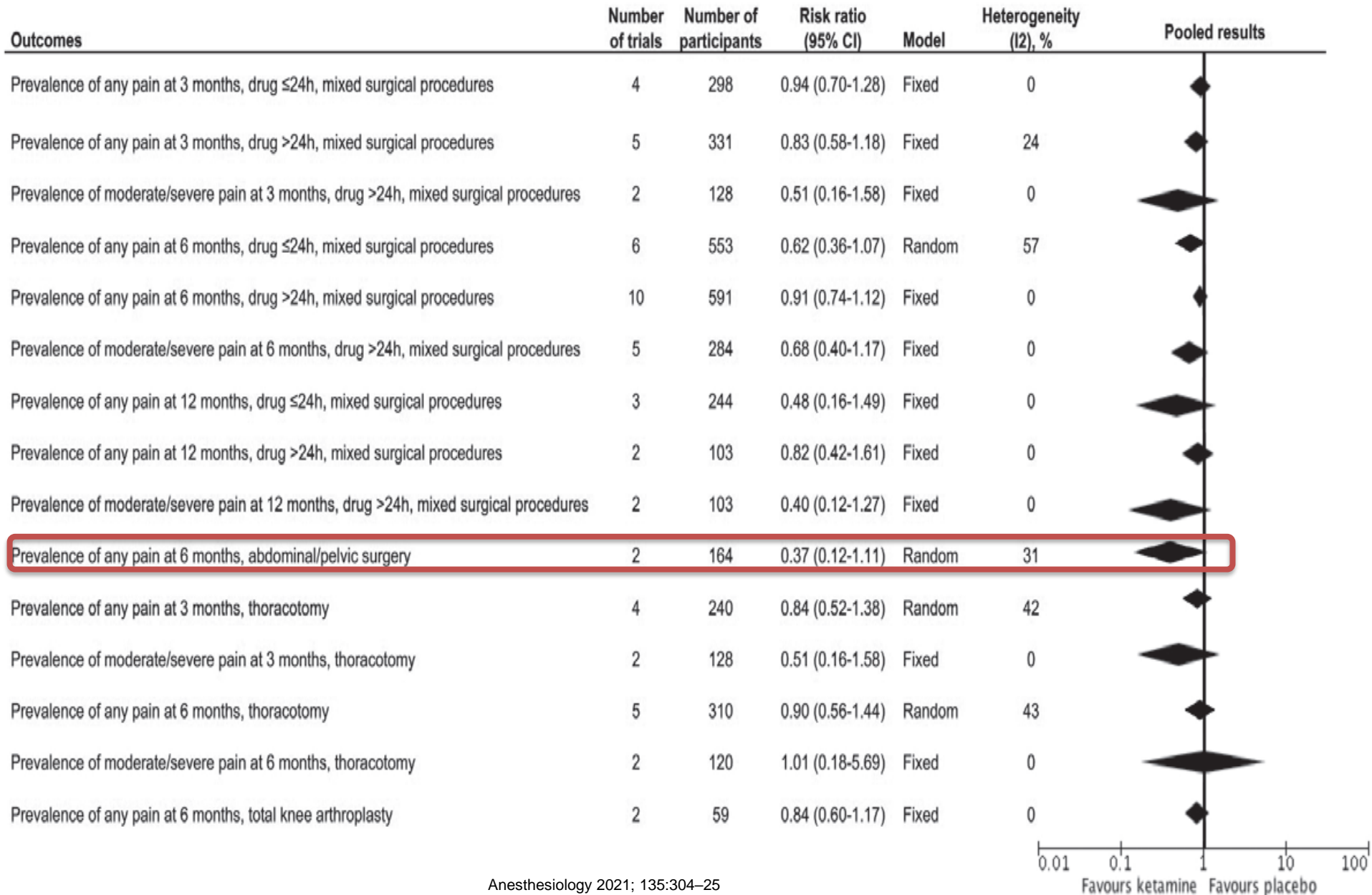
## **Pharmacotherapy for the Prevention of Chronic Pain after Surgery in Adults: An Updated Systematic Review and Meta-analysis**

Meg E. Carley, B.Sc., Luis E. Chaparro, M.D., F.R.C.P.C.,  
Manon Choinière, Ph.D., Henrik Kehlet, M.D., Ph.D.,  
R. Andrew Moore, D.Sc., Elizabeth Van Den Kerkhof, R.N., Dr.PH.,  
Ian Gilron, M.D., M.Sc.

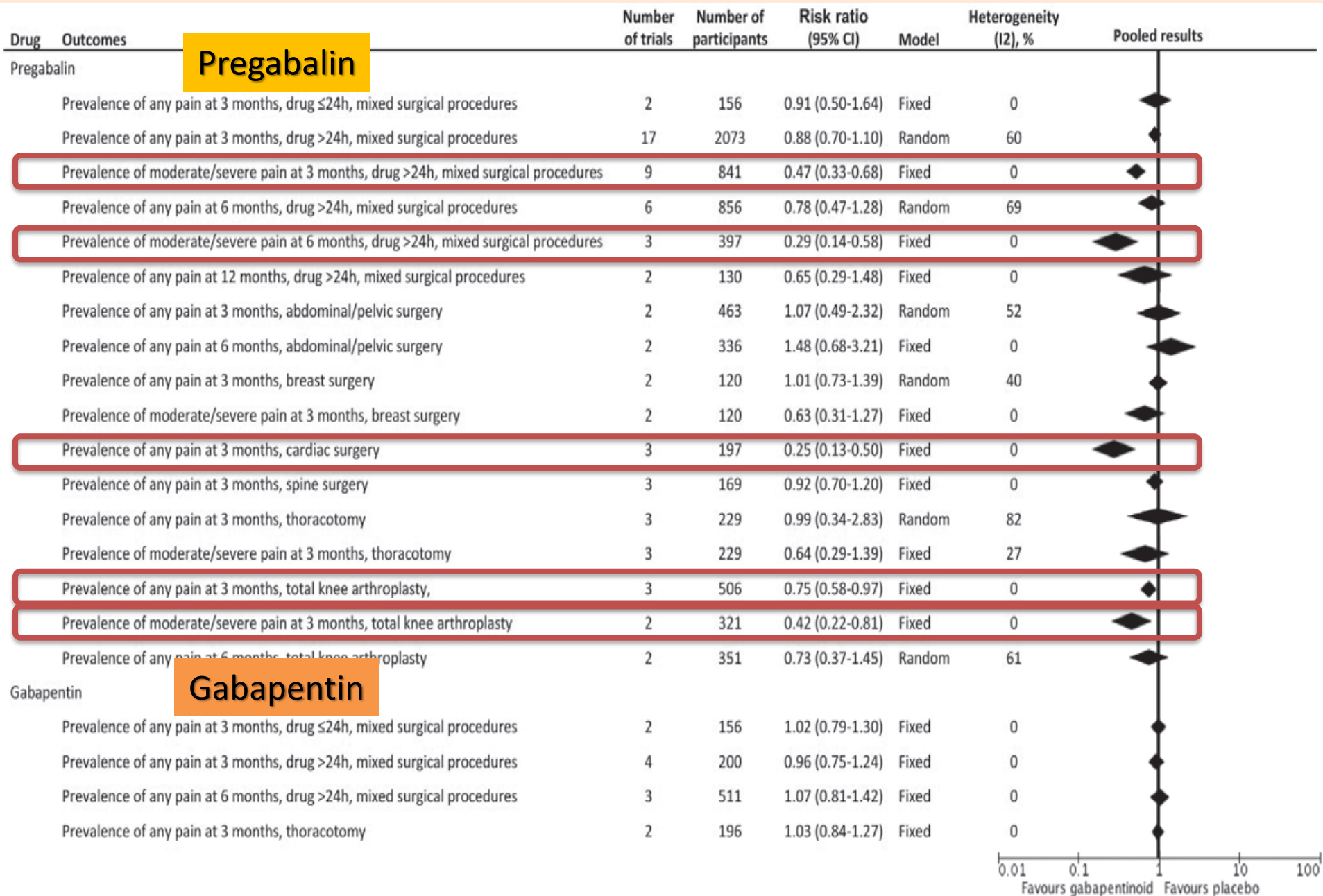
*ANESTHESIOLOGY* 2021; 135:304–25

- 6693 records were screened
- Characteristics of the 110 included studies (70 new plus 40 from the previous review 2013)
- double-blind, placebo-controlled, randomized
- pts 18 yr and older
- planned surgical procedure
- drugs administered  $\leq 24$  h or  $> 24$  h
- before, during, or after the procedure
- measure of pain **3, 6 and 12** mo postsurgery.

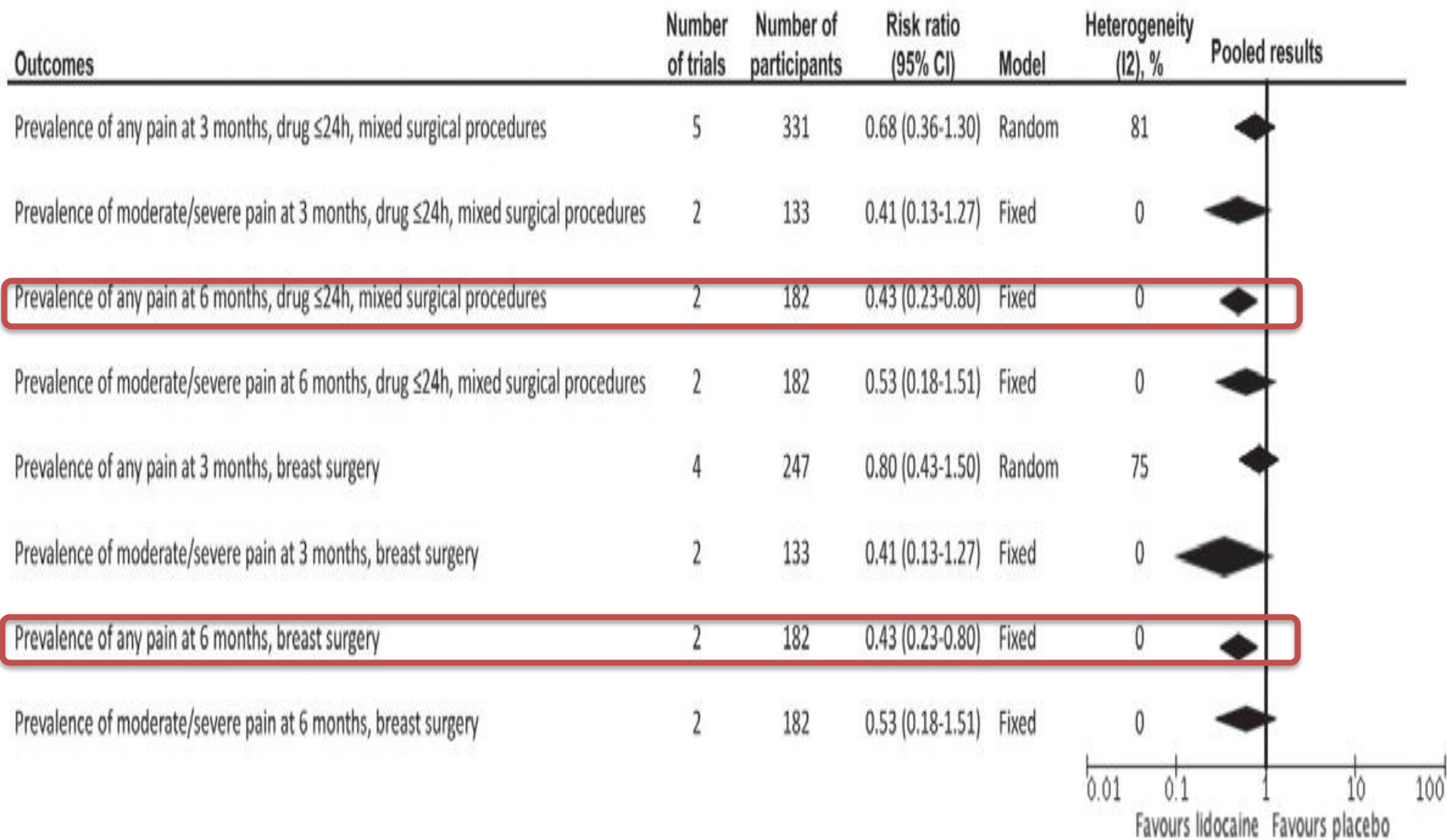
# Prevention of chronic pain after surgery: Ketamine



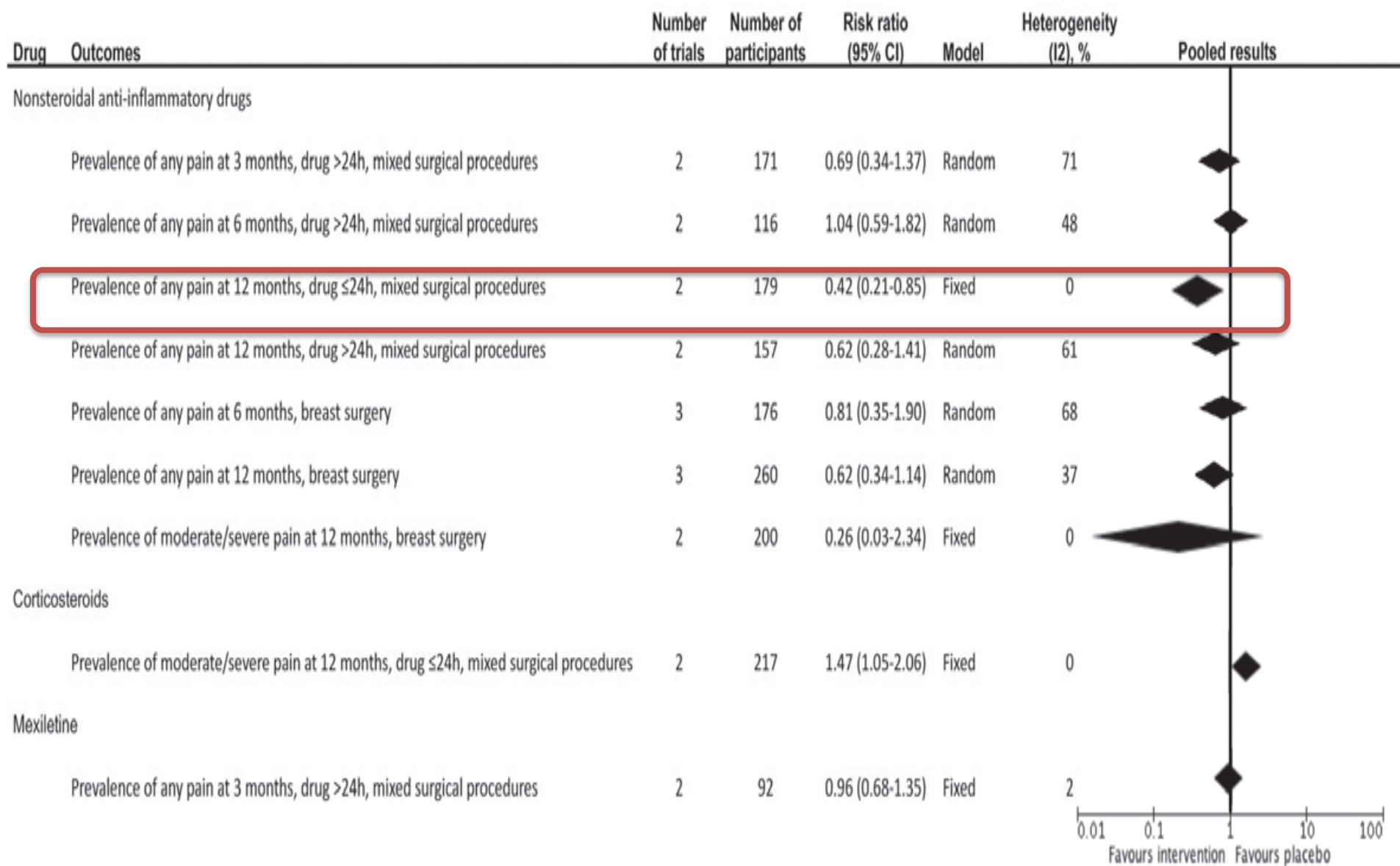
# Prevention of chronic pain after surgery: Gabapeptinoids



# Prevention of chronic pain after surgery: **IV Lidocaine**



# Prevention of chronic pain after surgery: Other drugs



# Impact of regional anaesthesia on chronic postoperative pain



Type of surgery	Studies (n)	Studies that favoured RA or LA, significantly different	Studies that favoured RA or LA, not significantly different	Studies that showed no difference or favoured conventional therapy	RA or LA techniques shown to favour prevention of chronic postoperative pain
Breast surgery	15	<ul style="list-style-type: none"> <li>● Kendall 2017</li> <li>● Strazisar 2014</li> <li>● Grigoras 2012</li> <li>● Strazisar 2012</li> <li>● Kairaluoma 2006</li> <li>● Fassoulaki 2000</li> </ul>	<ul style="list-style-type: none"> <li>● Karmakar 2014</li> <li>● Lee 2013</li> <li>● Ibarra 2011</li> <li>● Terkawi 2015</li> <li>● Fassoulaki 2005</li> </ul>	<ul style="list-style-type: none"> <li>● Al Ja'bari 2019</li> <li>● Albi-Feldzer 2013</li> <li>● Baudry 2008</li> <li>● Fassoulaki 2001</li> </ul>	<ul style="list-style-type: none"> <li>● Intravenous lidocaine infusion</li> <li>● Continuous wound infusion</li> <li>● Lidocaine cream</li> <li>● Paravertebral block</li> </ul>
Thoracotomy	8	<ul style="list-style-type: none"> <li>● Borys 2020</li> <li>● Lu 2008</li> </ul>	<ul style="list-style-type: none"> <li>● Comez 2015</li> <li>● Can 2013</li> <li>● Ju 2008</li> <li>● Senturk 2002</li> </ul>	<ul style="list-style-type: none"> <li>● Liu 2015</li> <li>● Katz 1996</li> </ul>	<ul style="list-style-type: none"> <li>● Epidural</li> <li>● Paravertebral block</li> </ul>
Caesarean section	5	<ul style="list-style-type: none"> <li>● Shahin 2010</li> </ul>	<ul style="list-style-type: none"> <li>● McKeen 2014</li> <li>● Bollag 2012</li> <li>● Lavand'homme 2007</li> </ul>	<ul style="list-style-type: none"> <li>● Loane 2012</li> </ul>	<ul style="list-style-type: none"> <li>● Intraperitoneal installation</li> <li>● TAP block</li> <li>● Continuous wound infusion</li> </ul>
Iliac bone graft	4	<ul style="list-style-type: none"> <li>● Singh 2007</li> <li>● Blumenthal 2005</li> <li>● Gundes 2000</li> </ul>	<ul style="list-style-type: none"> <li>● Barkhuysen 2010</li> </ul>		<ul style="list-style-type: none"> <li>● Continuous wound infusion</li> <li>● Multiple wound infiltrations</li> <li>● Local wound infiltration</li> </ul>
Amputation	1		<ul style="list-style-type: none"> <li>● Karanikolas 2006</li> </ul>		<ul style="list-style-type: none"> <li>● Epidural</li> </ul>
Cardiac surgery	2		<ul style="list-style-type: none"> <li>● Vrooman 2015</li> </ul>	<ul style="list-style-type: none"> <li>● Dogan 2016</li> </ul>	<ul style="list-style-type: none"> <li>● Lidocaine patch</li> </ul>
Laparotomy	2	<ul style="list-style-type: none"> <li>● Lavand'homme 2005</li> </ul>	<ul style="list-style-type: none"> <li>● Katz 2004</li> </ul>		<ul style="list-style-type: none"> <li>● Epidural</li> </ul>
Inguinal hernia repair	3	<ul style="list-style-type: none"> <li>● Mounir 2010</li> </ul>		<ul style="list-style-type: none"> <li>● Kurmann 2015</li> <li>● Theodoraki 2019</li> </ul>	<ul style="list-style-type: none"> <li>● Local wound infiltration</li> </ul>

# Preventing persistent postsurgical pain: A systematic review and component network meta-analysis

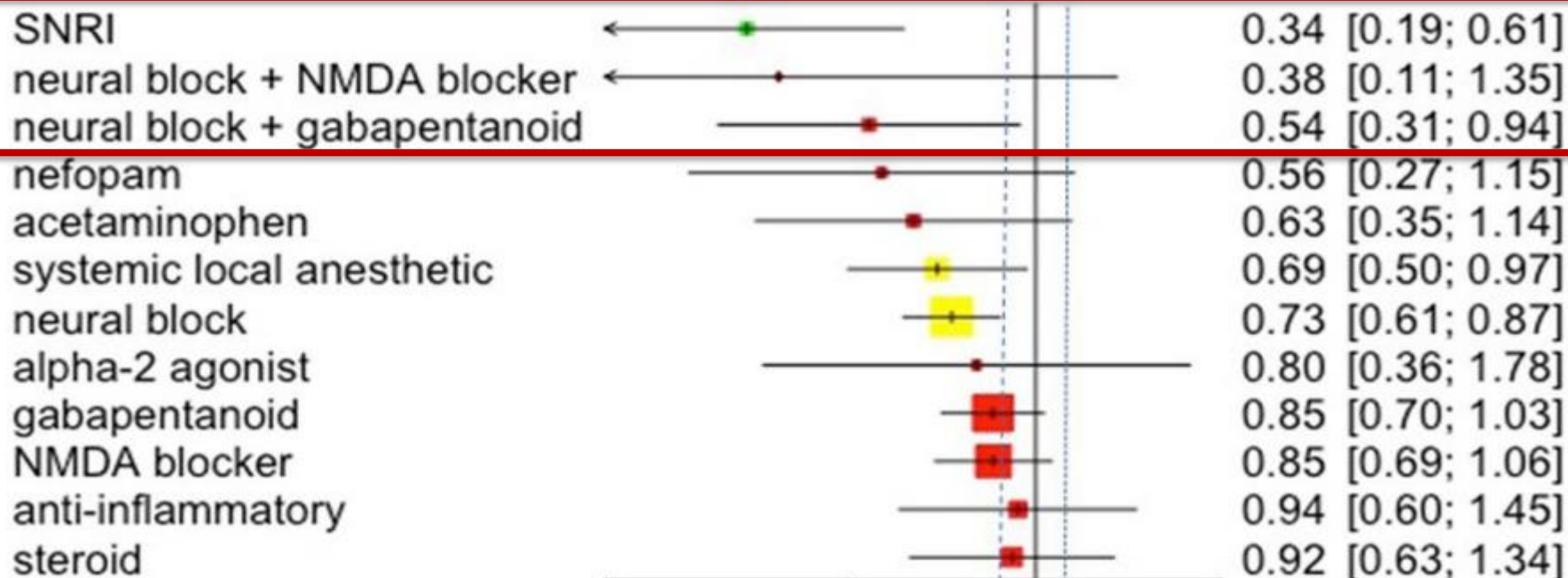
Claire Allen<sup>1</sup> | Andrew M. Walker<sup>1</sup> | Zahra A. Premji<sup>2</sup> |

Comparison: other vs 'placebo'  
(Random Effects Model)

Treatment

RR

95%-CI



0.2      0.5      1      2

Favors Treatment    Favors Placebo  
Relative Risk of Persistent Pain



# Conclusions

- Chronification of pain is bio-psycho-social process ( risk fa)
- Nerve damage, tissue ischemia during surgery??
- Active managements of pre-, intra- and post operative pain
- There is currently limited evidence for drugs preventing chronic postsurgical pain:
  - ✓ combinations of drugs?
  - ✓ regional anaesthesia prevent some chronic postsurgical pain?
  - ✓ combination of regional anaesthesia with drugs?



**To treat  
or not to  
treat?**