LUNG LAVAGE
for Meconium Aspiration Syndrome in Newborn Infants

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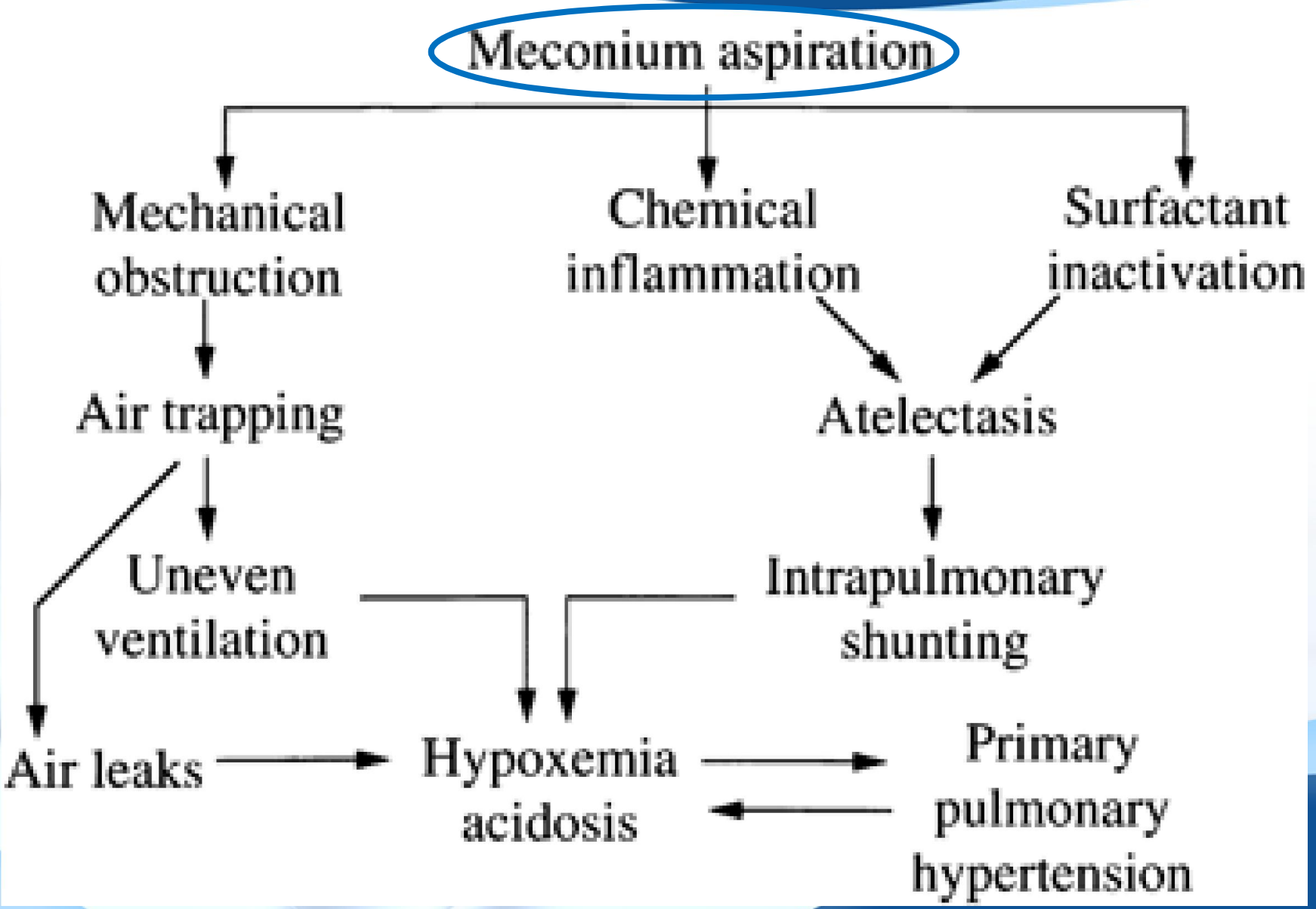
Description of the condition

- newborn inhales mixture of meconium and amniotic fluid into lungs in delivery


Meconium aspiration
Mechanical obstruction
Chemical inflammation
Surfactant inactivation
Air trapping
Atelectasis
Uneven ventilation
Intrapulmonary shunting
Air leaks
Hypoxemia acidosis
Primary pulmonary hypertension

Meconium Aspiration: The Statistics

- **Infants with MEC aspiration syndrome**
  - 35% need mechanical ventilation (range 25-60%)
  - 12% die (range 5-37%)

Management: at present

- Assisted ventilation
- Sedation
- Surfactant
- Nitric oxide
- ECMO
- Circulatory support
- Antibiotics
- ……

→ **Largely SUPPORTIVE**

Remove MEC from the lung:
Why NOT ???

Lung lavage for meconium aspiration syndrome in newborn infants (Review)

Hahn S, Choi HJ, Soll R, Dargaville PA

Cochrane Database of Systematic Reviews 2013
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Objectives

- Evaluate **Effects of LUNG LAVAGE** on **Morbidity and Mortality** in newborn infants with MAS

Search methods

- **Search database:**
  - Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library), MEDLINE, and EMBASE
  - up to December 2012
  - previous reviews including cross-references, abstracts, conference proceedings; and expert informants
- **Search words:**
  - meconium aspiration, pulmonary surfactants, bronchoalveolar lavage, lung lavage, pulmonary lavage

Selection criteria

- **Randomised controlled trials that evaluated the effects of lung lavage in infants with MAS**
- **Lung lavage: intervention in which fluid is instilled into the lung and then removed by suctioning and/or postural drainage**
  - Fluids that have been used for this purpose include saline, full-strength and dilute surfactant, and perfluorocarbon
- **Standard care: no lavage therapy, but include routine suction of the endotracheal tube to maintain its patency**

Results of the search

- **Twelve studies were excluded:**
  - Burke-Strickland 1973; Carson 1976; Rosegger 1987; Ogawa 1997; Su 1998; Lam 1999; Schlösser 2002; Kowalska 2002; Chang 2003; Salvia-Roigés 2004; Dargaville 2007; Armenta 2011
- **Four randomised controlled trials were identified**
  - (Ogawa 1997) was excluded as data on the non lavaged control group were not reported and are not now obtainable
- **Three studies are included in this review**
  - Wiswell 2002; Gadzinowski 2008; Dargaville 2011

Study analysis

- **Type of lavage fluid**
  - All included studies used diluted surfactant for lavage
- **Lavage aliquot volume**
  - ≥ 5 mL/kg in all studies comparing surfactant lavage with standard care
  - ≤ 5 mL/kg in the study comparing surfactant lavage followed by bolus surfactant with surfactant bolus therapy
- **Timing of lavage**
  - mean age ≥ than six hours in all included studies

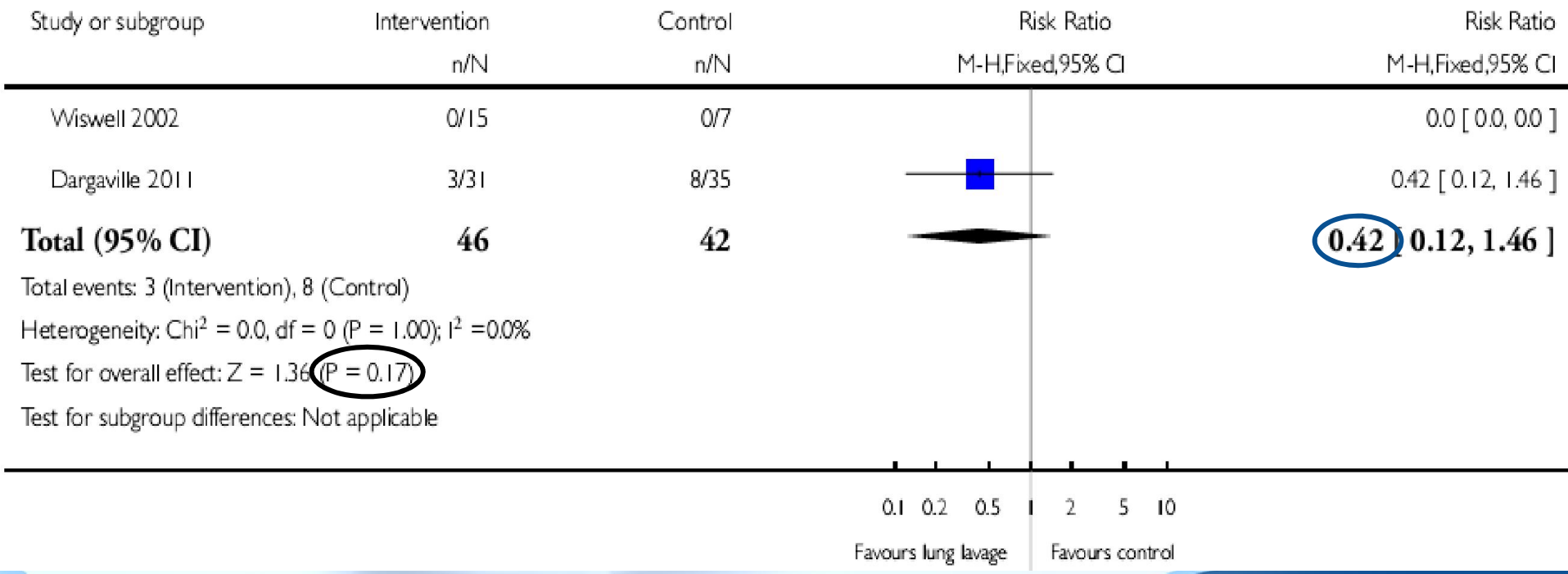
Comparison 1

LUNG LAVAGE VERSUS STANDARD CARE

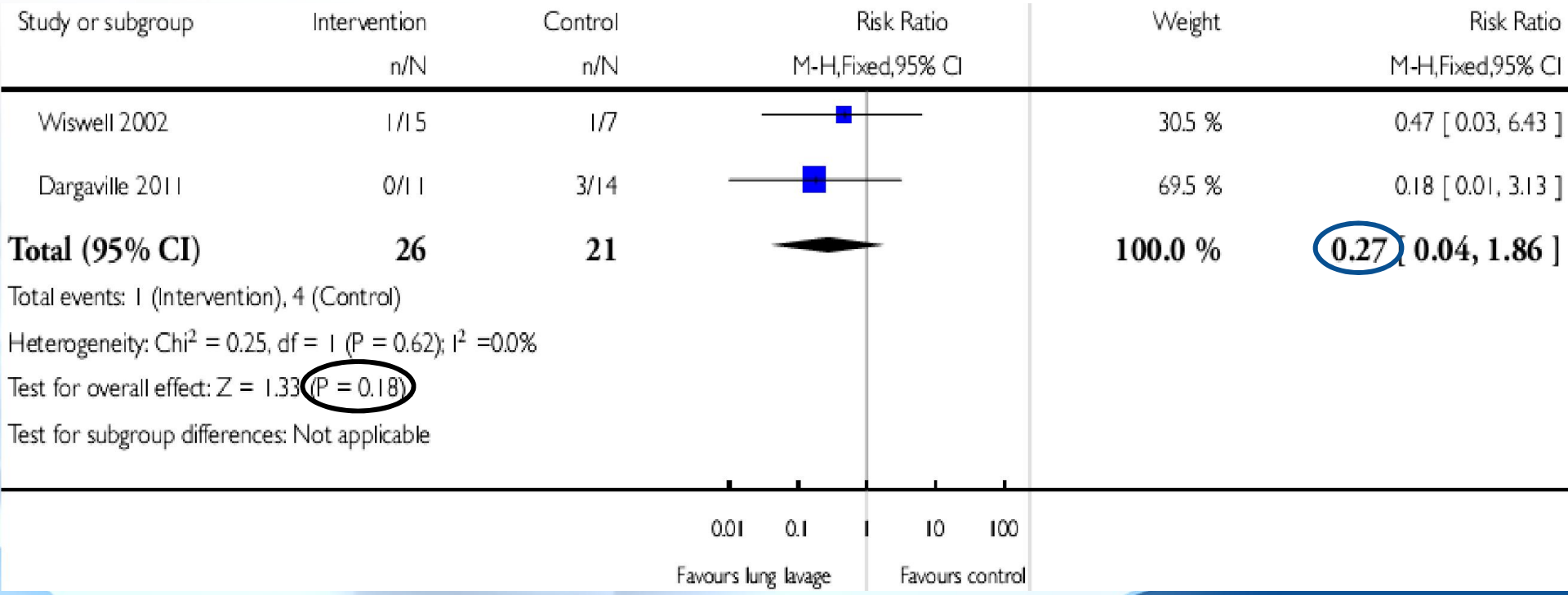
Lung lavage vs. Standard care

- **Two studies: Dargaville 2011; Wiswell 2002**
- **Outcomes:**
  - Death
  - Use of ECMO
  - Death or Use of ECMO
  - Pneumothorax
  - Indices of pulmonary function: Oxygenation Index, $AaDO_2$ and PaO_2/FiO_2

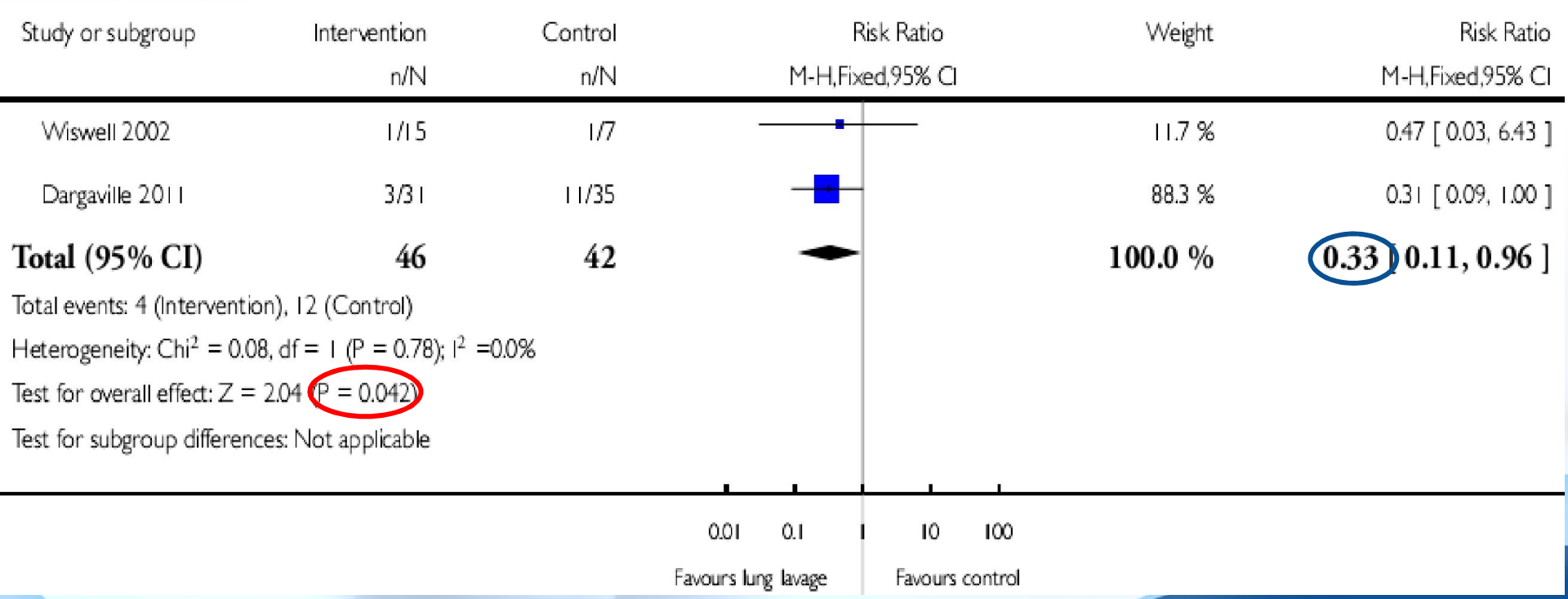
Outcome 1: Death



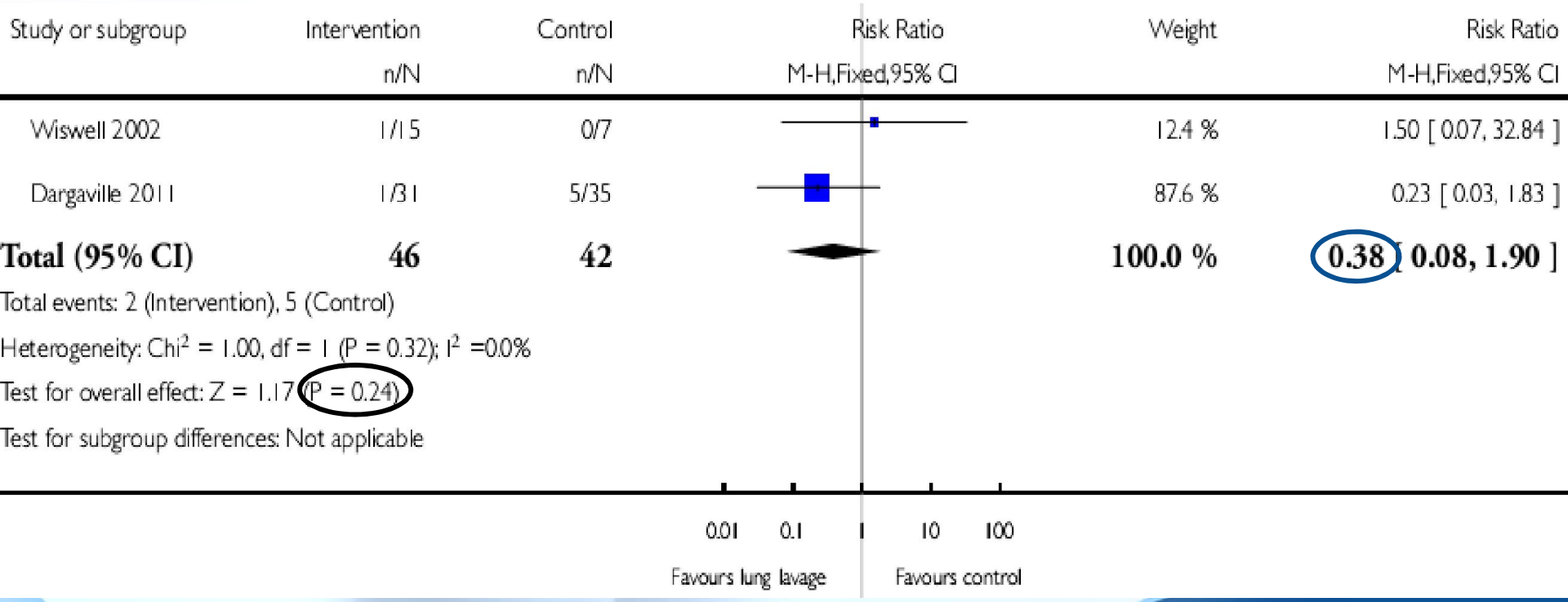
Outcome 2: Use of ECMO



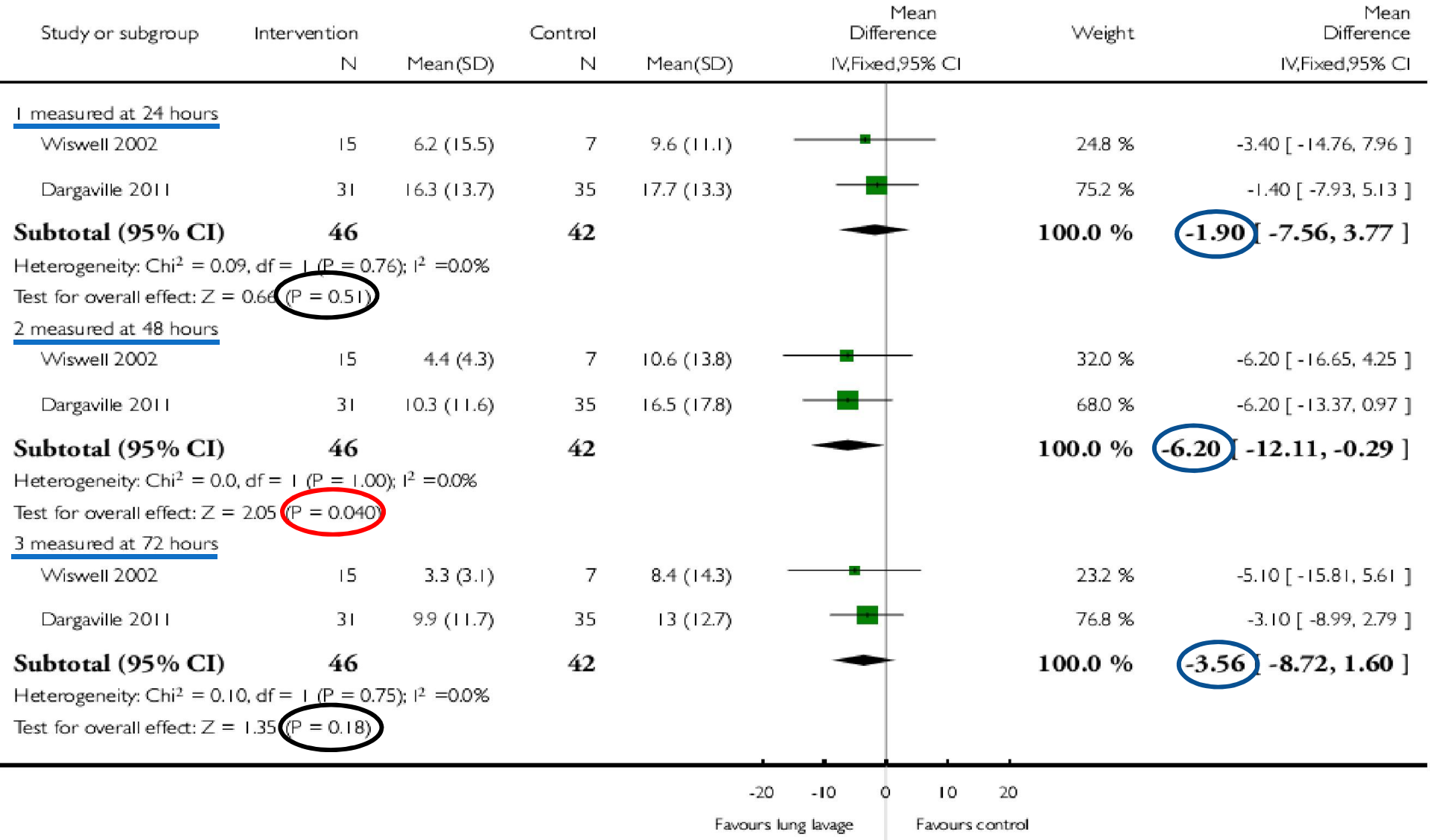
Outcome 3: Death or use of ECMO



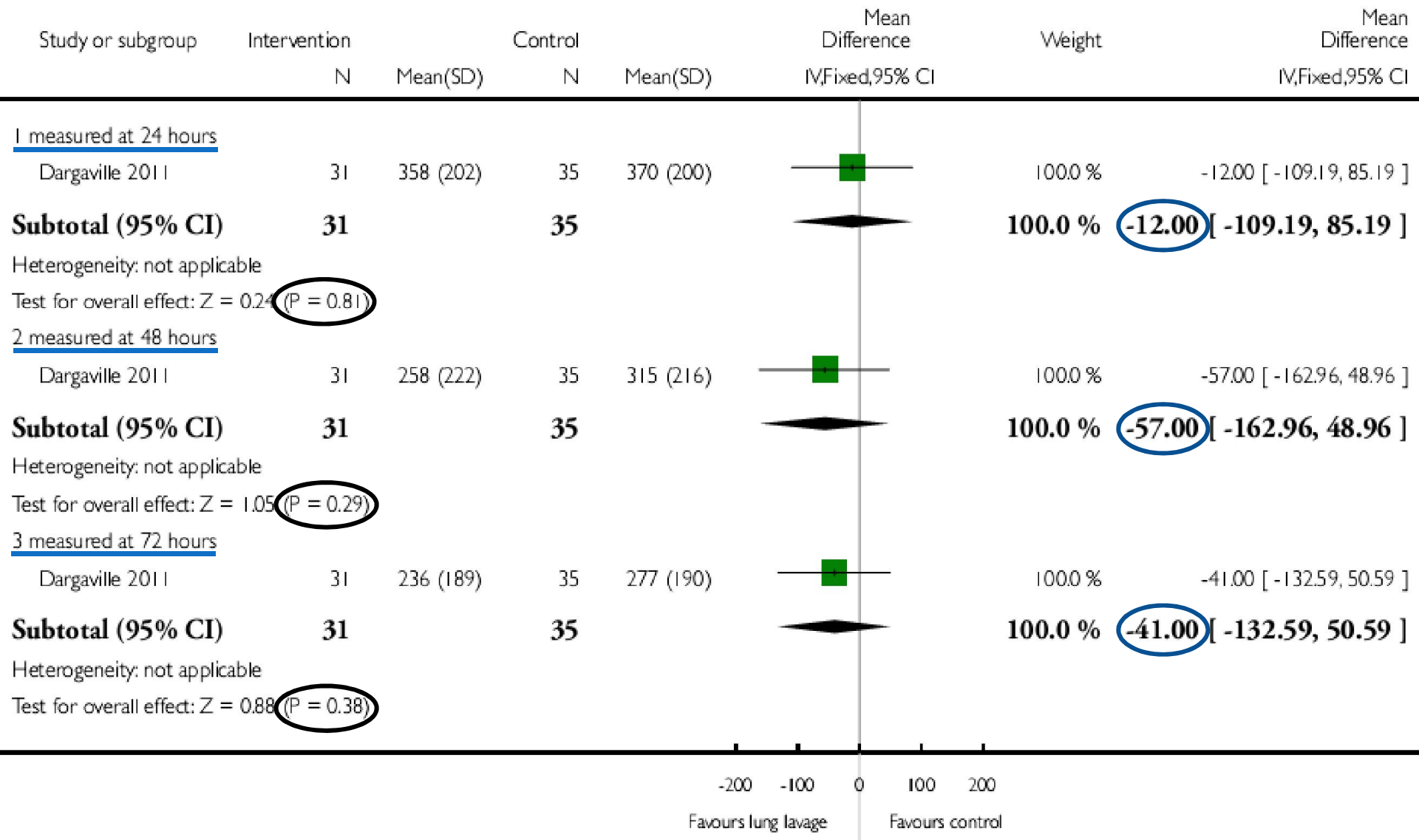
Outcome 4: Pneumothorax



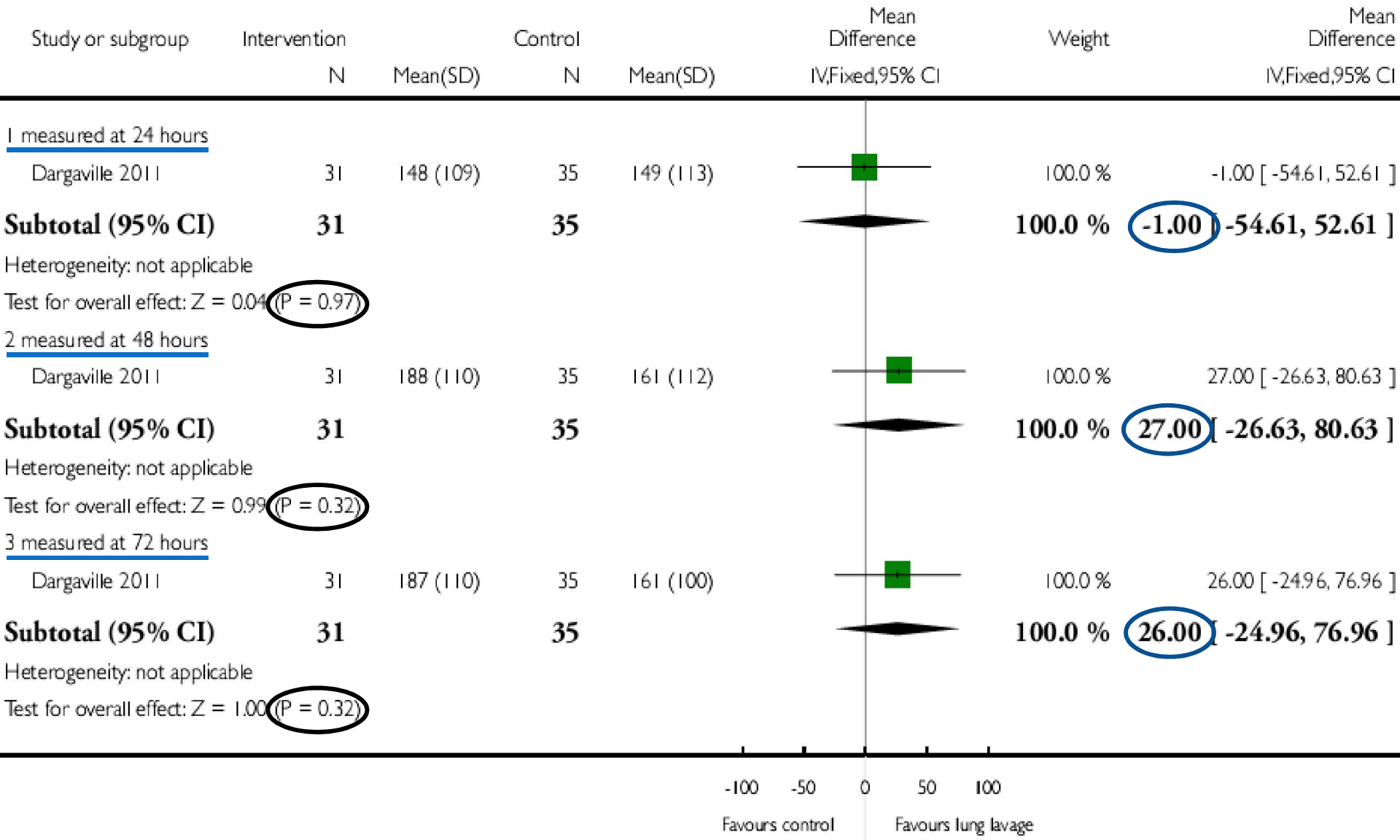
Outcome 5: Oxygenation index



Outcome 6: $AaDO_2$



Outcome 7: PaO_2/FiO_2



Result Analysis

- **Lung lavage has effect in all outcomes, but only these are significant in statistics:**
  - Outcome 3: Death or Use of ECMO
  - Outcome 5: Oxygenation index at 48 hours

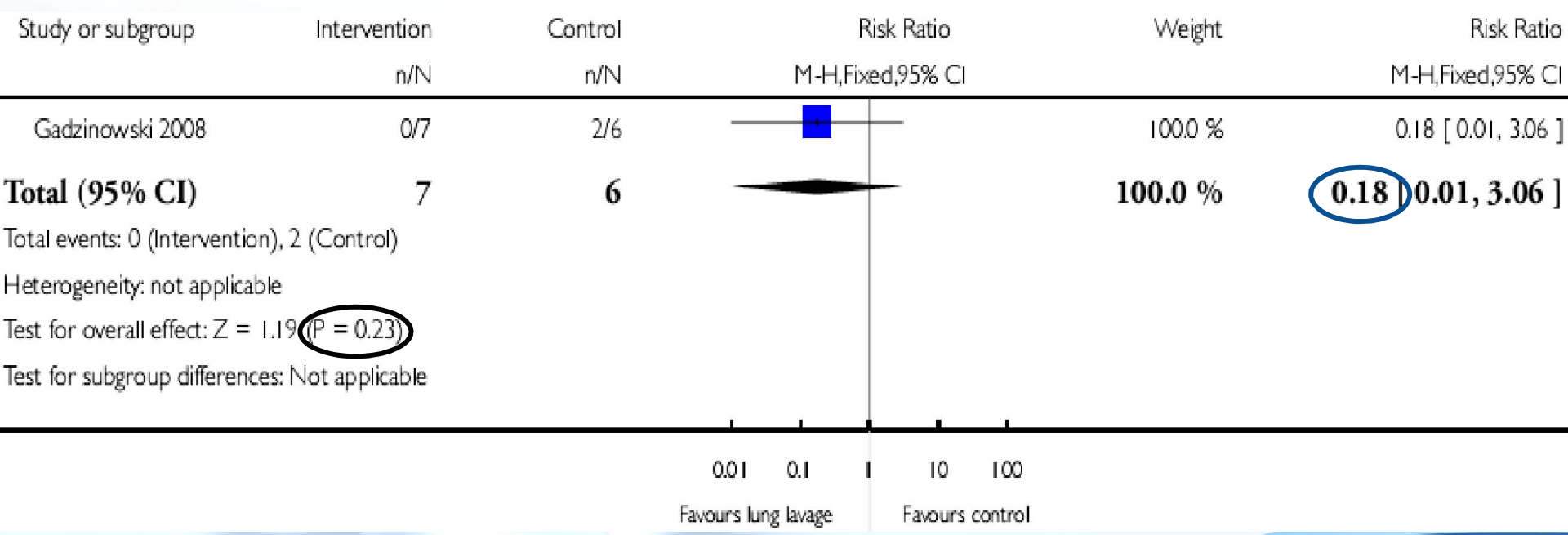
Comparison 2

LUNG LAVAGE FOLLOWED BY SURFACTANT BOLUS VERSUS SURFACTANT BOLUS

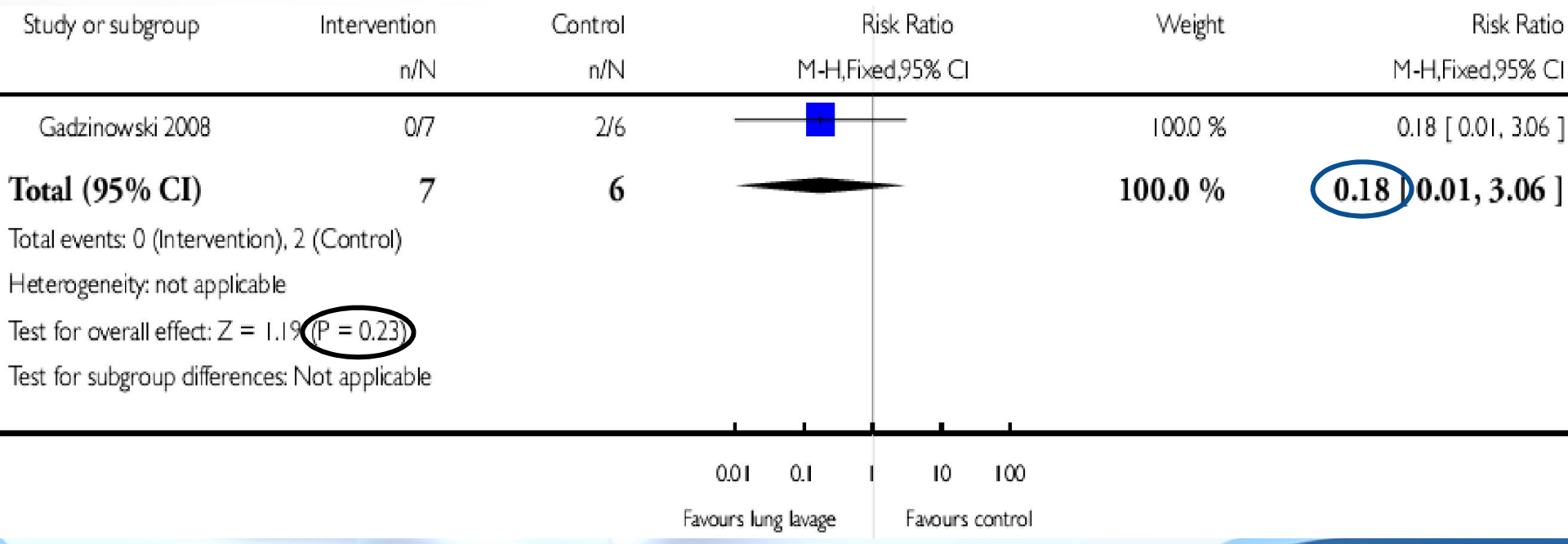
Lung lavage followed by surfactant bolus vs. surfactant bolus

- **One study: Gadzinowski 2008**
- **Outcomes:**
  - Death
  - Pneumothorax

Outcome 1: Death



Outcome 2: Pneumothorax



Authour's conclusion

- **In infants with MAS, lung lavage with diluted surfactant may be beneficial (Grade 2B)**
  - A Grade 2 recommendation is a weak recommendation. It means "this is our suggestion, but you may want to think about it". For Grade 2 recommendations, benefits and risks may be finely balanced, or uncertain.
  - Grade B evidence is evidence from randomized trials with important limitations, or very strong evidence of some other form.

Authour's conclusion

- **Additional controlled clinical trials of lavage therapy should be conducted to**
  - confirm the treatment effect
  - refine the method of lavage treatment
  - compare lavage treatment with other approaches, including surfactant bolus therapy
- **Long-term outcomes should be evaluated in further clinical trials**

THANK YOU FOR WATCHING!