

# **Influence of different levels of Positive End-Expiratory Pressure on Saturation Oxygenation Pressure Index in Mechanically Ventilated Newborn Infants**

Dr. med. Stephanie Fusch  
Fellow, Neonatology UKBB  
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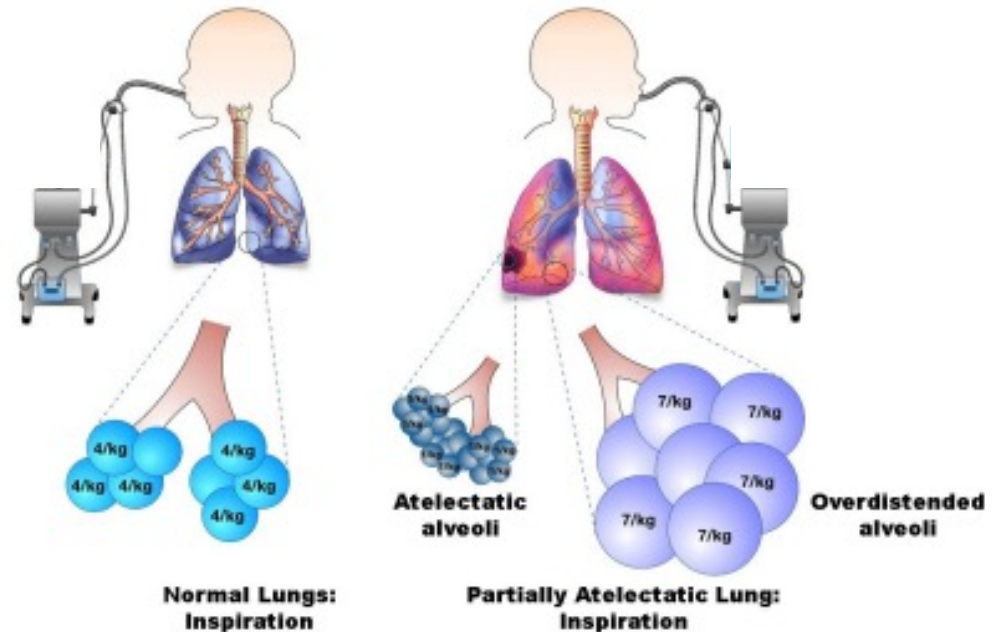
# Background

## Ideal PEEP

- dependant on gestational age and type of lung disease
- optimises lung recruitment
- facilitates gas exchange

## Inappropriate PEEP

- impairs oxygenation
- confers risk of ventilator induced lung injury



Kalikkot Thekkeveedu, Renjithkumar et al. *Journal of Clinical Medicine* 2022

# Background – Optimal PEEP?

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Bamat, Nicolas et al. “Positive end-expiratory pressure for preterm infants requiring conventional mechanical ventilation for respiratory distress syndrome or bronchopulmonary dysplasia.” *The Cochrane database of systematic reviews* vol. 2,2 CD004500. 26 Feb. 2019, doi:10.1002/14651858.CD004500.pub3

Sweet, David G et al. “European Consensus Guidelines on the Management of Respiratory Distress Syndrome: 2022 Update.” *Neonatology* vol. 120,1 (2023): 3-23. doi:10.1159/000528914

**Insufficient evidence to define  
optimal positive end-expiratory pressure (PEEP)**

# Aims

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- Ongoing prospective, observational cohort study in mechanically ventilated newborn infants

<b>SOPI (Saturation oxygenation pressure index)</b>	→ <b>standard monitoring</b>
FOT (Forced oscillation technique)	→ Fabian HFOi-Ventilator
EIT (Electrical Impedance Tomography)	→ EIT device

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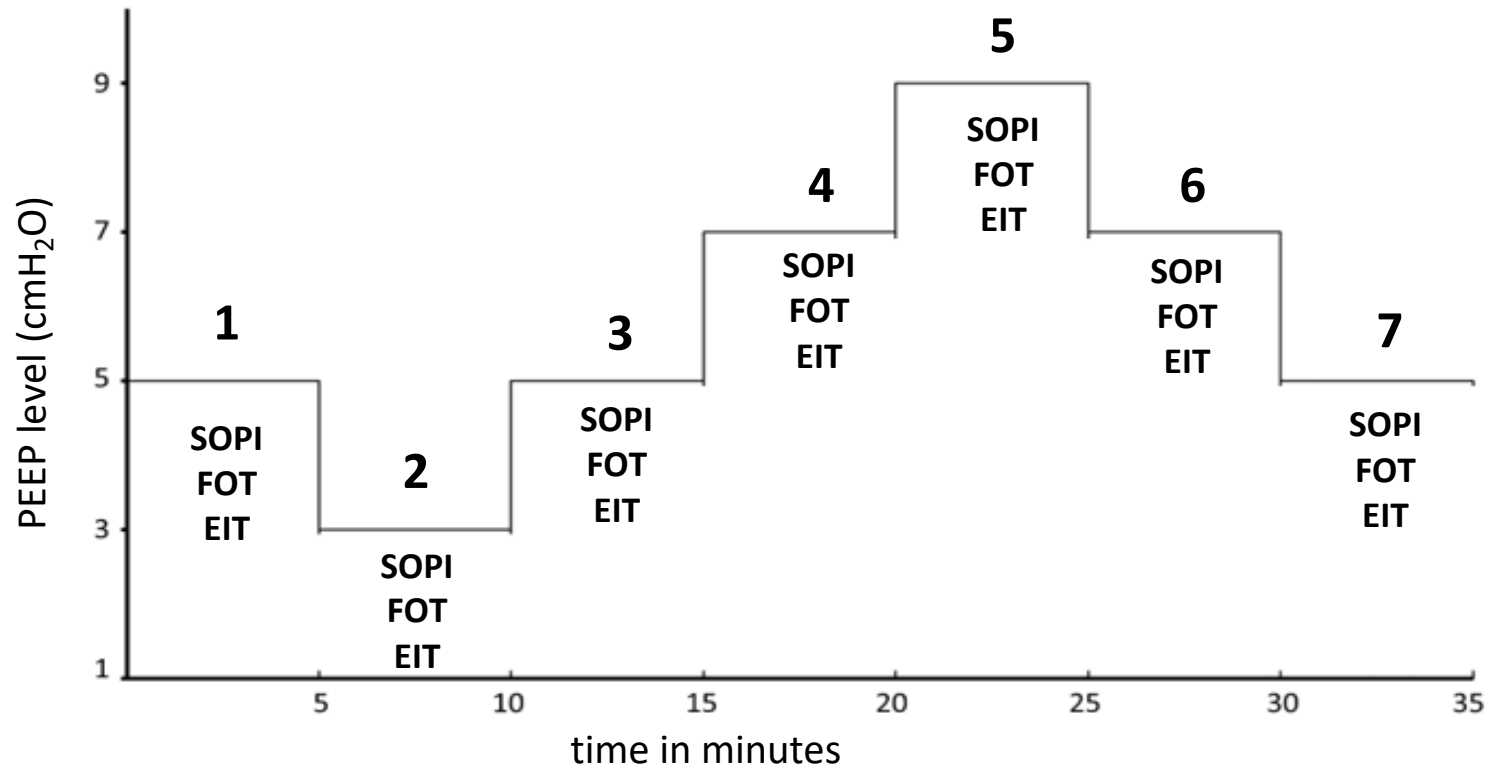
$$\text{SOPI} = [(\text{PEEP pressure} \times \text{FiO}_2 \times 100) / \text{SpO}_2]$$



**Influence of PEEP on  
oxyhaemoglobin saturation measured by SOPI**

# Materials and Methods

## PEEP steps



# Demographics

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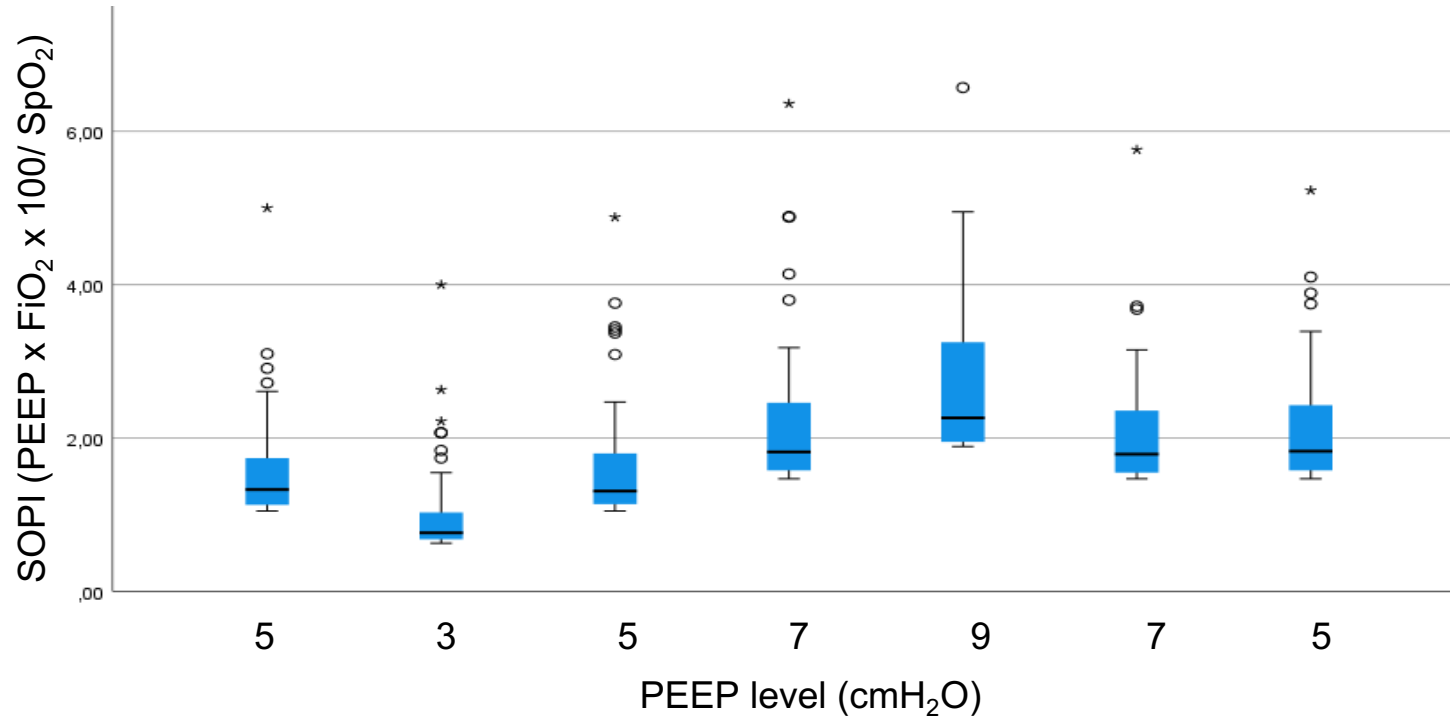
Patients n=18/86

Measurements n = 46

Male (%)	44
Gestational Age (w)	29.0 (26.0-35.3)
Weight (g)	965 (790-2619)
Surfactant (%)	83
Measurements per patient (n)	4 ± 2
Age at test (d)	3 (2-5)

w, weeks; g, grams; h, hours; d, days; normally distributed data reported as mean ± SD, non-normally distributed data reported as median (IQR)

# Results



Significant differences between different PEEP levels



# Conclusion

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- SOPI: feasible
- significant increase in SOPI with increasing PEEP level
- possible lung recruitment effect across measurements
- SOPI alone not sufficient to determine optimal PEEP

Combination of SOPI, EIT and FOT might allow to identify optimal PEEP in mechanically ventilated infants.