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**Title:** The effects of increasing inflation pressures in the resuscitation of prematurely born infants

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**Body:** Background: We have previously shown, using the UK recommended inflation pressures, expiratory tidal volumes (TV) rarely exceed the anatomical dead space during the first five inflations of face mask resuscitation in prematurely born infants, unless the inflations stimulated the infant to inspire. Aim To measure the effects of increasing the peak inflation pressure from 20 to 25 cmH<sub>2</sub>O on TV and end tidal carbon dioxide (CO<sub>2</sub>) levels. Method Eighteen infants (gestational age <34 weeks) resuscitated using peak inflation pressures of 25/5 cmH<sub>2</sub>O were matched by gestational age to 18 infants resuscitated with inflation pressures of 20/5 cmH<sub>2</sub>O. A respiratory on line monitor was used to record the inflation pressures, flow, volume and CO<sub>2</sub> levels during the first five inflations during face mask resuscitation. Inflations during which the infant inspired were excluded from the analysis. Results The median gestational age of the infants was 30 weeks. The median inflation pressures (peak inflating pressure - PEEP) were 22 cmH<sub>2</sub>O (range 20-25.6) and 16.3 cmH<sub>2</sub>O (range 20 -25.6) respectively (p<0.001). The median TVs were 2.32 (range 0.4-0.94) and 0.95 (range 0.11-3.9) ml/kg respectively (p<0.001). The median CO<sub>2</sub> levels were 2.32 (range 0.4-39) and 0.5 (range 0.2- 15.0) mmHg respectively (p<0.001). The facemask leaks in the two groups were similar (51 and 56% respectively) Conclusion Commencing face mask resuscitation using peak inflation pressures of 25 cmH<sub>2</sub>O rather than 20 cmH<sub>2</sub>O was more effective as evidenced by producing a median TV exceeding the anatomical dead space and more effective ventilation as indicated by higher expiratory CO<sub>2</sub> levels.