# WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care

**Worksheet author(s)**
Yacov Rabi, Colin Morley

**Date Submitted for review:** November 02, 2008

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## Clinical question.

In neonates receiving respiratory support (P) does the use of face mask interface (I) versus CPAP, NPCPAP, NC (C) (excluding intubation) improve outcome (O)?

**Is this question addressing an intervention/therapy, prognosis or diagnosis?** Intervention/therapy

**State if this is a proposed new topic or revision of existing worksheet:** New topic

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### Conflict of interest specific to this question

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet?

No

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### Search strategy (including electronic databases searched).

**PUBMED** (www.pubmed.org)
RUN AUGUST 13, 2008 (462 references identified)


**EMBASE** (OVID search)
RUN AUGUST 14, 2008 (464 references identified)

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Web of Science/ISI Web of Knowledge

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### SCOPUS

Run August 14, 2008 (32 references identified)

(Infant OR Newborn OR Delivery room) AND (Resuscitation OR positive end expiratory pressure OR Continuous Positive Airway Pressure OR cpap OR face mask OR nasal canula* OR nasal prong*)

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- **State inclusion and exclusion criteria**
  The following studies were excluded: Studies of endotracheal intubation and laryngeal mask interfaces, studies of different interfaces in which the groups received different pulmonary interventions (ie, continuous positive airway pressure versus intermittent positive pressure).

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- **Number of articles/sources meeting criteria for further review:**
  97 studies were reviewed. 4 studies met the criteria for inclusion in this worksheet. Of these 4 studies, 1 was LOE 2(pseudo-randomized), 3 were LOE 5 (1 study in different patient population, 2 studies using manikins).
### Summary of evidence

#### Evidence Supporting Clinical Question

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**Level of evidence**

- **E1** = Improved survival to discharge
- **E2** = Chest compressions
- **E3** = Intubation
- **E4** = Reduction in duration of assisted ventilation
- **E5** = Fewer days in hospital
- **E6** = Reduction of pulmonary air leaks
- **E7** = Leak around face mask
- **E8** = Peak pressure achieved
- **E9** = Other endpoint

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#### Evidence Neutral to Clinical question

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#### Evidence Opposing Clinical Question

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REVIEWER’S FINAL COMMENTS AND ASSESSMENT OF BENEFIT / RISK:

There are few studies that specifically address the effect of different non-invasive interfaces (eg, face mask, single nasal prong, nasal cannulae). Nearly all studies to date compare different methods of supporting ventilation (eg, intermittent positive pressure, continuous positive airway pressure). This is further complicated by the wide range of gestational ages presented in existing studies. Only 4 relevant studies were identified for inclusion in this worksheet; only one study was a clinical trial. This worksheet does not address the use of laryngeal mask airways or endotracheal intubation.

The main concern with the use of a face mask interface has been the potential for difficulty in achieving desired airway pressures due to leak where the mask contacts the face (Wood et al., 2008 – 2 studies). There does not appear to be much difference in the degree of leak between different face masks with a rounded design. However, it is possible to closely approximate target pressures required during resuscitation using a face mask interface despite the leak (Bennet et al., 2005). Maintaining a good seal with an anatomical (triangular) face masks is more difficult compared to round face masks (Palme et al., 1985). In this study, triangular masks had significantly greater leaks compared to soft circular masks. A subsequent study (O’Donnell et al., 2005) did not show a difference in leak around the face mask when comparing anatomically shaped masks to round masks.

Although there are case reports of pneumothorax associated with positive pressure ventilation (PPV) delivered via a face mask (Matsubara et al., 1997), none of the cohort studies or clinical trials confirmed that the risk of a pneumothorax is higher when using a face mask interface compared to other interfaces. There has also been concern about the efficiency of the face mask as it pertains to allowing adequate gas exchange. In preterm infants, but not in term infants, requiring resuscitation, the rate of gas exchange did not approximate that of healthy spontaneously breathing infants until 5 minutes of age (Palme-Kilander et al., 1993). Another concern with delivering PPV via face mask has been the potential for gastric distention which can interfere with ventilation by splinting the diaphragm. The opening pressure of the esophagus is higher than that of the airway and it is not likely that air will be forced into the stomach with the pressures used during resuscitation (Vyas et al., 1983). Gastric distention associated with CPAP use via non-invasive interface is more likely a result of a spontaneously breathing infant swallowing air.

The nasopharyngeal (NP) interface has the benefits of being relatively easy and quick to establish. Leak is minimized and desired pressures can be delivered if the mouth is kept closed and the opposite nostril is occluded. Nasal cannulae have similar benefits but are more prone to become dislodged and becoming obstructed. Because of the very short term use in the delivery room setting, problems with obstruction or nasal trauma attributed to more chronic use of nasal prongs/cannula are not likely. Infants receiving PPV via nasal canula had a lower incidence of intubation and chest compressions compared to infants receiving PPV via face mask, however, no differences were observed for the outcomes of death or admission to the neonatal intensive care unit (Capasso et al., 2005).

Acknowledgements:

Citation List

Reviewed References Meeting Inclusion Criteria


»Reviewer's Comments: Study compared 2 different face masks (Laerdal round mask vs Fisher & Paykel neonatal resuscitation mask) for amount of leak. 50 participants. PPV using Neopuff given to manikin. Both devices had >50% leak (Laerdal 55% (31) vs F&P 57% (25), no p value given but states difference is not significant). No effect of operator experience or technique. This study is included in worksheet because it directly compares 2 different interfaces (both face masks).

Reviewer's Comments: Very relevant study. PPV via nasal cannulae versus PPV via facemask. Found benefit for nasal cannulae. n =617. Infants needing PPV were assigned according to weekday (not blinded) to oxygen delivery either by bag and mask (n=314) or nasally by baby and nasal cannula(n=303). Mask used was a Rendell-Baker Salicek (triangular) connected to self inflating bag. Nasal cannula was rubber (Argyle Nasal Cannulae) connected to a self inflating bag. Results showed no difference in 1 or 5 minute Apgars. More infants in the face mask group required chest compressions - 26/314 vs 5/303 (p<0.001) - and intubation - 20/314 vs 2/303 (p<0.01). Other important outcomes for mask interface vs nasal cannulae interface - death 17/314 vs 8/303 (NS), air leak within 72 hrs - 3.6% vs 2.2% (NS). This study compared the delivery of IPPV via 2 different interfaces (nasal cannulae vs facemask). It will be included in the worksheet.


Reviewer's Comments: Very relevant study. Good comparison of round mask vs anatomical mask during IPPV in manikins. Used a Laerdal infant resuscitator (240 ml silicone self inflating bag) along with a Neopuff. Interface was a size 0/1 Laerdal face mask versus a size 1 anatomically shaped face mask with a partially filled cushioned rim. 34 participants of varying experience used each mask. Mean PIP, Vte and leakage from face mask for the round mask and anatomically shaped mask were - 26.5(2.9) vs 26.3 (2.8) cm H2O (NS, p=0.78), 7.5(5.0) vs 7.8(4.9) mls (NS, p=0.10), 69.6 vs 60.2 % (NS, p=0.08). Anecdotally, most participants (23/34) preferred the round mask. This study directly compared 2 different face masks (Laerdal vs anatomically shaped) and therefore is included in worksheet.


Reviewer's Comments: Study in term babies. Performed AFTER newborn resuscitation. Compared leaks between different face masks. Compared 5 neonatal face masks. n=44 babies. Recorded the mean of 10 breaths when babies were ventilated from a Babylog 2 respirator via face mask. Compared the triangular moulded rubber mask (Rendell-Baker), Laerdal, Ohio, Bennet and Ambu OA masks. Tests performed within a few days of birth (NOT a resuscitation study). Wide variation in weights of infants (1 to 5 kg). Soft circular mask (Laerdal) leaked the least (2% of tests) and triangular mask leaked the most (50% of tests). For BW>3 kg, triangular mask gave significantly lower peak pressure and significantly higher leakage than all other models compared pairwise (p<0.01 for each comparison). The Laerdal mask (soft circular mask) gave a significantly higher pressure and less leakage than all other masks: Ambu (p<0.01), Bennet (p<0.01), Ohio (p<0.02), and Rendell-Baker (p<0.01). This study directly compares different face mask interfaces. Although, this is not a study of delivery room resuscitation, it provides useful, relevant information and will be included in the worksheet.


Reviewer's Comments: Retrospective study comparing LMA to IPPV via facemask. Compared group of infants resuscitated before introduction of routine LMA use (pre 1996) to infants resuscitated using the LMA (after 2000). Before 1996, infants were resuscitated using a bag and face mask (type of face mask not specified). Infants resuscitated with an LMA were identified first and then appropriate matches from pre 1996 were chosen based on mode of delivery and gestational age. n=74 in each group. Results are presented as LMA group versus face mask group. Note that results for treatment failure (defined as need for LMA or ETT) are difficult to interpret. No infants died in either group. Median (range) length of hospital stay - 11 (3-71) vs 17 (3-49), p=0.77. Median (range) length of mechanical ventilation - 2.5 days (1-9) vs 4 (3-5), p=0.91. Pneumothorax occured in 1 infants in each group, p=0.86. LMA interface is beyond the scope of this worksheet and hence this study will not be included.


Reviewer's Comments: Randomized control trial. Randomization via sealed, opaque envelope. N=610. Infants 25 to 28 wks gestation. Spontaneously breathing infants in DR randomized to NCPAP (single or binasal cannulae) or endotracheal intubation and PPV. Intervention started at 5 minutes of age. Infants received mask ventilation until 5 minutes of age as needed prior to randomization. NCPAP was started at 8 cm H2O using either a short single or binasal prongs. No difference in BPD. At 36 wks, FiO2 of 30% or more was 'needed' by 9.4% of CPAP group and 8.8% of intubation group (p=0.80). Unadjusted odds ratio for primary outcome of death or BPD for the CPAP group was 0.80
Unadjusted absolute risk reduction was 5% (CI -3 to 13). Non significant difference in mortality. CPAP group had higher rate of pneumothorax - 9.1% vs 3% (p=0.001). Difficult to draw conclusion regarding interface given differences in method of delivering breath and differences in interface. Compared nasal CPAP to intubation, therefore not included in worksheet.


**Reviewer's Comments:** Study of face masks connected to T-piece resuscitator (Neopuff). Bench top study using a manikin where users performed IPPV with PEEP (30/5). Used a size 0/1 Laerdal neonatal mask. Examines effect of using Florian monitor to decrease leak. Found that before using Florian, mean leak was 26.6%(24.3). During Florian use, mean leak was 11.2% (13.1). Then hid monitor again and leak increased by 8.9% again. Study shows that leak associated with face mask interface can be reduced if used in conjunction with a monitor. Did not compare different interfaces therefore not included in review.


**Reviewer's Comments:** Randomized control trial. Not blinded. Randomized using sealed envelopes. Block randomization and stratification for each week of GA. n=207. Infants <33 wks. Compared (A) 10 second sustained inflation (20 cm H2O) via NP tube followed by early nasal CPAP (5-6 cm H2O) versus (B) manual IPPV with self inflating bag via face mask followed by nasal CPAP. PRIMARY outcome - intubation at <72 hours of age. SECONDARY outcome - BPD at 36 wks. Fewer infants were intubated and ventilated in group A (38/104 vs 52/103; OR 0.57 (CI 0.32-0.98). Grp A had fewer infants intubated at <72 hrs, fewer infants receiving >1 dose surfactant, shorter duration of vent support [median days IQR: 2.7 (0.5-10) vs 4.3 (0.5-20); p=0.01], less BPD (22/104 vs 34/103, p=0.05, less mod to severe BPD (9/104 vs 19/103, p=0.04, or 0.41 (0.18-0.96)). Incidence of pneumothoraces[1/104 vs 7/103; OR 0.13 (0.02-1.10)], IVH gr 3 and 4 (7/104 vs 3/103, p=0.3), cystic PVL (2/104 vs 5/103, p=0.4) were not different. This study examined different interventions delivered via different interfaces(sustained inflation via NP tube versus IPPV via face mask. However, it is not possible to comment specifically on the effect of the interface as any differences in outcome were likely due to other factors (sustained inflation vs IPPV). Therefore, study not included in worksheet.


**Reviewer's Comments:** Retrospective study of ENCPAP. n=228. Babies <1500 grams. All infants received either ENCPAP (161/228) via nasal prongs (mentioned only in discussion). 130/161 received CPAP in the DR, 31/161 received CPAP within 24 hours of admission to NICU. Most babies (but not all) had CPAP started in the DR. Infants in the ENCPAP group had a shorter length of stay. Main outcomes included BPD, IVH 3-4, PVL. Compared to benchmark data, infants in study had less BPD (29% vs 17.8%, p=0.001, CI 8-27.6), PVL (4% vs 1.3%, p=0.001, CI -1.2 to 3.8). No difference in IVH grade 3-4 (3% vs 1.8%, CI -4.1 to 7.7). It is not clear if this was the CPAP was used for resuscitation or if CPAP was started AFTER stabilization of the infant, therefore, study not included in worksheet.


**Reviewer's Comments:** Study performed on manikins. 3 devices compared - all used face mask interface. Able to reach target PIP well. Able to achieve good seal. 3 different devices - Neopuff, flow inflating bag with a flow control tailpiece, self-inflating bag with 450 ml volume. ALL 3 DEVICES USED THE SAME INTERFACE - A ROUND, CLEAR, CUSHIONED FACE MASK. Study performed on manikin. All devices able to approximate target mean PIP. For target PIPS of 20 and 40 cm H2O, self inflating bag (sd) 21.0 (1.7) and 39.6 (2.7), flow inflating bag 20.5(1.5) and 39.5(2.0), T piece resuscitator 20.1(0.8) and 38.2(2.1). There were statistically significant differences for these results but, clinically, the differences are negligible. The self inflating bag was not as good as the other 2 devices at approximating a target PEEP of 5 cm H2O (p<0.05)- Self inflating bag 3.6(1.9), flow inflating bag 4.4(1.2), T piece resuscitator 4.4(0.6). These results support the use of face mask during resuscitation as they demonstrate that seal can be established which is sufficient to allow delivery of clinically relevant pressures to the airway. Because all 3 groups used the same interface, this study is not included in the worksheet.

Reviewer's Comments: RCT with factorial design of sustained lung inflation. Compared sustained lung inflation (SLI) of 5 seconds with conventional lung inflation (CLI) of 2 seconds for the first assisted breath. n=52 (26 in each group). Used Laerdal face mask interface for both groups. Study showed no benefit clinically or for markers of lung inflammation at 12 hours of age. Note, 42/52 babies were intubated in the DR. Outcomes for CLI vs SLI were - death 3/26 vs 6/26 p=0.27, BPD10/26 vs 6/26 p=0.36, pneumothorax 1/26 vs 2/26 p=0.55, abnormal cranial ultrasound 7/26 vs 9/26 p=0.54. Same interface (face mask) used for both groups, hence study not included in worksheet.


Reviewer's Comments: In this study, both groups had placement of nasopharyngeal (NP) tube connected to a time-cycled ventilator. Group 1 received sustained inflation x 15 sec and repeated if indicated - with CPAP in between. Group 2 received NIPPV followed by NP CPAP as needed. In both groups, additional NIMV was given as needed for the treatment of apneas AFTER the intervention. Good amount of information presented on complications. n=95. GA 25.0 to 28.9 wks. Randomized using sealed opaque envelopes to sustained inflation via NP tube (Grp 1) or to NIMV via NP tube (Grp 2). Not blinded. Calculated sample size = 110 but study stopped after 61 pts recruited due to slow enrolment. PRIMARY outcome was treatment failure - need for endotracheal intubation within 48 hrs of birth. Grp 1 met failure criteria in 19/31 cases (61%, CI 42-78). Grp 2 met failure criteria in 21/30 cases (70%, CI 51-85). The CI for the difference of 9% was -15% to 33%. There were no significant differences in secondary outcome measures between the groups. These included (Grp 1 vs Grp 2) - survival 28/31 vs 30/30, IVH gr 3 or 4 - 3/31 vs 2/30, PVL 2/31 vs 4/30, air leak 3/31 vs 4/30, days on ventilator 5 days (0-77) vs 7 days (0-70), BPD 4/28 vs 6/30. Authors state that 'with the same inflating pressure as suggested for endotracheal intubation of preterm infants, 72% of our infants with clinical signs of RDS after birth were stabilized without EI/MV in the delivery room’. Both groups had the same interface (NP tube), therefore study not included in worksheet.


Reviewer's Comments: Study performed in manikin. Assessed nature of leak around silicone Laerdal face mask during PPV. Used respiratory monitor to measure volume of gas passing through the resuscitation device and the volume of gas returning from the test lung. Demonstrated leak around face mask most commonly during inflation. Interesting finding was that, on average, 18.3% (10.5) of the delivered volume simply distended the face mask, without entering the airway. This represents a volume of 2.4 (1.4 ml) - used size 0/1 mask for this study. This study assessed 1 interface (Laerdol face mask) and hence is not included in worksheet.


Reviewer's Comments: Compares LMA to facemask with PPV via bagging unit. Some useful information presented regarding the facemask group. n=50. All babies delivered by cesarean and all required active resuscitation. Random assignment (how?) to 2 groups. Unblinded. Grp 1 - n=25, resuscitated with laryngeal airway. Grp 2 - n=25, resuscitated with face mask connected to Mapleson F circuit. 3/25 infants in Grp 2 could not be effectively ventilated with face mask and 2 were intubated, 1 had LMA placed (cleft lip and palate). No inferential statistics reported - just descriptive results. Result reported (Grp 1 vs Grp 2) - Success of ventilation 96% vs 88%, pink up time 33.33 sec vs 44.52 sec, 5 min Apgar mean (range) 8.8 (6-10) vs 8.8 (7-10), total duration of PPV mean (range) - 1.76 min (40 sec - 10 min) vs 2.14 min (40 sec - 12 min), tracheal intubation - 1 vs 2+1, gastric distention 3 vs 7, Pmax 12 cm H2O vs 22 cm H2O. This study compared facemask interface to LMA. Without inferential statistics, it is difficult to arrive at a meaningful conclusion, hence this study will not be included.


Reviewer's Comments: RCT (central randomization). Not blinded. Compared DR CPAP/PEEP (PEEP 5) vs IMV/No PEEP (PIP 15 to 25, PEEP 0). Used facemask interface unless met intubation criteria. RCT. n=104. Infants <28 wks GA. Randomized to CPAP or no positive end expiratory pressure in DR. 4/43 infants <700g and 3/37 infants <25 wks were successfully resuscitated with CPAP alone. 80% were intubated within 7 days of birth. CPAP use in DR did not decrease need for subsequent intubation. Good study. Difficult to extract specific meaningful information related to effect of interface. Therefore, study not included in worksheet.

**Reviewer's Comments:** Retrospective cohort study. Compared immediate intubation versus CPAP via NP tube. Intervention started in the DR. n=123. ELBW population (<1000 g). Studies 2 different epoques. In 1994, ELBW infants were intubated immediately after receiving bag/mask ventilation (n=56). Policy changed in 1996 so that ELBW infants received a sustained inflation manoeuvre (15 to 20 seconds of 20 to 25 cm H2O) via a nasopharyngeal tube and a mechanical ventilator, followed by CPAP (n=67). Mouth and other nostril were closed during manoeuvre. PRIMARY outcome - rate of intubation until time of discharge. Rate of intubation in the delivery room decreased from 84% to 40% (p<0.01) and rate of intubation at any time decreased from 93% to 75% (p<0.01). SECONDARY outcomes - no difference in mortality (1994 - 15/56, 1996 - 15/67), less IVH > grade 2 (1994 - 21/56, 1996 - 11/67, p<0.01), BPD (1994 - 13/56, 1996 - 6/67, p<0.05), shorter hospital stay (1994 - 102 +/- 27, 1996 - 91 +/- 36, p<0.05), higher PaCO2, lower pH. No difference in pneumothorax (1994 - 13/56, 1996 - 9/67), gastric distention. Not included in worksheet because unable to determine any effect attributable to the interface.


**Reviewer's Comments:** Case report of 3 infants that developed pneumomediastinum after receiving IPPV using a face mask during resuscitation. All were term/post-term AGA infants that received PPV via Elder CPR/demand valve (pressure limited to 40 cm H2O). Not included in worksheet.


**Reviewer's Comments:** Observational study. n=28. Variable gestational ages - 5 were full term, 8 had GA 32-36 wks, 17 had GA 27-31 wks. Study intervention lasted 5 minutes. All received 50% oxygen. Infants all resuscitated with face mask and Laerdal 500 ml Infant Resuscitator - 2 needed subsequent intubation. VCO2 lower in babies receiving IPPV than in spontaneously breathing infants (historical controls). Two thirds of the mask ventilated infants established regular spontaneous respirations within 5 minutes, 29/30 within 10 minutes of birth. For GA 27-31 wks, VCO2 was below 4 mg/kg/min and increased significantly from the first to the fifth minute (p<0.05). For 32-36 wks, VCO2 was lower than in spontaneously breathing neonates during the second (p<0.05), third (p<0.01) and fourth (p<0.01) minutes but not during the fifth minute. In term infants, the VCO2 did not differ significantly from spontaneously breathing term infants over the 5 minutes. All infants had same face mask interface and hence, this study is not included in worksheet.


**Reviewer's Comments:** Reports on pressures needed to open the esophagus during IPPV delivered via face mask. n=9 asphyxiated babies and 4 stillborn babies. Used modified Laerdal bag with pressure-limiting blow-off valve to provide face mask resuscitation (face mask has soft rubber rim). Authors state that rate of gastric distention is higher during CPAP because infants are actively swallowing air (this is merely the authors expert opinion and is not based on study findings). Highest pressure at which air failed to enter the esophagus was 78 cm H2O in the liveborn babies. In the liveborn babies, air did not enter the esophagus until a mean PIP exceeding 54 cm H2O. Once air entered the esophagus, subsequent entry of air into esophagus occurred at lower pressure. Indicates that air is unlikely to enter stomach when using ‘normal’ pressures during resuscitation with a face mask. Study included 1 interface (facemask) and hence will not be included in worksheet.

**Reviewed References Not Meeting Inclusion Criteria**


**Reviewer's Comments:** letter to the editor.

   **Reviewer's Comments:** Questionaire re delivery room practices. Includes data from Ireland and USA. Shows self-inflating bags, flow-inflating bags and T-piece resuscitators all used. NO INFORMATION REGARDING INTERFACE.


   **Reviewer's Comments:** Study of adult patients.


   **Reviewer's Comments:** Review article. No references to resuscitation.

5. De Paoli, A. G., Davis, P. G., Faber, B., and Morley, C. J. Devices and pressure sources for administration of nasal continuous positive airway pressure (NCPAP) in preterm neonates. 2008. 1: CD002977-

   **Reviewer's Comments:** Does not address issue of interface. States that insufficient data exists to include analysis of CPAP use in resuscitation.


   **Reviewer's Comments:** Letter.


   **Reviewer's Comments:** Review article.


   **Reviewer's Comments:** Review article. Expert opinion of authors recommends use of T-piece via mask or nasal prongs during resuscitation.


   **Reviewer's Comments:** Protocol only.


    **Reviewer's Comments:** Protocol only.


   **Reviewer's Comments:** Short letter (alert) referring to COIN trial.


   **Reviewer's Comments:** Review article.


   **Reviewer's Comments:** Study of educational intervention to reduce mask leak while using Neopuff on manikin. No clinical outcomes.


   **Reviewer's Comments:** Review article.

»Reviewer's Comments: Short report comparing 3 CPAP devices for WEANING from IMV.


»Reviewer's Comments: Survey of resuscitation practices in low-resource settings. No information on interface.


»Reviewer's Comments: No information regarding CPAP, PPV. Study only presents data related to the provision of free-flow oxygen.

18. Frazier, M. D. and Werthammer, J. Post-resuscitation complications in term neonates. 2007. 27; 2: 82-84.

»Reviewer's Comments: No information relating to interface and no details of PPV. Report 2 cases of pneumothorax (1 in a child with meconium aspiration). Most 'complications' not likely related to interface (eg, hypoglycemia, hypermagnesemia).


»Reviewer's Comments: Not a DR study. Excluded infants requiring intubation in DR. Timeline for starting NIMV vs NCPAP not clear but appears to be immediately upon reaching NICU.

20. Lagercrantz, H. Does CPAP work when it really matters? 2007. 96; 4: 481-

»Reviewer's Comments: Commentary.


»Reviewer's Comments: Observational study. Sustained inflation vs IPPV - both via NP tube. Difficult to interpret as 3 groups were fundamentally different.


»Reviewer's Comments: Letter.


»Reviewer's Comments: Exclusive LMA interface outside of scope of question.

24. Turkbay, D., Dilmen, U., and Altug, N. Pneumopericardium in a term infant on nasal continuous positive airway pressure. 2007. 92; 3: F168-

»Reviewer's Comments: Case report. Air leak occurred on 2nd day of life. Infant not noted to have received PPV in DR.


»Reviewer's Comments: CPAP not started until admission to NICU.


»Reviewer's Comments: Review article. No discussion of interface.

   »Reviewer's Comments: Review of different interfaces. Not specific to resuscitation. Non referenced opinion 1 - disadvantage of the single nostril prong is the leak of pressure out of the opposite nostril and obstruction of prong with mucus. Non referenced opinion 2 - appropriate fit for binasal prongs is essential for success. Non referenced opinion 3 - nasal masks cause less trauma to the nose internally than other nasal interfaces but can be hard to maintain a seal and can cause nasal airway obstruction. Non referenced opinion 4 - Nasal canulalae are less traumatic to the nose. Non referenced opinion 5 - all nasal devices are limited in that pressure is lost if the mouth is not closed.


   »Reviewer's Comments: Excellent review article. Get following references 24,25,26,27,28,29,57,71.


   »Reviewer's Comments: Review article (in French).


   »Reviewer's Comments: No information provided regarding interface.


   »Reviewer's Comments: Excellent review paper. Specifically addresses face masks (p 67). Get references 20,22,24,61.


   »Reviewer's Comments: Retrospective study of ENCAP use in DR. Addressed use of CPAP applied via face mask in DR. No specific information on interface.


   »Reviewer's Comments: Letter to the editor. Short report about weaning CPAP.


   »Reviewer's Comments: Review article (French). Does not address issue of INTERFACE.


   »Reviewer's Comments: Not a delivery room study.


   »Reviewer's Comments: No studies identified that compared LMA to bag/mask ventilation.


   »Reviewer's Comments: Does not address question of interface other than to show smaller leak at face mask/Laerdol bag when used with manometer.

   »Reviewer's Comments: No information related to INTERFACE.


   »Reviewer's Comments: Not a resuscitation study.


   »Reviewer's Comments: Study performed in intubated lambs.


   »Reviewer's Comments: Does not include data on resuscitation.


   »Reviewer's Comments: Review article. Does not present information regarding INTERFACE.


   »Reviewer's Comments: Review article. Does not address resuscitation.


   »Reviewer's Comments: All manikins intubated. Does not address issue of non-invasive interface.


   »Reviewer's Comments: Compared 2 methods of generating CPAP in this bench top study. Did not address interface. Both devices used a nasal canula.


   »Reviewer's Comments: Review article. No references specifically related to resuscitation.


   »Reviewer's Comments: Review article. No information regarding INTERFACE.


   »Reviewer's Comments: No studies identified in meta-analysis.


   »Reviewer's Comments: Protocol only.


   »Reviewer's Comments: Lamb study. All lambs intubated.

Reviewer's Comments: **CPAP not started until after resuscitation.**

52. Tracy, M., Downe, L., and Holberton, J. How safe is intermittent positive pressure ventilation in preterm babies ventilated from delivery to newborn intensive care unit? 2004. 89; 1: F84-F87.

Reviewer's Comments: **All babies intubated. No data on type of interface.**


Reviewer's Comments: **Questionaire on LMA use. Does not present outcome data. No information regarding different INTERFACES.**


Reviewer's Comments: **Studied only intubated, anaesthetized lambs.**


Reviewer's Comments: **Review article.**


Reviewer's Comments: **Review article (in Spanish).**


Reviewer's Comments: **Describes methods of delivering 'free flow' oxygen only.**


Reviewer's Comments: **Study of continuous distending pressure started outside the DR. All infants had signs of RDS (radiologic, PaO2 criteria).**


Reviewer's Comments: **Study of asphyxiated babies resuscitated with either bag and mask or bag and ETT. Unfortunately, analysis does not stratify by the INTERFACE used during resuscitation. Cohort of babies born between 1969 and 1978.**


Reviewer's Comments: **Review article. Does not address use during resuscitation.**


Reviewer's Comments: **Editorial.**

Reviewer's Comments: Study of 2 different bags vs Neopuff. No data presented regarding interface.


Reviewer's Comments: Not a resuscitation study.

64. Milner, A. The importance of ventilation to effective resuscitation in the term and preterm infant. 2001. 6; 3: 219-224.

Reviewer's Comments: Good review article of basic physiology as it relates to establishing FRC by different methods.


Reviewer's Comments: Case report of retinal hemorrhages following chest compressions. Baby intubated at birth.


Reviewer's Comments: Bench top study. Did not address issue of interface.


Reviewer's Comments: Study only includes LMA use. No infants received CPAP or face mask interface.


Reviewer's Comments: Review article.


Reviewer's Comments: No discussion of interface.


Reviewer's Comments: Not a delivery room study. However, compared 2 interfaces for delivering nasal CPAP (infant flow driver which uses two 6 mm long cannulae versus single prong nasal cannula). Study of physiologic effects.


Reviewer's Comments: Review article.


Reviewer's Comments: Study of adult patients with chronic lung disease. (In French).

Reviewer's Comments: Compares mouth to mask ventilation with bag and mask ventilation for 3 different devices.


Reviewer's Comments: Does not address issue of airway interface.


Reviewer's Comments: All babies were intubated.


Reviewer's Comments: All babies were intubated.

78. WILSON, M. G. and ROSCOE, S. N. Resuscitation of newborn premature infants; a clinical study of the use of positive pressure respiration. 1958. 88; 4: 312-315.

Reviewer's Comments: Study is from 1958. Used 'hand' resuscitation with face mask compared to standard resuscitation. Study too old to be applicable today (no steroids, no surfactant, etc.).