Septiembre – Noviembre

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Un Nuevo Concepto en Medicina Perinatal

Neo Red

Comparison of the management recommendations of the Kaiser Permanente neonatal early-onset sepsis risk calculator (SRC) with NICE guideline CG149 in infants ≥34 weeks' gestation who developed EOS

- **Método:** retrospectivo, 5 centros Inglaterra y Gales. Aplicación virtual de ambas guías (NICE vs SRC) en 70 RN ≥34 con sepsis precoz confirmada por cultivos (HC o LCR) y tratada al menos 5 días con ATB.

- Se excluyen CoNS (contaminación).

- **Outcome:** número de RN en los que se recomienda usar ATB antes de las 4 horas de vida.

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Indicaciones para screening y tratamiento de EOS (NICE 2012)

Factores de riesgo materno para EOS

'Red Flags'
Parenteral antibiotic treatment given to the woman for confirmed or suspected invasive bacterial infection (such as septicaemia) at any time during labour, or in the 24-hour periods before and after the birth [This does not refer to intrapartum antibiotic prophylaxis]
Suspected or confirmed infection in another baby in the case of a multiple pregnancy
'Non-Red Flags'
Invasive group B streptococcal infection in a previous baby
Maternal group B streptococcal colonisation, bacteriuria or infection in the current pregnancy
Prelabour rupture of membranes
Preterm birth following spontaneous labour (before 37 weeks' gestation)
Suspected or confirmed rupture of membranes for more than 18 hours in a preterm birth
Intrapartum fever higher than 38°C, or confirmed or suspected chorioamnionitis

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Indicadores clínicos en RN

'Red Flags'	
Respiratory distress starting more than 4 hours after birth	
Seizures	
Need for mechanical ventilation in a term baby	
Signs of shock	
'Non-Red Flags'	
Altered behaviour or responsiveness	Need for cardio–pulmonary resuscitation
Altered muscle tone (for example, floppiness)	Need for mechanical ventilation in a preterm baby
Feeding difficulties (for example, feed refusal)	Persistent fetal circulation (persistent pulmonary hypertension)
Feed intolerance, including vomiting, excessive gastric aspirates and abdominal distension	Temperature abnormality (lower than 36°C or higher than 38°C) unexplained by environmental factors
Abnormal heart rate (bradycardia or tachycardia)	Unexplained excessive bleeding, thrombocytopenia, or abnormal coagulation (INR greater than 2.0)
Signs of respiratory distress	Oliguria persisting beyond 24 hours after birth
Hypoxia (for example, central cyanosis or reduced oxygen saturation level)	Altered glucose homeostasis (hypoglycaemia or hyperglycaemia)
Jaundice within 24 hours of birth	Metabolic acidosis (base deficit of ≥ 10 mmol/litre)
Apnoea	Local signs of infection (for example, affecting the skin or eye)
Signs of neonatal encephalopathy	

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Indicaciones para screening y tratamiento de EOS (NICE 2012)

- Factores de riesgo maternos:
  - 2 non-red flags
  - 1 red flag
- Indicadores clínicos en RN:
  - 2 non-red flags
  - 1 red flag

* RN sin red flags y sólo 1 FR materno o indicador clínico, uso de juicio clínico y considerar:

- No iniciar ATB
- Monitorizar SV y condición clínica al menos por 12 horas (0, 1h y 2h, luego cada 2h)

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Sepsis Risk Calculator (2018)

Predictor	Scenario
Incidence of Early-Onset Sepsis	
Gestational age	weeks / days
Highest maternal antepartum temperature	Fahrenheit
ROM (Hours)	
Maternal GBS status	Negative / Positive / Unknown
Type of intrapartum antibiotics	Broad spectrum antibiotics > 4 hrs prior to birth / Broad spectrum antibiotics 2-3.9 hrs prior to birth / GBS specific antibiotics > 2 hrs prior to birth / No antibiotics or any antibiotics < 2 hrs prior to birth

Calculate » Clear

Risk per 1000/births	
EOS Risk @ Birth	

EOS Risk after Clinical Exam	Risk per 1000/births	Clinical Recommendation	Vitals
Well Appearing			
Equivocal			
Clinical Illness			

Classification of Infant's Clinical Presentation Clinical Illness Equivocal Well Appearing

Sepsis Risk Calculator (2018)

Clinical Exam	Description
Clinical Illness	1. Persistent need for NCPAP / HFNC / mechanical ventilation (outside of the delivery room) 2. Hemodynamic instability requiring vasoactive drugs 3. Neonatal encephalopathy /Perinatal depression ▪ Seizure ▪ Apgar Score @ 5 minutes < 5 4. Need for supplemental O_2 ≥ 2 hours to maintain oxygen saturations > 90% (outside of the delivery room)
Equivocal	1. Persistent physiologic abnormality ≥ 4 hrs ▪ Tachycardia (HR ≥ 160) ▪ Tachypnea (RR ≥ 60) ▪ Temperature instability (≥ 100.4˚F or < 97.5˚F) ▪ Respiratory distress (grunting, flaring, or retracting) not requiring supplemental O_2 2. Two or more physiologic abnormalities lasting for ≥ 2 hrs ▪ Tachycardia (HR ≥ 160) ▪ Tachypnea (RR ≥ 60) ▪ Temperature instability (≥ 100.4˚F or < 97.5˚F) ▪ Respiratory distress (grunting, flaring, or retracting) not requiring supplemental O_2 Note: abnormality can be intermittent
Well Appearing	No persistent physiologic abnormalities

Table 1 Incidence of early-onset sepsis in babies born ≥34 weeks' gestation

Centre	Cases of EOS ≥34+0 gestation (n)	Total births ≥34+0 gestation during study period per unit	Incidence per 1000 births	Study period	Background incidence used in calculator
Swansea	19	25 930	0.7	2008–2017	0.6*
Bath	18	46 859	0.4	2008–2016	0.5
Exeter	12	30 447	0.4	2009–2016	0.5
Cornwall	19	31 061	0.6	2010–2016	0.6
Glan Clwyd	4	8036	0.5	2015–2017	0.5
Total	72	142 333	0.5		

*At time of study the highest background incidence available to use on sepsis risk calculator (SRC) was 0.6, but higher rates are now available.
EOS, early-onset sepsis.

Table 2 Organisms identified

Organism	n
Group B *Streptococcus*	63 (1 later excluded)
Escherichia coli	2
Streptococcus mitis	2
Haemophilus influenzae	1
Staphylococcus aureus	2 (1 later excluded)
Streptococcus anginosus	1
Streptococcus viridans	1
Total	72 (2 later excluded)

Table 3 Infant characteristics

	All infants	Treated by NICE	Treated by SRC	Untreated by 4 hours
	Total 70	Total 39 55.7%	Total 27 38.6%	Total 31 44.3%
	n (%)	n (%)	n (%)	n (%)
Gestation ≥34 to <37 weeks (n)	9 (12.9%)	6 (15.4%)	4 (14.8%)	3 (9.7%)
Maternal temperature ≥38°C (n)	10 (14.3%)	10 (25.6%)	4 (14.8%)	0
Mean ROM (hours)	23	29	24	15
ROM ≥24 hours (n)	24 (34.3%)	19 (48.8%)	9 (33.3%)	6 (19.4%)
Maternal GBS (n) status by 4 hours				
Negative	6 (8.6%)	1 (2.6%)	1 (3.7%)	5 (16.1%)
Positive	4 (5.7%)	4 (10.3%)	0	0
Unknown	60 (85.7%)	34 (87.2%)	26 (96.3%)	26 (83.9%)
Intrapartum antibiotics (n)				
Broad spectrum >4 hours prior to birth	2 (2.9%)	2 (5.1%)	0	0
Broad spectrum 2–3.9 hours prior to birth	6 (8.6%)	6 (15.4%)	2 (7.4%)	0
GBS specific >2 hours prior to birth	4 (5.7%)	4 (10.3%)	2 (7.4%)	0
None or <2 hours prior to birth	58 (82.9%)	27 (69.2%)	23 (85.2%)	31 (100%)
≥1 NICE red flag (n)	29 (41.4%)	29 (74.4%)	25 (92.6%)	0
1 NICE risk factor (n)	30 (42.9%)	19 (48.7%)	17 (63%)	11 (35.5%)
≥2 NICE risk factors (n)	18 (25.7%)	18 (46.2%)	8 (29.6%)	0
None of the above	20 (28.6%)	0	0	20 (64.5%)

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Table 3 Infant characteristics

	All infants	Treated by NICE	Treated by SRC	Untreated by 4 hours
	Total 70	Total 39	Total 27	Total 31
	n (%)	n (%)	n (%)	n (%)
Clinical illness category to 4 hours (n)				
Well	43 (61.4%)	13 (33.3%)	1 (3.7%)	30 (96.8%)
Equivocal	1 (1.4%)	0	0	1 (3.2%)
Unwell	26 (37.2%)	26 (66.7%)	26 (96.3)	0
CRP in the first 4 hours				
Number of values	41 (58.6%)	38 (97.4%)	26 (96.3)	3 (9.7%)
Mean	11.8	12.4	13	4
Median (range)	3 (0.1–64)	3 (0.1–64)	2.1 (0.1–64)	3 (1–8)
CRP>10 (n)	13 (18.6%)	13 (33.3%)	9 (33.3%)	0()
Max CRP				
Number of values	68 (97.1%)	38 (97.4%)	26 (96.3%)	30 (96.8%)
Mean	79.2	61.5	72	103.1
Median (range)	61.5 (3–300)	52 (3–154)	61.5 (10–154)	85 (4–300)
CRP>10 (n)	60 (85.7%)	33 (84.6%)	25 (92.6%)	27 (87.1%)

Conclusiones

- 81% de los RN con EOS comprobada presentó síntomas dentro de las primeras 24h.
- Antes de las cuatro horas ambas guías son malos predictores de sepsis para al menos 2/3 de los RN.
- Más pacientes serían identificados con la guía NICE (17.1%).

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Basic principles of neonatal bubble CPAP: effects on CPAP delivery and imposed work of breathing when altering the original design

- **Objetivo:** evaluar efectos de cambios en modelo original de bCPAP (1) resistencia interfase nasal, (2) volumen de espacio muerto, (3) diámetro/resistencia de rama exhalatoria.

- **Método:** modelo de pulmón mecánico, medición de PEEP entregado y trabajo respiratorio impuesto.

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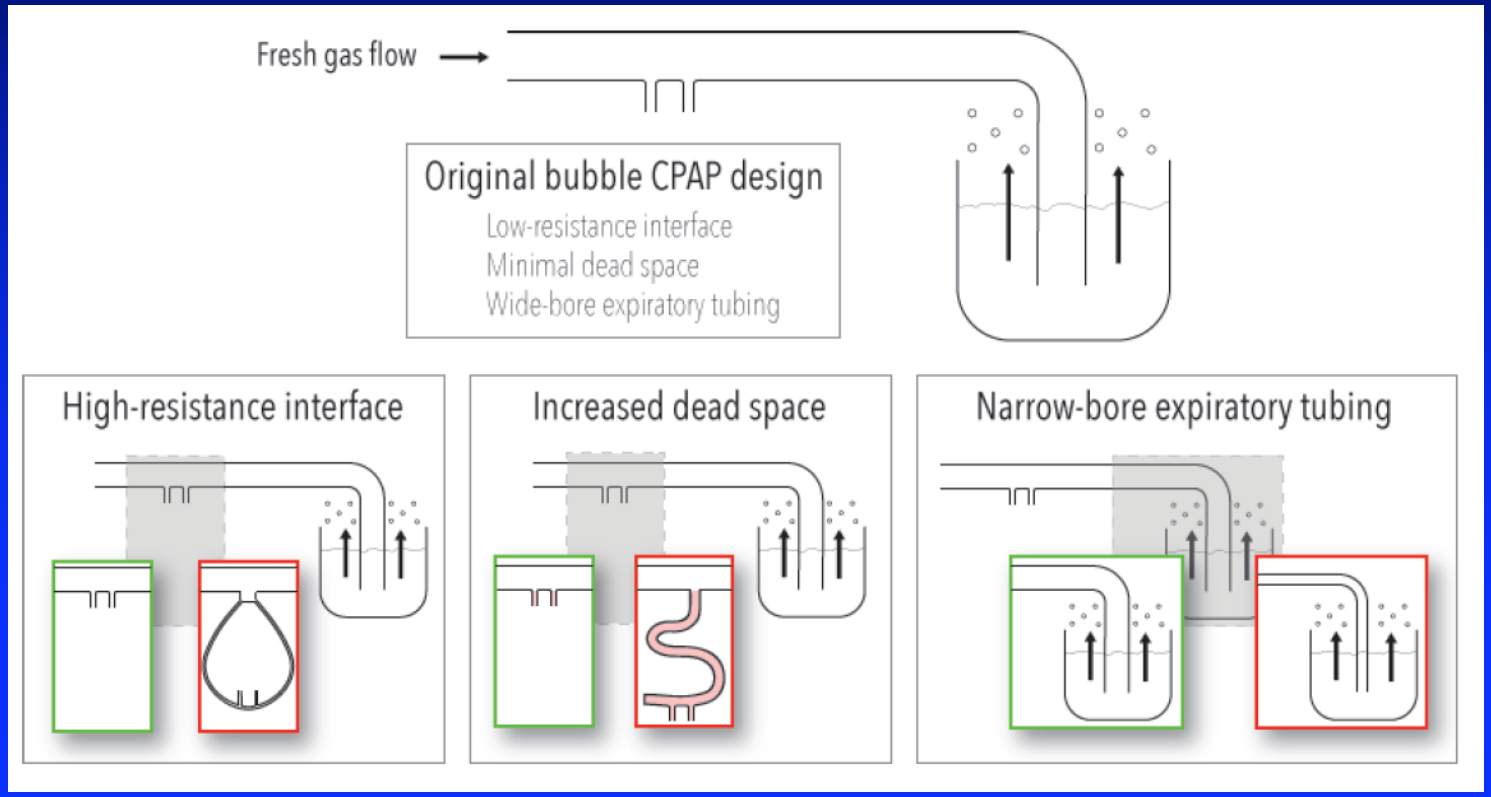
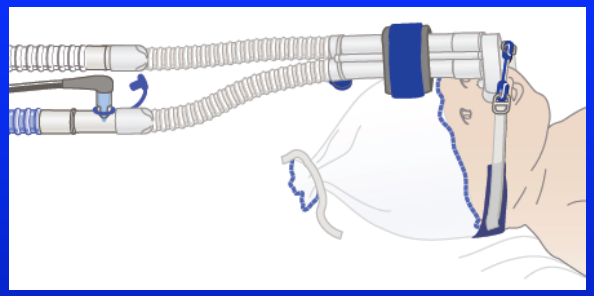
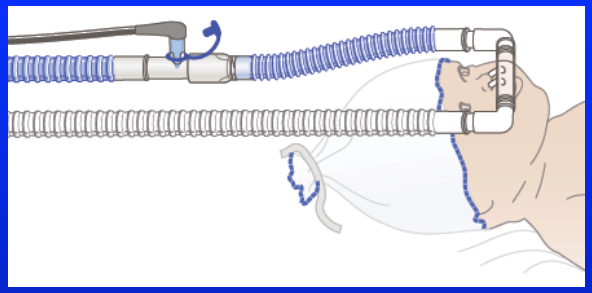
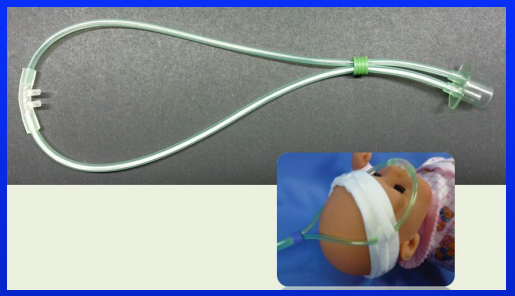
Table 1 bCPAP design variations

	Interface resistance	Dead space	Expiratory tubing resistance	Comment
Sahni and Wung[5]	Low	Low	Low	Used in several trials and manuscripts; Fisher & Paykel bCPAP has a similar design
Audu *et al*[8]	High	Low	High	Description of modified oxygen cannula (figures 1–3) later used in clinical trial
Brown *et al*[31]	Low	High	Low*	Description of the first version of the Pumani CPAP (figure 1)
Daga *et al*[9]	High	Low	High	Clinical trial using modified oxygen cannula with seal (figures 1–5)
Duke†[10]	High	Low	High	Review including modified oxygen cannula (figures 2 and 3). Other designs: original bCPAP (figure 1) and high-resistance interface (RAM type, figure 5).
Kawaza *et al*[32]	Low	High	Low*	Clinical trial including Pumani first version, reference to Brown *et al*
Chisti *et al*†[11]	High	Low	High	Randomised trial including modified oxygen cannula, reference to Duke
McAdams *et al*[23]	High	Low	Unknown	Case series and description of bCPAP with high-resistance interface (RAM type) (figure 2)
Ezenwa *et al*[12]	High	Low	High	Retrospective observational study using modified oxygen cannula (figures 1 and 2)
WHO†[13]	High	Low	High	Manual including modified oxygen cannula (figures 15 and 16). Other designs: original CPAP (figure 14).
Bennett *et al*[33]	High	High	Low*	Description of a bCPAP system with a high-resistance interface (RAM type) and connector tube similar to Brown *et al* (figure 1)
Falk *et al*[30]	Low	Low	High	Description of the second version of the Pumani CPAP (figure 2)
Bjorklund *et al*[39]	High	Low	High	Clinical trial using modified oxygen cannula with seal (figure 1)
Thaddanee *et al*[14]	High	Unknown	High	Observational trial and description of two modified oxygen cannula systems (figures 1 and 2).
Amadi *et al*[15]	High	Low	High	Observational trial and description of modified oxygen cannula systems (figure 1)

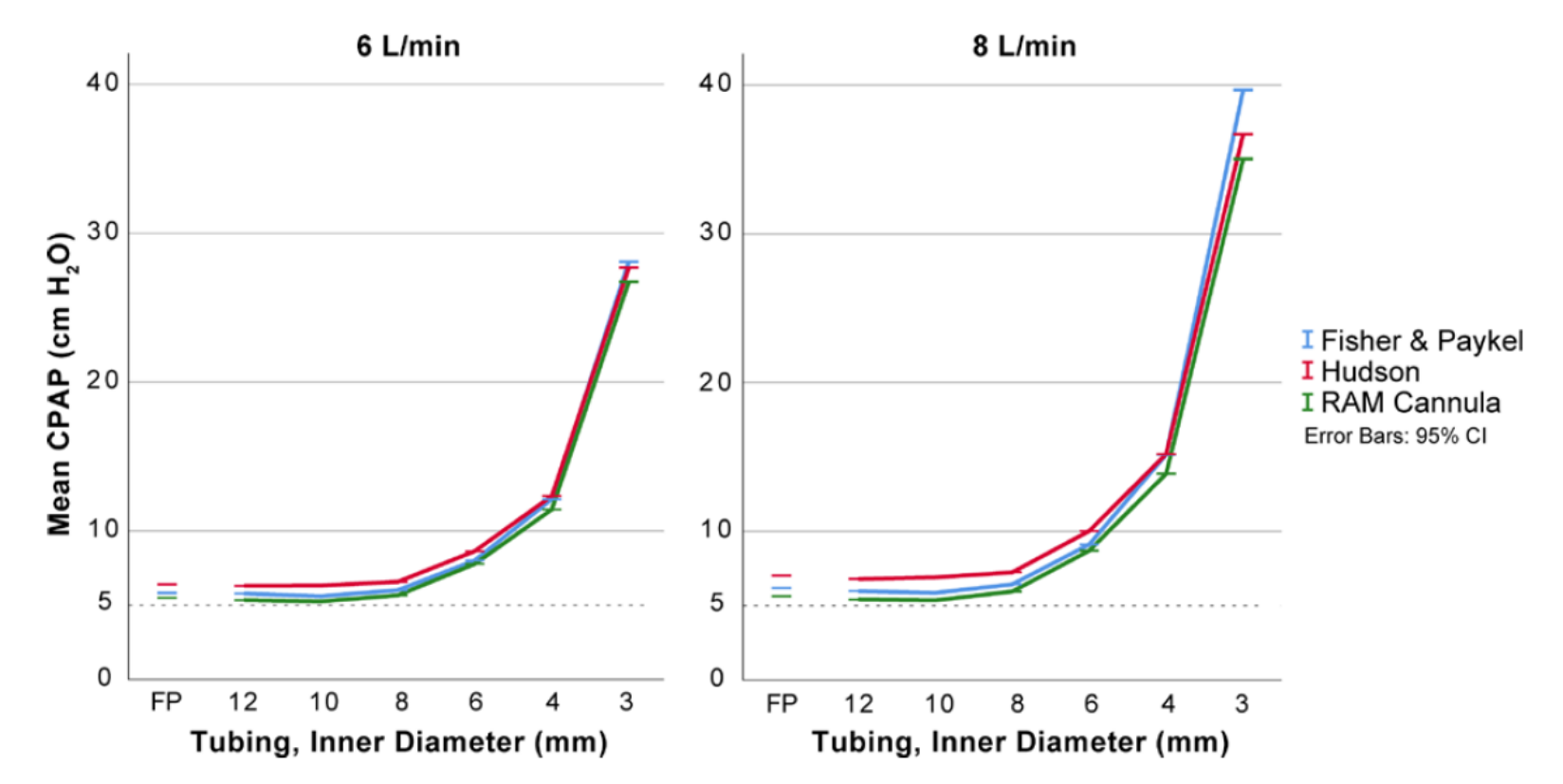

Fresh gas flow
Original bubble CPAP design
Low-resistance interface
Minimal dead space
Wide-bore expiratory tubing
High-resistance interface
Increased dead space
Narrow-bore expiratory tubing



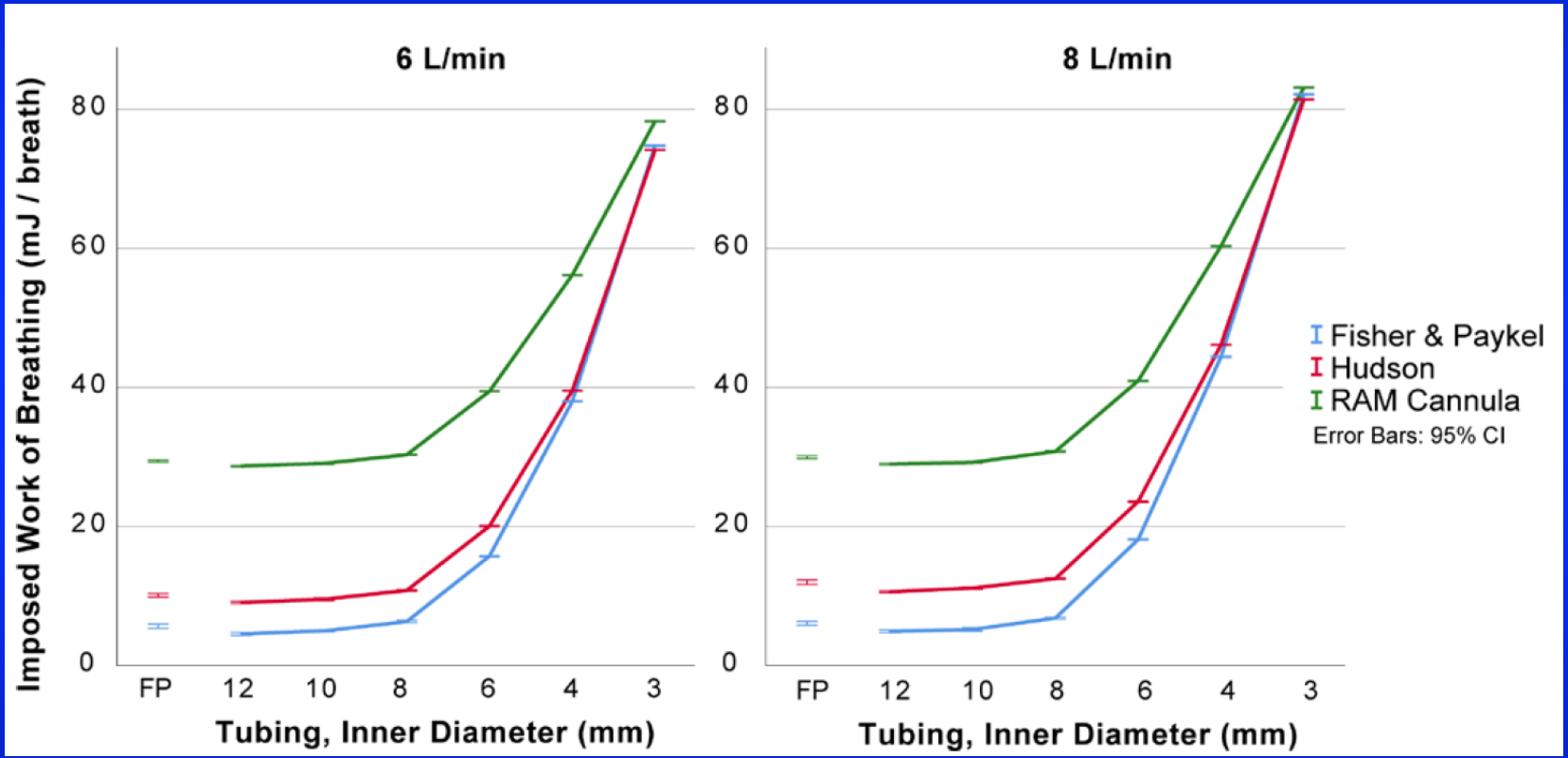




PEEP entregado



Trabajo Respiratorio



Conclusiones

- Cánula corta y máscara nasal son las interfases recomendadas.
- Cánula RAM no está aprobado por FDA, uso off-label.
- Uso de cánula RAM con sello completo de narinas y boca provoca resistencia muy alta.

The practice of blood volume submitted for culture in a neonatal intensive care unit

- Volumen óptimo para hemocultivo:
  - 1 ml
  - BD BACTEC 1-3 ml
  - < 0.5 ml sensibilidad desconocida

- **Objetivo:** evaluar impacto de QI para mejorar volumen de sangre de hemocultivo e identificar factores que determinan muestran subóptimas.

- **Método:** peso de frasco de HC pre y post inoculación de sangre.

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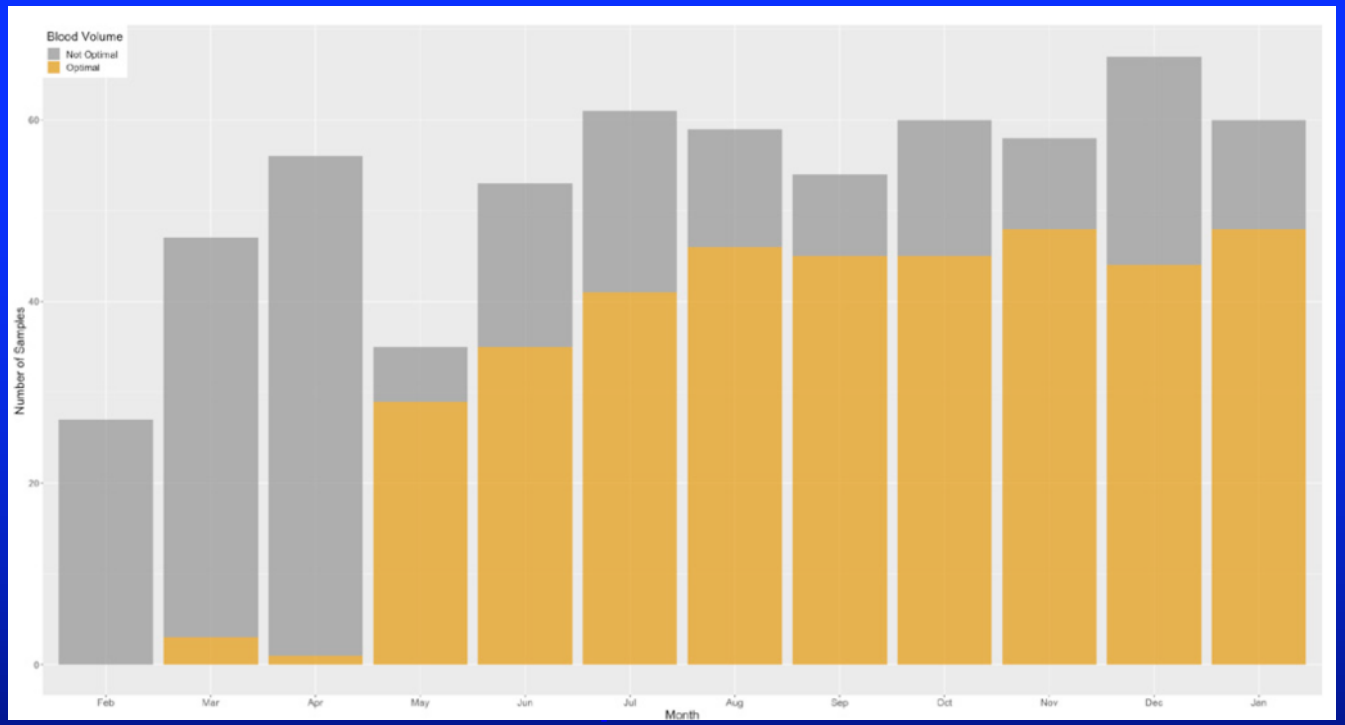
- 637 muestras (130 pre-intervención y 507 post intervención).
- Previo a intervención el 3.1% de los HC tenía volumen óptimo, mediana (IQR) 0.36 (0.23) mL.
- Post intervención el 75% de los HC tiene volumen óptimo, mediana (IQR) 0.9 (0.27) mL.
    - 93.2% de muestras subóptimas fue debido a dificultad para refluir catéter.



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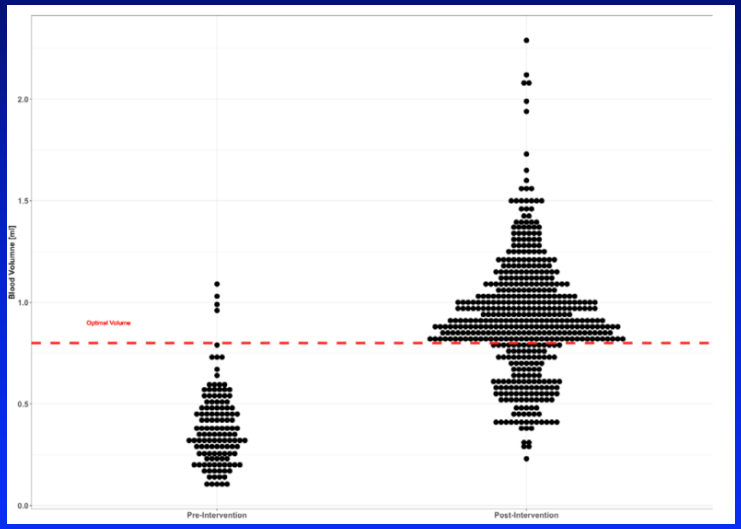
Blood Volume [ml]
2.0
1.5
1.0
0.5
0.0
Optimal Volume
Pre-Intervention
Post-Intervention

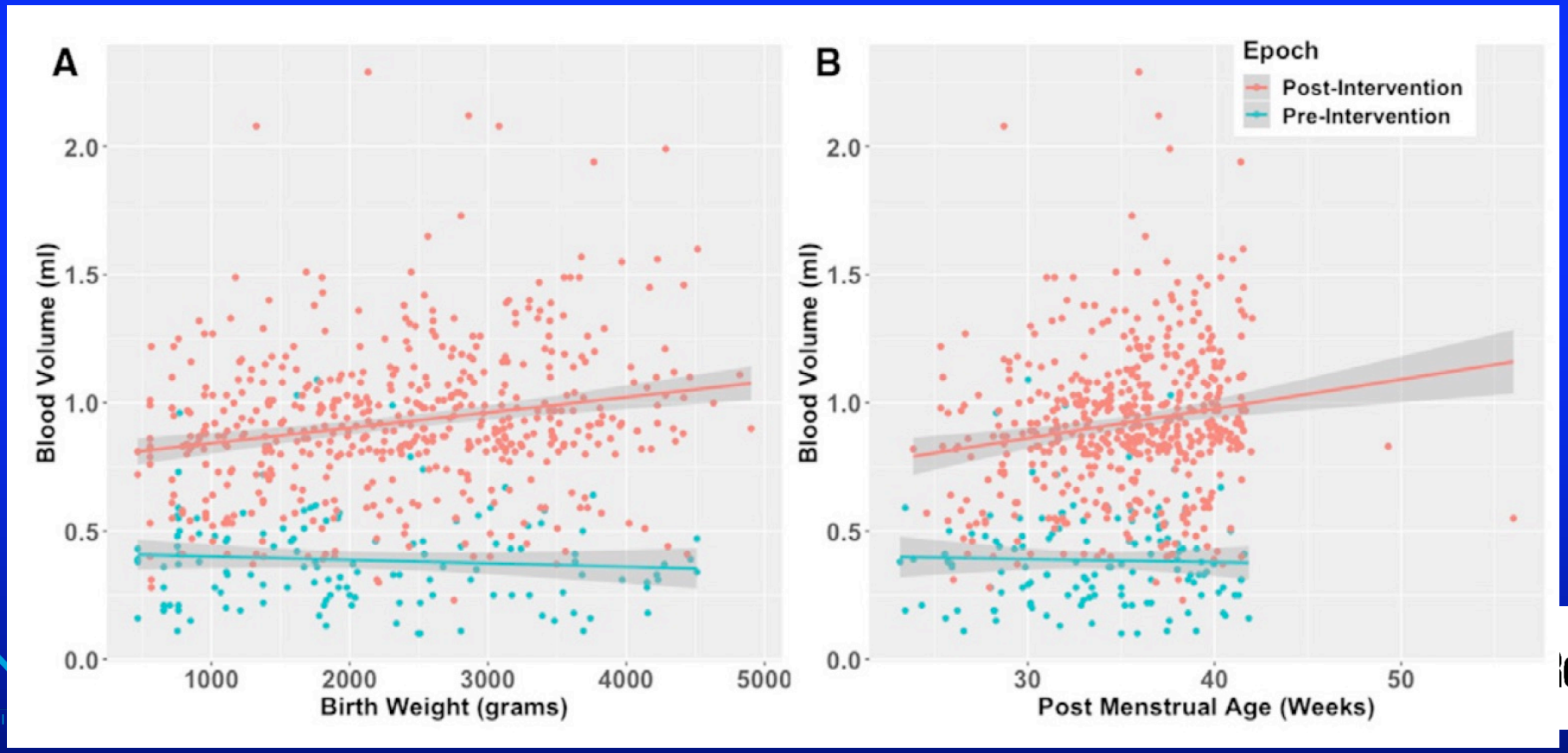
A
Blood Volume (ml)
2.0
1.5
1.0
0.5
0.0
1000
2000
3000
4000
5000
Birth Weight (grams)
B
Epoch
Post-Intervention
Pre-Intervention
Blood Volume (ml)
2.0
1.5
1.0
0.5
0.0
30
40
50
Post Menstrual Age (Weeks)

Table 2 Proportion of positivity with optimal and suboptimal blood volume

Nature of organism	Optimal volume (n=385)	Suboptimal volume (n=252)	P value
Pathogen	21/385=5.5%	11/252=4.4%	0.54
Contaminant	2/385=0.5%	8/252=3.2%	0.008

Total number of cultures 637.

¿Relación entre volumen subóptimo y contaminación de la muestra?

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