

FETAL AND NEONATAL

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Duration of and trends in respiratory support among extremely preterm infants

- **Objetivo:** estimar duración y tendencia de apoyo respiratorio y mortalidad en PT < 28s.
- **Método:** retrospectivo, 31 centros de CNN, PT 23+0 a 27+6, que ingresan a NICU 2010-2017.
- **Exclusión:** sin soporte con PP, alta previo a weaning de SPP o 34s (paliativos o error de registro).
- **Outcomes:**
 - Tiempo hasta 1° extubación exitosa (7 días).
 - Tiempo hasta extubación exitosa definitiva.
 - Tiempo de retiro de todo SPP (7 días).
 - Tiempo de retiro de todo apoyo ventilatorio.

Infants born at gestational age 23⁺⁰ to 27⁺⁶ weeks
admitted to a Canadian Neonatal Network neonatal intensive
care unit (2010-2017)
n = 9,678

Excluded (n = 797)

- ◆ Major congenital anomaly (n = 350)
- ◆ Birthdate missing (n = 25)
- ◆ Discharge date missing (n = 27)
- ◆ Discharged home prior to corrected gestational age > 34 weeks (n = 16)
- ◆ Total hospital stay > 8 months (n = 39)
- ◆ Discharged home while on ventilation (n = 26)
- ◆ Admitted after the 3rd day of life (n = 259)
- ◆ Never on any respiratory support (n = 55)

GA	Survived	Died	Total
23	2	11	13
24	1	12	13
25	4	8	12
26	6	1	7
27	8	2	10
Total	21	34	55

Infants included in the study

n = 8,881

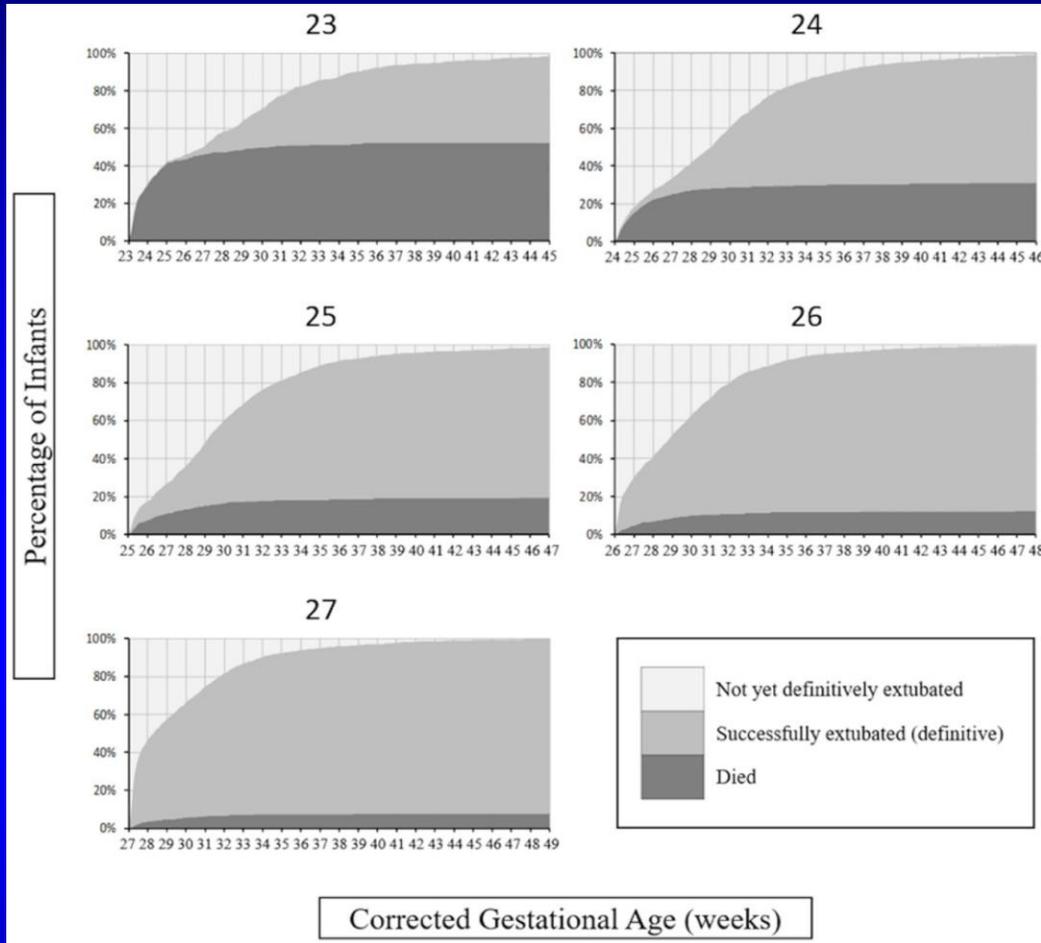
Supplementary Table S3. Antenatal and Perinatal Characteristics of Study Infants

		All (includes infants who received any form of positive pressure support) (n = 8,881)	Only infants who received endotracheal ventilation (n = 7,788) 88%
GA at birth, No. (%)	23 weeks	638 (7%)	636 (8%)
	24 weeks	1432 (16%)	1413 (18%)
	25 weeks	1959 (22%)	1873 (24%)
	26 weeks	2251 (25%)	1940 (25%)
	27 weeks	2601 (29%)	1926 (25%)
Male, No. (%)		4745 (53%)	4219 (54%)
Birth weight, mean (SD)		846 (207)	825 (202)
Multiple births, No. (%)		2212 (30%)	1968 (25%)
Antenatal corticosteroids, No. (%)		7691 (88%)	6647 (87%)
Outborn, No. (%)		1255 (14%)	1193 (15%)
C-section, No. (%)		4970 (56%)	4410 (57%)
18% fallece previo al alta	23 weeks GA at birth	338 (53%)	336 (53%)
	24 weeks GA at birth	452 (32%)	450 (32%)
	25 weeks GA at birth	375 (19%)	373 (20%)
	26 weeks GA at birth	262 (12%)	262 (14%)
	27 weeks GA at birth	161 (6%)	161 (8%)

Table 1 Time to weaning off respiratory support according to gestational age at birth

GA (n)	ETTV at any time, n (%)	ETTV within the first 7 days after birth, n (%)	PPS within the first 7 days after birth, n (%)	Died while on ETTV or within 7 days after extubation, n (%)	Died while on PPS or within 7 days after weaning off PPS, n (%)	In-hospital mortality, n (%)
23 (n=638)	636 (100)	635 (100)	638 (100)	332 (52)	336 (53)	338 (53)
24 (n=1432)	1413 (99)	1375 (96)	1428 (100)	442 (31)	452 (32)	452 (32)
25 (n=1959)	1873 (96)	1775 (91)	1954 (100)	365 (19)	377 (19)	375 (19)
26 (n=2251)	1940 (86)	1786 (79)	2249 (100)	242 (11)	257 (11)	262 (12)
27 (n=2601)	1926 (74)	1771 (68)	2597 (100)	153 (6)	161 (6)	161 (6)

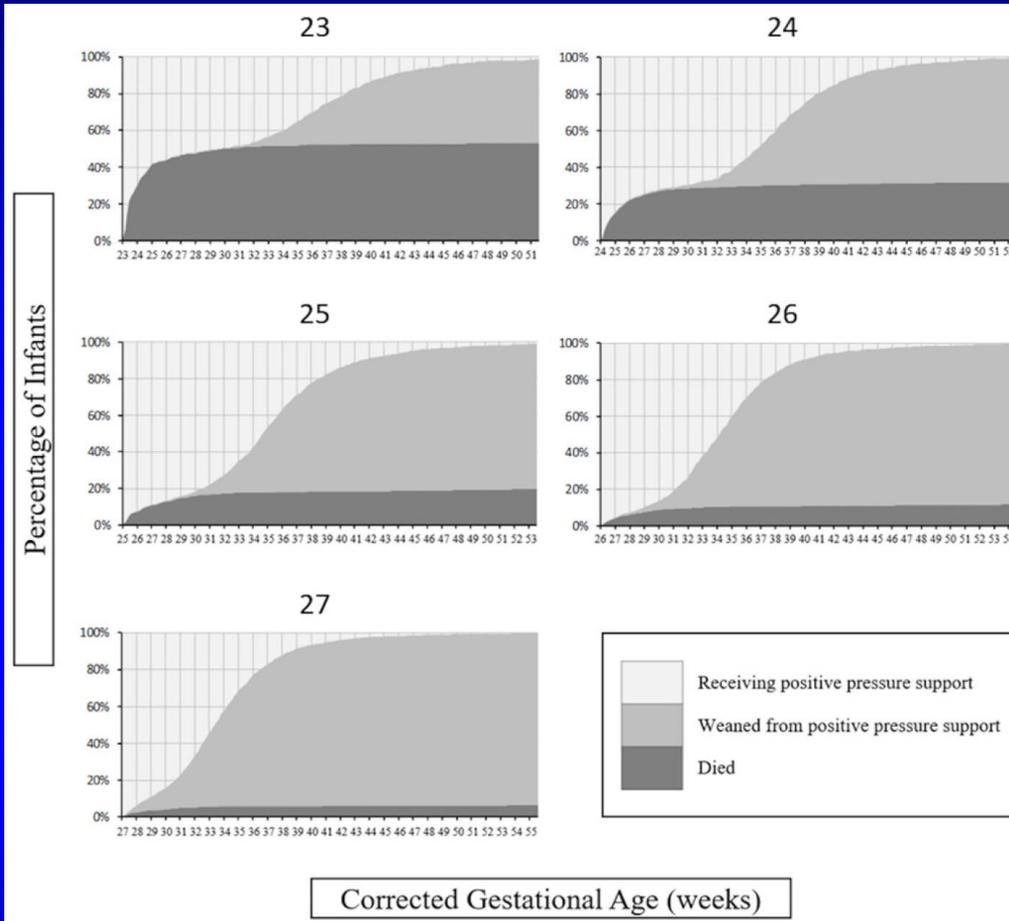
Tiempo hasta 1° extubación exitosa (7 días)



GA (n)	Postnatal age (days) at first successful extubation*	CGA (weeks) at first successful extubation*
23 (n=638)	42 (31–56.5)	29.4 (27.4–31.1)
24 (n=1432)	36 (20–49)	29.1 (26.9–31.0)
25 (n=1959)	22 (6–37)	28.1 (25.9–30.3)
26 (n=2251)	9 (2–26)	27.3 (26.3–29.7)
27 (n=2601)	4 (2–15)	27.6 (27.3–29.1)

Data presented as median (IQR).
 *Estimated using only infants treated with endotracheal ventilation who were successfully extubated.

Tiempo de retiro de todo soporte con presión positiva (7 días)

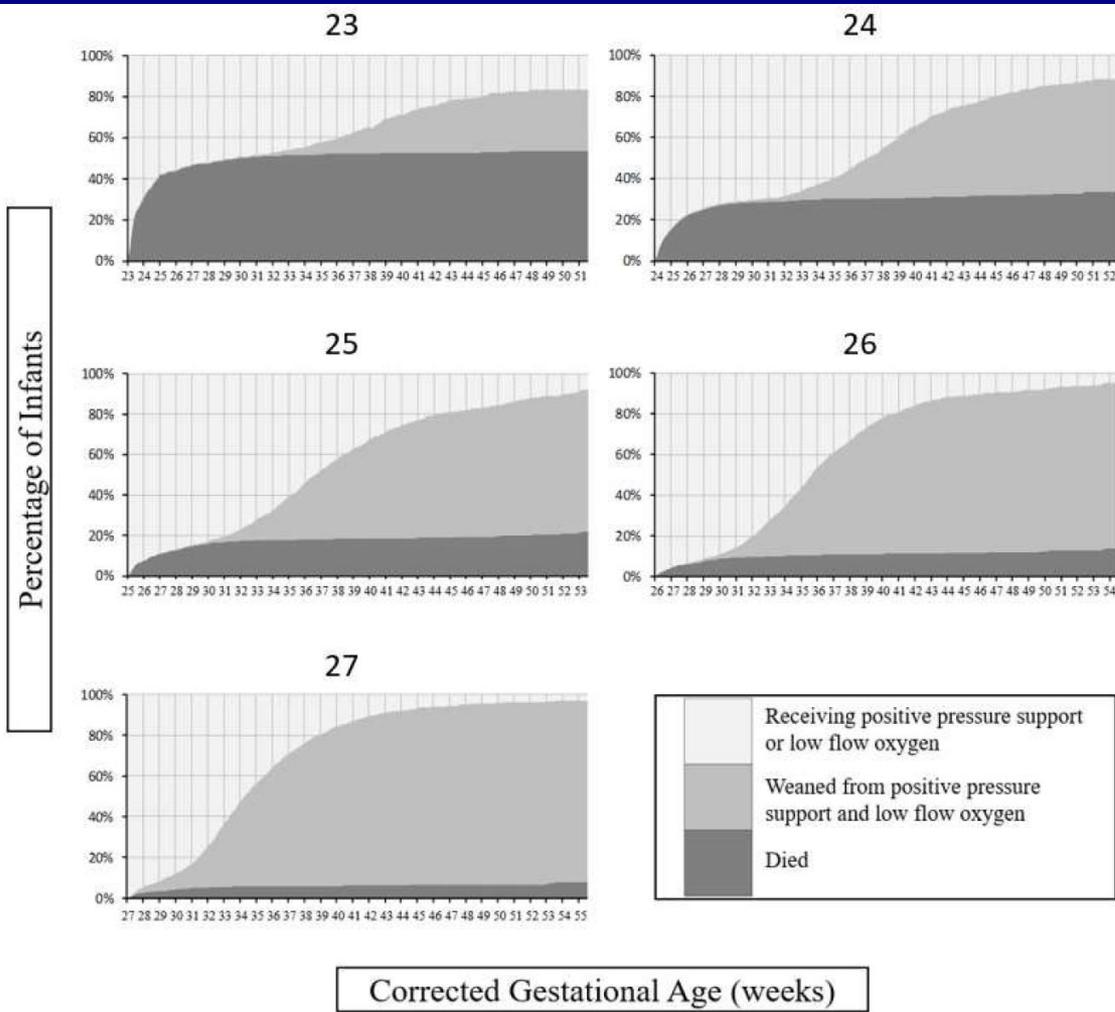


GA (n)	Postnatal age (days) at weaning off PPS†	CGA (weeks) at weaning off PPS†
23 (n=638)	97 (81–117)	36.9 (34.6–39.7)
24 (n=1432)	87 (72–104)	36.4 (34.3–38.9)
25 (n=1959)	72 (58–89)	35.3 (33.3–37.7)
26 (n=2251)	59 (45–74)	34.4 (32.4–36.6)
27 (n=2601)	45 (31–60)	33.4 (31.4–35.6)

Data presented as median (IQR).

†Estimated using only infants treated with positive pressure ventilation who successfully weaned off.

Tiempo de retiro de todo soporte con presión positiva u O2

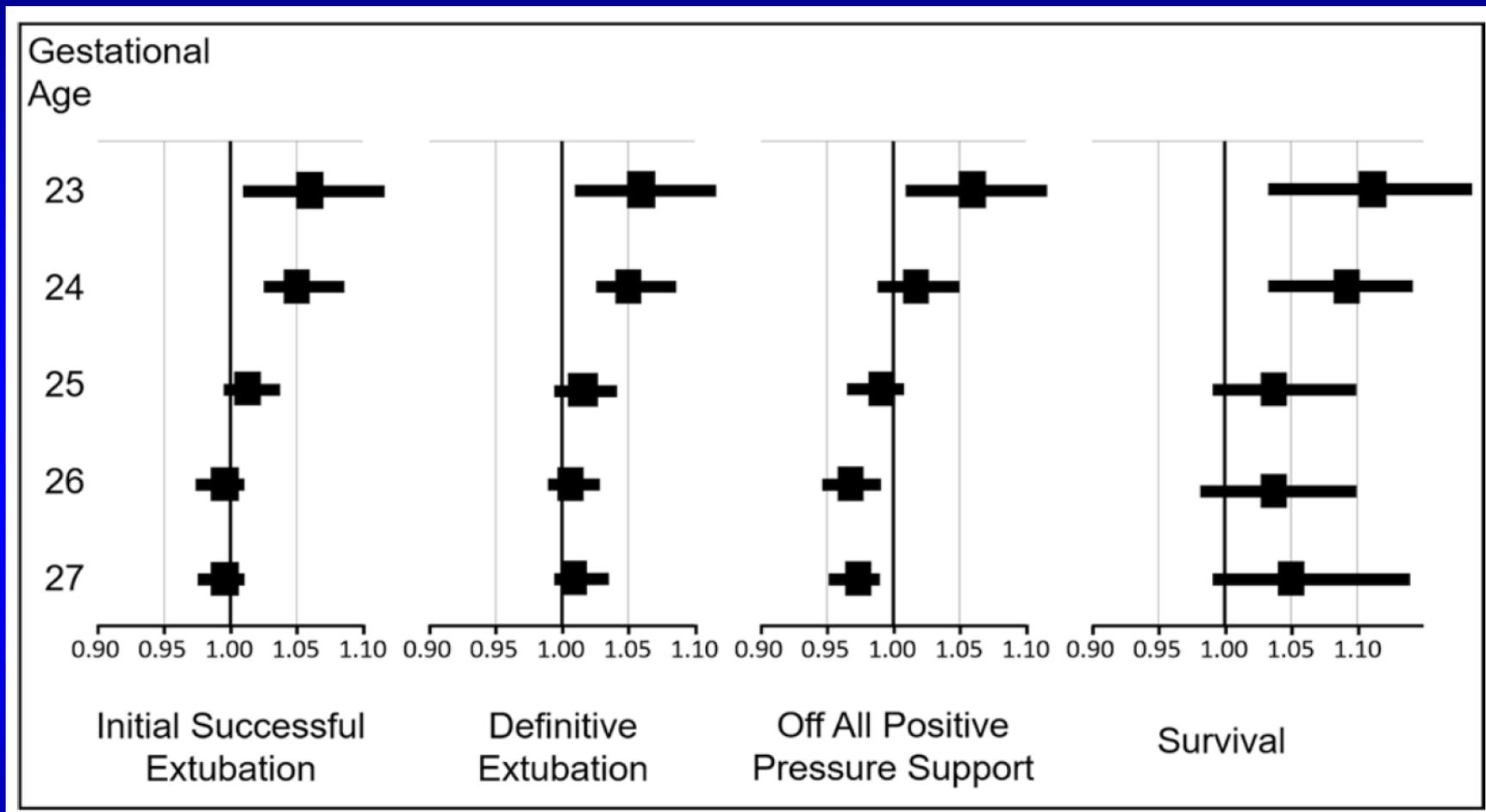


GA (n)	Postnatal age (days) at weaning off all respiratory support (PPS or LFO ₂)‡	CGA (weeks) at weaning off all respiratory support (PPS or LFO ₂)‡
23 (n=638)	104 (84–122)	37.9 (35.0–40.4)
24 (n=1432)	97 (80–112)	37.9 (35.4–40.0)
25 (n=1959)	78 (63–98)	36.1 (34.0–39.0)
26 (n=2251)	64 (49–82)	35.1 (33.0–37.7)
27 (n=2601)	48 (34–65)	33.9 (31.9–36.3)

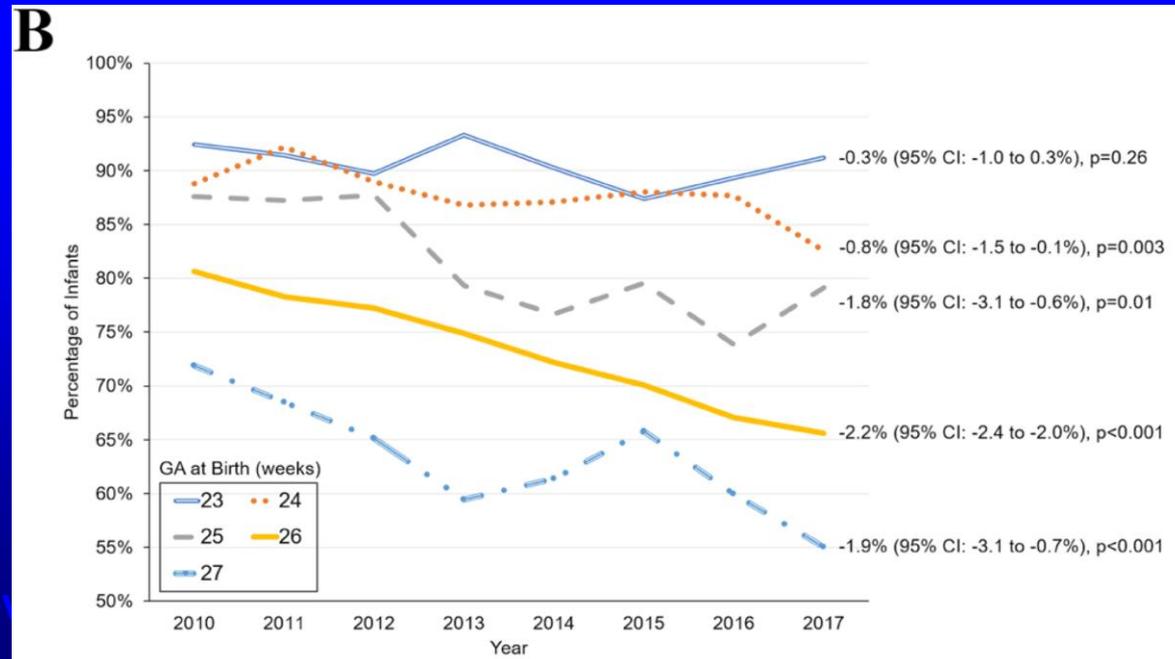
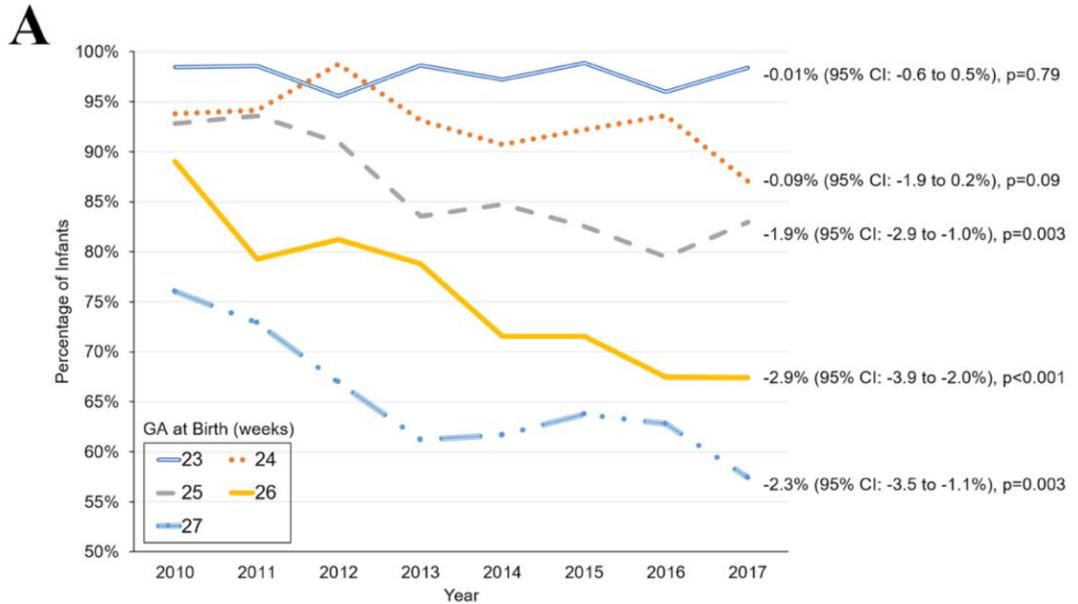
Data presented as median (IOR).

‡Estimated using only infants treated with positive pressure ventilation and/or low-flow oxygen who were successfully weaned off.

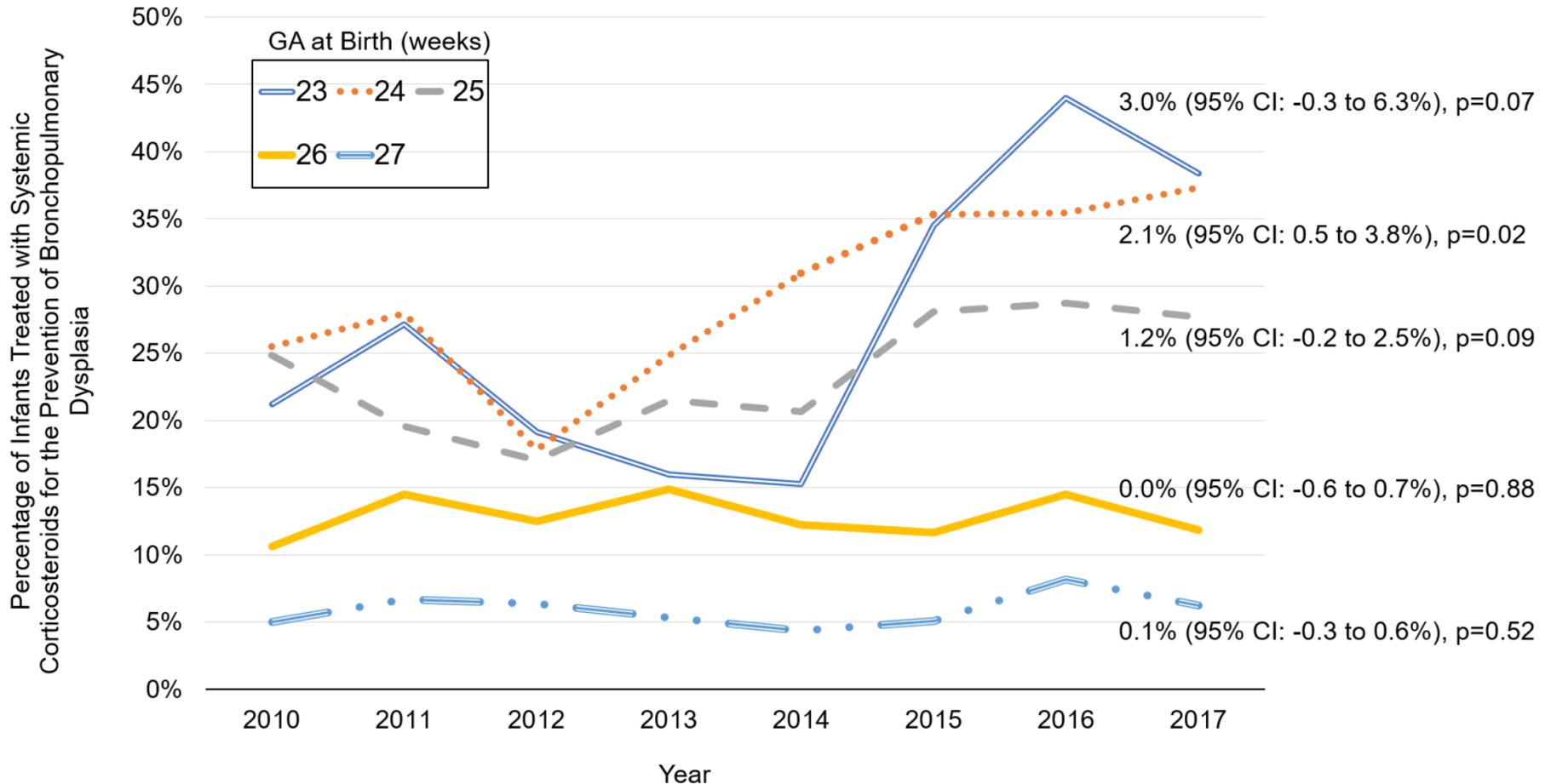
Tendencia anual de continuar con SPP y sobrevida 2010-2017



Tendencia anual en intubación y uso de surfactante < 48h de vida



Tendencia anual en uso de corticoides para prevención de DBP



Conclusiones

- Prematuros periviables de la CNN, experimentaron mejoría en sobrevida y weaning precoz de todas las formas de SPP, comparados con 26-27s, que permanecieron más tiempo en SPP.
- Prematuros de mayor riesgo han mejorado sobrevida, sin aumentar el tiempo en VMI.
- Se observó en PT 24s mejora sobrevida y extubación más precoz junto a reducción en uso de surfactante y aumento del uso de corticoides postnatales.
- Información relevante para consejería pre y post natal, benchmarking, QI y planificación de recursos.

Does the first hour of continuous EEG predict neonatal seizures?

- **Introducción:** 90% convulsiones neonatales subclínicas, ACNS recomienda monitoreo continuo (cEEG) de al menos 24h en RN con riesgo de convulsiones. aEEG baja especificidad y artefactos. cEEG es costoso y requiere expertiz para informe en tiempo real.
- **Objetivo:** determinar en RN en riesgo de convulsiones, si actividad basal durante 1° hora de monitoreo predice convulsiones en siguientes 96h.
- **Métodos:** análisis retrospectivo post hoc de cohorte NEOLEV2.
 - Pacientes: 36-44s, < 2 semanas, con riesgo o sospecha clínica de convulsiones.
 - 1° hora de análisis por 2 neurólogos independientes (1 staff senior y 1 becado).
 - Anormalidades ritmo de base según score de Tharp y convulsiones (videoEEG).

A: Mildly abnormal	B: Moderately abnormal	C: Markedly abnormal
Mild excessive discontinuity during discontinuous portions of the tracing (interburst intervals exceeding 6 seconds)*	Moderate excessive discontinuity for CA (interburst intervals exceeding 30 seconds)	Markedly excessive discontinuity for age (interburst intervals exceeding 60 seconds) despite the preservation of some age appropriate background patterns.
Mildly excessive interhemispheric asynchrony for conceptual age	Moderately excessive inter-hemispheric asynchrony for corrected age	Gross interhemispheric asynchrony
Poor concordance between clinical and electrographic sleep states	Persistent low voltage (<25uV for all states)	Extreme low voltage (<5uV)
Mild poverty of anticipated rhythms for corrected age	Poverty of anticipated rhythms for corrected age	Burst suppression
Mild focal abnormalities or focal voltage attenuation	Marked focal abnormalities	Isoelectric

Table 1 Indications for monitoring and seizure aetiology

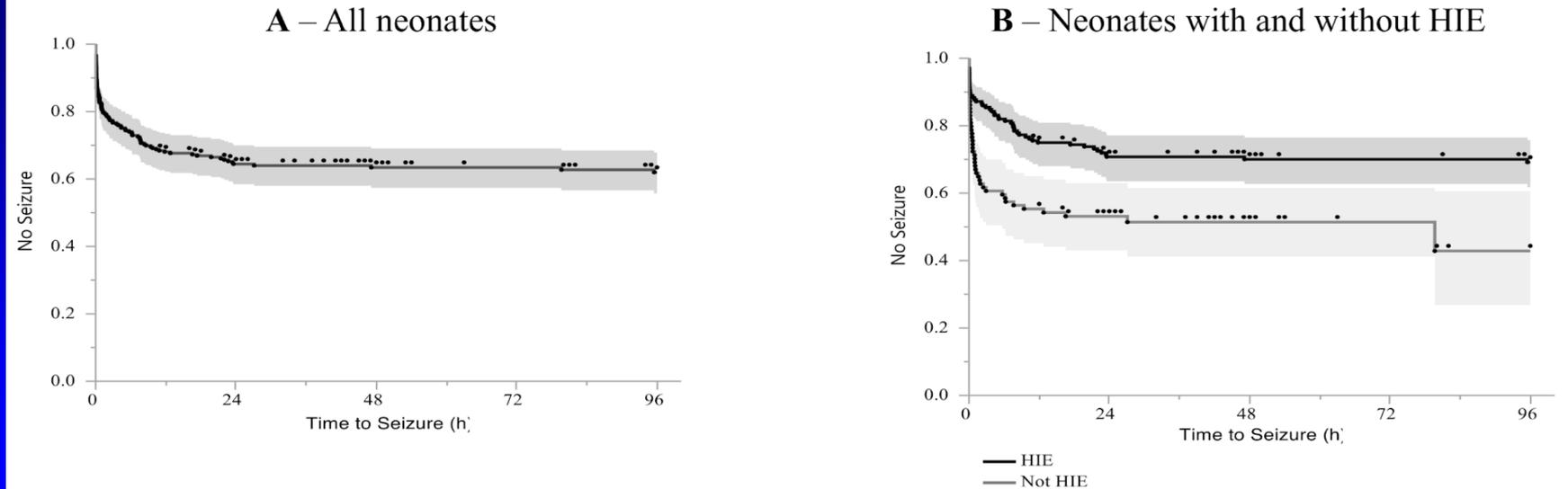
		All neonates n=266	Seizures* n=98 37%
Indication for cEEG monitoring	Suspected seizures	97	53
	Perinatal depression†	167	43
	Other*	21	10
Seizure aetiology	Hypoxic-ischaemic encephalopathy	172	52
	Stroke	–	13
	Intracranial haemorrhage	–	4
	Infection	–	2
	Genetic epilepsy	–	7
	Cortical malformation	–	3
	Other	–	2
	No aetiology found	–	15

*Other indications for cEEG monitoring included abnormal neurological examination, apnoea and encephalopathy developing after delivery.

†Nineteen neonates had both perinatal depression and suspected seizures as indication for cEEG monitoring; eight of these had seizures.

cEEG, continuous video-electroencephalography.

Time to first seizure Kaplan-Meier curves



- 50/98 (51%) tuvo 1° convulsión durante primera hora de cEEG, 44/98 (45%) entre 1 y 24h, 4/98 entre 24 y 96h de monitoreo.
- Mediana de tiempo para 1° convulsión fue de 1 hora (IQR: 0.08–7.5).
- Mediana de tiempo para 1° convulsión en los que no convulsionaron la primera hora fue 7.6 horas (IQR: 3.1–15.6) y 3.7 horas para los con EHI (IQR: 0.05–9.4).

- Durante 1° hora 48% tuvo ritmo de base normal, 30% levemente anormal, 13% moderadamente anormal y 9% severamente anormal.
- De las 50 convulsiones durante 1° hora de vida, 12% fueron con ritmo de base normal, 32% levemente alterado, 44% moderadamente anormal y 12% severamente anormal.

Table 3 The efficacy of cEEG background observed in the first hour to predict a subsequent seizure

	Neonates* n (%)	Seizure from 1 to 24 hours†	Seizure from 1 to 96 hours†	Seizure risk ratio‡	P value
All	216	0.21 (0.16–0.27)	0.24 (0.18–0.30)		
Individual grade					
Severely abnormal	19 (9)	0.70 (0.46–0.87)	0.76 (0.52–0.91)	7.0 (3.4–14.3)	<0.0001
Moderately abnormal	13 (6)	0.31 (0.12–0.59)	0.31 (0.12–0.59)	2.4 (0.82–7.3)	0.11
Mildly abnormal	63 (29)	0.18 (0.10–0.29)	0.23 (0.13–0.36)	1.4 (0.69–2.9)	0.33
Normal	121 (56)	0.13 (0.08–0.21)	0.14 (0.09–0.22)	Ref	
Combined grade					
Abnormal	95 (44)	0.30 (0.21–0.40)	0.34 (0.25–0.45)	2.4 (1.3–4.4)	0.003
Normal	121 (56)	0.13 (0.08–0.21)	0.14 (0.09–0.22)	Ref	
Combined grade					
Moderately abnormal and severely abnormal	32 (15)	0.54 (0.37–0.71)	0.58 (0.40–0.74)	4.3 (2.4–7.7)	<0.0001
Normal and mildly abnormal	184 (85)	0.15 (0.10–0.21)	0.18 (0.12–0.24)	Ref	

*Neonates who had a seizure in the first hour (n=50) were excluded.

†The risk of seizure for the time periods indicated estimated by Kaplan-Meier time-to-event analysis.

‡The ratio of the risk of seizure over the 1–96 hours' time period compared with the Ref (reference) category calculated using Cox regression analysis.

cEEG, continuous video-electroencephalography.

Conclusiones

- El análisis de la primera hora de cEEG predice el riesgo de convulsiones en las siguientes 96h.
- Durante la 1° hora de cEEG es importante ya que el 48% de los que tienen convulsiones son en la 1° hora (incluyendo 6 RN con ritmo de base normal).
- La detección y tratamiento precoz reduciría el daño y mejoraría la eficacia de los AC.

Fate of pulmonary hypertension associated with BPD beyond 36 weeks postmenstrual age

- **Objetivo:** determinar la sobrevida y evolución de HP asociada a DBP en prematuros extremos después de las 36s EGC.
- **Métodos:** cohorte retrospectiva en U. Groningen (Holanda). PT < 30s y/o < 1000g, nacidos 2012-2017, HP confirmada desde las 36s.

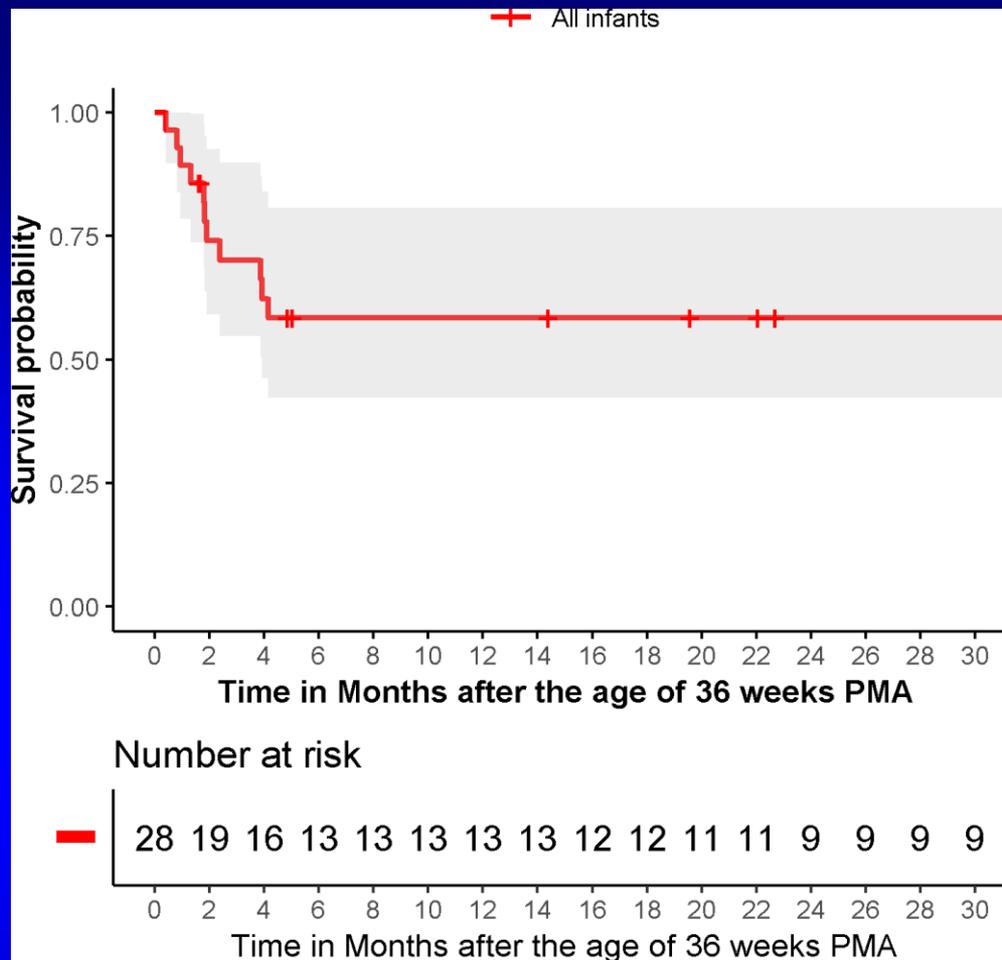
Table 1 Pulmonary hypertension (PH) definition

PH	In the presence of a (supra)cardiac shunt Bi-directional or R-L flow through shunt In the absence of a (supra)cardiac shunt RVSP >40 mm Hg and/or RVSP/SBP >0.5 and/or Every degree of systolic septal flattening
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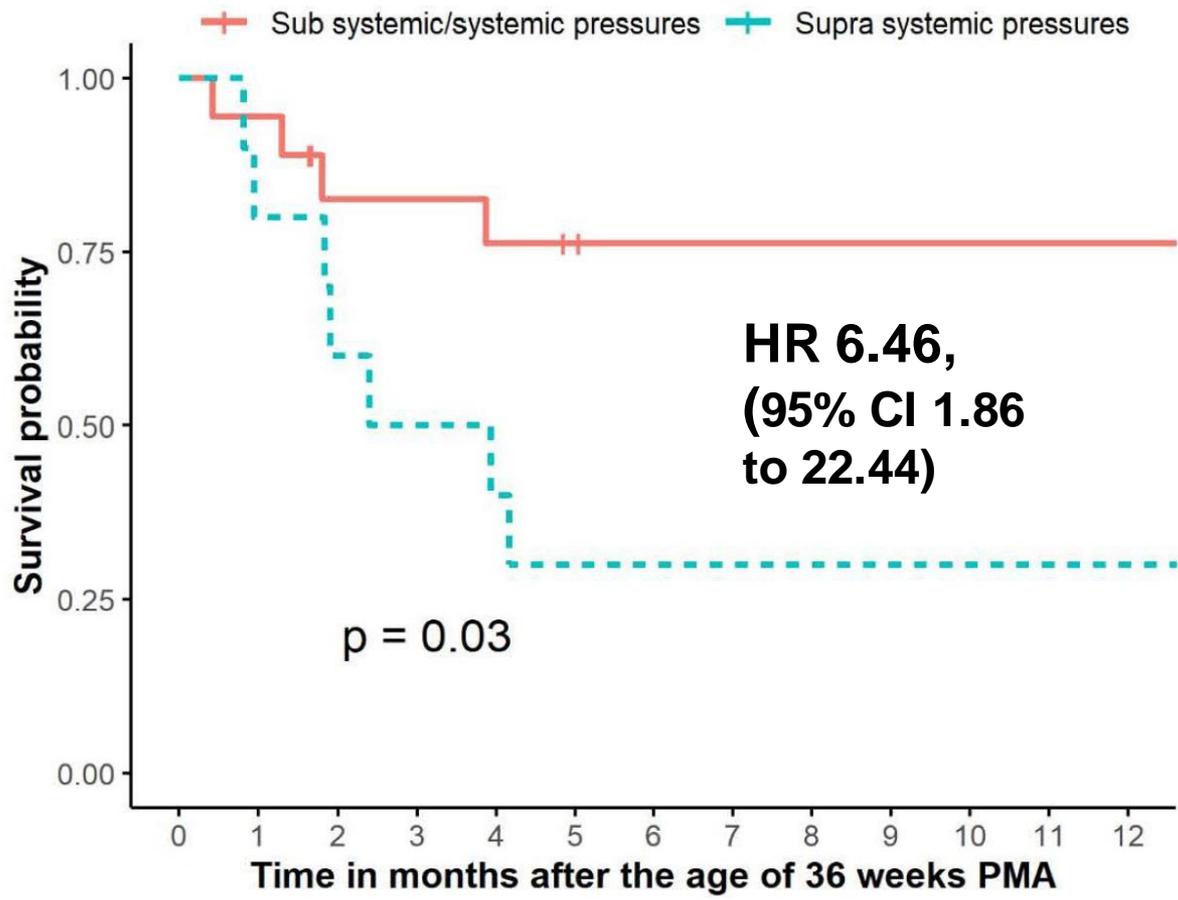
RVSP, right ventricular systolic pressure; SBP, systolic blood pressure.

Table 2 Patient characteristics

Patient characteristics	All infants n=28	N	Survivors n=17	N	Non-survivors n=11	N	P value
Before 36 weeks PMA							
Male sex, n (%)	18 (64)	28	11 (65)	17	7 (64)	11	1.00
Gestational age, weeks	26.4±1.6	28	26.4±1.4	17	26.4±1.8	11	0.40
Birth weight, g	790.0±234.2	28	820.6±267.8	17	742.7±171.2	11	0.36
SGA, n (%)	8 (29)	28	5 (29)	17	3 (27)	11	1.00
PPROM, n (%)	5 (19)	27	3 (19)	16	2 (18)	11	1.00
Pre-eclampsia, n (%)	9 (33)	27	5 (31)	16	4 (36)	11	1.00
Multigestation, n (%)	2 (7)	27	1 (6)	16	1 (9)	11	1.00
Presence of NEC, n (%)	6 (21)	28	1 (6)	17	5 (45)	11	0.02
Presence of IVH, n (%)	9 (32)	28	5 (29)	17	4 (36)	11	1.00
Grade I	4 (14%)	28	2 (12%)	17	2 (18%)	11	0.71
Grade II	4 (14%)	28	3 (18%)	17	1 (9%)	11	
Grade III	1 (4%)	28	0 (0%)	17	1 (9%)	11	
Grade IV	0 (0%)	28	0 (0%)	17	0 (0%)	11	NA
Presence of ROP, n (%)	9 (32)	28	6 (35)	17	3 (27)	11	1.00
Received dexamethasone, n (%)	6 (21)	28	3 (18)	17	3 (27)	11	1.00
Received iNO therapy, n (%)	3 (11)	28	2 (12)	17	1 (9)	11	0.22
At and beyond 36 weeks PMA							
Respiratory status at 36 weeks PMA							0.02
Ventilator, n (%)	0 (0)	28	0 (0)	17	0 (0)	11	
CPAP, n (%)	8 (29)	28	2 (12)	17	6 (55)	11	
Supplemental O ₂ , n (%)	15 (54)	28	10 (59)	17	5 (45)	11	
BPD, n (%)	28 (100)	28	17 (100)	17	11 (100)	11	0.56
Mild BPD, n (%)	4 (14)	28	3 (18)	17	1 (9)	11	
Moderate BPD, n (%)	1 (4)	28	1 (6)	17	0 (0)	11	
Severe BPD, n (%)	23 (82)	28	13 (76)	17	10 (91)	11	
Age at PH confirmation beyond 36 weeks PMA, months	2.5 (1.6–4.6)	28	2.7 (1.7–5.4)	17	2.1 (0.4–3.1)	11	0.12
Suprasystemic pressures, n (%)	9 (32)	28	3 (18)	17	6 (55)	11	0.095
PDA, n (%)	21 (84)	25	11 (73)	15	10 (91)	11	0.36
PAH-targeted therapy, n (%)	14 (50)	28	10 (59)	17	4 (36)	11	0.44
Monotherapy, n (%)	11 (39)	28	9 (53)	17	2 (18)	11	0.12
Dual therapy, n (%)	3 (11)	28	1 (6)	17	2 (18)	11	0.54
Dexamethasone, n (%)	7 (25)	28	4 (24)	17	3 (27)	11	1.00
iNO therapy, n (%)	7 (25)	28	4 (35)	17	3 (27)	11	0.22
PH resolved, n (%)	16 (57)	28	16 (94%)	17	0 (0%)	11	<0.0001



- 11/28 (39%) fallecieron durante período.
- Sobrevida a los 1, 3 y 7 meses (>36s) 89%, 70% y 58%.

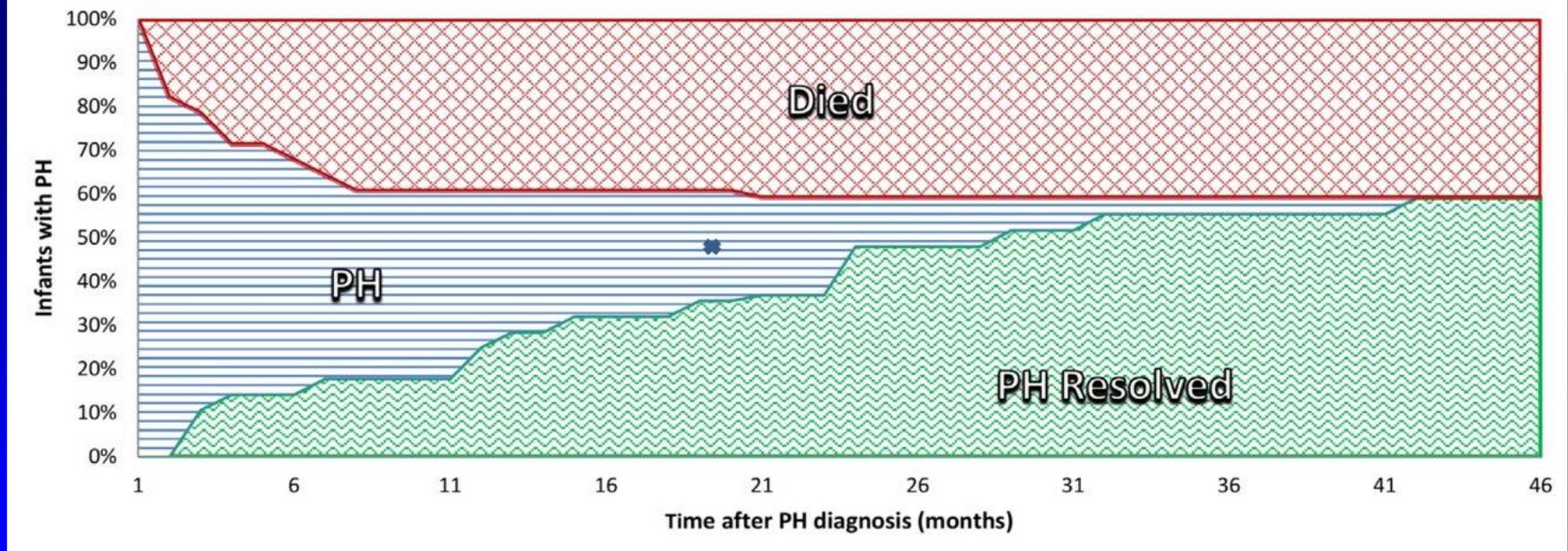


HP Supra Sistémica
 sobrevive a los 1, 3 y
 7 meses (>36s) 80%,
 50% y 30%.

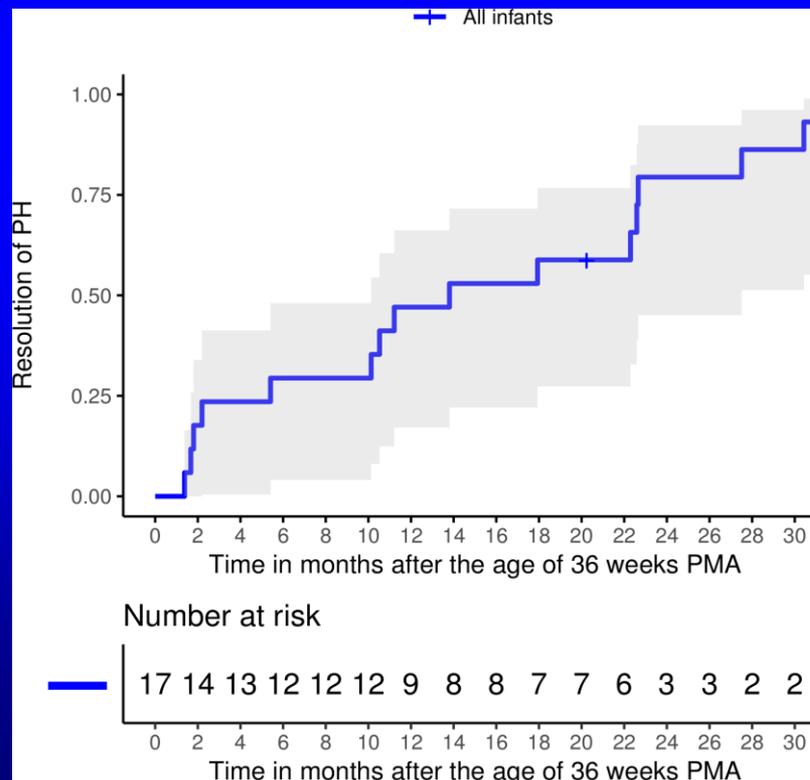
Number at risk

	18	17	13	13	12	11	10	10	10	10	10	10	
	10	8	6	5	4	3	3	3	3	3	3	3	
	0	1	2	3	4	5	6	7	8	9	10	11	12

Time in months after the age of 36 weeks PMA



De los sobrevivientes (n=17), HP se resolvió durante seguimiento a los 1, 2 y 2.5 años 47%, 79% y 94%.



Conclusiones

- En esta cohorte se muestra baja sobrevida $< 60\%$ a los 6 meses EGC. Muertes ocurren los primeros 6 meses después de las 36s.
- De los sobrevivientes el 100 % tuvo resolución de HP a los 2.5 años.
- Severidad de HP y apoyo ventilatorio a las 36s serían predictores de pronóstico de la HP-DBP.
- PSP suprasistémica y dependencia de CPAP a la 36s se han asociado a mayor mortalidad.