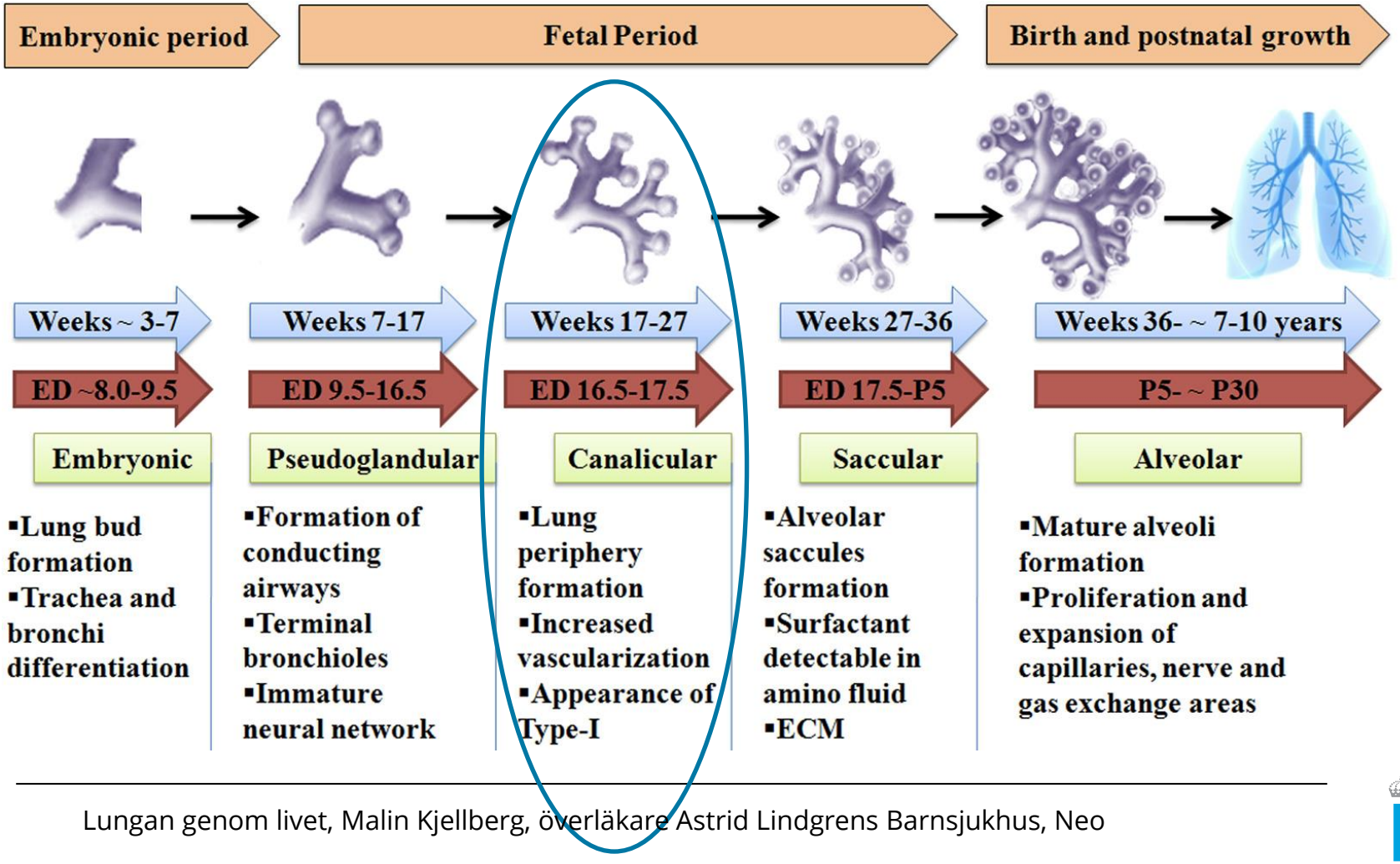
Vad händer om man föds för tidigt?

Vad triggar BPD?

Normal lungutveckling



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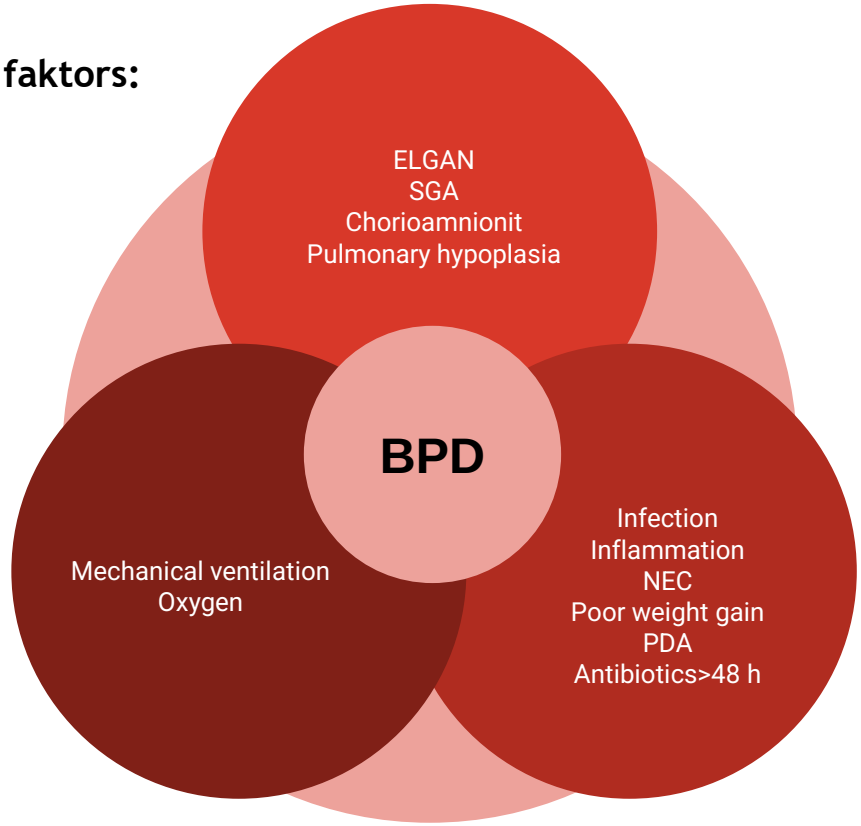
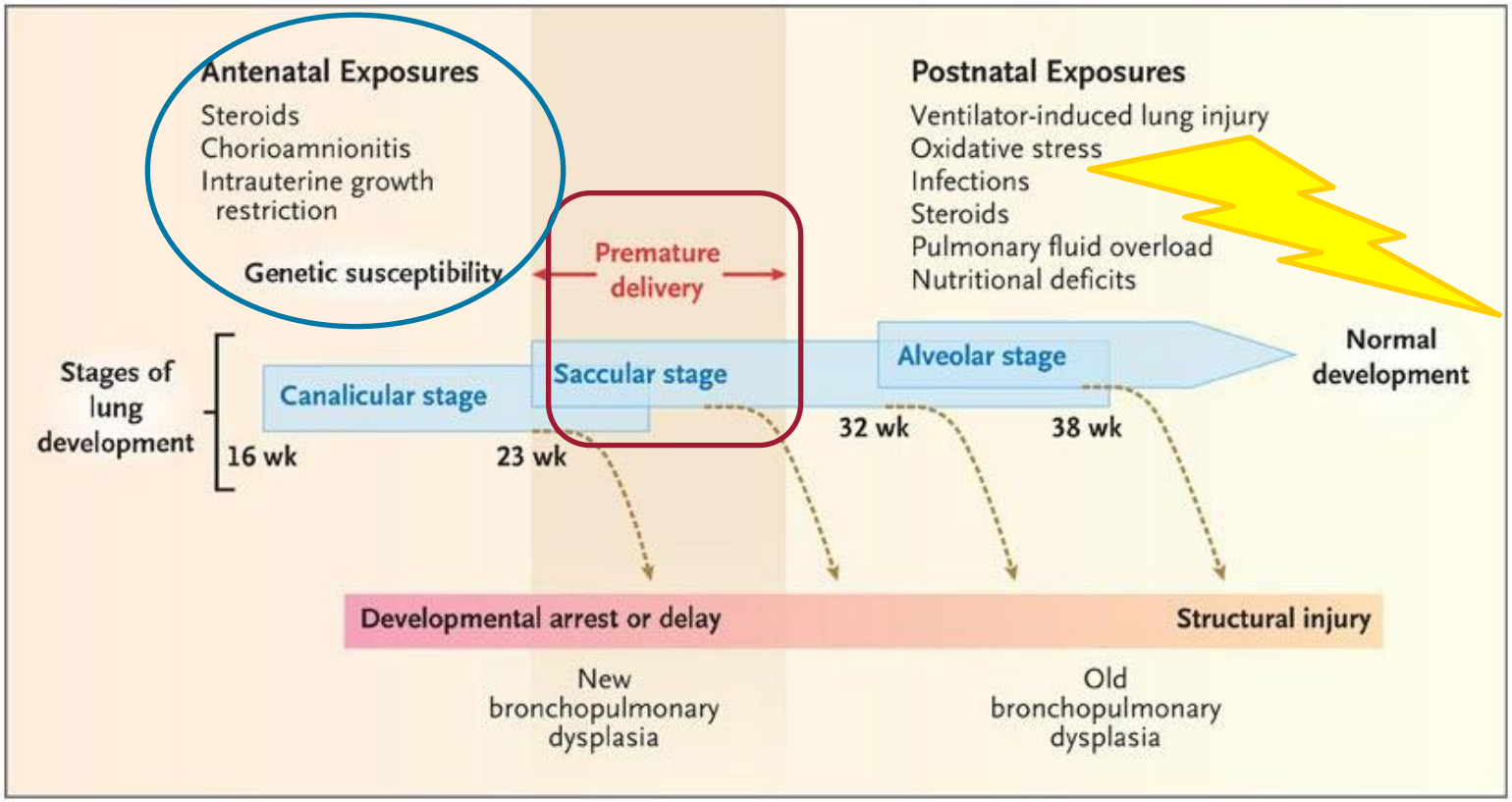
BPD= Bronchopulmonell dysplasi= Syrgas v 36

Perinatal, postnatal risk faktors:



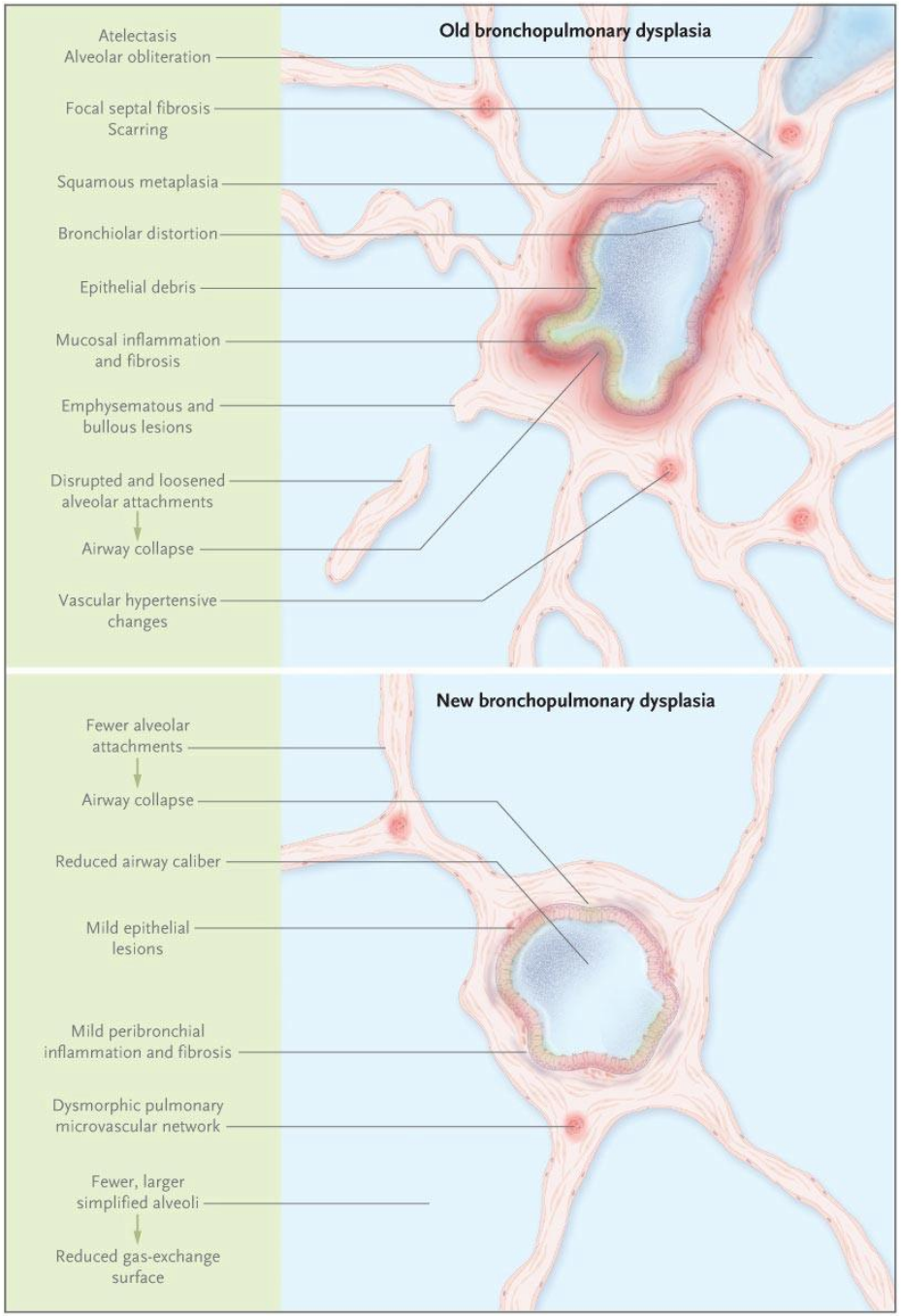
Lung injury, delayed and altered lung development

Omogen skör lunga



Baraldi E, Filippone M. N Engl J Med 2007;357:1946-1955

Adapted from Fletcher and Peto

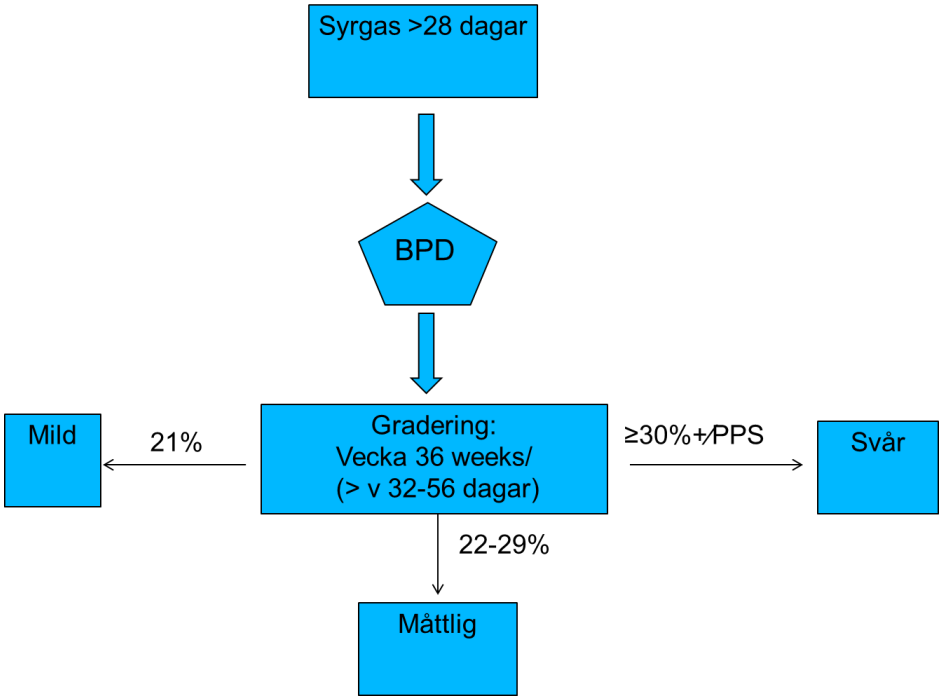


BPD

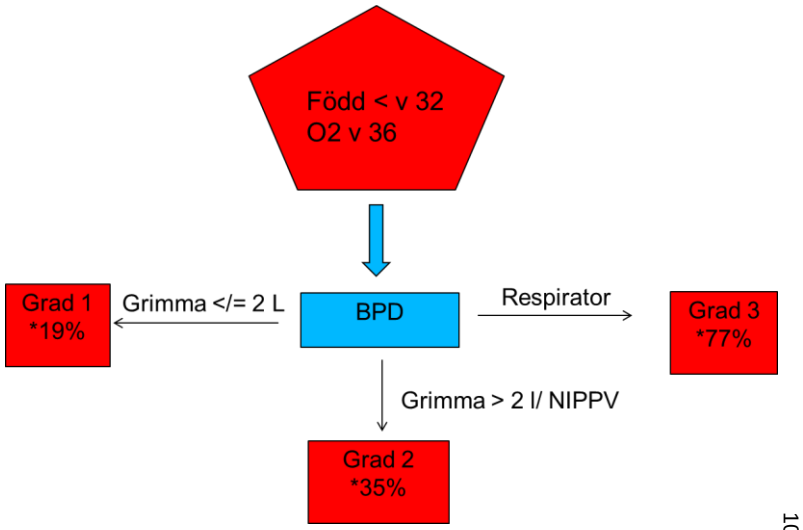
Northway 1967 måttligt prematura
”Gammal” BPD
Trasiga lungor
Definition: Röntgen, PAD, klinik

Coalson 2003, Jobe 1999
extremt prematura
”Ny” BPD
Omogna lungor
Definition: Syrgasbehov

Jobe 2001
Flesta publikationer
Tillägg Walsh ORT

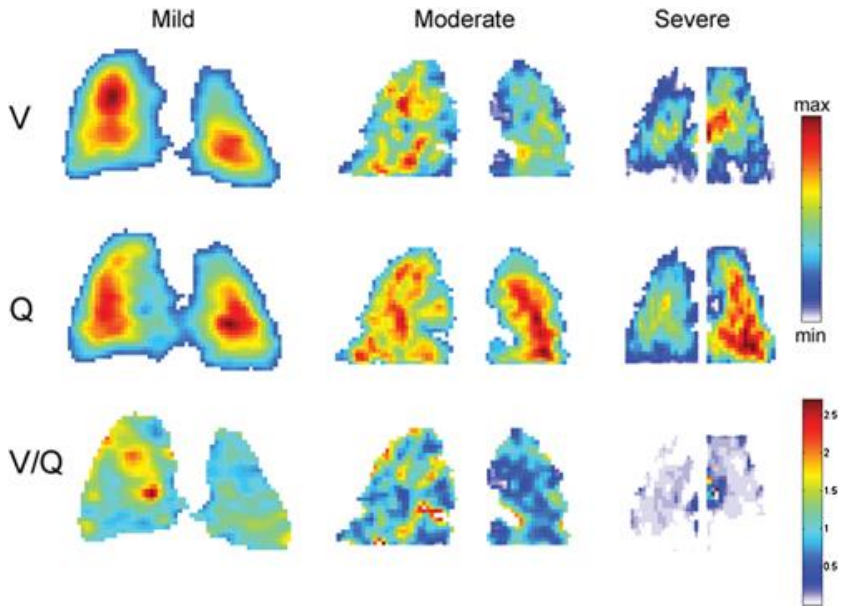


Jensen 2019
Bäst prediktion



*Död/ svår lungsjukdom

Kritik definition:
Diagnos = Behandling given Lungfunktionsmätning?



SPECT-normalvärde saknas

Spädbarnsspirometri:

Undersökarberoende, svårt standardisera, svårt på sjuka

CT-anatomisk, ej funktionellt

MR-funktionell lovande

Lungultraljud-bra i stunden

Lungröntgen- ej prediktivt

BPD, Hur vanligt är det?

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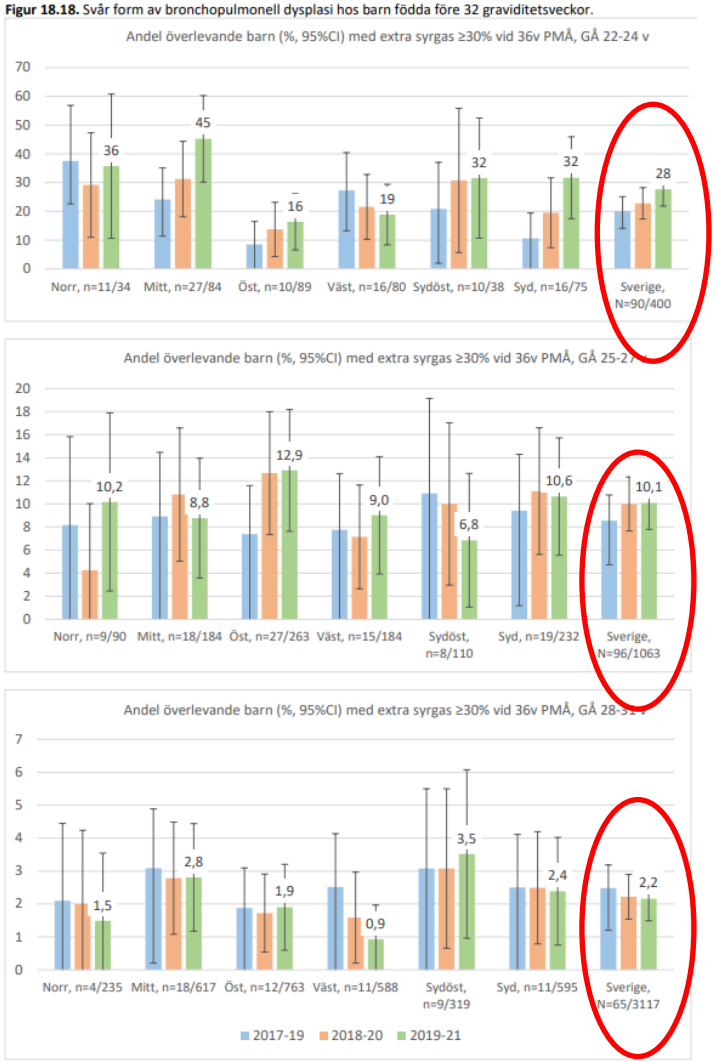
SNQ årsrapport

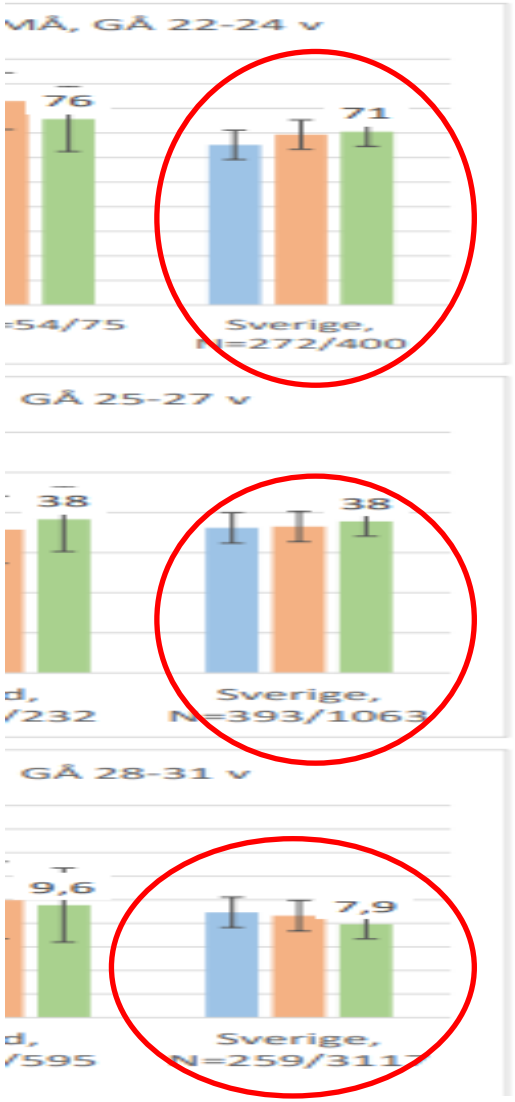
Bronchopulmonell dysplasi (BPD)

Figur 18.16. Bronchopulmonell dysplasi hos barn födda före 32 graviditetsveckor.

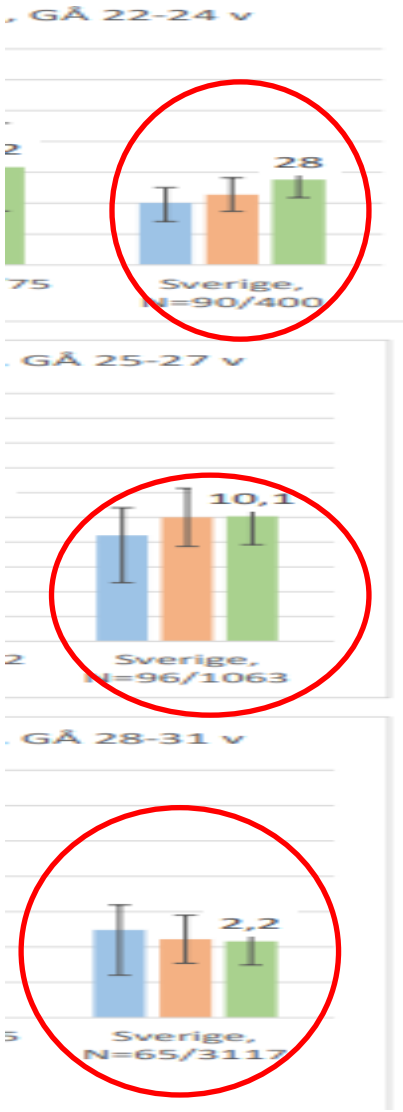
Figur 18.18. Svår form av bronchopulmonell dysplasi hos barn födda före 32 graviditetsveckor.



SNQ årsrapport



Syrgas
v 36



Syrgas
>30%
V 36

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Vad kan vi göra? (Referenser i slutet)

Prenatalt

- Stoppa snittglada obstretiker
- Invänta Betapredeffekt
- Antibiotika till modern vid chorioamnionit /PPROM

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Vid förlossning:

- 21-30% syrgas från start
- CPAP
- Ej sustained inflation
- Vid intubation- Surfactant < v 32 (på ind. även >32)
- HFOV-open lung strategy, O2 < 30%, gå ned i tryck efter något dygn.
- SIPPV- tidaler 4-5 ml/kg- volymgaranti
- Håll värmen

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Är CPAP bättre än intubering från start?

	Mechanical ventilation	Early NCPAP	Surfactant	BPD
Columbia	29%	63%	10%	4%
Boston	75%	11%	45%	22%

Van Marter et al, Pediatrics 2000

Boston vs Columbia; *"However, after adjusting for baseline risk, most of the increased risk of BPD … was explained simply by the initiation of mechanical ventilation"*

På avdelning dag 1

- Koffein
- CPAP
- Om respirator-håll lungan öppen
- Surfactant om syrgas>30% och stigande. LISA, (SALSA)
- Lugn och ro - undvik PPHN
- Nutrition
- (Lågdos hydrokortison)

Om respirator alt CPAP failure: Håll lungan öppen initialt, weana tryck första dagarna

Open lung+ snabb weaning vs Låga tryck dag 0-7

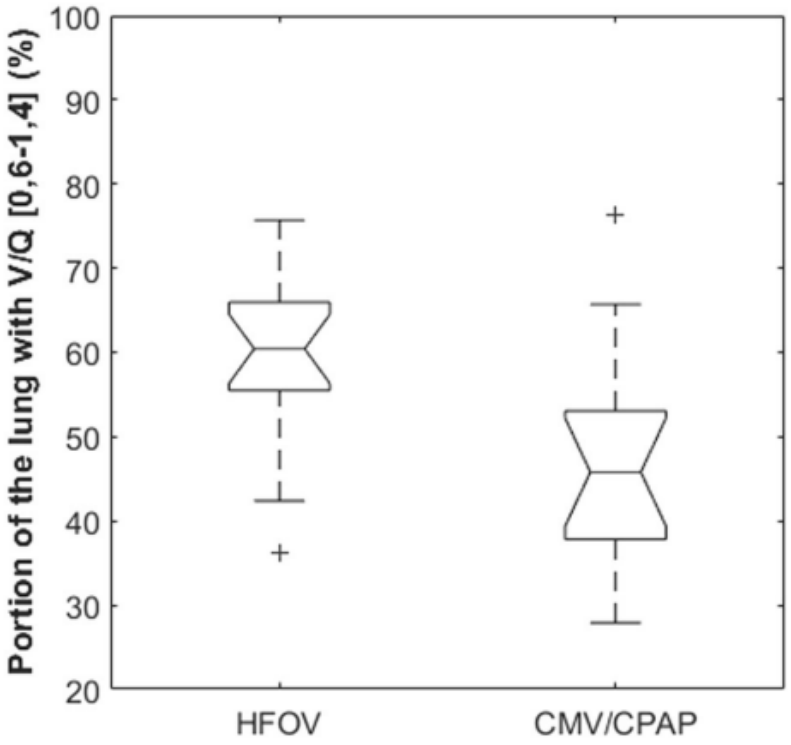

Fig. 3 Primary outcome of pulmonary ventilation/perfusion (V/Q) matching at 36-37 weeks postmenstrual age. The boxplots show

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Första tiden

- Minimal handling
- Matupptrappning efter tolerans
- Nutrition, god tillväxt
- Sätt ut antibiotika efter 2-3 dygn om inga tecken till infektion (blododling, lab). > v 26- ab endast vid riskfaktorer
- Permissiv hyperkapne <8,5
- Minska tryck i respirator
- Extubera tidigt när barn ej katabolt
- Saturationsgräns 90-95

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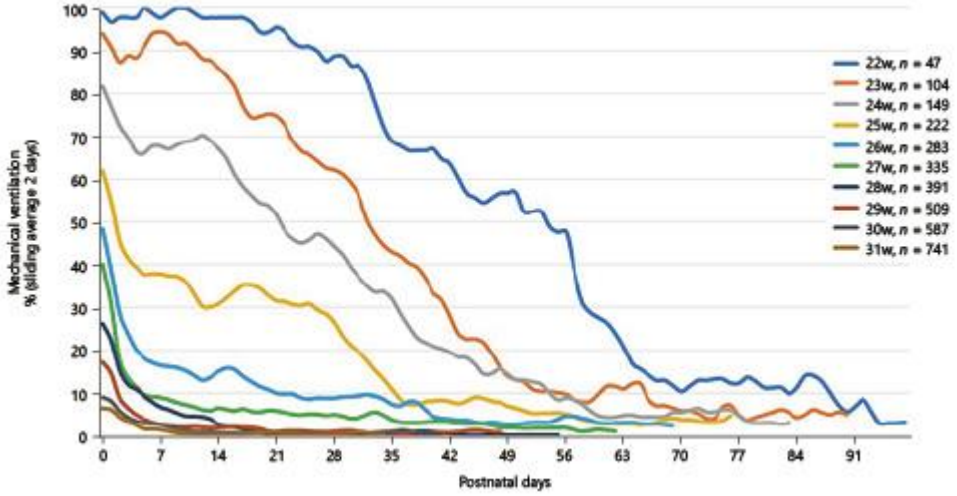
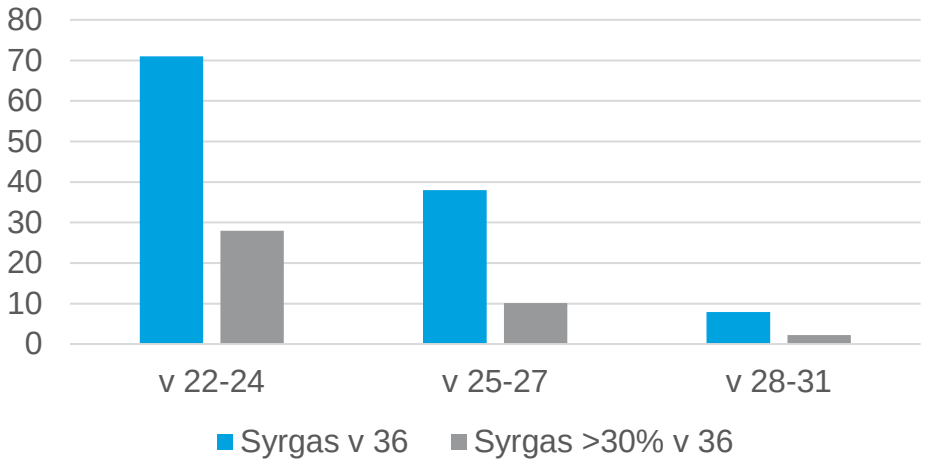
Andningsunderstöd Sverige 2015-2022



Norman M, Jonsson B, Söderling J, Björklund L, J, Håkansson S: Patterns of Respiratory Support by Gestational Age in Very Preterm Infants. Neonatology 2023

BPD 2019-2021



SNQ

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Ventilator Induced Lung Injury (VILI)

- Atelektaser
- Volutrauma
- Ojämn expansion
  - Uttänjningsskador
  - Barotrauma
- Biokemisk inflammation
- Oxidativ stress

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Ca 1 vecka och framåt

Tidig hud mot hud

Belastande duktus?
Behandla medicinskt

Extubera

Nutrition

Håll infektionsfri

Ha kvar CPAP,

ej högflödesgrimma < v 30-32 eller efter extubation

Om det går åt fel håll

Temporär förbättring:

Furix enstaka doser

Sänka vätska

Kortison om failed extubation och >4 veckor

Fortsatt svårt lungsjuk> v 32

PPHN? Sildenafil?

EKG- högerkammarbelastning?

v 36, syrgas <30%? Oxygen reduction test

- Följ upp!
- Lungfunktionsundersökning
- Inhalationer vid viroser
- RS profylax
- Influensa vaccin

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Hur kan vi bli bättre?

- Skonsam ventilering
- Hög och jämn kompetens dygnet runt
- Enhetlig strategi
  Teamet blir bra på det man är van vid
- Forska mera!

VEGF-ökad överlevnad, främjar angiogenesis, förebygger alveolar skada. Minskar vid hög syrgasnivå

NO

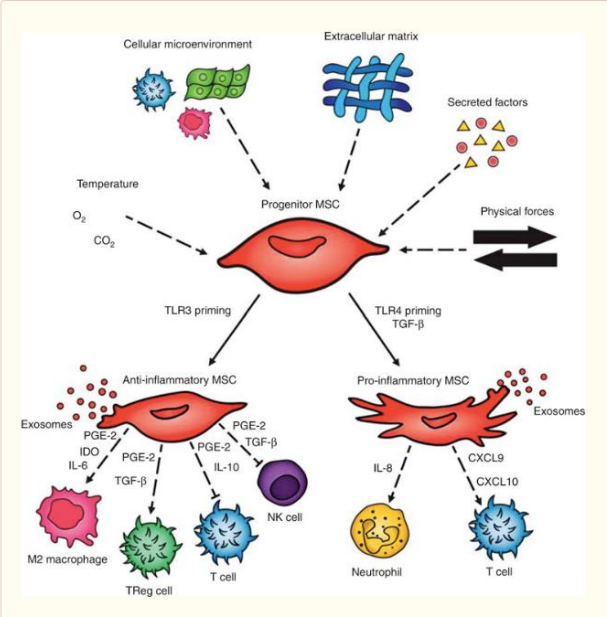
Antiinflammatorisk

Regulatorer för TGF-β/fibroblast/extracellular matrix

Regulators of angiogenesis: endoglin, matrix metalloproteinase 9

Sildenafil

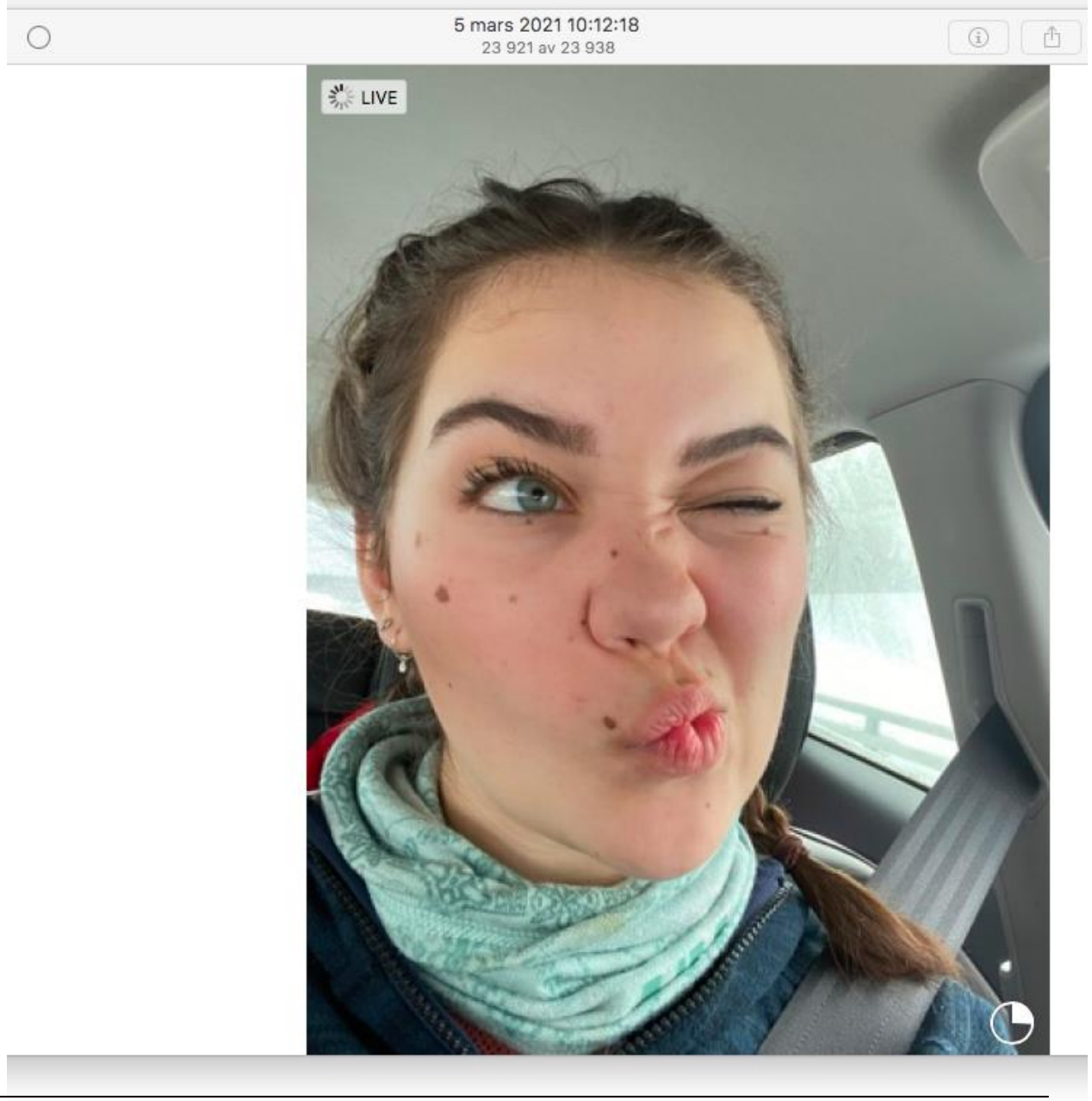
Stamceller



Referenser:

TO AVOID LUNG INJURY / CHRONIC LUNG DISEASE
Resuscitate with room air at birth (Saugstad, Vento)
Caffeincitrate (Henderson-Smart- Cochrane 2010)
Don't intubate unless unavoidable (Fischer 2013)
Minimize time with mechanical ventilation (Robbins 2015, Jensen 2015)
CPAP from start and post extubation. PEEP important (Van Marter 2000, Vanpee 2007(BPD at 40 weeks))
If mechanical ventilation necessary: use syncronized intermittent positive pressure ventilation, preferably volume targeted (Greenough Cochrane 2008)
Prevention/ reduktion BPD vecka 36
Andningsstöd:
LISA reduces BPD compared to INSURE, CPAP, NIPPV, nebulized surfactant, MV (Isayama 2016)
HFOV (Sun 2014, Cools- Cochrane 2015, Greenough, Solís-García (studier från 1992, 1996, 2001, 2005)) Cochrane 2015:
Early first extubation attempt (Robbins 2015, Jensen 2015)
CPAP decreases the need for intubation and mechanical ventilation (historical controls)
Early treatment with nCPAP in very low birth weight infants. Kamper et al Acta Paediatr 1993;83:193-97.
Neonatal care of very-low-birthweight infants in special-care units and neonatal intensive-care units in Stockholm, Jonsson B. *Acta Pediatr 1997*
Early nasal continuous positive airway pressure treatment reduces the need for intubation in very low birth weight infants, Gittermann MK, 1997
Nasal continuous positive airway pressure and outcomes of preterm infants. De Klerk AM, De Klerk RK. *J Paediatr Child Health 2001; 37: 161–167.*
Delivery room management of extremely low birth weight infants: spontaneous breathing or intubation?, Lindner W, *Pediatrics 1999; 103: 961–967*.
Prophylactic nasal *CPAP* in the newborn of GA 28 - 31 weeks. *F Sandri et al, Arch Dis Child Fetal Neonatal Ed 2004:89:F394-8.*
Variables assocciated with early failure of nasal CPAP. *Ammari et al. J Pediatr 2005;147:341-7.*
Early nasal CPAP in DR. *Finer, N. N. et al. Pediatrics 2004;114:651-657*
Läkemedel
PREMILOC: Low dose hydrocortison 10 days (8.5 mg/kg) BPD↓ NDI not affected 2 years (Baud 2016, 2017) But Peltoniemi, 2016, showed more NDI at 7 years
Inhalation steroid<7 days: BPD↓mortality at 2 years ↑(Shah 2017, Bassler 2018)
Surfactant with budesonide (up to 6 doses given): BPD↓NDI not affected 2 y (Yeh 2016)
?Immediate "Kangaroo Mother Care"and Survival of Infants with Low Birth Weight. 25% minskad dödlighet,35% minskad hypotermi,18% minskad sepsis(WHO Immediate KMC Study Group 2021)
Vitamin A (7% reduction)- No long term effect on lung function (Tyson 1999, Maden 2004)
Caffeine Early steroids< 8 days compared to no steroids reduces BPD, NDI at 2 years (Doyle-Cochrane 2017)
Late>7 days BPD ↓ NDI not affected, late FEV1 ↓ (Doyle- Cochrane 2017)
Higher compared to lower doses of dexamethasone BPD↓, NDI↓ *and* early<8 days versus 8-21 days and >21 days - no difference BPD, NDI (Onland-Cochrane 2017)
Ingen effect
Sustained inflation- no reduction in BPD (Schmolzer 2015), increase in death before 48 h (Kirpalani 2019, SAIL trial)
Inhaled steroids started> 7 days of age (Onland 2017)
Bronchodilators (Ng- Cochrane 2016)
Nitric oxide (Barrington- Cochrane 2017)
Saturationsgränser
COIN, SUPPORT, BOOST, BOOST II, COT
Saturation 90-95% versus 85-90%:
90-95%: Lower mortality, NEC before discharge. Trend increased BPD (because of higher target)
Riskfaktorer för BPD
Mechanical ventilation initiation and duration (Ambalavanan 2011and 2008, Hunt 2018 (MV day 7), Laughon 2011, Gagliardi 2011(delivery room intubation) Oh 2005(duration))
More aggressive respiratory management (Subramaniam Cochrane 2011) Intubation (Van Marter)
Oxygen toxicity (Northway 1967, Vento 2009, Alvira 2017)
Infection (Oh 2005, Ballard 2016, Lapcharoensap 2017)
Antibiotics > 48 h first week (Novitsky 2015 (endotracheal colonization resistant gram neg. bacteria))
PDA (Oh 2005, Noori 2009) but late versus early medical treatement reduces BPD (Gudmunsdottir 2015)
Postnatal growth failure (Ehrenkrantz 2006, Clark 2003, Poindexter 2015)
HFNC vs CPAP:
High Flow Nasal Cannula Use Is Associated with Increased Morbidity and Length of Hospitalization in Extremely Low Birth Weight Infants. Taha, 2016

Frågor?



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