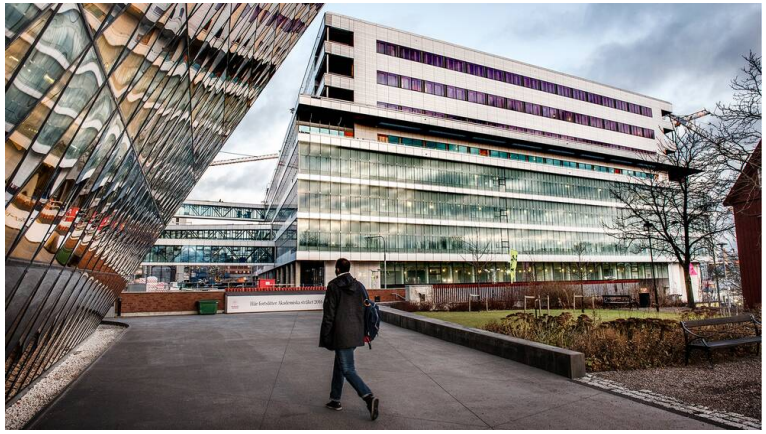
Resuscitation UPDATE

Baldvin Jónsson
Neonatology Dept., Karolinska University Hospital, Stockholm, Sweden



Neonatal resuscitation

ILCOR guidelines for initial stabilization of preterm infants recommend:

In apnoeic infants use pressure limitation during PPV and use PEEP

For spontaneously breathing infants, use CPAP initially rather than intubation and PPV

Stabilize – not resuscitate!

Definition of *resuscitate*

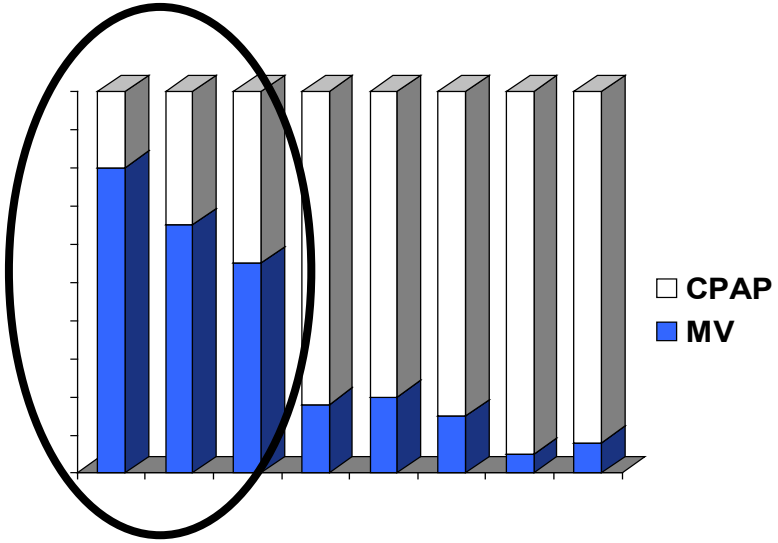
transitive verb

: to revive from apparent death or from unconsciousness

- Give the baby a chance to breathe spontaneously with support?

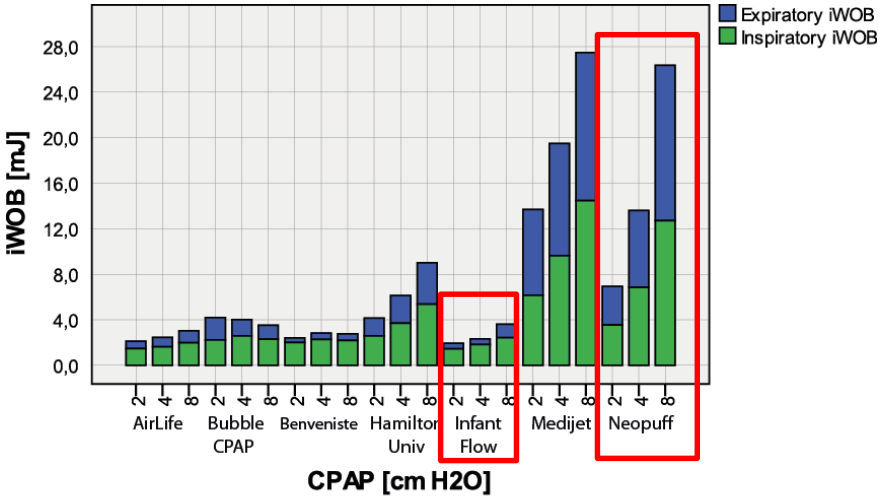
- Avoid DR intubation and MV
- Create a ”window of opportunity” for other interventions

What was used in the DR at Karolinska from year 2000?



- Many of the smallest infants need some form of PPV initially before spontaneous respiration is established.
- Intubation rates remained high.

Background to New System



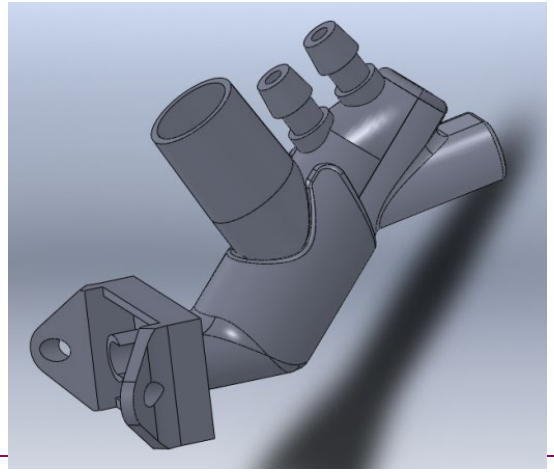
INFANT FLOW

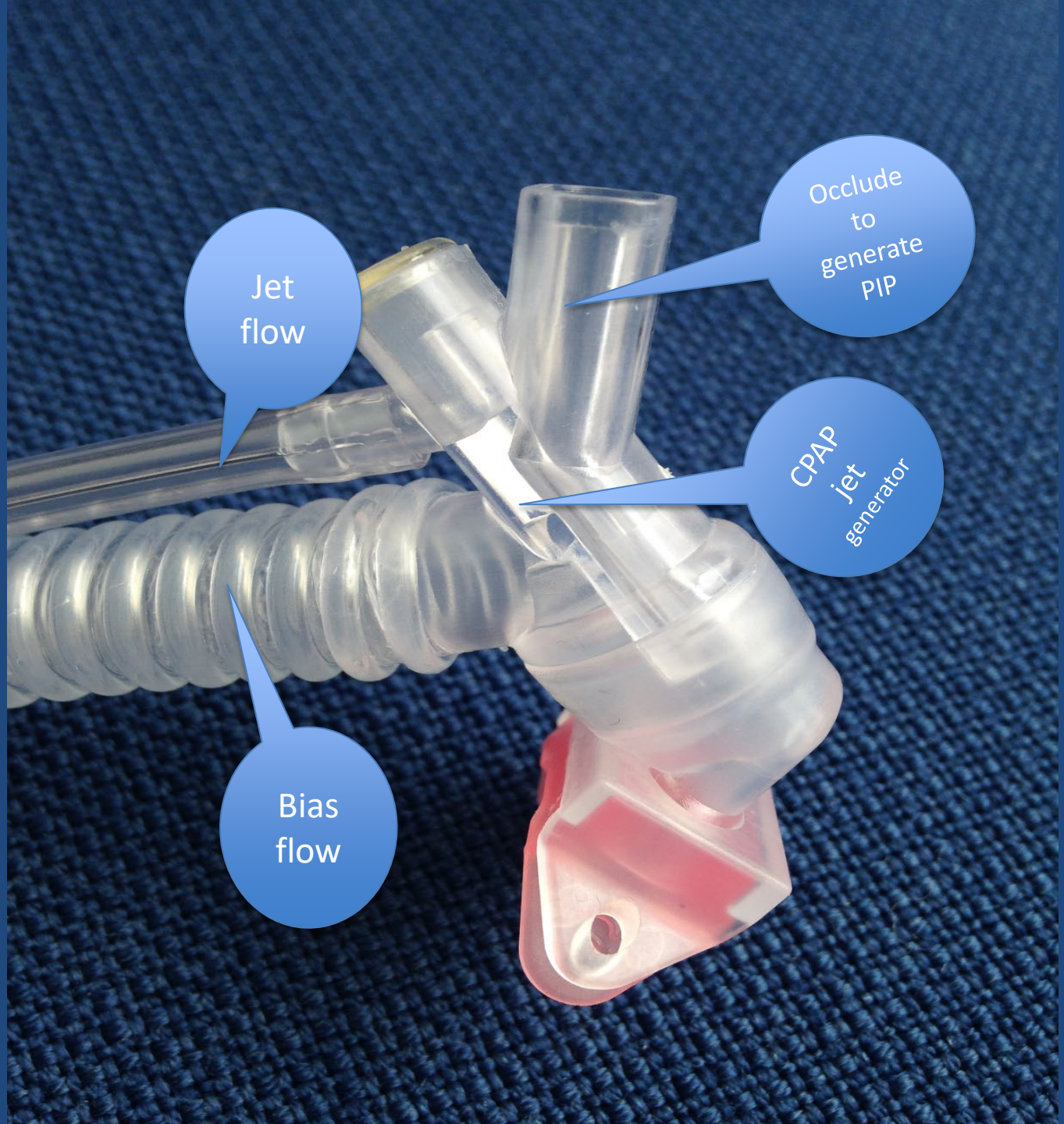
- Pressure stability
- Prongs

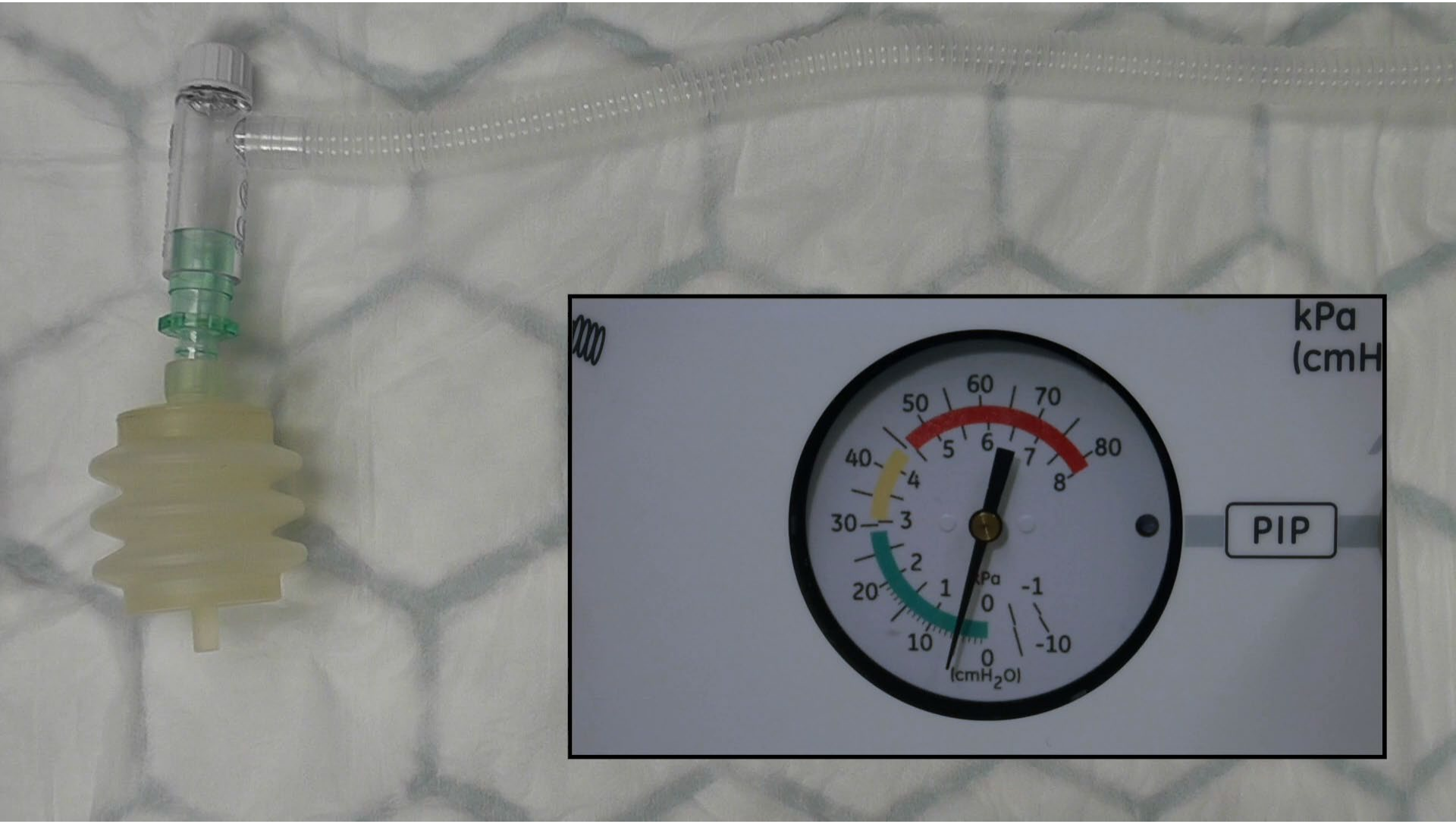
NEOPUFF

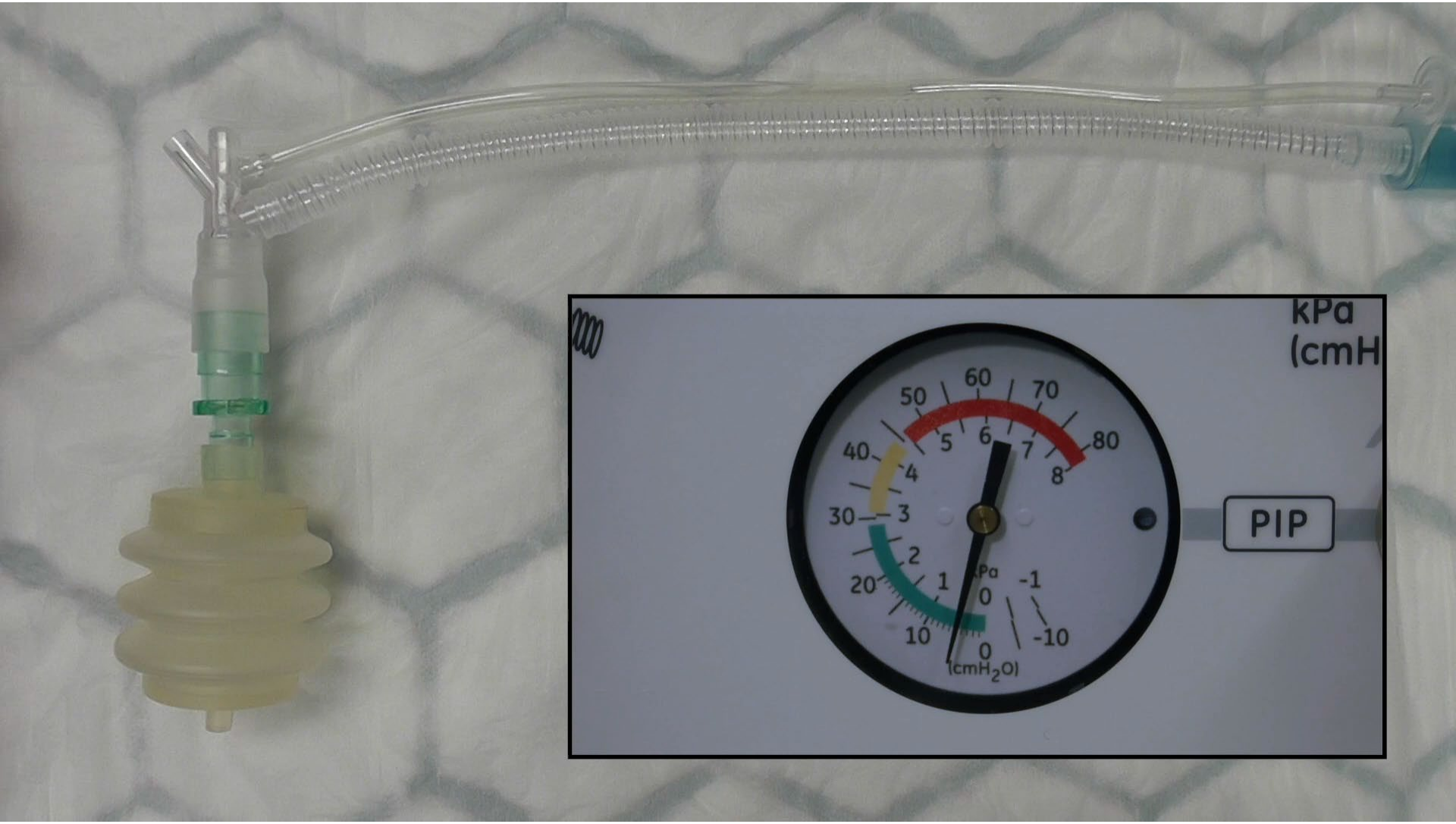
- PPV
- Face mask

HYBRID




Jet flow
Occlude to generate PIP
CPAP jet generator
Bias flow


kPa
(cmH
PIP
60
70
50
80
40
30
20
10
5
6
7
8
4
3
2
1
0
-1
-10
kPa
(cmH2O)


kPa
(cmH
PIP
50
60
70
5
6
7
80
8
40
4
30
3
2
20
1
10
-1
-10
0
(cmH2O)

IN VITRO PERFORMANCE

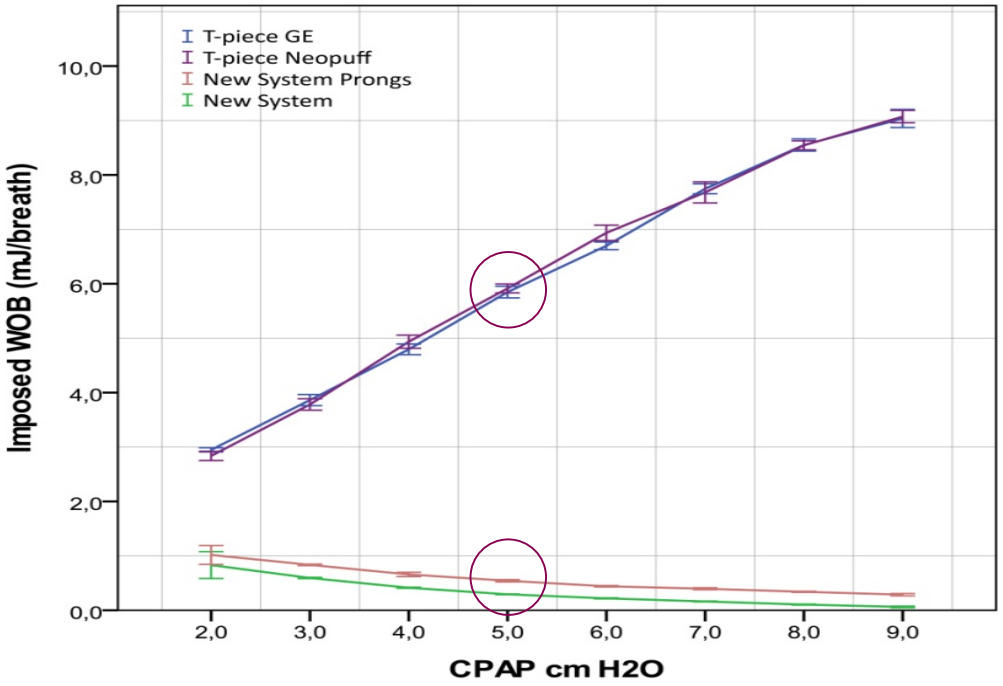


Figure 1: Imposed Work of Breathing (WOB) at different CPAP levels. Simulations with 16 ml TV and RR 60. Bars represent 95% CI.

Snorri Donaldsson och Baldvin Jonsson är vinnarna av årets Athenapris, rPAP. De har belönats för en uppfinning so andningsstöd till för tidigt födda barn

Bild: Adam Wrafter/Bildbyrån

BARNSJUKVÅRD | MEDICINSK TEKNIK | LUFTVÄGARNA | PREMIUM

Små näsor är fokus för årets Athenapristagare

Med sin teknik, som gett dem årets Athenapris, vill forskarna hjälpa för tidigt födda barn att andas på egen hand. Nu utvärderas tekniken i en internationell svenskledd studie.

Publicerad: 2019-11-06 06:00
Petra Hedbom
petra.hedbom@dagensmedicin.se (mailto:petra.hedbom@dagensmedicin.se)

Initial stabilisation of preterm infants: a new resuscitation system with low imposed work of breathing for use with face mask or nasal prongs

Snorri Donaldsson,[1,2] Thomas Drevhammar,[2,3] Leena Taittonen,[4] Stina Klemming,[1] Baldvin Jonsson[1,2]

What is already known on this topic?

- Continuous positive airway pressure delivered with T-piece systems is not pressure stable and has high imposed work of breathing (iWOB).
- The International Liaison Committee on Resuscitation 2010 consensus document states that prongs may be a more effective interface than face mask.
- There are few alternatives to T-piece systems and the clinical importance of pressure stability is not known.

What this study adds?

- The new system is pressure stable and can be used with prongs or face mask.
- A clinical feasibility trial revealed no problems with usage.
- Trials on the clinical effect of iWOB and type of interface are now possible.

CORSAD

Comparison Of Respiratory Support After Delivery on infants born before 28 weeks gestational age

(ClinicalTrials.gov (NCT02563717))

Research question

For infants born <28 weeks of age, can initial respiratory resuscitation with new system (low iWOB and prongs) reduce the frequency of delivery room intubations compared to standard treatment with T-piece system (high iWOB and face mask)?

Summary

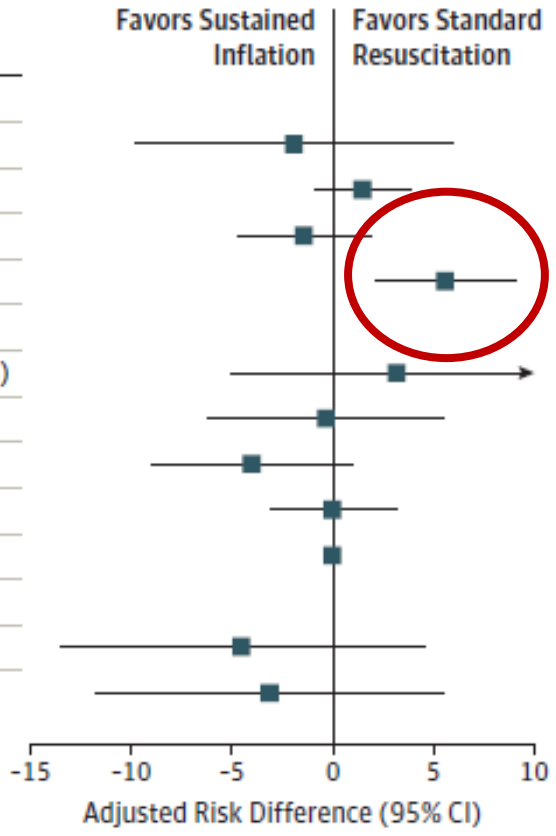
- Two arm randomised comparison of two resuscitation systems, traditional T-piece and New System.
- Multicentre trial (250 patients)
- Infant <28 weeks GA
- Stratified randomisation
- CPAP for 10-30 min, PPV as needed
- Primary outcome DR intubation or death
- Secondary outcomes include safety and respiratory variables up to 72 hours after birth
- GCP standard with monitoring and an eCRF
- Clinical protocol provided for study procedures

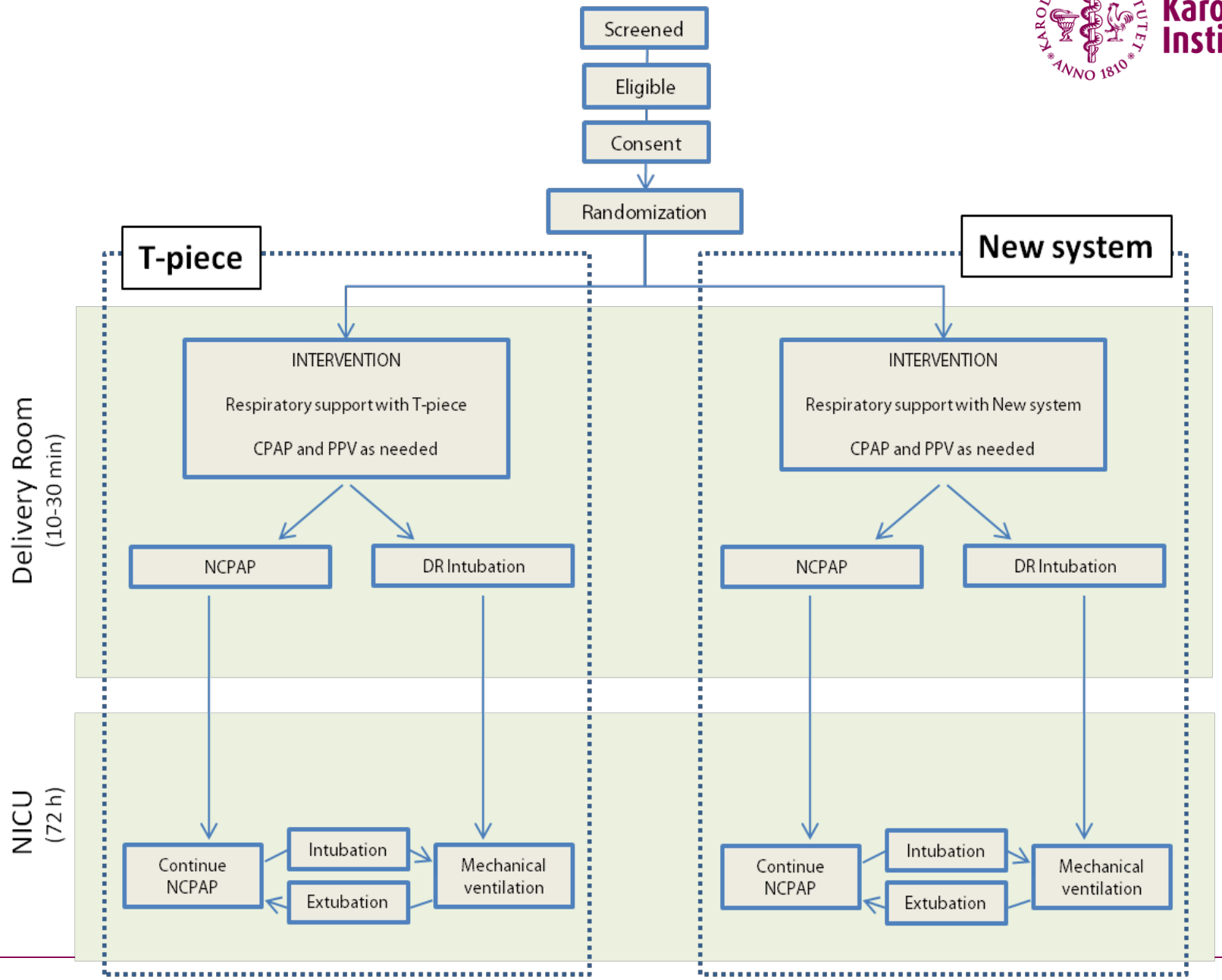
Effect of Sustained Inflations vs Intermittent Positive Pressure Ventilation on Bronchopulmonary Dysplasia or Death Among Extremely Preterm Infants

The SAIL Randomized Clinical Trial

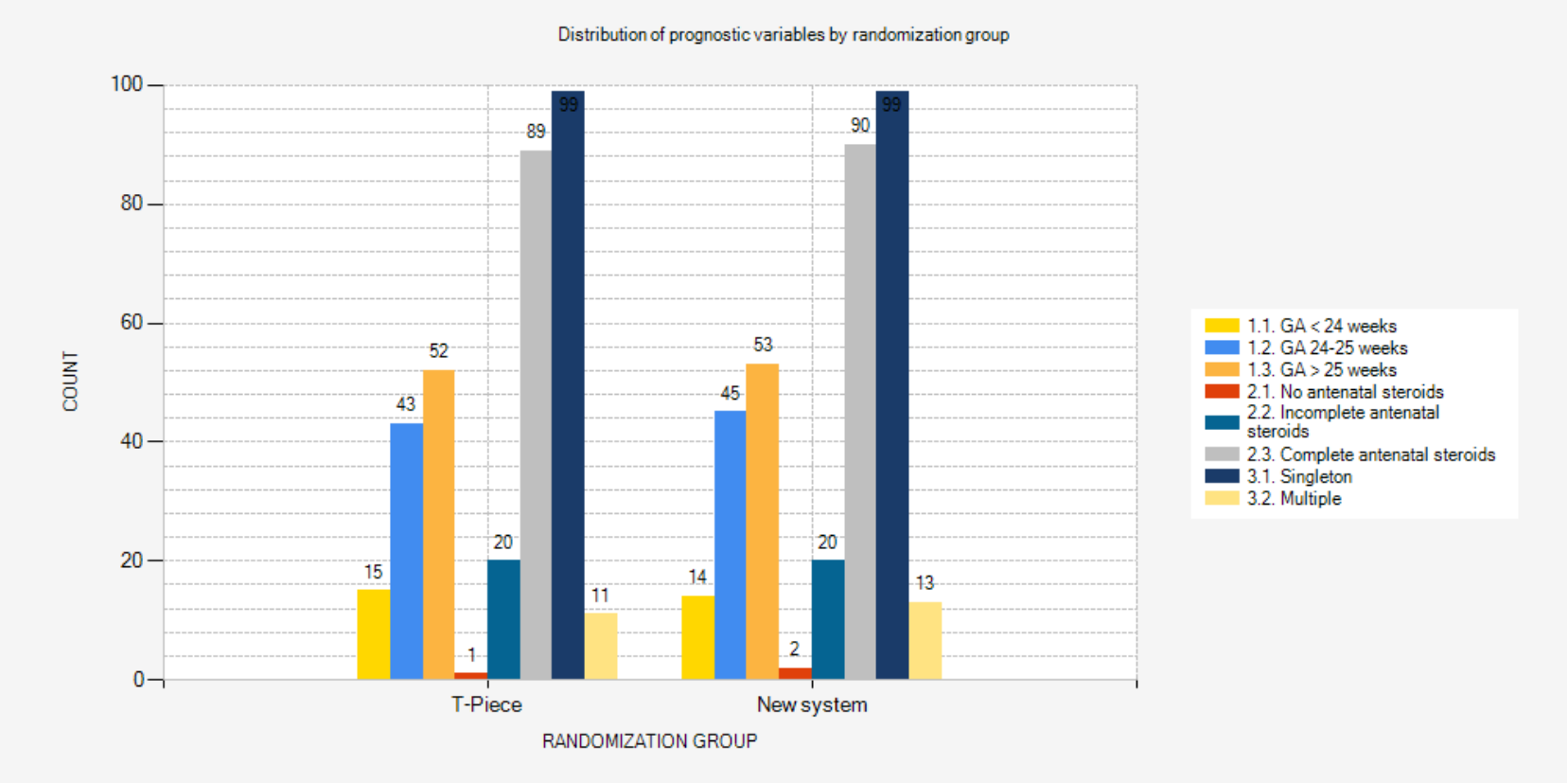
JAMA. 2019;321(12):1165-1175. doi:10.1001/jama.2019.1660

Event	Event Rate, No. (%) Sustained Inflation (n = 215)	Standard Resuscitation (n = 211)	Adjusted Risk Difference, % (95% CI)
Within first 2 days of life			
FIO_2 ≥0.4 for ≥2 h	50 (23.3)	52 (24.6)	-1.9 (-9.8 to 5.9)
Epinephrine	5 (2.3)	2 (1.0)	1.5 (-0.9 to 3.9)
Chest compressions	6 (2.8)	8 (3.8)	-1.4 (-4.7 to 1.9)
Death	16 (7.4)	3 (1.4)	5.6 (2.1 to 9.1)
Within first 10 days of life			
IVH grade I/II	51 (23.7)	44 (20.9)	3.2 (-5.0 to 11.4)
IVH grade III/IV	21 (9.8)	22 (10.4)	-0.3 (-6.2 to 5.5)
Pneumothorax	11 (5.1)	19 (9.0)	-4.0 (-9.0 to 1.0)
Pulmonary interstitial emphysema	7 (3.3)	6 (2.8)	0.0 (-3.1 to 3.2)
Pneumopericardium	0	0	
At 28 days of life			
>30% Oxygen	66 (30.7)	76 (36.0)	-4.5 (-14 to 4.6)
Mechanical support	84 (39.1)	91 (43.1)	-3.1 (-12 to 5.5)

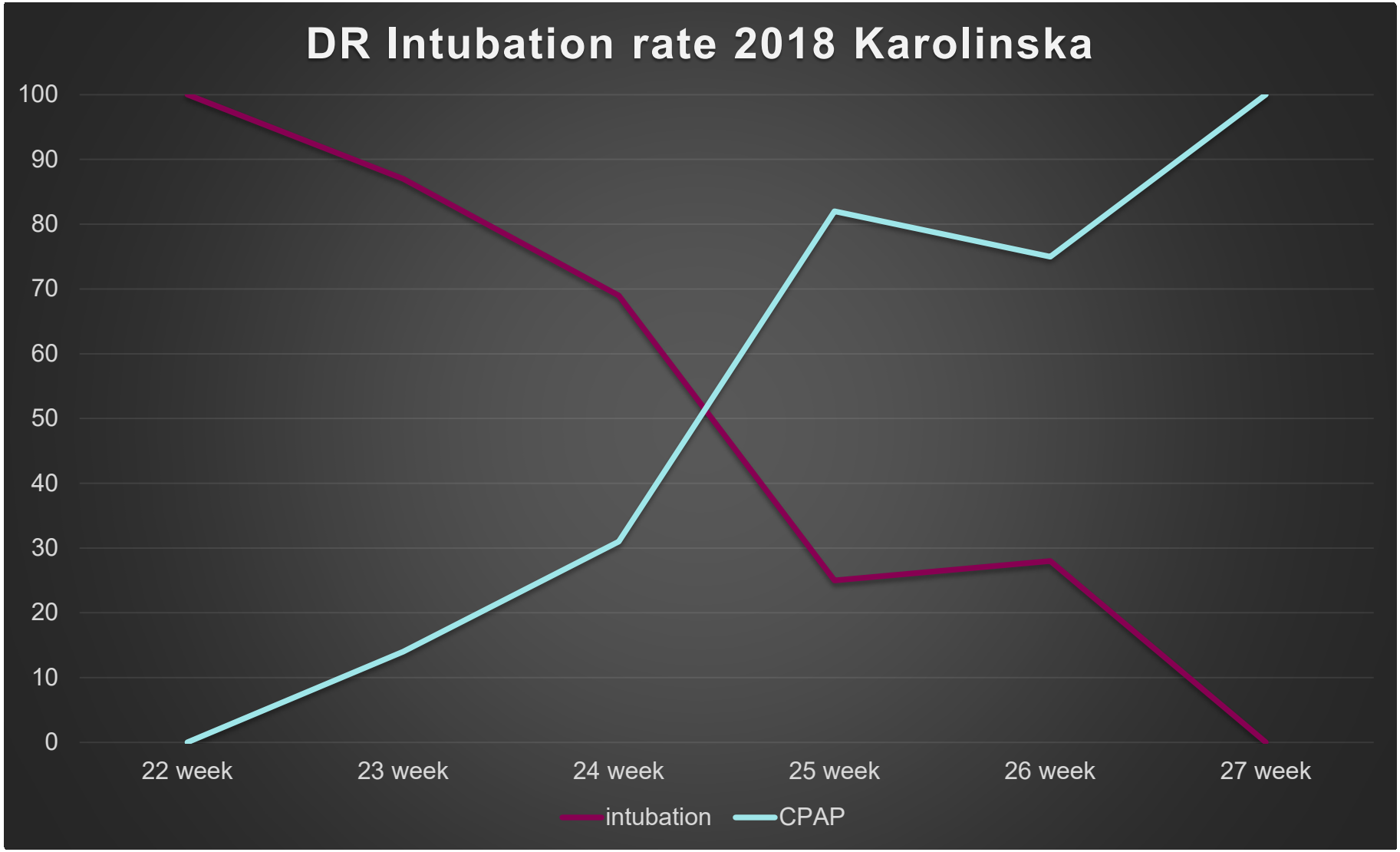



Screened
Eligible
Consent
Randomization
T-piece
New system
Delivery Room
(10-30 min)
INTERVENTION
Respiratory support with T-piece
CPAP and PPV as needed
INTERVENTION
Respiratory support with New system
CPAP and PPV as needed
NCPAP
DR Intubation
NCPAP
DR Intubation
NICU
(72 h)
Continue NCPAP
Intubation
Extubation
Mechanical ventilation
Continue NCPAP
Intubation
Extubation
Mechanical ventilation


WWW.FREEWORLDMAPS.NET
ICELAND
Norwegian Sea
White Sea
NORWAY
FINLAND
Atlantic Ocean
Gulf of Bothnia
SWEDEN
Oslo
Helsinki
St. Petersburg
Tallinn
Stockholm
RUSSIA
ESTONIA
North Sea
LATVIA
Riga
Glasgow
UNITED KINGDOM
DENMARK
Baltic Sea
LITHUANIA
Copenhagen
IRELAND
Dublin
Vilnius
Leeds
Manchester
Sheffield
Minsk
BELARUS
Birmingham
Hamburg
Amsterdam
POLAND
GERMANY
London
Berlin
Warsaw
Düsseldorf
Kiev


Distribution of prognostic variables by randomization group
COUNT
100
80
60
40
20
0
15
43
52
1
20
89
99
11
14
45
53
2
20
90
99
13
T-Piece
New system
RANDOMIZATION GROUP
1.1. GA < 24 weeks
1.2. GA 24-25 weeks
1.3. GA > 25 weeks
2.1. No antenatal steroids
2.2. Incomplete antenatal steroids
2.3. Complete antenatal steroids
3.1. Singleton
3.2. Multiple

SNQ data Karolinska



SNQ data Karolinska