



# Low blood pressure during the first 24 hours – does it matter?



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on behalf of the **German Neonatal Network** and the **Neo-Circulation project**

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**Background:** Blood pressure in preterm infants correlates with gestational age, birth weight and postnatal age. To date, it is not known whether a threshold between “physiologic” low blood pressure and “pathologic” hypotension, causing short or long-term complications, exists. In prior studies, hypotension in very-low-birthweight (VLBW) infants during the first 24 h of life was associated with adverse short-term outcomes such as intraventricular hemorrhage (IVH), bronchopulmonary dysplasia (BPD) and death (1).

## Objectives

- To reevaluate lowest mean arterial blood pressure during the first 24 h of life (minMAP) in a large cohort of VLBW-infants
- To confirm or contradict associations between hypotension and short-term outcome parameters.

**Conclusions:** In a large cohort of VLBW- preterm infants,

- the lowest mean arterial blood pressure during the first 24 h was 1–2 mm Hg below gestational age,
- low arterial blood pressure during the first 24 hours is associated with higher mortality and morbidity.
- This underlines the need for randomized controlled trials on the use of vasoactive drugs in this vulnerable patient cohort.

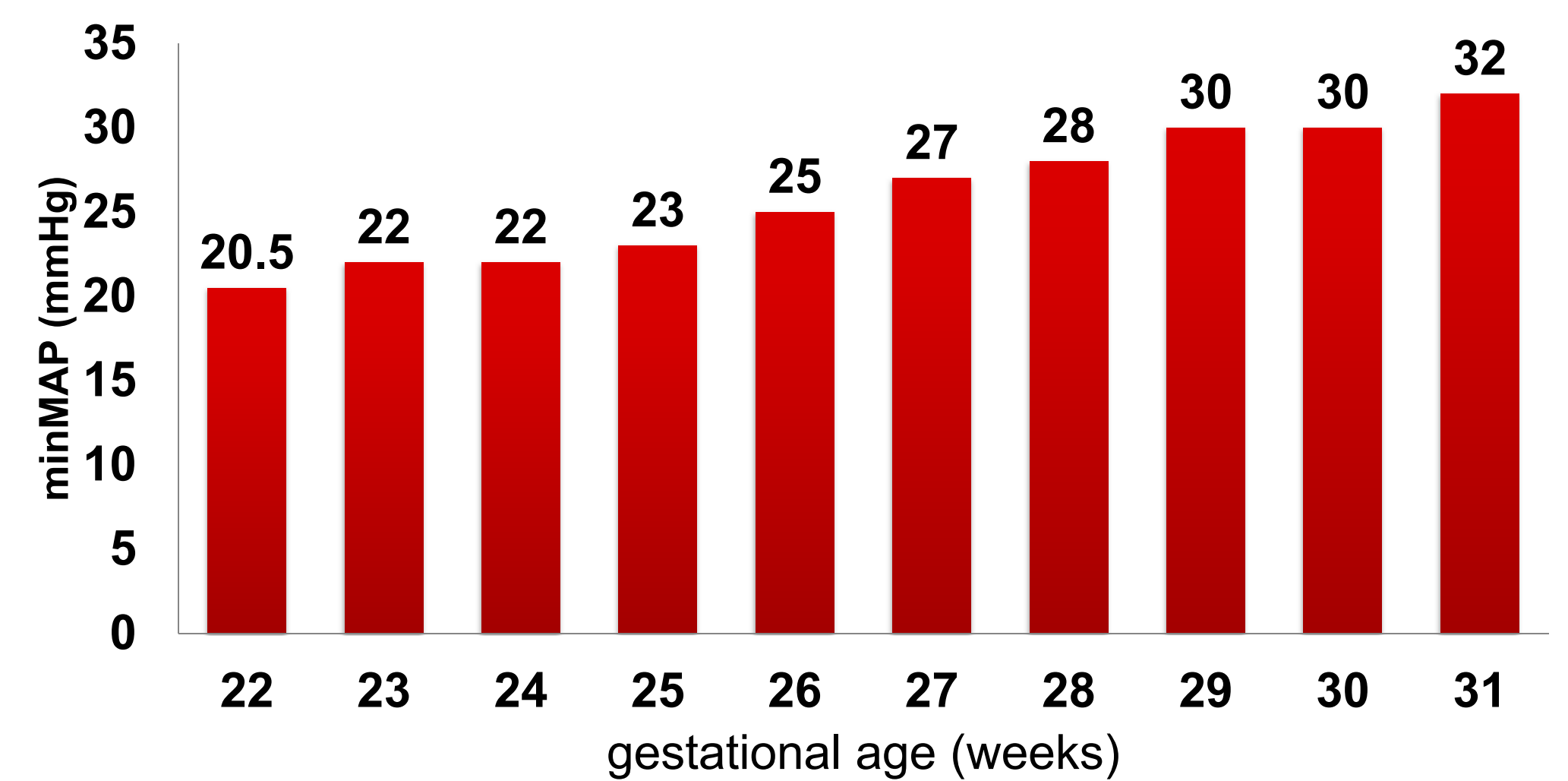
## Results

	„Hypotension“ minMAP < P25	minMAP P25-P75	„Higher Blood Pressure“ minMAP > P75	p
MinMAP (mean, SD)	19.75 (3.34)	27.09 (3.66)	35 (5.32)	<0.001
Gestational age in weeks (mean, SD)	27.76 (2.32)	28.15 (2.27)	28.21 (2.25)	<0.001
Birth weight in g (mean, SD)	982 (313)	1034 (299)	1047 (339)	<0.001
Gender, male in %	50.2	52.8	53.6	0.038
Multiples in %	41.3	36.5	31.1	<0.001
SGA in %	12.9	10.6	10.6	0.031
Caesarean section in %	75.4	79.4	82.7	<0.001
Emergency caesarean section in %	17.4	11.2	7.9	<0.001
5 min APGAR score <7 in %	24.2	17.6	16.1	<0.001
NapH <7,1 in %	5.5	2.6	2.7	<0.001
Mechanical ventilation in %	66.7	51.0	43.2	<0.001

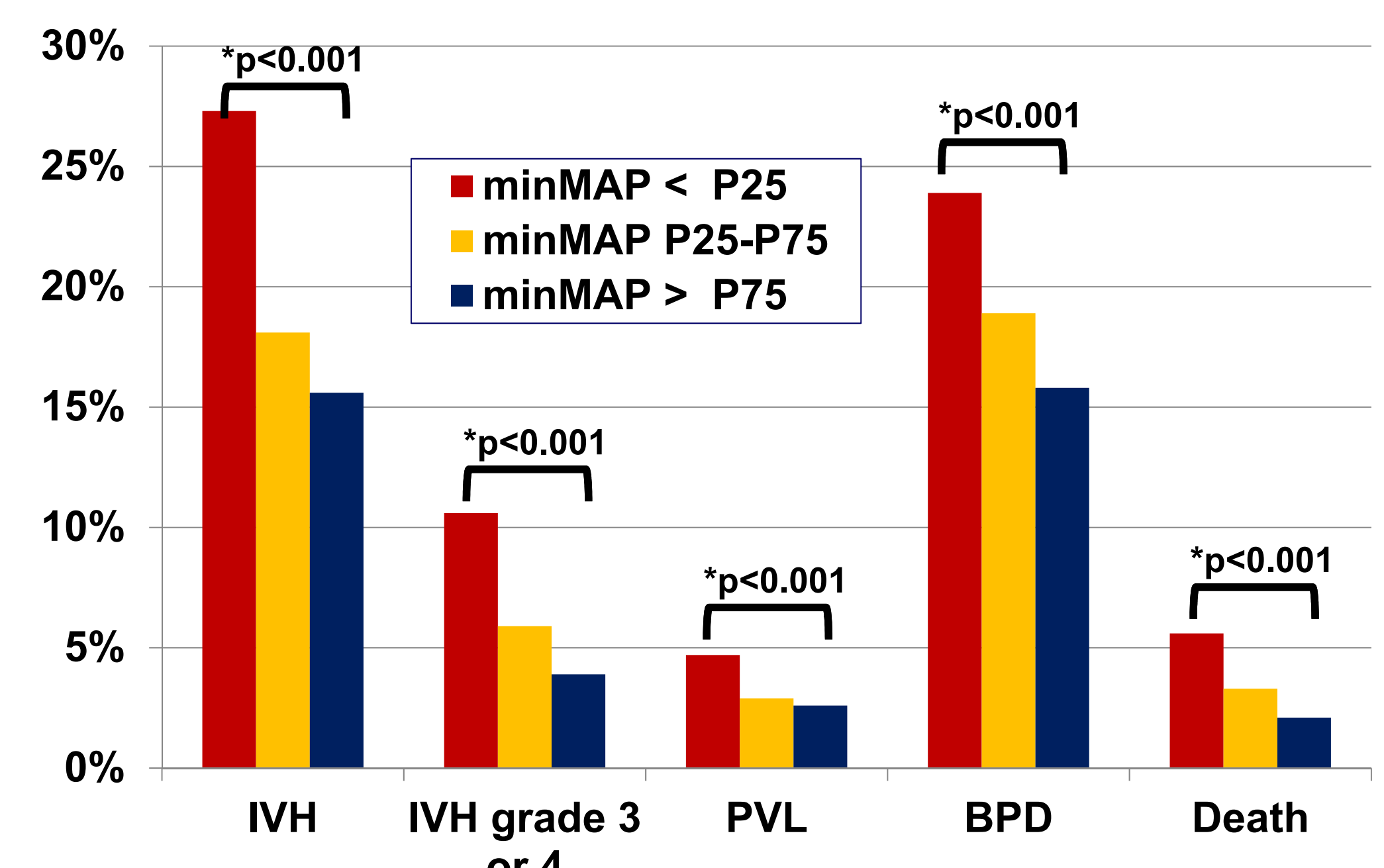
**Fig.1:** Clinical characteristics of the VLBW cohort with gestational age 22+0–31+6 weeks stratified to blood pressure in the first 24 h of life

Groups: “Hypotension”, minMAP in the lowest quartile of all patients of the same gestational age, minMAP P25-75, minMAP in the two middle quartiles of all patients of the same gestational age and “Higher blood pressure” (>P75), minMAP in the highest quartile of all patients of the same gestational age.

- In a second, independent cohort of VLBW-infants, we confirmed associations between hypotension during the first 24 hours of life and short-term parameters such as higher rates of death, IVH, PVL and BPD
- In infants below 27 weeks of gestations, the lowest mean arterial blood pressure during the first 24 h was 1–2 mm Hg below gestational age



**Fig. 2:** Lowest arterial blood pressure during the first 24h (minMAP): median stratified for gestational age



**Fig.3:** Outcome parameters of preterm infants with Hypotension (minMAP < P25) and higher blood pressure (minMAP > P75)

**Methods:** Retrospective cohort analysis of the minMAP of 7806 VLBW infants with a gestational age <32 weeks in correlation with clinical data. Hypotension was defined as minMAP being in the lowest quartile of all patients of the same gestational age (in completed weeks) and was compared to higher blood pressure, defined as minMAP being in the highest quartile of all patients of the same gestational age.

Data were analysed with SPSS Statistics V.20.0. We used  $\chi^2$ , Fisher’s exact test and Mann–Whitney U test for explorative analysis. Multivariate logistic regression models were used for retesting of associations. A p value <0.05 was considered as statistically significant.

Abbreviations: minMAP, lowest mean arterial blood pressure during the first 24 h of life; VLBW, very-low birth weight; SGA, small for gestational age (birth weight <10<sup>th</sup> percentile); P, percentile; IVH, intraventricular hemorrhage; PVL, periventricular leukomalacia; BPD, bronchopulmonary dysplasia;