

Perinatal care at the threshold of viability; Part I: Systematic Analysis of Outcomes and Resource Needs for Neonatal Intensive Care Units to inform Healthcare Planning

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The aim of this project was to provide a decision support for resource planning of neonatal intensive care units (NICUs) in Austria. We collected evidence on the clinical outcomes in terms of survival and survival without neurodevelopmental impairment (NDI) of extremely preterm (EP) infants, as well as evidence on the resources needed in NICUs.

The research questions were answered with mixed methods. A systematic review (SR) of the clinical outcomes survival and survival without impairment in relation to gestation week (week 22+0 until 25+6) was performed in five databases (Medline via Ovid, PubMed, Embase, The Cochrane Library, CRD). The search was limited to publications from the last five years and to secondary evidence (SR, Meta-Analysis, MA, HTA-reports). An additional systematic search on resource needs was conducted in the same databases, and data on the number of periviable births in Austria was collected. The literature search was complemented with semi-structured interviews with the heads of neonatal intensive care units (NICUs) in Austria.

The systematic review on outcomes found that survival calculated as percentage of liveborn infants ranged from 9% to 27%, 55%, and 73% at 22, 23, 24, and 25 weeks of gestational age (GA), respectively. The chances for survival without severe impairment were estimated to be 43%, 47%, and 61% at 23, 24, and 25 weeks of GA, respectively. Data on week 22 was insufficient. The results of international studies were very heterogeneous and showed large differences in survival rates. Outcomes on survival with or without neurocognitive impairment were considered imprecise due to low case numbers, especially for 22 and 23 weeks of GA. Consequently, the quality of the evidence was graded to be very low.

The literature review on resource needs concluded that because there is a trend towards improved outcomes of EP infants, ensuring an adequate level of nursing staff was the key challenge. In line with the international literature, ensuring an adequate level of nursing staff to respond to the increased workload was also identified as a key problem shared amongst NICUs in Austria. The current shortage of nursing staff could not only lead to a deterioration of outcomes for patients, but also to closed beds and transfers from one clinic, or region, to another.

In order to capture resource needs for the Austrian context, future research would need to analyse primary quantitative data from Austrian perinatal care centres. Data on outcomes, lengths of stay, staffing requirements and applied interventions, would allow planning of resource allocation and cost-budget as well as impact analysis. Regarding quality of care, outcome data of different clinics would give insights into potential centre level differences.

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