

Clinical Variability in Neonatology: Context Matters

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In their article in this issue of *Pediatrics*, Helenius et al¹ remind us of the variations that exist across countries in the care that children receive. By analyzing data from the International Network for Evaluating Outcomes of Neonates, the authors found significant differences in the standardized survival ratios among neonates born at 24 to 29 weeks' gestation in 11 high-income western countries and regions, ranging from 1.10 in the best-performing country to 0.88 in the worst-performing country. Interestingly, the rank order of the standardized ratio for survival was similar at each week of gestational age, suggesting that the factors that drive the observed differences are systematic.

This survey is largely area-based, although, for some large nations (eg, Japan, the United Kingdom, and Spain), the coverage is far from complete. Therefore, the exact figures for a given country might be different from those reported in this article, but compared with data from the United States (from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Research Network² and the Vermont Oxford Network³), the survival rates in the International Network for Evaluating Outcomes of Neonates study are remarkably similar; at each gestational week, the maximum difference among the 3 networks is 2%.

These results are not unexpected. Variations in care and outcomes are ubiquitous and are hardly explained solely by differences in case mix. The importance of studying such variations

is found in trying to elucidate the causes by uncovering patterns and mechanisms for these variations and, ultimately, by developing interventions leading to improvement. Observational studies like this one can help generate hypotheses and can reveal points for further study.⁴

One of the challenges in sorting out causes of variation in this study and others is that the researchers' choices regarding study design often determine what is found and what remains in the background. By rolling up many risk factors into a country as the exposure variable, the authors implicitly focus on countless economic, organizational, cultural, and social differences that cannot be separated in this analysis, which include differences in the gross national product, maternal age at delivery, organization of perinatal regionalization and transport, and number of multiple births, to name but a few of the items listed by the authors in this and another recent study.^{1,5} Moreover, even within nations, there are inequalities that affect health (including social class and socioeconomic status, geographical area, and ethnicity),⁶ despite the presence of a national health system. For instance, the neonatal mortality rates in the most deprived areas of England are more than twice as high as those in the least deprived areas, according to 1 report.⁷ A significant ethnic disparity in quality of care has been demonstrated in California NICUs.⁸ In Italy, a clear North-South gradient for neonatal mortality is apparent.⁹ Although Helenius et al¹ do not provide any estimate of the within-country variability, the authors

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of other studies suggest that it is substantial.¹⁰

Given the wide-ranging sources of variability, where do we go from here? Tackling variations in socioeconomic status is clearly beyond the reach of a practicing clinician. Nevertheless, the community of neonatologists and obstetricians can play a role in reducing this variability. We share a common culture in which we strive to give each new life the best start possible and in which we are firmly committed to increasing the adoption of evidence-based interventions, a goal still not achieved.^{1,5,11} By using this approach, we focus on biological similarities between human beings, which should guarantee that treatments have the same effect everywhere, and we downplay the differences caused by social, economic, cultural, and organizational factors that affect generalizability.¹² However, implementation must be tailored to the unique circumstances within each practice site. Even the effectiveness of a strong evidence-based intervention, such as antenatal steroid prophylaxis, depends on context, as is clear from the negative results of a recent trial in low- and middle-income countries.¹³

The task is therefore to understand how to blend evidence-based interventions and local context, that is, to understand how to go “glocal.” Collecting and analyzing data on outcomes and comparing the results with a benchmark or with peer countries, as has been done in this study, is the first step, and it can begin to reveal where we should focus our efforts. Comparisons between countries may also reveal differences in procedures that can be related to outcomes. How to best meet the challenge of quality improvement is still not clear.¹⁴ The field of quality improvement mainly follows precepts taken from the industry,¹⁵ and further research is needed on this topic.

With their results, the authors of a simulation study,¹⁶ who intriguingly borrow from classic evolutionary biology,¹⁷ indicate that investigating and implementing better practices arising from local comparisons might be more effective than uniformly applying standard interventions from large-scale studies.¹⁶

The problem of reducing variability, implementing effective treatments, and continually improving the quality of care still needs to be solved. This study by Helenius et al¹ is welcome because its authors focus our attention beyond the individual clinical features of each neonate, reminding us of the importance of our attitude regarding local and global comparisons.

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