

Researchers Develop New Statistical Methods Which Reveal New Information about Mortality Risk in Preterm Infants

Epidemiology and Biostatistics Associate Professor [Marco Geraci](#) and Assistant Professor [Nansi Boghossian](#) (Arnold School of Public Health, University of South Carolina) have collaborated with researchers at the University of Vermont and the University of Rome to conduct a study on mortality risk in preterm infants based on head-to-body proportions. Their study was published in [Statistical Methods in Medical Research](#).

With this project, supported by an [ASPIRE](#) grant and NIH funding, the authors developed an approach to risk classification based on quantile contours and allometric modelling of multivariate anthropometric measurements. They propose using the allometric direction tangent to the directional quantile envelope to identify abnormal ratios.

They apply the proposed approach to a large dataset from the Vermont Oxford Network containing observations of birthweight and head circumference for more than 150,000 infants born very preterm at 22 to 29 weeks' gestation.

“We know that growth-restricted preterm infants have a higher risk of mortality as compared to infants whose size is appropriate for their gestational age. However, the negative effect of growth-restriction is compounded by a disproportion between head and body,” says Dr. Geraci. “Our analysis suggests that disproportionately growth-restricted infants with a larger head circumference-to-birthweight ratio are at increased mortality risk (about 50-60% higher) as compared to proportionately growth-restricted infants. We estimated that, of the more than 3,000 very preterm infants born each year in the US, about 1,300 are born disproportionately growth-restricted and, therefore, should be classified as being at higher risk of mortality” says Geraci. “Our methods can be applied not only to other anthropometric ratios such as the body mass index (heart disease and type 2 diabetes) or the waist-to-height ratio (prehypertension), but also ratios commonly found in clinical and biomedical studies, like the ratio between insulin and C-peptide (pancreatic cancer), the ejection fraction (heart failure), the albumin-to-globulin ratio (liver insufficiency, immunodeficiency and cancer), and metabolite ratios (type 2 diabetes) to mention a few.”