

The Clinical and Policy Implications of New Measures of Premature Infant Growth

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With the rates of premature delivery still exceeding 11% and increased survival rates, there has been growing attention to the processes of care during a child's stay in the NICU that optimize their short- and long-term outcomes. As pointed out in the recent article by Olsen et al,¹ the appropriate growth of a prematurely born infant may have a significant impact on his or her developmental and growth outcomes after discharge from the NICU. In fact, appropriate growth encompasses many aspects of the care of the premature infant besides the monitoring of growth parameters and providing appropriate fortified nutrition.² For example, infants with more severe pulmonology complications of preterm birth are more likely to have growth failure,³⁻⁵ which may follow them after discharge from the NICU.⁶ Thus, assessing an individual NICU's ability to appropriately grow the premature infants in their care may be a comprehensive measure of the clinical care at that NICU. Do we have the data, with the addition of the BMI growth curves developed by Olsen et al, for this to occur?

Several issues remain in the assessment of growth and nutrition in the NICU. First, length is typically an inaccurate measure. For example, a study from Australia found that 59% of the length measures taken on term infants using measuring tape compared with measurement boards differed by >0.5 cm and that 53% of infants had different growth curve percentiles depending on the method of measurement.⁷ Similar differences

were seen in outpatient clinics.⁸ The data used in the development of the BMI growth curves notes that "measuring tape or length board" provided data for this study. Although measurement boards are considered more accurate, they are more invasive to use and could cause increased distress in fragile, sick infants. Until there are more precise but less invasive methods of obtaining lengths, the imprecision in many measurements of length will be a barrier to the use of BMI or any other measure that combines weight and lengths.

Because BMI is a relatively new measure for premature infants, there is limited information about the association between abnormally high or low BMIs and outcomes of preterm infants. This is particularly important because of recent information about the importance of high BMIs in infants and later obesity in adolescence and early adulthood,^{9,10} as well as hypertension.¹¹ Such information still needs to be collected and assessed for BMIs collected during the neonatal intensive care course.

The final issue surrounds what to do with this information. Clinicians already have weights and length data at their disposal. However, without information on the body composition of the infant, and targeted methods to improve linear growth or protein accretion over fat deposition, clinical care typically revolves around modifying the 1 thing that clinicians have control over: caloric density. This article highlights the lack of

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information about appropriate body composition of preterm, growing infants and methods to optimize their growth and development.

The work of Olsen et al is an innovative step toward giving clinicians more information to adjust their provision of nutrition in the NICU. However, those methods remain elusive, require more research, and likely will require individualization based on the infant's birth weight, gestational age, growth trajectory, and presence of other conditions such as pulmonary health. These data also highlight areas that still need investigation before we develop "ideal" ranges of body composition and/or anthropomorphic measures such as BMI for clinical care, and begin to consider growth as a quality metric of neonatal intensive care.

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