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Pediatric Endocrinology Nursing Society Department

PENS 2023 Position Statement on Linear Growth Measurement of Children☆☆☆



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Executive summary

The Pediatric Endocrinology Nursing Society (PENS) is committed to advancing the art and science of pediatric endocrinology nursing using evidence-based practice. PENS members specialize in the nursing care of children with disorders of growth and hormone regulation. Measuring the linear growth patterns of children is an essential component of child health surveillance. When concerns arise about patterns of growth, children are generally referred to and evaluated by pediatric endocrinology. The PENS organization believes that nurses in all areas of pediatrics are in a unique position to ensure accurate and reliable growth measurement, thereby promoting the timely recognition of abnormal patterns of growth.

The PENS growth measurement position statement was originally developed in 2014 and was published in the *Journal of Pediatric Nursing* (Foote et al., 2015). As the research progressed regarding methods for growth assessment and the racial and gender disparities in the assessment and treatment of growth disorders, a revised position statement was required. The 2023 updated position statement was developed by a PENS subgroup and resulted from a thorough review of the literature. This position statement outlines recommendations for healthcare providers and organizations to improve the accuracy and reliability of linear growth measurements. Ongoing advocacy and leadership by pediatric nurses are needed to share this statement widely and incorporate into practice.

Background

Since healthy infants and children have predictable patterns of linear growth (length/height), normal growth is used as a standard for

assessing child health and well-being (American Academy of Pediatrics, 2023; Centers for Disease Control and Prevention, 2010). Children with growth pattern deviations (e.g., unexplained short or tall stature, growth failure, growth acceleration) should be evaluated to differentiate between normal growth variants and pathologic conditions. Growth is such a sensitive indicator of health that abnormal growth may be the earliest sign of pathology (Craig et al., 2011; Haymond et al., 2013). Pathological growth may result from nutritional disease, a genetic disorder, an endocrine cause, psychosocial problems, intrauterine growth retardation, or systemic disease and/or disease progression or exacerbation (Haymond et al., 2013; Richmond & Rogol, 2023; Rogol & Hayden, 2014). Females and children of color are less likely to be referred for evaluation of growth failure, less likely to be treated with growth hormone, and are more likely to have an organic cause of growth failure (Beliard et al., 2022; Grimberg et al., 2015; Hawkes et al., 2021; Lipman & McCurry, 2017).

Growth assessment accuracy is tantamount (UNICEF, 2019). Measurement error can occur when inaccurate instruments are used to obtain length or height (Berkson et al., 2013; Foote, 2014; Foote et al., 2020; Lipman et al., 2004). Incorrect technique by the measurer is another source of measurement error (Foote et al., 2020). Therefore, it is critical that measurers are educated in correct technique, with their competency validated. Studies have shown that regular training, supervision, and standardization (Becquey et al., 2013; Lipman et al., 2004) as well as limiting the number of examiners obtaining measurements (Geeta et al., 2009) increase the precision of anthropometric measures. Measurements obtained by registered nurses were more accurate than those obtained by other personnel (Hench et al., 2005). When a standing height cannot be obtained in a child older than 36 months of age, segmental measurements can be obtained to estimate height although correlation is variable (Lamounier et al., 2020). Three-dimensional optical imaging devices for acquiring anthropometric measurements are being utilized for adults, but accuracy in children has been inconsistent (Kennedy et al., 2022). Growth measurement error can lead to misinterpretation of growth patterns, resulting in delayed diagnosis and treatment in some children and inappropriate referral of normally growing children.

An interdisciplinary team critically evaluated the evidence to develop a clinical practice guideline on linear growth measurement of children (Foote et al., 2009) that was reviewed by PENS experts and

☆ The Pediatric Endocrinology Nursing Society (PENS) is committed to the development and advancement of nurses in the art and science of pediatric endocrinology nursing and to improve the care of all children with endocrine disorders through the education of the pediatric healthcare community. To aid in achieving that goal, the purpose of the PENS department is to provide up-to-date reviews of topics relevant to the PENS membership and to the general readership of the *Journal of Pediatric Nursing*.

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endorsed by the PENS organization. The purpose of the guideline is to assist health care personnel in using standardized instruments and techniques to accurately and reliably measure growth. Pilot testing of the guideline revealed its ease of use and high intra-examiner and inter-examiner reliability (Foote et al., 2011).

PENS encourages nurses to examine and improve growth measurement practices in their primary care, acute care, specialty care, school, and community health settings. Strategies to improve growth measurement practices have been published (Foote, 2014; Lipman et al., 2004). In addition, routine growth monitoring of children is a convenient and cost-effective method of assessing general health status (Fayter et al., 2008).

Position

As nursing experts on children's growth and advocates for all children, the Pediatric Endocrinology Nursing Society:

1. Supports the American Academy of Pediatrics recommendations for growth measurement during periodic health maintenance visits;
2. Encourages health care providers to measure linear growth during visits because of illness when health maintenance visits are missed, during chronic disease visits, and during hospitalizations to avoid missed opportunities to detect growth problems;
3. Supports programs to train measurers and ensure competency;
4. Stresses the need to advocate for equitable evaluation of growth and treatment of growth disorders for all genders and racial/ethnic populations;
5. Endorses evidence-based clinical practice guidelines on linear growth measurement;
6. Supports the use of standardized and calibrated length boards and stadiometers to measure linear growth;
7. Supports obtaining segmental measurements of children who are unable to stand up straight;
8. Opposes the use of tape measures (to measure the length of infants and other children who cannot stand alone) and height measurement instruments attached to weighing scales (with floppy-arm devices);
9. Supports measuring children at least twice at each encounter and recording the mean of the measurements;
10. Encourages institutions to adopt policies and procedures on growth measurement of children;
11. Supports the use of growth charts to identify patterns of growth and compare them with population-based normative data. PENS supports the CDC recommendation for use of WHO growth charts for children from birth to 2 years of age and CDC growth charts for children 2 years of age and older; and
12. Advocates for the review of growth patterns after each measurement to determine if: 1) the child is growing adequately; 2) the child's growth requires closer monitoring, further evaluation, treatment, or referral; and 3) the child needs to be re-measured due to possible measurement error.

Approved by the Pediatric Endocrinology Nursing Society (PENS), September 2023.

Endorsed by the Pediatric Endocrine Society (PES), November 2023.

Endorsed by the Canadian Pediatric Endocrinology Nurses (CPEN), November 2023.

Endorsed by the Society of Pediatric Nurses (SPN), January 2024.

Resources

Linear growth measurement resources can be accessed through the PENS Web site at <https://pens.org/pens-resources/linear-growth-measurement/>.

The American Academy of Nursing features a *Raise the Voice EDGE RUNNER* training program on linear growth assessment that can be accessed at <http://www.aannet.org/edge-runners-improving-the-accuracy-of-linear-growth-assessment-in-children>.

Declaration of competing interest

None.

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