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## Editorial

# Pediatric and Neonatal Malnutrition: A Collaborative, Family-Centered Approach Improves Outcomes

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Assessment of nutritional status and ensuring adequate nutrient intake are essential components of health care for infants and children who are ill. Pediatric malnutrition is defined as “an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development, and other relevant outcomes.”<sup>21</sup> It is either illness-related or caused by social/environmental factors that result in decreased nutrient intake. It is classified as acute (less than 3 months) or chronic (greater than 3 months) in duration.<sup>1</sup>

Malnutrition should be documented and treated for several reasons.<sup>2</sup> Although malnutrition is common—especially among hospitalized children with acute or chronic illness, special health care needs, and socio-environmental issues such as abuse, homelessness, or limited access to high quality nutritious food<sup>3,4</sup>—its true prevalence is underreported and not well understood. According to Healthcare Cost and Utilization Project data from 2002-2011, 2.6% of children hospitalized annually received a coded diagnosis of malnutrition; and overall prevalence increased by 8% annually during the same time frame.<sup>3</sup> Previous studies using criteria other than coded diagnosis of malnutrition have reported a prevalence of 6% to 51%.<sup>1</sup> Very low-birth-weight infants are also at high risk for malnutrition due to increased nutrient requirements and altered nutrient utilization related to an immature gastrointestinal tract. Research indicates extrauterine growth failure, usually defined as weight less than the 10<sup>th</sup> percentile at discharge or 36-40 weeks, is common in preterm infants.<sup>5-7</sup> Awareness of pediatric undernutrition by health care providers has increased over the past 5 years; yet without an accurate understanding of malnutrition prevalence during infancy and childhood, the clinical significance and associated costs are difficult to quantify.

Malnutrition increases consumption of health care resources due to its association with adverse outcomes. These adverse outcomes can range in severity and have lifelong repercussions in some cases: loss of lean body mass, muscle weakness, developmental/intellectual delays, infections, immune dysfunction,

delayed wound healing, prolonged length of hospital stay, and even death.<sup>1,3,8</sup> Optimal nutrition can also ameliorate medical complications of prematurity that are associated with increased length of stay and costs.

Diagnosing malnutrition can increase reimbursement for hospital care for an individual patient and over time increases the acuity factor for the facility.<sup>2</sup> ICD-10 codes E44.1 (mild protein/calorie malnutrition), E44.0 (moderate protein/calorie malnutrition), and E43.0 (severe protein/calorie malnutrition) should be used in place of P92.6 (failure to thrive). Even if reimbursement is not increased, malnutrition should be identified, evaluated, treated and monitored for optimal long term outcomes. Malnutrition added to the problem list on the discharge summary will inform the medical staff following the patient post discharge to continue focus on the correction of growth deficiencies. Nutrition affects growth and development and can have lifelong impact.<sup>9</sup> The first 1,000 days of life is the peak time for brain development, and brain development is dependent on optimal nutrition. Research indicates that there are critical periods in brain development that depend on the availability of specific nutrients and that later supplementation cannot make up the deficit.<sup>2</sup> A strong relationship between nutrition, brain growth, and neurodevelopmental outcomes exists. Several studies have demonstrated a link between poor growth and neurocognitive development up to 19 years of age.<sup>5,10-22</sup> Early aggressive nutrition during the first two weeks of life promotes better brain growth and accelerated white matter maturation and promotes better growth.<sup>23-27</sup> Poor head growth during the NICU stay and post discharge has been associated with motor and cognitive delays.<sup>28</sup> Catch-up in weight and head growth after 36 weeks improves neurodevelopmental outcomes.<sup>6,7,28</sup> Research supports a link between length, brain development, and neurocognitive outcome.<sup>16,17,19,29-31</sup> This link is reinforced by body composition studies that have revealed less lean body mass with similar fat mass in preterm infants, even late preterm infants, at hospital discharge compared to term infants.<sup>32-35</sup> This linear growth failure combined with expected fat mass accretion suggests that a decline in length z

scores or inadequate linear growth velocity is an important indicator of malnutrition in preterm infants and neonates. Early monitoring of growth to detect growth deficits is a strategy for improving growth outcomes.<sup>24</sup>

The most rapid growth phase in the life cycle occurs in preterm infants and neonates and they are most vulnerable to calorie, protein, and nutrient deficits during this time. Variations in growth rates between NICUs can be attributed to variations in nutrition practices.<sup>36-44</sup> There is substantial research that supports the fact that nutrition practices impact growth and that extrauterine growth failure can be ameliorated or prevented.<sup>36-42,44-47</sup>

In 2014 the Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition published a consensus statement with recommended indicators for identification of pediatric malnutrition in children 1 month of age to 18 years of age.<sup>4</sup> The indicators describe criteria for mild, moderate, and severe malnutrition based on weight, length, BMI, weight for height, mid-upper arm circumference and nutrient intake. Preterm infants and neonates less than 28 days are not included. To fill this gap, the Pediatric Nutrition Practice Group of the Academy of Nutrition and Dietetics published recommended indicators for identifying malnutrition in preterm infants and neonates in 2018.<sup>48</sup> The indicators also describe criteria for mild, moderate, and severe malnutrition using weight, length, and nutrient intake.

Identification of malnutrition starts with nutrition screening which is often completed by nurses. Nutrition screening, although conducted through different processes at different institutions, has the shared goal of identifying malnutrition risk in a timely manner so that a nutrition care plan can be implemented to prevent further deterioration in nutrition status and subsequent unfavorable outcomes. Because nurses and nursing staff have early and consistent contact with pediatric and neonatal patients and their families, their role in the process of nutrition screening, identification, documentation, and implementation of treatment plans for malnutrition should not be understated. From the initial physical exam when signs and symptoms of muscle wasting and subcutaneous fat loss may be observed; to assistance with feeding, bathing, dressing, and other activities of daily living when delays and changes from a child's baseline functional status may be noted; to facilitating consults and referrals for clinical nutrition services; to noticing the affect and interactions of caregivers with their children throughout the course of bedside care; to the rapport that is developed between nursing staff and families and also with the entire health care team; to obtaining and documenting accurate anthropometric measures used in malnutrition assessment as well as in monitoring and evaluation of the care plan; to ensuring the timely and appropriate administration of nutrition orders; the list of ways in which nurses and nursing staff are essential to the nutrition care process goes on and on. For one example, accuracy of the diagnosis of malnutrition is dependent on precise anthropometric measurements obtained using recommended technique and equipment. Length measurements obtained using a nonstandard length board or a tape measure are frequently inaccurate when compared with measurements obtained using recommended equipment and technique.<sup>49</sup> Valid length measurements can increase the number

of infants identified with growth abnormalities.<sup>50</sup> Nurses may be the first member of the health care team to recognize red flags and other malnutrition risk factors, they often have the best sense of family dynamics, and they are indispensable allies for pediatric and neonatal registered dietitian nutritionists in our quest to create optimal health for infants, children, and adolescents through the healing power of food and nutrition.

The identification and documentation of pediatric undernutrition, especially illness-related malnutrition often seen in acute care as well as hospital ambulatory care settings, is a multi-step process. Recommended indicators are evidence-informed and consensus-derived, and a validation effort is currently underway with the Malnutrition Clinical Characteristics Validation and Staffing Optimization Study by the Academy of Nutrition and Dietetics. In addition to evaluating the predictive validity of the indicators in relation to patient outcomes, interrater reliability and quantification of nutrition care associated with improved inpatient outcomes will be evaluated.<sup>51</sup> As a result; we will undoubtedly see future changes to the process. The goal to identify malnutrition risk sooner, intervene earlier, and prevent adverse outcomes will not change. Nor will the fact that effective management of pediatric and neonatal malnutrition requires collaborative, interdisciplinary, and patient-centered interventions. All members of the health care team must recognize the impact of malnutrition on quality of life, on both developmental and treatment outcomes, and on reimbursement for services. They must recognize the urgency surrounding early identification and treatment of undernutrition in all patient populations from preterm infants to adolescents and on into adulthood. New research is needed in establishing interdisciplinary protocols for screening, diagnosis, treatment, and coding. More data is needed on prevalence for national benchmarking in order to evaluate trends and measure the effects of interventions. Keeping up with the changing landscape of malnutrition might seem overwhelming or even unnecessary at times. But pediatric malnutrition is one thing we can't afford to overlook on any day or any shift.

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## Editorial

# Challenges Facing Pediatric Dentistry Diplomates and the American Board of Pediatric Dentistry: Setting the Bar for Minimal Competency vs. Excellence

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## ABSTRACT

Over the past two decades, the American Board of Pediatric Dentistry (ABPD) has admirably and conscientiously grappled with the dilemma of how to maintain the bar of clinical competency while vastly enhancing its membership numbers to pursue board certification. This editorial seeks to discuss the changes which have occurred historically that has impacted on the nature and quality of the examination process that is used to determine what constitutes a level of competency for pediatric dentists in the U.S. For matters of practicality and consistency throughout various disciplines within medicine and dentistry, perceptions have increasingly moved in the direction that a degree of competency be defined for which the vast majority of providers potentially qualify. While it would be optimal to set the bar for achievement at the level of excellence, doing such excludes the bulk of practitioners as previously existed in health care during the previous half-century. The need to redefine what sufficiently constitutes merely an acceptable level of comprehension has become the rule rather than the exception by today's standards. Recognition of the achievement of excellence, while beyond the purview of certifying boards, might still best be re-examined, re-designed and awarded to the benefit of the practitioners and public these boards are intended to endorse and serve. The fact of the matter is that satisfactory completion of current board certification does not carry the weight or prestige it once represented. Certification boards might do well to reassess or reframe the reward of Diplomate status on the basis of the achievement of excellence *vs.* adequacy that is measured.

Prior to 2002, the process of board certification in pediatric dentistry involved a rigorous four-part format which required a minimum of three to four years to complete. The initial or eligibility part began with an all-day written examination based and referenced from a well-conceived and lengthy 200 article reading list of classical and contemporary literature spanning all relevant and related areas of pediatric dentistry. Upon completion of part 1, applicants were considered eligible to participate in the next three sections. Part 2 included freelance style oral examination by two peers over approximately one hour on any conceivable subject(s). Part 3 consisted of submission of 5-6 documented cases involving specific but commonly seen clinical entities requiring pre-treatment, immediate post-treatment, and follow-up results to demonstrate and document ones diagnostic and clinical skills. The final section, Part 4, included an all-day site visit to illustrate clinician judgment,

hands-on skills and general decorum and staff interaction in one's clinical setting. This author completed the certification process in 1983, a time when approximately 15% of the membership the American Academy of Pediatric Dentistry (AAPD) had sought and completed certification. The process of board certification between specialties at this time was similar with some minor degree of variation and expectation while the focus was sustained toward the pursuit of excellence. At that time a similarly small percentage pursued certification in orthodontics. An image of elite status prevailed that readily acknowledged that those having completed the process were considered among the brightest and most talented in their field.

Many if not the vast majority of specialists elected not to pursue certification because of its degree of difficulty, effort de-

manded, costs involved, and minimal impact on private practice reward. During this period, practitioners were not penalized for not having secured certification other than to refrain from the mention of having secured diplomate status to their clientele. During the latter, 1980's and early 1990's hospital staff bylaws began moving in the direction that if a clinical specialty participated in an American Board, board certification was required by the time of reappointment to the medical staff. Because hospital dentistry is an active component of pediatric dentistry, the ability to admit patients for treatment under anesthesia served as a significant incentive for pediatric dentists to seek board certification. This became a timely opportunity for reassessment of the ABPD examination process to explore what might be needed to encourage interest and expand membership to seek certification. Herein was a crossroad which challenged the mindset of either a pursuit of excellence, hence elite recognition of clinician skills and competency *vs.* a significant lowering of the bar to what constituted a minimum standard that most clinicians could satisfy. To preserve an ability to make use of general anesthesia for their patients, clinicians without hospital appointment or privileges, make use of an itinerant anesthesiologist in an office setting, or use of freestanding surgical centers where costs are less prohibitive and care was accessible to those with inadequate or no medical insurance coverage.

During a short interim between major changes in the two formats, applicants had the choice of taking the original format or the much-abbreviated revision. It became clear that advancing the numbers in pursuit of certification would result and be attractive only in the direction of the abbreviated format. Hundreds of pediatric dentists now appear annually to pursue board certification unlike before with the more demanding and lengthy four-part format.

It became logical that exploration to re-define the goals and objectives of being certified to identify minimally competent levels *vs.* elite or extraordinary status has evolved to the present day examination process, which is substantially abbreviated in comparison to its earlier form. Reports indicate that substantial increases in membership receiving Diplomate status have resulted from the substantial reductions in the length and demands of the new format. If the goal was to redefine what simply constituted the minimum level of clinician sophistication and competency, which could be argued better and more fairly represents the present-day standard for a given discipline, then little opposition to a divestiture from elite recognition should result. That said, however, the bottom line has in actuality become the pursuit of a minimal level of expectation which depending on one's perspective is now considered both acceptable and reasonable. For those having completed the more demanding four-part format, however, impressions conceivably and justifiably may lean in the direction that the level of excellence achieved from more rigorous and demanding preparation should warrant some tangible form of greater distinction if not recognition than the current certification status.

This in no way should imply the ABPD has been anything short of diligent in its commitment and dedication to creating and continually updating the certification process. Settling for the status quo is not among its mission. The ABPD, like other specialties in

both medicine and dentistry, has in a subtle way gone that direction by further changes that have instituted a Re-Certification examination. Through such, those having completed the more demanding previous format are exempt from having to complete a recertification examination. These Diplomates have been granted "unlimited" certification status. Arguments both in support (or the lack thereof) for the need for re-certification exist. The implementation of a Re-Certification examination is not uncommon today among many medical and dental disciplines; all fields undergo dynamic changes and additions of new knowledge over time. Recertification, therefore, appeals as a desirable mechanism by which verification that clinicians have upgraded and further advanced their own knowledge base can be considered useful and appropriate. Herein lies a fundamental discrepancy between clinicians, once masters of their craft, who conceivably practice within the same framework and parameters over a lengthy career without fervent intent and desire to update their skills. For others, however, one might argue that recertification can be considered unnecessary in light of the existence of licensure demands in all states for mandatory continuing education. Alternatively, movement in this direction only serves to foster a greater pursuit of excellence and raise the proverbial bar of competency. Re-Certification today comprises a 50 question written multiple choices, open book examination. Successful Re-certification requires a minimum of 80% correct responses. This author would hypothetically argue that for those having completed the original four-part format, dedication to lifelong learning likely more accurately characterizes their recognition of the need to stay current and master new and developing knowledge. Challenge to the validity and need for a fifty question multiple choice examination to serve as validation and verification of one's level of current competency is at best suspicious. One conceivable and fiscal argument for recertification might be that having such exposes a large number of candidates to expanded revenues for the board.

This author would encourage the ABPD to explore or survey the viewpoint of its members relative to their own perceptions of the merit and personal accomplishment from participation in the certification process, be it from the original format to the current format. I further encourage the board to consider a further delineation in Diplomate Status for those who have completed the original far more demanding format as compared to the current abbreviated format. Call it Diplomate "Master," or Diplomate(\*), or some appropriate symbol, the distinction seems warranted. Recognition of minimal levels of competency *vs.* the highest level of the pursuit of the highest level of excellence should accompany this noble and gratifying achievement. On the other hand, the American Board should be commended for their fervent and dedicated efforts to update its examinations, using every means within its power to demonstrate validity be it through psychometric evaluation and contemporary assessment criteria. Re-assessment to include classical as well as contemporary literature, inclusive of evidence-based studies as available, across various areas of mainstream topics seems warranted. Expansion of questioning and exploration in areas of safe and effective pediatric sedation, recognition and management of adverse reactions and medical emergencies, pediatrics, orthodontics and fundamental aspects of growth and development, assessment of the mixed dentition and

rationale for when space maintenance is warranted are among useful areas for inclusion. Having from an academic and private practice environment met and interviewed numerous potential applicants for private practice settings who have completed certification with the abbreviated format, and postgraduate students over the past several decades, these areas constitute in this author's opinion, areas of weakness in need of attention. In final analyses, these aspects will remain amongst the challenges of advanced training in pediatric dentistry and the American Board whose responsibilities

fall in establishing standards for the field and setting the bar for the pursuit of minimal competency *vs.* excellence.

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## Editorial

# Challenges Ahead for Advanced Training Programs in Pediatric Dentistry in the Area of Sedation for Pediatric Dentists and the Commission on Dental Accreditation

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Amongst the challenges faced by advanced training programs in pediatric dentistry is adequate preparation of its students or residents to make use of the most effective and safe sedative agents and combinations for managing the diverse range of non-coping behaviors of pre-cooperative and non-cooperative pediatric patients. The dilemma is complicated by a number of factors. Foremost is a constricted interval of time in which to acquire sufficient exposure and expertise in both didactic and clinical applications. Having sufficient patient populations reflecting various levels of patient apprehension, resistance, and dental pathology has potential to limit student and resident experience is another complication. Faculty variability with respect to expertise, comfort level, and firsthand experience making use of a less than diverse arsenal of agents no doubt has potential impact on resident experience. This is particularly disconcerting where programs have elected to reduce their armamentariums to the extent that experience is gained exclusively with use of a single medication.

Fulfillment of accreditation standards in this area is recognizably a challenge for some if not many programs. Didactic training must include sufficient exposure and knowledge of both classical and contemporary literature that provides clinical opinion, substantive retrospective and prospective evidence-based support of the efficacy, safety and recovery parameters for numerous agents for successful management of patient anxiety and resistive behaviors. To ensure safety across all levels of sedation, students must be able to demonstrate competence in airway management and recognition of developing adverse physiologic responses. Knowledge and proficiency in physical diagnosis and pharmacology of sedative and analgesic medication are prerequisite skills to demonstrate competency. Lastly, clinical exposure must be as diverse as possible using a broad range of agents and dosing appro-

priate for the specific needs of a given patient.

Considerable energies have been expended by the Commission on Dental Accreditation (CODA) to determine what constitutes minimally acceptable (not necessarily optimal) experiences in the area of pediatric sedation training. Factors which influence the commission's recommendations and required expectations for faculty competence are in some respects limited, but nevertheless carry foremost the responsibility to protect the public. A critical and comprehensive review of the existing pediatric sedation literature from the perspective of pediatricians, anesthesiologists, oral and maxillofacial surgeons and pediatric dental specialists reveals a paucity of controlled investigations to clarify let alone shed considerable light on what agents have proven track records of efficacy and safety. Despite the existence and perpetual revision of existing national safety guidelines for the use of pediatric sedation, mishaps involving morbidity and catastrophic outcome continue to be appear. Nevertheless, while it is the global intent of regulatory agencies to protect children, parents and dentists from such occurrences, resources and manpower are not readily in place to guarantee provider compliance on either a state to state or national level. Compliance and safety concerns however within training programs falls under the auspices of the program director and faculty in attendance. Within private practice, providers and their staffs must satisfy state regulations and guidelines for safety.

For discussion purposes, the CODA has outlined specific minimum experiences that must take place within a twenty-four-month training program. Beyond the use of nitrous oxide alone, students/residents must experience a minimum of 50 sedation experiences, half of which must occur as primary operator. No determination or mention to date exists to identify what agents must

be used within these experiences. All decisions as to what agents are employed are made by the respective program directors and their institutional formulary service. In some states, specific agents are excluded due to an occurrence of adverse reactions, miss-use or abuse, based on litigation outcomes and not necessarily science. Under these circumstances, decisions on what to include or exclude fall outside the realm of program directors. This likely contributes to a reticence for CODA to identify what agents must be taught in training programs. This particular judgment, however, is subject to significant concern. Surveys both recent and of old have identified use of a wide range of agents at but a few institutions; others make use only of agents which possess reversal capabilities. If optimal agents were readily known and this was a perfect world, these types of limitations might be considered reasonable. From the perspective of this author, the latter approach represents a major deficiency in preparing residents for the needs of challenging children. For some institutions, for all intent and purposes, large numbers of patients who could conceivably be treated safely with conscious sedation are being channeled to general anesthesia to transfer all risk to anesthesiologists. Whether or not this falls within the best interests of these children depends on the judgment of the parent and provider. Nevertheless, the CODA has systematically outlined criteria in conjunction with and consistent with the American Academy of Pediatric Dentistry (AAPD) for which sedative management of challenging behaviors maintaining consciousness is considered appropriate. It is noteworthy that sedation continuing education courses offered by the AAPD while alluding to the use of some regimens, avoid recommendations of

what constitute viable agents. In an otherwise ideal world, clarification of a range of agents for which students and residents should receive instruction and experience would be helpful to mitigate this deficiency. Without substantive data, however, to demonstrate evidence-based support for efficacy and safety, it is not surprising that these agencies to date refrain from their inclusion. Without consistent levels of comfort of program directors using a broad regimen of agents, student exposure/preparation can be expected to be insufficient.

One conceptual platform remains. Complete reliance on agents such as midazolam, with or without nitrous oxide, remains an unfortunate state of affairs for our management arsenals for children and advanced training programs. Extensive study of midazolam has been performed. Distinct limitations with respect to efficacy and duration of action render it of limited value for anything but short and ultra-short duration visits. Where anxiety levels and resistance are severe, virtually all studies report the need for persistent adjunctive physical restraint to complete treatment. Perhaps future reports will enable better judgments associated with proper dosing limits for various agents and situations.

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**DISCLAIMER** |

This editorial reflects the opinion of the author and in no way should be construed to represent the views of the American Academy of Pediatric Dentistry (AAPD) or Commission on Dental Accreditation (CODA).