

# Pediatric Section Newsletter

Summer 2016

## Letter from the Pediatric Section Chair

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Hello,

It has been a busy summer in the Corkins House and I am sure many of you share that feeling. With the summer ending and back to school time upon us not only are our families busy readying for the coming school year, but so are the families and children with whom we work. Children receiving home nutrition support need new orders for the schools and home care companies. Back to school can be more stressful when children reach a milestone and are entering a new school such as Kindergarten, Middle School, High School or College and even more stressful if the child has a food allergy or other special diet or nutrition related need. Having the support of pediatric nutrition care specialists can help and support these families to overcome the stressful situations. I am these families appreciate all that you do to support them.

In addition, registration is open for Clinical Nutrition Week 2017. We would love to see you there. If you are not able to attend in person, consider the other options available.

Again we have a survey in the newsletter. Please take the time to complete the survey. I hope that others find the information gathered in them as helpful as I do. We are always open to hear your questions or thoughts. Please feel free to email me (kgcorkins@yahoo.com) if you would like to include something in the next survey. Enjoy the rest of the summer!

Sincerely,



Kelly Green Corkins, MS, RD, LDN, CNSC

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## Pediatric Section Microsite

Visit the Pediatric Section microsite to access past versions of the newsletter, the Hot Topic of the Quarter survey, current research updates, and much more!

[Pediatric Section Microsite](#)



### Member Spotlight: Jodi Wolff, MS, RDN, LD, FAND, FAACPDM

#### **What is your current job title and work location?**

Pediatric Dietitian, Rainbow Babies and Children's Hospital  
Adjunct Professor, Case Western Reserve School of Medicine  
Cleveland, Ohio

#### **What is your educational background?**

Bachelor of Science, Master of Science in Nutrition

#### **How did you get involved in the field of clinical nutrition?**

I participated in a Mission Trip to the Dominican Republic when I was a freshman in college and saw many children with malnutrition. Seeing the effects of malnutrition sparked a desire to try and figure out how to help people get better by improving their nutrition. I returned from that trip and changed my major from social work to nutrition.

#### **What specifically do you do in your current position?**

I work as part of an interdisciplinary team that cares for children with complex medical needs such as cerebral palsy and syndromes with various forms of neurological impairment. Most of the patients in our program require enteral nutrition and part of my role is to recommend appropriate feeding regimens to support growth and to adjust plans based on GI tolerance.

#### **Why did you become involved in A.S.P.E.N. and what are the benefits of being involved?**

I was asked to serve on the ASPEN Malnutrition Committee which has been a wonderful experience. I have the opportunity to work alongside individuals who have made extraordinary contributions in the field of nutrition. As a result, I have learned new things and continue to be inspired, working with those who share my passion to make a difference by addressing malnutrition. Being involved with ASPEN has led to tremendous networking resulting in several opportunities for professional and personal growth. It has challenged me to do things I may not have attempted on my own. ASPEN has provided the support I need to continue to develop my skills and I have made some great new friends along the way.

#### **What recommendations would you give to someone just starting out in your field?**

I would tell them "Do not wait until later to get involved. Get involved now". Looking back, I wish I would have known all the benefits of volunteering and started this earlier in my career. I would recommend asking where a

group needs help and then jump on a committee and help wherever the need is. Initially it may seem like a small contribution, but if you are faithful in the little things you will likely be asked to do more which can lead to great opportunities. This will likely result in some kind of informal mentoring as you work with professionals that have years of experience. Don't wait until you have more experience to get involved, get involved early in your career and you will reap many personal and professional benefits.

## Results from the Parenteral Nutrition Writing and Components Hot Topic of the Quarter Survey

1. **What is the name of the institution at which you practice?**
  - a. We had a great response from individuals working all over the country.
2. **Does your institution routinely add heparin to neonatal TPN?**

a. Yes	74.5%
b. No	25.5%
3. **Does your institution routinely add heparin to pediatric TPN?**

a. Yes	38.8%
b. No	61.2%
4. **Does your institution add insulin to neonatal TPN?**

a. Yes	8.7%
b. No	91.3%
5. **Does your institution add insulin to pediatric TPN?**

a. Yes	14.3%
b. No	85.7%
6. **Does your institution continue to run parenteral lipids while a patient is receiving an IV calcium chloride infusion?**

a. Yes, in the same line	6.7%
b. Yes, in the same line but via separate lumens	17.8%
c. Yes, only in separate IVs	40%
d. No	40%
7. **Does your institution continue to run TPN containing phosphorus while a patient is receiving an IV calcium chloride infusion?**

a. Yes, in the same line	20.2%
b. Yes, in the same line but via separate lumens	14.6%
c. Yes, only in separate IVs	43.9%
d. No	34.2%
8. **Does your institution have a nutrition support team?**

a. Yes	51.2%
b. No	48.8%
9. **If Yes, which disciplines are represented on the nutrition support team?**

a. Physician	70%
b. Nurse Practitioner	17.4%
c. Physician Assistant	4.4%
d. Pharmacist	69.6%
e. Dietitian	87%
f. Registered Nurse	21.7%
g. Other	8.7%
i. Feeding team and adult nutrition support	

**10. At your institution who is responsible for writing parenteral nutrition orders?**

- |                        |       |
|------------------------|-------|
| a. Physician           | 64.3% |
| b. Nurse Practitioner  | 54.8% |
| c. Physician Assistant | 16.7% |
| d. Pharmacist          | 42.9% |
| e. Dietitian           | 45.2% |
| f. Registered Nurse    | 0%    |
| g. Other               | 0%    |

**11. If you have one, does your institution's nutrition support team follow enteral patients not receiving TPN as well?**

- |        |       |
|--------|-------|
| a. Yes | 61.5% |
| b. No  | 38.5% |

## New Hot Topic of the Quarter Survey: Vitamin and Mineral Status in Long Term Nutrition Support

Please complete the survey before it closes on Friday September 23<sup>rd</sup>.

[Vitamin and Mineral Status in Long Term Nutrition Support](#)

## New Opportunities for Enteral tube Location (NOVEL) project Update from Beth Lyman, MSN, RN, CNSC

The work of the NOVEL Project workgroup continues to go off into many directions and we now have a request of YOU! Recent feedback from many centers indicate one of the reasons pH measurement is not used to verify NG tube placement is because of the logistics of point of care (POC) testing. We intend to work on this issue as all of us know bedside glucose monitoring is POC testing and is considered an essential part of patient care.

What I need to hear from you is this: If your institution does NOT use pH measurement for NG tube placement verification, is it because of POC testing? If so, specifically what are the concerns? Please email Beth Lyman at [lyman@cmh.edu](mailto:lyman@cmh.edu).

As a brief update, the NICHD multi-center research study has been submitted and is to be reviewed in October. The home care survey has been accepted for publication in the *Journal of Pediatric Nursing*. A retrospective NICU study has just been completed looking at >1000 patients and we found pH measurement in this population is an appropriate method to verify NG tube placement.

## Research Updates-Call for Volunteers!

If you are interested in providing research updates for any pediatric specialty area, such as oncology, nephrology, etc., to be included in the quarterly newsletters please contact Celina Scala at [Celina.M.Scala@rush.edu](mailto:Celina.M.Scala@rush.edu).

## Pediatric GI Research Updates

Provided by Marisa Dzarnoski Riley, RD, CNSC

### **Administration in Infants With Gastroschisis: A Pilot Randomized Placebo-Controlled Trial**

Study Design: Randomized, Blinded, Placebo-Controlled Trial

This study was conducted to assess how intestinal microbiota in infants with gastroschisis are affected by current treatment practices and to determine if probiotic supplementation would affect length of stay. A total of 24 infants were enrolled and received either *B infantis* probiotic or placebo after surgery. Patients receiving the probiotic had significantly higher proportions of fecal *Bifidoacteriaceae* and lower proportions of fecal *Clostridiaceae* at the end of the study, when compared to controls. It was also noted that this characteristic

was only found after gastric suction ceased. With exclusion of two infants found to have intestinal atresia during the study, there was a positive association between percentage of fecal Enterobacteriaceae at first stool and length of stay.

*Powell WT, Borghese RA, Kalanetra KM, Mirmiran M. Probiotic Administration in Infants With Gastroschisis: A Pilot Randomized Placebo-Controlled Trial. J Pediatr Gastroenterol Nutr. 62;6:852-857.*

### **Is there A Role for Pre-, Pro- and Synbiotics in the Treatment of Functional Constipation in Children? A Systematic Review**

Study Design: Systematic Review

This study was intended to provide an update on the role of pre-, pro- and synbiotics on treatment of functional constipation in children. A total of six randomized controlled trials (RCTs) related to prebiotics, six RCTs related to probiotics and one RCT using synbiotics were included in the review. The studies included were quite heterogeneous and defecation frequency was the only outcome measure that was included in all studies. Roughly half of the prebiotic studies found defecation frequency benefits and 4/6 found defecation frequency benefits with probiotics. There was little evidence from the included studies to support a recommendation for use of pre-, post- and synbiotic use in children to treat functional constipation.

*Koppen IJN, Benninga MA, Tabbers MM. Is there A Role for Pre-, Pro- and Synbiotics in the Treatment of Functional Constipation in Children? A Systematic Review. J Pediatr Gastroenterol Nutr. 63; S27-S35.*

### **Early Mucosal Healing with Exclusive Enteral Nutrition is Associated with Improved Outcomes in Newly Diagnosed Children with Luminal Crohn's Disease**

Study Design: Prospective, longitudinal cohort study

This study followed 54 children newly diagnosed with luminal crohn's disease who received exclusive enteral nutrition (EEN) for at least six weeks in combination with early immunomodulator (IM) treatment. Outcome of interest was ability to achieve sustained remission (SR) on a long-term basis with use of IMs without need for corticosteroids, infliximab, or surgery. Clinical Pediatric Crohn's Disease Activity Index (PCDAI), biochemical markers of inflammation, and endoscopic assessment were used to identify mucosal healing and SR. Complete mucosal healing occurred in 33% of the children and was the only type of remission (not biochemical or clinical remission) with a significant positive association with SR. The authors concluded that early complete MH after EEN was the most important factor leading to SR over and beyond three years with use of only maintenance IMs.

*Grover Z, Burgess C, Muir R, Reilly C. Early Mucosal Healing with Exclusive Enteral Nutrition is Associated with Improved Outcomes in Newly Diagnosed Children with Luminal Crohn's Disease. J Crohns Colitis. 2016; 1-6.*

## **Neonatal Research Updates**

Provided by Jackie Wessel, Med, RDN, CNSC, CSP, CLE

### **The impact of maternal and neonatal associated factors on human milk's macronutrients and energy**

Study Design: Prospective analytical study

This study was completed on human milk samples to test the impact of specific maternal and neonatal associated factors on human milk's macronutrients and energy. A human milk analyzer (HMA, MIRIS, Uppsala, Sweden) was used to test 630 samples of expressed milk and 95 samples of donor pasteurized milk from 305 mothers.

They found a significant inverse correlation of fat, protein and energy with gestational age and birth weight. Fat and energy were lower in colostrum, were increased in transitional milk and decreased on the 30th day of

mature milk. The rate of protein decline from colostrum to mature milk was lower in premature infants resulting in higher protein in their mature milk. The most carbohydrate was found in mature milk of preterm deliveries. A positive correlation was found between maternal age and fat contents. In women with higher post-pregnancy BMI levels greater amounts of fat and energy were seen. Women with diet controlled gestational diabetes had milk samples with lower in protein and higher fat and energy.

Prematurity, maternal age, diet controlled gestational diabetes and high post-pregnancy BMI levels were found to have a statistically significant effect on milk's macronutrients and energy.

I found this to be an interesting article and again points out that all milk is not the same; as with other papers that have discussed this such as the Arslangolu article. Ideally we would all have human milk analyzers but in lieu of that perhaps stratifying our patients into groups based on the possible nutrient difference in their milk could help with our fortification strategies.

*Dritsakou K, Liosis G, Valsami G, et al. The impact of maternal and neonatal associated factors on human milk's macronutrients and energy. J Matern Fetal Neonatal Med. 2016 Jul 13:1-17. [Epub ahead of print]*

### **Delayed Introduction of Parenteral Phosphorus Is Associated with Hypercalcemia in Extremely Preterm Infants** Study Design: Cohort Study

This study compared two cohorts of extremely low birth weight (ELBW) infants separated by plan-do-study-act (PDSA) cycles to evaluate and reduce the incidence of abnormal ionized calcium (iCa) concentration. This was done as they recognized that hypercalcemia was a problem in the first week of life (iCa > 1.45 mmol/L) in their level four nursery.

Data were recorded for 150 premature infants with mean birth weight of  $726 \pm 164$  g, 48% male, and mean gestational age of  $26 \pm 2.1$  wk. This process included an internal practice analysis and PDSA cycles monitored prospectively over three years. In the first protocol, 66 infants received 0-1.2 mmol parenteral phosphorus supplementation/kg/d beginning at 72 h of life. In the second protocol, 84 infants born received earlier phosphorus supplementation within 24 h of life. The peak whole blood iCa and serum phosphorus concentrations were monitored in the first week.

Early introduction of phosphorus was significantly associated with a decreased mean peak iCa ( $1.64 \pm 0.27$  mmol/L to  $1.50 \pm 0.23$  mmol/L,  $P = 0.001$ ), and the incidence of severe hypercalcemia (iCa > 1.60 mmol/L) decreased from 50.0% to 21.4% ( $P = 0.002$ ) in the first week of life. There was no difference in mortality, bronchopulmonary dysplasia, renal calcifications, seizures within seven days of birth, brain calcifications, or intracranial hemorrhage between cohorts.

They concluded that the early introduction of phosphorus in PN solutions is associated with reduced incidence of whole blood iCa abnormalities in the first week of life and should be considered for ELBW infants. This paper has the same conclusion as Bonsante and others that are concerned about pushing infants into anabolism without the provision of phosphorus (and also potassium in the Bonsante article). Hypercalcemia is typically the result of inadequate phosphorus provision early on as seen in this study. Early parenteral nutrition should include phosphorus, and the early provision is not associated with adverse outcome.

*Hair AB, Chetta KE, Bruno AM, Hawthorne KM, Abrams SA. Delayed Introduction of Parenteral Phosphorus Is Associated with Hypercalcemia in Extremely Preterm Infants. J Nutr. 2016 Jun;146(6):1212-6. doi: 10.3945/jn.115.228254. Epub 2016 May 4.*

### **Early neurodevelopmental outcomes of infants with intestinal failure**

## Study Design: Descriptive Study

The objective of this study was to evaluate neurodevelopmental outcomes in children with intestinal failure at 0-15 months corrected age. As the survival rate of infants and children with intestinal failure is increasing, focusing on the morbidities of intestinal failure is important.

This study analyzed the clinical, demographic and developmental assessment results of 33 children followed in an intestinal rehabilitation program between 2011 and 2014. Their outcome measures included: Prechtl's Assessment of General Movements, Movement Assessment of Infants, Alberta Infant Motor Scale and Mullen Scales of Early Learning.

In this study clinical factors were correlated with poorer developmental outcomes at 12-15 months corrected age. Thirty-three infants had a median gestational age of 34 weeks (interquartile range 29.5-36.0) with birth weight 1.98 kg (interquartile range 1.17-2.50 kg). Twenty-nine (88%) infants had abnormal General Movements. More than half had suspect or abnormal scores on the Alberta Infant Motor Scale and medium to high-risk scores for future neuromotor delay on the Movement Assessment of Infants. They saw delays in all of the Mullen subscales, especially in gross motor skills. Some of the factors significantly associated with poorer outcomes at 12-15 months included: prematurity, low birth weight, central nervous system co-morbidity, longer neonatal intensive care admission, necrotizing enterocolitis diagnosis, number of operations and conjugated hyperbilirubinemia.

In conclusion, they found that there are multiple risk factors that contribute to early developmental delay in children with intestinal failure. This correlates with prior studies of this population and again highlights the importance of close developmental as well as medical follow-up for these infants. The studies used are different as they are assessing earlier and using different tests. Many other studies rely on the Bayley tests at 18-22 months. It would be interesting to also see Bayley scores done on these infants to see the correlation. The Bayley III test is used now while many older studies used the Bayley II test.

*So S, Patterson C, Gold A, Rogers A, Kosar C, de Silva N, Burghardt KM, Avitzur Y, Wales PW. Early neurodevelopmental outcomes of infants with intestinal failure. Early Hum Dev. 2016 Jul 7;101:11-16. doi: 10.1016/j.earlhumdev.2016.05.012. [Epub ahead of print]*

## **Use of extensively hydrolysed formula for refeeding neonates postnecrotising enterocolitis: a nationwide survey-based, cross-sectional study**

Study Design: Cross - sectional Survey, Descriptive

This is a cross-sectional survey of neonatal intensive care units in France, with more than half of the French neonatal units participating in this survey. Extensively hydrolyzed formula (EHF) was used in 91% of the surveyed units. On the day of the survey, of the 1969 hospitalized NICU infants, 12% were fed an EHF. Eleven percent of the EHF choices were due to previous NEC. The main reasons for using an EHF to feed infants post-NEC were the absence of human milk (maternal and donor) (75%) and surgical management of NEC (17%). When given, EHF was mainly prescribed for a period varying between 15 days and three months. None of the surveyed units continued using the EHF after size months of age. More than half of the surveyed units hospitalized infants for the initiation of weaning off of EHF. Only 21% of the units tested these infants for cow's milk allergy.

This is an interesting study even if it is descriptive as there are some differences between French and US practice. Rarely would an infant be hospitalized for a formula change, especially when used for post NEC management. Also the length of time of EHF use is interesting. In the NIH-AND work on management of surgical infants, very little literature has been found on this topic.

Lapillonne A, Matar M, Adleff A, et al. Use of extensively hydrolysed formula for refeeding neonates postnecrotising enterocolitis: a nationwide survey-based, cross-sectional study. *BMJ Open* 2016;6:e008613 doi:10.1136/bmjopen-2015-008613 Paediatrics

**Is targeted fortification of human milk an optimal nutrition strategy for preterm infants? An Interventional study**  
Study Design: Prospective randomized trial

The purpose of this study was to evaluate the safety and efficacy of growth on a plan of targeted fortification of human milk for premature infants. Ten premature infants were studied with birth weights  $1223 \pm 195$  g and gestational age  $29.1 \pm 1.03$  weeks. 118 samples of 24 hour pooled homogenized milk (Sonicator®, Uppsala, Sweden) were analyzed using mid-infrared transmission spectroscopy (Miris AB®, Uppsala Sweden). The analysis and calculation of the recipe was done biweekly. Targeted fortification of human milk was performed by adding macronutrients to the human milk to obtain optimal ratios of fat (4.4 g), carbohydrates (8.8 g), and protein (3 g) per 100 ml. The intervention period lasted 4–7 weeks. Weekly weight and daily growth rates were compared with those of a group of very low birth weight preterm infants who received standard fortified human milk ( $n = 10$ ). The osmolality as well as the metabolic and gastrointestinal tolerance were monitored. Intergroup differences were evaluated using the Mann–Whitney U-test.

The average amount of macronutrients added to human milk was  $1.4 \pm 0.1$  g of protein,  $2.3 \pm 0.5$  g of carbohydrate, and  $0.3 \pm 0.1$  g of fat per 100 ml. Osmolality values after target fortification were within recommended limits ( $376 \pm 66$  mOsm/kg). Weekly weight gain was ( $205.5$  g; 95 % CI 177–233 vs  $155$  g; 95 % CI 132–178  $p = 0.025$ ) in the standard fortification group. Daily growth rates were higher in the infants receiving targeted fortification ( $15.7$  g/kg/day; 95 % CI 14.5–16.9 vs  $12.3$  g/kg/day; 95 % CI 10.7–13.9;  $p = 0.005$ ) The infants receiving targeted fortified milk consumed similar volumes as infants in the standardized fortification group ( $148 \pm 4.5$  vs  $146 \pm 4$  ml/kg/day). Gastrointestinal nor metabolic intolerance issues were observed. Their conclusion was that targeted fortification appears to promote growth in very low birth weight preterm infants without any detrimental effects.

Morlacchi L, Mallardi M, Guiani M, et al. Is targeted fortification of human milk an optimal nutrition strategy for preterm infants? an Interventional Study. *J of Transl Med* 2016, 14: 195.

**Necrotizing enterocolitis and preterm infant gut bacteria.**

This is an excellent review article that describes the microbiome/NEC relationship.

Warner BB, Tarr PI. Necrotizing enterocolitis and preterm infant gut bacteria. *Semin Fetal Neonatal Med.* 2016 Jun 22. pii: S1744-165X(16)30027-0. doi: 10.1016/j.siny.2016.06.001. [Epub ahead of print] Review.

## Neurology Research Updates

Provided by Lauren Kronisch, RDN

**Gut–Brain axis: how the microbiome influences anxiety and depression**

Study Design: Review

Current research about the connection between brain functioning and gut bacteria indicates this connection may impact humans’ behavior and mood. Studies suggest gut bacteria affect the body’s stress response and consuming specific bacterial species effect mood and behavior. For instance, the normal hypothalamic-pituitary adrenal axis (HPA) is dysfunctional in depressive episodes and microbiota has been directly linked to HPA reactivity. Furthermore, mice and humans treated with probiotics exhibit decreased depressive behavior, anxiety, and GI inflammation. Additional research may assist in developing microbiome based mental health and mood disorders treatment.



Foster JA and Mcvey Neufeld KA. Gut-Brain Axis: How the Microbiome Influences Anxiety and Depression. *Trends in Neurosciences*. May 2013; 36 (5): 305-12.

## A.S.P.E.N. Mentoring Program

Are you interested in sharing your experience and expertise with another A.S.P.E.N. member? Would you like to learn from a fellow A.S.P.E.N. clinician? If so A.S.P.E.N.'s new mentoring program is right for you! Set up a profile as either a mentor or mentee at the link below to be paired with another A.S.P.E.N. clinician. Don't miss this great opportunity to network and grow both personally and professionally.

[A.S.P.E.N. Mentoring Program](#)

## Member Updates and Spotlight

We want to hear from you! The A.S.P.E.N. Pediatric Section group is proud of the many accomplishments of our members and we'd like to highlight what you're doing. If you have any feedback or ideas, noteworthy awards, presentations, published research, or projects that you'd like to share with our members please let us know by contacting the section group newsletter editor Celina Scala at [Celina\\_M\\_Scala@rush.edu](mailto:Celina_M_Scala@rush.edu).

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