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Women's Health REPORT
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THE GUT MICROBIOME AND WOMEN'S HEALTH

By Megan Baumler, PhD, RD, CD

This article is approved for 1 CPEU by the Commission on Dietetic Registration, the credentialing agency of the Academy of Nutrition and Dietetics. Upon reading this article, please take the quiz at http://bit.ly/1WtnBp0.

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The gut microbiome is one of the fastest growing areas in research. Key findings in the last decade suggest a wealth of knowledge yet untapped on the relationship between bacteria in the digestive tract and the host's health outcomes. Importantly, these key findings indicate that gut bacteria influence health status, and in turn, our health status influences our gut bacteria. If we can better understand this bidirectional relationship, overall health may be significantly improved.

The trillions of bacteria that live in the gastrointestinal (GI) tract, 70% of which are in the colon, have a collective identity and genetic profile called the gut microbiome.[1] This is the genomic information -- complete DNA sequences -- of all the bacteria taking up residence in our GI tract. As it turns out, each of us has a different microbiome, with different types and amounts of bacteria. While the gut microbiome is substantially influenced by environmental factors including diet, an individual's gut microbiota is relatively stable over time.[2] One study found that in a group of subjects over a 5-year period, 60% of gut bacterial species were preserved. Interestingly, people who are related have more similarities in their gut microbiome compared to people who are not related.[2] Regardless, most of the bacteria in the human gut are from the two phyla Firmicutes and Bacteroidetes, but the number of species represented in an individual's gut could be in the range of 500-1,000.[1] Aside from differences in the exact make-up of our microbiota, the general functions of commensal gut bacteria are clear and include:

- promoting immunity (preventing overgrowth and absorption of patho genic bacteria) and integrity of the GI tract (regulating the expression of antimicrobial factors produced by intestinal epithelial cells) and
- supporting nutrient harvest and synthesis (gut bacteria metabolize dietary material in the colon and produce short chain fatty acids, B vitamins, and vitamin K that are absorbed by colonic epithelial cells of the host).[3,4]

Less clear, and the topic of much research, are the more specific functions of different types of gut bacteria, and the mechanisms to intentionally manipulate the gut bacteria to favorably influence the host's health.

The extent of health conditions related to metabolism that are shown to be associated with the gut microbiome is surprising. A momentous study that preceded the tidal wave of publications on this topic was published by Backhed, et al. in 2004. Their group found that mice that were raised germ-free (gnotobiotic) but subsequently colonized with bacteria from normal, non-obese, non-diabetic mice quickly developed excess body fat and insulin resistance on an isocaloric diet.[5] This study established convincingly that gut bacteria play an important role in energy harvest and metabolic balance of the host. Subsequent studies have shown that the gut microbiome is also involved in glucose homeostasis, risk for metabolic syndrome, and obesity (recent review).[6]

We are at the tip of the iceberg in unraveling the systemic impact of the gut microbiome on health. Many of the existing studies are in mice, and limited to conclusions based on associations rather than causality. With sufficient funding and enhanced technology, the path to a deeper understanding of the gut microbiome is on the horizon. Several investigations of relationships between gut bacteria and health outcomes have been or are currently being conducted and many are related to women's health. We will now explore some of these areas.

Pregnancy and Fetal Health

The impact of the microbiome on pregnancy and child health outcomes is a subject of great interest, yet the research is in its infancy. The opportunity to positively influence a human's life even before birth represents a critical window for intervention. This theory, known as the Fetal Origins of Disease, declares that the maternal prenatal environment influences fetal health and predisposes a child to future chronic disease or positively promotes a healthy metabolic profile. Maternal gut bacteria may have a direct impact on infant health. Babies born vaginally have health advantages such as reduced risk for obesity, celiac disease, and irritable bowel disease compared to those born by

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Women'sHealthREPORT

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FROM THE CHAIR **Heather A. Goesch,** MPH, RDN, LDN

Hello and welcome to a new membership year of the Women's Health DPG! I am both honored and excited to be serving as Chair, and look forward to continuing my support of this group, our profession, and each of you as nutrition and women's health champions.

My primary area of expertise and passion is maternal and women's nutrition and health, currently focused on private practice and individual corporate consulting. I have been involved with the DPG leadership as the Publications Editor since 2012. *Women's Health Report (WHR)* is now in the more than capable hands of our immediate Past Chair, Kathleen Pellechia, and I for one am beyond thrilled to see the new directions and heights to which she will take it.

Right off the bat she offers Issue 1 and the hot theme of the gut microbiome, featuring an excellent piece by Megan Baumler on the symbiotic relationship between women's health and the bacteria that reside in our GI systems. And believe it or not, FNCE® is right around the corner. In this issue, you will see a list of key events, including our Spotlight Session: *Women's Health, Prenatal Nutrition and Infant Outcomes: A Public Health Perspective*, the presentation of the WH member awards, and our booth (#162) at the DPG/MIG Showcase. Come visit us!

Allow me a moment to recognize and thank Lisa Akers for her previous year at the helm of this tremendous DPG. She took on many projects behind the scenes that will provide lasting benefits, and I am grateful for her dedication and support. I would also like to express my gratitude to the newsletter Editorial Team and all contributing authors without whom *WHR* would not have been possible. Last, but not least, thank you to the enthusiastic volunteers who serve in leadership roles that help this group grow and thrive, as well as to each of you for your passion, your drive, and your willingness to share your expertise with not only the public but also your colleagues!

If you have any questions or are interested in serving in a leadership capacity this membership year please let us know – we would love to hear from you!

FROM THE EDITOR **Kathleen Pellechia,** RD

Hello, WH DPG members! I hope you enjoyed the summer and found opportunities to soak in all that it offers. I would like to welcome all of our new members and thank all of our returning members for their continued support. This issue marks a number of "firsts." It is the first issue of this membership year, it is the first time we are featuring an article on the gut microbiome, and it my first issue as your Publications Editor.

Since 2004 I have served in a leadership role with this DPG. It is a group of passionate and talented practitioners and I am proud of all we have accomplished. I am honored to serve in this new role and will do my best to fill the shoes of my predecessor Heather Goesch, who we are fortunate to have as our new Chair. Heather's enthusiasm and vision will only continue to raise the bar for this group.

In this issue you can also find a research brief related to gut health, an update on the development of the 2015 Dietary Guidelines for Americans, and a schedule of WH DPG events at the upcoming 2015 Academy of Nutrition and Dietetics Food & Nutrition Conference & Expo™ (FNCE©). This year's event is scheduled for October 3-6th in Nashville, TN and we look forward to seeing you there!

I hope you enjoy our feature piece on what is quickly becoming a hot topic in the field. We are just scraping the surface in terms of understanding how gut microbiota impact us and how we impact them! If you have ideas for future issues please let me know at publications@womenshealthdpg.org.

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cesarean, although a causal relationship via gut bacteria has not been shown (recent review).[7,8] A study on the characterization of gut bacteria related to pregnancy showed that women who were overweight prior to pregnancy had a different gut bacteria profile compared to women who were of a normal weight prior to pregnancy.[9] Furthermore, E. coli levels were found to be higher in the women with excessive weight gain during pregnancy compared to women with normal weight gain – and these E. coli levels were positively associated with the birth weight of the baby, meaning that the more E. coli present in maternal gut bacteria, the higher the birth weight of the baby.[9] Maternal gut bacteria is transferred to the baby during birth and through breast milk; breast fed babies have reduced body fat as adults, but whether this is related to gut bacteria transferred from the mother is unclear.[9] These are intriguing data suggesting that the relationship between maternal health and gut bacteria may also have an influence on fetal health.

Many of the studies on this topic involved the use of probiotics to determine whether changing the gut bacteria milieu has an impact on the factor of interest. One study found that probiotics (Lactobacillus casei DN11401) taken for 6 weeks before and after delivery resulted in an increased number of natural killer cells (a type of white blood cell) in maternal blood, and reduced gastrointestinal symptoms in the infants, as compared to placebo.[10] Other studies indicate that maternal probiotics may improve atopic dermatitis symptoms in infants; although, there were differences based on the type of probiotic and health of the pregnant woman.[9] Collectively, these studies suggest that the microbiome of the mother impacts the health of her baby, and that this relationship may be positively influenced by the use of probiotics.

Probiotics have also been potentially implicated for potential prevention of gestational diabetes (GD), given the involvement that gut bacteria have in metabolism and the relative lack of effective prevention strategies for GD.[12] One rather large randomized controlled trial found that Lactobacillus rhamnosus GG and Bifidobacterium lactis Bb12 (10^{10} colony forming units/day for each) given during pregnancy significantly reduced fasting blood sugar (baseline-adjusted means 4.45, 4.60 and 4.56 mmol/l in diet/probiotics, diet/placebo and control/placebo, respectively; $P = 0.025$) and improved insulin sensitivity (adjusted means 7.55, 9.32 and 9.27 mU/l; $P = 0.032$).[13] Furthermore, compared with women taking the placebo, GD was significantly reduced in the women taking the probiotics ($P = 0.03$).[14] Several other clinical trials examining the impact of probiotics on risk of GD in high-risk populations are underway, and while the evidence isn't strong enough to routinely recommend probiotics during pregnancy, the published data suggest it may be a low-risk intervention with potentially multi-faceted benefits.

Gender-Specific Relationships between BMI and Gut Bacteria

The associations between gut bacteria and energy balance may depend on gender. One recent study fully characterized the gut microbiome of 82 men and women, and examined them for associations related to energy balance.[15] They found that men and women had different gut bacteria profiles, namely that women had a lower abundance of Bacteriodetes (a microbe known to be associated with overweight/obesity). Furthermore, women with a BMI over 25 kg/m^2 had different gut profiles compared to those with a BMI less than 25 kg/m^2; an association interestingly not observed in men. Lastly, they found that fiber from beans, fruits, and vegetables was associated with greater amounts of Actinobacteria and Clostridia, and that this association was stronger in women than in men. Clostridia are considered to be favorable since they produce a type of short chain fatty acid that may be anti-carcinogenic.[15] The authors suggested that hormonal factors may explain these gender based differences. A better understanding of how gender impacts the gut microbiome and its association with health will make clearer the potential therapeutic implications, and will allow dietitians to counsel patients and clients in a more targeted way.

Breast Cancer

A connection between the gut microbiome and cancer has been alluded to in the past, and with advancing technologies, a more definitive link is now being established. Proposed theories describing the biochemical relationship include:

- gut bacteria indirectly promote epithelial cell proliferation;
- dysbiosis with gut bacteria reduces the immune capacity of the gut and thus increases malignancy susceptibility; and
- gut bacteria may induce inflammation.[16]

While the exact mechanism of action of the gut microbiota and development of breast cancer has yet to be determined, emerging evidence is promising. For example, a recent study by Goedert et al. examined the gut bacteria in postmenopausal women with breast cancer compared to controls.[17] The breast cancer patients had significantly reduced diversity of gut bacteria; however, in the control patients the diversity factor was related to estrogen levels, while in the breast cancer patients it was not. As with many studies examining the relationship between gut bacteria and health, it is difficult to determine whether these alterations are a cause or a consequence of the condition, and if causality can be concluded. A study by Flores et al. examined the relationship between gut bacteria and endogenous estrogen to explore a potential mechanistic link between gut bacteria and breast cancer.[18] They found that urinary estrogen concentration was strongly associated with fecal microbiome richness and diversity, and concluded that gut bacteria influence non-ovarian estrogens, thus affecting the risk for estrogen-related conditions such as breast cancer. This study was limited, however, by the number of participants who were postmenopausal women. While information is limited, the data are intriguing and more studies are likely to emerge to clarify the relationship.

Anxiety and Depression

Evidence for a relationship between the gut microbiome and behavior, mood, and mental disorders is mounting. Much of the evidence is in animal models, which shows that being raised germ-free with subsequent colonization impacts the amount of stress and anxiety in reaction to certain stressors such as restraint and changes in light .[19] One study found that colonizing germ-free mice with gut bacteria from a high-anxiety mouse model caused a significant increase in anxiety.[20]

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Lastly, several studies have demonstrated that administration of probiotics including primarily those from the Bifidobacterium and Lactobacillus genera resulted in a reduction in anxiety in mice in response to stressors (recently reviewed). While the mechanism underlying the impact of gut bacteria on stress and anxiety is not clear, germ-free animals have alterations in neurotransmitter signaling.[19] The few human studies investigating gut bacteria and anxiety suggest that probiotics may significantly reduce the stress response, likely due to the favorable effect of the probiotics on gut bacteria. Messaudi et al. for instance compared the effect of Lactobacillus helveticus R0052 and Bifidobacterium longum R0175 probiotics to a placebo on mood in human subjects and found an overall improvement in stress and anxiety levels in the probiotic group.[21] Similarly, Benton et al.[22] compared the effects of a probiotic (Lactobacillus casei)-containing milk beverage (providing 6.5 x 109 per day) to placebo and found those with the lowest mood to begin with experienced improvement from probiotics, but not in the placebo group.[22] More studies involving humans and the relationship between gut bacteria and anxiety/stress are needed.

Cardiovascular Disease

Heart disease is the leading cause of death for both men and women (www.CDC.gov). While modifiable factors such as diet and non-modifiable factors such as predisposing genes have been shown to be strongly associated with risk for heart disease, there are undoubtedly other factors involved. Several studies have identified gut bacteria as the potential link between dietary sources of lecithin (such as egg yolks) and heart disease: gut bacteria metabolize dietary lecithin, and subsequently produce the proatherogenic metabolite trimethylamine-N-oxide (TMAO).[23] One of these studies found that when 40 healthy adult subjects received a round of broad spectrum antibiotics (and thus suppression of intestinal bacteria), their plasma levels of TMAO were dramatically reduced, implicating that gut bacteria are the primary source of TMAO.[24] These same researches conducted a prospective clinical study on over 4000 subjects who were followed for 3 years to monitor for cardiac events. Baseline plasma TMAO concentrations were collected, and participants who had the highest concentration of plasma TMAO had a significantly increased risk of a major adverse cardiac event (hazard ratio, 2.54; 95% confidence interval [CI], 1.96 to3.28; P<0.001).[24] The results remained significant after adjusting for cardiac risk factors and after analysis of cardiac events separately. Another study in mice found a similar relationship, but with a different dietary source: red meat.[25] L-carnitine, a nutrient in red meat with a similar structure to choline, is also metabolized by gut bacteria, and results in the production of TMAO.

Following treatment with antibiotics and a dose of L-carnitine, TMAO production was significantly reduced, demonstrating that TMAO production from L-carnitine is dependent on gut bacteria.[25] Furthermore, plasma levels of L-carnitine were found to be significantly associated with CVD ($p<.05$) in 2,595 subjects, even after adjusting for traditional CVD risk factors.[25] These researchers also reported a potential mechanism: mice with higher levels of TMAO had a significant reduction in the reverse cholesterol transport, which would theoretically increase risk for CVD.[25] Conclusions from these studies clearly indicate a role for gut bacteria in the development of heart disease. However, before there is strong clinical applicability of these findings, future studies that indicate which specific gut bacteria species produce TMAO from L-carnitine and phosphatidylcholine (and other potentially harmful metabolites), and if possible how to optimize our gut bacteria (certain foods/lifestyles/probiotics to generate the more helpful bacteria) are needed.

On Deck

Our understanding of the impact of gut bacteria on health and vice versa is rapidly growing in this energizing era of research. While the translational component has yet to be manifested into routine treatment, there are many metagenomics studies underway to keep an eye out for in the near future. The Human Microbiome Project (HMP) is a National Institutes of Health (NIH) initiative launched in 2008 with the goal to "generate resources that would enable the comprehensive characterization of the human microbiome and analysis of its role in human health and disease" (www.hmpdacc.org). This ongoing project has already yielded numerous publications, and resulted in the development of advanced techniques and tools to identify microbiotic sequence data, examine the relationship to health and disease, and explore the ethical implications for this data. One such publication demonstrated that gut bacteria was associated with the response of children (ages 7-17 years old) with irritable bowel syndrome (IBS) to a low FODMAP diet. Those with bacteria known to have more saccharolytic enzymatic activity responded more favorably to the diet with fewer IBS symptoms.[26] The HMP is undoubtedly providing massive quantities of data that will take time to organize and be translated to clinical practice, but check the website periodically to stay current as the research unfolds.

MetaHIT (Metagenomics of the Human Intestinal Tract) was a four year project with 13 academic and industry partners spanning eight countries aiming to establish connections between gut bacteria and obesity, and inflammatory bowel diseases (www.metahit.eu). As a result, a catalogue containing 9,879,896 genes from the human GI tract was created, which serves as a reference to facilitate the understanding of the variation of the gut microbiome across difference disease states.

Another exciting project under way is the American Gut Project - the result of a crowd-funded initiative (www.americangut.org). The aim of this project is to collect microbiotic information from as many people who are willing to volunteer (data from over 3,000 people has been sequenced to date). Health information, including a 7-day diet record, is collected from volunteers, and as the data bank grows, associations between microbiota and health status are determined. This IRB-approved study will undoubtedly yield peer-reviewed publications that will advance our knowledge on the bidirectional relationship between gut bacteria and host health. Large studies such as this, MetaHIT, and the HMP are helping to identify associations that can subsequently be explored further in randomized controlled trials to determine causal relationships with therapeutic potential.

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Conclusions and Practical Implications

The relationship between our health and our gut bacteria is dynamic. The evidence so far suggests that greater microbial diversity may have a favorable impact on health. In one study, greater gut bacteria diversity was associated with lower inflammatory markers, improved functional and health indicators, and a more diverse diet; although, the population in this study was elderly, and whether the findings apply to other populations is unclear.[27]

The current evidence also suggests a high fiber diet improves gut bacteria profile, at least in children. A study published in 2010 compared gut bacteria profiles from children, ages 1-6 years old, in Africa with a high fiber, low processed foods diet to children in Europe with a low fiber, higher processed foods diet.[28] The gut bacteria from those in Africa had more Bacteroidetes, more bacteria known to be better able to metabolize fiber (absent in the guts of those in Europe), as well as greater overall microbial richness and diversity. The authors surmised that gut bacteria adapted to the high fiber diet in the children from Africa, "allowing them to maximize energy intake from fibers while also protecting them from inflammations and non-infectious colonic diseases." Another study found that an increase in whole grain intake improved gut microbial diversity and inflammatory markers including postprandial serum glucose.[29] Multiple studies indicate that diet is perhaps the most important determinant of gut bacteria profile (recently reviewed).[30-32]

While we are not to the point of recommending specific foods to promote proliferation of certain bacteria for a particular health outcome, we can promote a diet rich in fruits, vegetables, and whole grains to generate a diverse gut bacteria profile. We can also provide guidance on use of probiotics based on evidence that they may improve conditions such as gestational diabetes and stress. Improved practice will result from staying current with ongoing research on gut bacteria, diet, and health outcomes- one of the most exciting and rapidly evolving areas of research.

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RESEARCH BRIEF: Probiotics and Blood Glucose in Obese Pregnant Women

By Christine D. Garner, PhD, MS, RD

Lindsay KL, Kennelly M, Culliton M, Smith T, Maguire OC, Shanahan F, Brennan L, McAuliffe FM. Probiotics in obese pregnancy do not reduce maternal fasting glucose: a double-blind, placebo-controlled, randomized trial (Probiotics in Pregnancy Study). *Am J Clin Nutr*. 2014 99(6):1432-1439. doi:10.3945/ajcn.113.079723

Maternal obesity rates have increased over recent decades,[1] which is concerning because of the numerous associated health risks during pregnancy, including gestational diabetes mellitus (GDM).[2,3] In GDM, a woman's body is unable to produce enough insulin and/or unable to respond appropriately to insulin for proper glucose uptake. GDM and co-occurring hyperglycemia have numerous short- and long-term health risks for both mothers and their children.[4] Researchers identified and demonstrated a role of gut microbiota in human metabolism in recent years. Two prior studies demonstrated favorable effects of probiotic consumption on glucose regulation during pregnancy in non-obese women.[5,6] The study conducted by Lindsay et al.,[7] highlighted in this issue's Research Brief, examines the effect of a probiotic on maternal glucose concentrations in obese women.

The authors of this study enrolled obese pregnant women at a single antenatal clinic in Dublin, Ireland to participate in a randomized, double-blind, placebo-controlled trial. To be eligible, women had to meet the following criteria: pre-pregnancy body mass index (BMI) between 30 and 39.9 kg/m^2, singleton pregnancy, < 20 weeks gestation, and > 18 years of age. Women were excluded if they had a history of diabetes, or if a congenital anomaly was present.

Women were randomized to receive either a probiotic or a placebo capsule. The probiotic capsule contained 100 mg Lactobacillus salivarius UCC118, a bacteria previously shown to persist transit through the gastrointestinal tract and influence the immune system. At randomization, a research dietitian provided the women with information on healthy eating for pregnancy and answered questions. Participants were also provided information about probiotic-containing foods, and were instructed to avoid consumption of such foods to minimize confounding.

Participants received capsules for their assigned group at 24 weeks, and were instructed to take 1 capsule/day after a meal and to keep the capsules refrigerated. Participants were provided enough capsules to complete the 4-week intervention, and asked to return bottles at the end of the intervention. Capsules were counted at this time to check compliance -- non-compliance was determined as ≥ 3 capsules missed during the intervention period. The intervention period of 4 weeks was determined because prior research had demonstrated that the Lactobacillus salivarius UCC118 strain modulated the gastrointestinal tract of healthy non-pregnant adults after 21 days.

At 24 weeks (baseline) and 28 weeks, (end of the intervention period) fasting glucose was measured and additional fasting serum samples were obtained. An oral glucose tolerance test was performed to test for GDM at 28 weeks as well. Additional measurements were taken, including fetal anterior abdominal wall width (a marker of fetal adiposity) using ultrasonography, glucose and serum cord blood samples at delivery, and other delivery details, such as gestational age, infant birth weight, length, and head circumference.

Participants were instructed to complete at 3-day food diary during the study period, for which they were to record all food and drink consumed on three consecutive days, including one weekend day. They were also provided a lifestyle questionnaire about activity, dietary and smoking habits, alcohol consumption, and education level. Food record data was analyzed using WISP nutritional analysis software to assess energy and nutrient intake.

The researchers' goal sample size was ≥ 150 participants. This was determined to be a large enough sample size to account for dropouts, loss to follow-up, poor compliance, and antibiotic use on top of the minimum calculated sample size, which required 100 subjects (50 per group) to detect a 0.4 mmol/L (7 mg/dL) reduction in fasting glucose with a 0.05 significance level with ≥ 80% power.

The primary outcome of interest was the change in maternal fasting glucose from baseline to 28 weeks between the probiotic and placebo groups. Secondary outcomes were the differences between groups in incidence of impaired glycemic control (GDM and impaired glucose tolerance) and neonatal anthropometric measurements. Gestational weight gain, delivery complications, maternal serum insulin, CRP, C-peptide, lipids, neonatal glucose, 5-minute Apgar scores, and NICU admission were also assessed as outcomes.

Statistical analyses were completed on an intention-to-treat basis. Baseline characteristics and dietary intakes between groups were assessed for differences using t and chi-square tests. BMI differed significantly between groups, thus, further analyses were conducted using BMI as a covariate. Secondary analyses were conducted with the removal of non-compliers and antibiotic users from the sample. The Bonferroni method was applied to correct for multiple comparisons.

Random assignment to the treatment group was completed for 175 women, but 34 women dropped out prior to 34 weeks, leaving a total of 138 women (63 in probiotic group, 75 in placebo group) who began treatment. There were no differences between the two groups in maternal age, parity, education, smoking status, or nutrient intake; BMI was the only significantly different baseline characteristic between the two groups (probiotic group mean 32.9 ± 2.4 kg/m^2, placebo group mean 34.1 ± 2.7 kg/m^2).

The primary outcome – changes in maternal fasting glucose from 24 to 28 weeks – did not differ between the probiotic and placebo groups when controlling for prepregnancy BMI. There were also no differences between groups in incidence of GDM or impaired glucose tolerance; 6 women (3 from each group) developed GDM, and 15 (7 in the probiotic group, 8 in the placebo group) developed impaired glucose tolerance. Additionally, there were no differences in infant birth weight, ponderal index, gestational age at delivery, or Apgar scores. The maternal outcomes of

Continued on page 7

gestational weight gain, delivery outcomes, and metabolic variables also did not differ between groups. In secondary analyses, 6 women who reported antibiotic use and 21 women with poor compliance were excluded. In the remaining 110 women, no significant differences were detected for any outcome. In summary, no significant differences were detected for any outcome that was investigated between the probiotic and placebo groups.

The authors found no effect of the 4-week probiotic intervention among obese pregnant women on maternal glycemia in the intent-to-treat analysis or in the secondary analysis. These results are contrary to two prior intervention studies that reported favorable effects of probiotics on serum insulin, plasma glucose, and GDM incidence.[5,6] The authors speculated that such discrepant findings suggest that obese pregnant women may respond differently to probiotic treatment than non-obese women. Other explanations of discrepant findings include the use of a different probiotic strain or a shorter intervention period.

The strengths of this study include that it was adequately powered and blinded, had a low drop-out rate, and high compliance. Also importantly, the intervention yielded no adverse effects on either the women or their infants, supporting the safe use of probiotics in pregnancy. One limitation is that fecal samples were not collected from participants, thus, it was not ascertained whether the probiotics successfully established in the gut flora of the intervention group, or whether there were differences in gut flora between the two groups. Additionally, because a different probiotic strain was used in this study than in the previous studies that included healthy women and had favorable outcomes, direct comparisons between these studies are not possible. To conclude, this study adds two possible pieces of evidence to the literature: 1) It is possible that beneficial effects of probiotics previously observed in healthy pregnant women may not be translatable to obese pregnant women; and 2) It is possible that probiotics have strain-specific effects, and certain strains may not be optimal for use in pregnancy.

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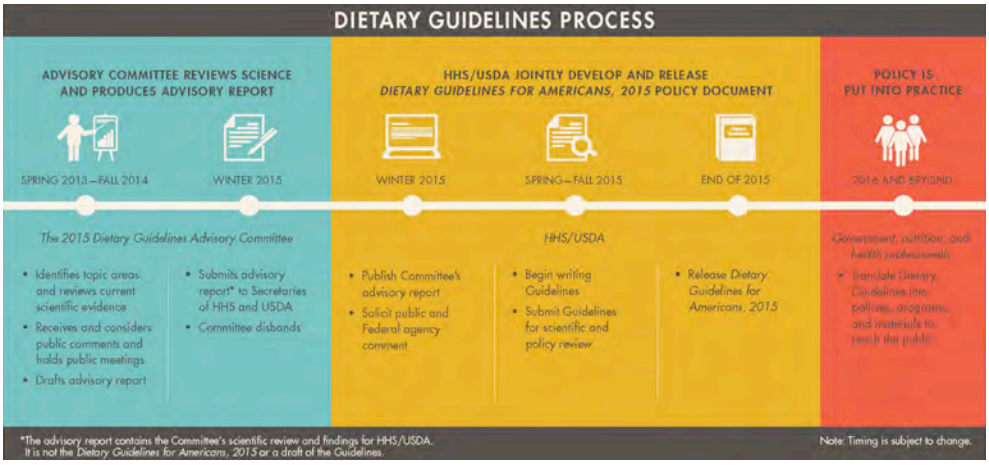
DEVELOPMENT OF THE 2015 DIETARY GUIDELINES FOR AMERICANS: A Status Report By Deena Meister

2015 DIETARY GUIDELINES DEVELOPMENT PROCESS

Every five years the Dietary Guidelines for Americans (DGA) are revised and released. The DGA are recommendations for people, ages 2 and older, regarding healthy eating to help achieve and maintain a healthy weight, prevent disease, and promote overall health. The DGA are a joint project of the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (HHS).

Since 1985, a Dietary Guidelines Advisory Committee (DGAC) is organized for the purpose of reviewing recent and relevant scientific and medical research to facilitate the revisions. Following this assignment, the DGAC submits a report to the Secretaries of HHS and USDA that is used to revise the existing DGA.[1]



The 2015 process for developing the DGA included seven public meetings held between June 2013 and December 2014. The meetings discussed the progress of DGAC subcommittees appointed to gather and evaluate scientific evidence. The topics discussed in each meeting are briefly addressed in the following paragraphs, but can be looked at in further detail here: http://www.health.gov/dietaryguidelines/2015.asp#meetings.

The goals of the initial meetings were to receive input from experts in the field, and to identify new themes for moving forward. One particular item discussed was the socio-ecological model used when developing the 2010 DGA. This model acknowledges and takes into account the personal and environmental factors that affect individual choices related to diet, physical activity, and health.

In the third meeting, Dr. Barbara Millen, DrPH, RD Chair of the DGAC, stated that there are new themes that the committee is focusing on. These themes included evidence of the effect of food patterns on health outcomes, the complexity of factors that influence individual choices, and how to make changes on an individual and population level, looking at "what works" in terms of making healthy changes, healthy dietary patterns, and sustainability.[2]

As the meetings progressed, more speakers presented scientific evidence, and each subcommittee stated conclusions and recommendations. Key findings included:

- Americans have low vitamin D, potassium and fiber intake; however, they are overconsuming sodium and saturated fat.
- Characteristics linked to good health outcomes were: higher intake of fruits, vegetables, whole grains, low-fat dairy, fish/seafood, legumes, lean meat and nuts; moderate alcohol consumption; low consumption of red and processed meats; and lower intake of sugar-sweetened food and bever ages, and refined grains.
- A highly plant-based diet is more environmentally friendly and sustainable.
- There is enough room in the DGA recommendations to incorporate different individuals and cultures.
- Self-monitoring is the best strategy in weight management and lifestyle changes.[3]

Following this series of meetings, the DGAC submitted its "Scientific Report of the 2015 Dietary Guidelines Advisory Committee" in early 2015. In February of this year the report was publicly posted at http://health.gov/dietaryguidelines/2015-scientific-report/. In March a public comment meeting was held in Bethesda, Maryland. As of June 1, 2015 comments made at the meeting and those submitted online through the open comment period (closed on May 8, 2015) were also posted on the website.

In addition to the feedback submitted on the report, a summit held in Washington, DC in May 2015 through Ohio State University and National Geographic led to the development of key points for the DGAC to consider. These key points included: 1) The DGA should address the diversity of the population; 2) Implementation of the DGA should affect positive behavior change; and 3) The DGA should be able to be used by individuals, communities, and institutions, and also be backed by the public and private sector. To read the full recommend takeaway messages, visit http://agrilinks.org/sites/default/files/resource/files/DGA%20Summit%20Key%20Takeaways.pdf.

Over the summer the HHS and the USDA will consider the DGAC's scientific recommendations, as well as the public and agency comments. The 8th edition of the DGA is expected to be released in Fall 2015. You can stay up-to-date on its progress and sign up for email updates at: http://www.health.gov/DietaryGuidelines/.

SEEKING TESTIMONIALS FROM MEMBERS

The **WH DPG** is looking for members to provide testimonials about working in women's health, and on membership in the WH DPG. If interested, please email info@womenshealthdpg.org.

DEVELOPMENT OF THE 2015 DIETARY GUIDELINES FOR AMERICANS Continued from page 8

A WORD ON THE BIRTH TO 24 MONTHS AND PREGNANCY (B-24/P) PROJECT

This project has the goal of eventually incorporating children from birth to two, as well as pregnant women, into the DGA by the year 2020. This is a 5-phase project, taking place over the next couple of years.[4]

The first phase involves four workgroups; each assigned a different age group to develop questions and research areas to incorporate in the USDA's Nutrition Evidence Library (NEL).

Work group	Age	Focus
Work group 1	0-6 months	Research areas such as infant formula, breastfeeding, and maternal diet and allergy risk
Work group 2	6-12 months	Research protein needs and long-term health in infants
Work group 3	12-24 months	Research development and measurement for physical activity
Work group 4	0-24 months	Research mother and caregiver influence on what the infant/toddler is eating

Phase 2 will involve two steps: 1) Create a process for gathering and reviewing the information, and 2) Gather the information and evidence. Phase 3 will focus on development of the technical report, which will be delivered to the DGAC for the 2020 DGA in Phase 4. The final report submitted by the DGAC will include recommendations for all Americans including birth to 2 years of age and pregnant women.

Visit http://www.nel.gov/birth-to-24-overview to see the project outline in greater detail, or http://www.cnpp.usda.gov/birthto24months for updates regarding the B-24/P project.

References

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2: "2015 Dietary Guidelines Advisory Committee Meeting 3" 16 June 2015 http://www.health.gov/dietaryguidelines/2015-BINDER/meeting3/index.aspx

3: "2015 Dietary Guidelines Advisory Committee Meeting 7" 22 June 2015 http://www.health.gov/dietaryguidelines/2015-BINDER/meeting7/index.aspx

4: " USDA-HHS Dietary Guidance Development Project for Birth to 24 Months and Pregnancy (B-24/P)" 03 July 2015 http://www.nel.gov/birth-to-24-overview

Malnutrition
HOD Fact Sheet

Academy of Nutrition and Dietetics

House of Delegates *Fall 2015*

The House of Delegates will meet on October 2-3, 2015 in Nashville, TN. The dialogue session on October 2 will be on Malnutrition. The following Fact Sheet provides a quick overview of this complex topic. Delegates and members are encouraged to review the full HOD Backgrounder on this topic to have a deeper understanding of this issue. The complete HOD Backgrounder can be found at: www.eatrightpro.org/resources/leadership/house-of-delegates/about-hod-meetings (Eat Right Pro> Leadership> House of Delegates> About HOD Meetings> Fall 2015 Meeting Materials).

Introduction

Malnutrition (undernutrition) is common across many nutrition and dietetic practice settings, including but not limited to acute care, long-term care, outpatient/ambulatory clinics, public/community health settings, and schools, and it affects children, adults, and the elderly. Malnutrition affects individuals with both chronic and acute illness; starvation (i.e., anorexia nervosa); and/or food insecurity (i.e., elderly, socially isolated, low income). The prevalence of malnutrition across all healthcare settings is staggering. In the hospital, malnutrition prevalence is estimated to range from 13-88%, encompassing pediatrics and adults. The prevalence in the long-term care setting and outpatient/homecare setting is similar, 21-51% and 13-30%, respectively. Registered Dietitian Nutritionists (RDNs) and Nutrition and Dietetic Technicians, Registered (NDTRs) encounter malnourished individuals through a variety of community settings, including health departments, clinics, schools and school based health centers, nutrition education programs, food and nutrition assistance programs, food banks, grocery stores and other food retail or foodservice venues. According to the United States Department of Agriculture (USDA), 49.1 million people, including 15.9 million children under the age of 18, were food insecure in 2013 in the United States. Food insecurity places these children and adults at risk for malnutrition. A number of factors can explain the wide range of malnutrition prevalence including patient or client population, disease severity, access to nutritious food, and how malnutrition is defined in these practice settings. A common theme across all of these settings is the lack of diagnosis for malnutrition and thus, the lack of treatment.

Early identification, assessment, and nutrition intervention of the malnourished individual or individual at risk for malnutrition is important in improving outcomes. As the nutrition expert, the RDN can and should be involved with the complete spectrum of addressing and managing malnutrition.

Mega Issue Question: How do we empower RDNs to be experts and leaders in management of malnutrition (identification, diagnosis and intervention)?

Meeting Objectives:

Participants will be able to:

1. Recognize the magnitude, contributing factors and consequences of malnutrition in the United States.
2. Expand awareness of the impact/ outcomes of managing malnutrition (identification, diagnosis, intervention) across all dietetic practice settings.
3. Affirm and promote the role of and the opportunities for RDNs and Nutrition and Dietetic Technicians, Registered (NDTRs) in management of malnutrition.

Beginning in 2008, my department established a dialogue with our Health Information Management (HIM) Department to increase awareness about the impact of malnutrition on hospital reimbursement. The hospitals' coders told us that physicians under-recognized the prevalence of malnutrition and they saw an opportunity for us (RDNs) to educate the interdisciplinary team about the value of incorporating Body Mass Index and the medical diagnosis of malnutrition in the medical records of patients when it is present and part of the their overall treatment plan. We emphasized that early nutrition intervention can reduce costs associated with malnutrition, while appropriate documentation and billing can impact revenue from government and private payers. Last fiscal year, a query for the diagnosis of malnutrition was conducted, and it was found that 263 cases were identified, which resulted in a $3,000 change in reimbursement per patient. We were told we had made an impact of $789,000 for the hospital.

Jennifer Wooley, MS, RD, CNSC
Clinical Nutrition Manager
University of Michigan Health System

Academy's Capacity and Strategic Position to Address Malnutrition

The Academy of Nutrition and Dietetics has a vested interest in addressing malnutrition and teaching members how to identify, document and treat malnutrition. Various resources have been developed, and partnerships have been formed to further the Academy's vision of optimizing health through food and nutrition. Resources, partnerships and research currently available include:

Resources	Partnerships	Research
Academy Website: Malnutrition Codes and Characteristics/ Sentinel Markers Academy of Nutrition and Dietetics Health Informatics Infrastructure (ANDHII) Nutrition Care Process Terminology Nutrition Care Manual Standards of Practice (SOP) and Standards of Professional Performance (SOPP) Dietetic Practice Groups Kids Eat Right- Hunger in Our Community: What We Can Do Toolkit Food and Nutrition Security Action Plan	Alliance to Advance Patient Nutrition Malnutrition Quality Improvement Initiative Future of Food Initiative Nutrition Focused Physical Exam Training Workshop	Malnutrition Clinical Characteristics Validation Study

GETTING THE WOMEN'S HEALTH WORD OUT THROUGH SOCIAL MEDIA By Miri Rotkovitz, MA, RD, *WH DPG Social Media Coordinator*

Once upon a time our DPG newsletter was the primary means of member communication. It was a simple-looking, two-color printed affair, with a bit of clip art thrown in to fancy it up. Producing each issue involved lots of long-hand revisions, third party printing arrangements, faxing, and snail-mailing.

Today our all-digital newsletters boast a far slicker design, thanks to our graphic designer, Steve Bonnel. Our editorial board capitalizes on internet communication to enable a far more streamlined content development and revision process. These advancements have freed us up to focus on high quality articles, rather than the technical mechanics of newsletter production.

Several years ago, as email and internet use became commonplace, we launched an electronic mailing list (EML) through which DPG members could seek practice-related advice from, and share research with, colleagues. With the launch of our overhauled DPG website, www.womenshealthdpg.org, we've added a user forum to the site to increase communication opportunities for members.

But as our communications have moved into the digital space, it hasn't escaped us that there are many more venues in which we could establish a presence and engage our members. The world of social media grows ever more vital and networked by the day. Virtual spaces like Facebook, Twitter, and Pinterest offer amazing opportunities to amplify our DPG's voice and message, while putting breaking women's health news on our radar – and that of our members. Cultivating a social media presence also affords the DPG the chance to connect with organizations and professionals working toward similar goals in women's health and wellness promotion. To that end, we've established a Social Media Coordinator position, and are developing official social media policies to guide our efforts. Our ultimate goal is to assemble a social media team to help curate and share news more effectively across our various social media accounts.

As we work to establish our online presence, we're cognizant that our audience – and therefore our strategy – will necessarily vary according to the nature of each virtual space. We are carefully crafting our accounts to reflect and uphold the DPG's values and goals. Here's a look at the accounts we've created to date, and our approach to each:

1. Facebook: This account is targeted primarily to DPG members, as the platform's format offers ample room for user comments and dialogue. In order to curate useful information and news, we follow the pages of many nutrition, health, and social welfare organizations dedicated to women's health, breastfeeding promotion, and related topics. We also follow fellow RDNs and DPG members. Find and "like" us on at https://www.facebook.com/WHDPG.

2. Twitter: Designed to relay short bits of commentary and links to breaking news, Twitter is geared toward dialogue with a broader audience. At present, this account is a useful source for discovering relevant news, content, and trending women's health topics, events, and issues. Follow https://twitter.com/womenshealthdpg for updates.

3. Pinterest: We are currently curating Pinterest boards that we hope will prove useful both for members' personal use, as well as for sharing with clients. Our reach will likely be broadest on this highly visual platform, and we expect that non-RDNs will find our boards as they search Pinterest. We are therefore working to ensure the boards are useful for laypeople as well. Future boards may include recipes, health and nutrition related infographics, breastfeeding-friendly fashions, etc. We are taking care to select "pins" that do not promote specific brands, or imply support of businesses that are not baby-friendly or WHO code compliant. Before we officially launch our Pinterest account, the DPG's executive committee will provide feedback on these boards, to help ensure that selected pins reflect our policies and standards. You'll be able to find us on Pinterest at Women's Health DPG. Stay tuned!

We hope you'll join us online, and we promise to keep you posted as we make forays into other social media realms, such as LinkedIn and Google+.

In the meantime, if you are social media savvy and passionate about sharing the latest news and research in women's health and nutrition, we could use your help! If you're interested in assisting our social media efforts, contact us at info@womenshealthdpg.org. Thanks!

CALL FOR NOMINATIONS

The Women's Health DPG is looking for enthusiastic members to serve for the 2016-2017 membership year! We are seeking nominations for the following elected positions:

Chair-Elect
Nominating Chair-Elect

If you would like to nominate someone or would like more information about either position, please contact Maria Bournas at info@womenshealthdpg.org

Deadline for nominations is October 8, 2015.

SCHEDULE OF WH EVENTS: FNCE® 2015 October 3 – 6, Nashville, TN

Sunday, October 4
8:00 AM – 9:30 AM
Music City Center, Grand B

Spotlight Session: *Women's Health, Prenatal Nutrition and Infant Outcomes: A Public Health Perspective*
The United States' infant mortality rate is 27th in the world, higher than that found in many Western European and East Asian countries. This session highlights the four leading causes of infant mortality, the role nutrition plays, and explores why some women receive insufficient care. Using a community/public health approach, we will examine how RDNs can positively impact infant mortality by addressing strategies that, if achieved, will improve the health of women and infants.

Speakers: Jamie Stang, PhD, MPH, RDN and Helene Kent, MPH, RDN
**The 2015 WH DPG Awards will be presented to recipients at the session.*

Monday, October 5
9:00 AM – 12:00 PM
Music City Center, Exhibit Hall C

DPG/MIG Showcase
Stop by to meet members of the leadership team, and see what's new and coming soon to the WH DPG!

Mothers Room at Music City Center Room 105
Saturday 7:30 a.m.-4:30 p.m.
Sunday 7:30 a.m.-5:30 p.m.
Monday 7:30 a.m.-5:30 p.m.
Tuesday 7:30 a.m.-3 p.m.

The Public Health/Community Nutrition Practice Group and the Academy of Nutrition and Dietetics are proud to sponsor the Mothers Room at FNCE®. The Mothers Room offers a quiet, private and relaxing place for breastfeeding mothers to nurse their infants or pump breast milk while attending FNCE®.

MEMBER SPOTLIGHT By Wendy Baier Cartier, RD, *WH DPG Assistant Publications Editor*

Lisa Eaton Wright, MS, RDN, LDN, *WH DPG Policy and Advocacy Leader*

Tell us a about your professional background and how you became interested in becoming an RDN. Nutrition and dietetics is a second career for me. I was/still am a licensed court reporter in the State of Illinois, with a specialty in medical malpractice litigation, and continue to take three to four depositions per month to keep my skills sharp. I have been an RDN since March of 2010. Many of my friends suggest it was destiny that I be an RDN with a name like Eaton Wright!

In all seriousness, I have always been interested in nutrition. In May of 2005 I saw an ad for a new Master's program in nutrition and wellness. I went to the open house to learn more, and started taking classes that fall for the didactic program in dietetics. After completing my second Bachelor's degree (my first in political science), I earned a Master's in Nutrition in December 2009 and sat for the RD exam in March 2010.

You are the new Women's Health Policy and Advocacy Leader. How did you become interested in policy? When registering for classes in nutrition, I met with the department chair and told her of my interest in food policy. She suggested I go to the Academy's Public Policy Workshop, and I attended in 2008. Over the years I have witnessed PPW evolve into an incredible learning environment for RDNs who want to be a part of the policy-making process -- the energy and momentum are incredible.

In addition to being interested in nutrition policy, I am involved with other areas as well. When my kids entered school, I became very interested in education and it's funding, so I decided to run for election. I was elected to our local school board twice, serving a total of eight years. Many lessons were learned sitting on a board like that. It's a commitment, both in time and energy. If you really want to impact your daily life through policy, sit on a community board and, of course, vote. "All politics is local" really means that those who vote and participate are focused on resolving their local issues.

Do you have any guidance for other dietitians who wish to become involved in policy? If you haven't attended PPW, I highly recommend it. You will come away with a greater understanding of how important policy is to our profession. In addition, if you want to have an impact on food and nutrition policies, you need to be informed, be involved and get connected. Make the time to read Academy communications regarding legislation and regulations that impact our profession. Make the time to participate in Action Alerts when there's a call to action. Become familiar with your legislators, and connect with them through action alerts, town hall meetings, or office visits.

Describe your current area of practice. For my first job as an RDN, I was hired by a group of urologists with 10 locations and a prostate cancer treatment center. They had never employed an RDN before and I had never practiced as one. But I convinced them I was the best person for the job and started in July 2010. I stayed there for 18 months until I was encouraged to apply for a position in employee wellness at the second largest community college in Illinois. As part of the process, I presented a new Wellness Program to the interviewers. I was hired in February of 2012 and continue there to this day. I love everything about my job --- the people, the environment, the work. I present workshops on nutrition and schedule other professionals to deliver wellness workshops for our employees. I partner with our fitness center, culinary department, foodservice provider and many other departments on campus to provide wellness opportunities for the staff. I leverage the resources of our vendors and community partners to expand the wellness offerings to our employees. Every day is different and I enjoy the flexibility of my position, as well as the opportunity to be the nutrition and wellness expert for our three campuses.

What are your future goals or areas of interest? I continue to be fascinated by public policy. Policy affects so much of our daily lives and certainly impacts our professional lives as dietitians. I want to motivate my peers into action: to learn, to inform themselves, to connect, to act. We can't rely on others to do this for us. So many think, "Well, those policy people, they like that stuff, they can handle it." It takes a team: team effort, team strategy, teamwork!

Name some lessons that you have learned along the way. Ask. Just ask. I have asked for a raise. I have asked for opportunities at work. I have asked legislators to support various issues. I asked to be the WH DPG PAL. I have been told YES about 98% of the time. You don't know unless you ask. So go for it! Be consistent and persistent -- in all things.

What are a couple highlights of your dietetic career that you are proud of? While I have only been a dietitian for five years, I have been involved on many levels in our profession. I have learned so much from incredibly smart dietitians and dedicated Academy staffers. In the Illinois affiliate, I have served as a District President, Public Policy Coordinator, and Affiliate President; for the Academy, Chair of the Legislative and Public Policy Committee. Each leadership role has brought new insight and skills into my life, as well as new friendships. These opportunities to serve have allowed me to feel a sense of ownership for our profession, and that sense of ownership makes me feel even more committed -- to my peers, to our profession, and to our professional association.

Do you have any final thoughts that you would like to share? I think my mission has always been to inform myself about the policy process, and to go out and share what I have learned and experienced with my peers. I hope to be able to do that as PAL for the Women's Health DPG. I consider myself a women's health champion and am thrilled to serve in this role. I speak with passion about policy because I am passionate about it. It's important. It matters. Remember: It's our profession. Own it. Advocate for it!

2015-2016 WOMEN'S HEALTH DIETETIC PRACTICE GROUP LEADERS

Executive Committee

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Please send any questions or comments to info@womenshealthdpg.org.

Academy of Nutrition and Dietetics

2016 FNCE® Call for Educational Sessions — Now Open!

The Academy is looking for innovative, cutting-edge educational sessions that will make an impact!

We are accepting proposals online through November 15, 2015.

Each year the Academy receives hundreds of proposals for FNCE® sessions. To stand out and enhance your chances of acceptance, be sure to ask yourself these key questions to enhance your steps to success:

- What new information are you showcasing or releasing in your proposed topic area?
- What outcomes are you highlighting?
- Is your proposal science— or evidence-based?
- What are the applications to dietetics practice?

Academy of Nutrition and Dietetics
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