Preconception Health: The Role of Nutrition

AN ASPHN BRIEF - 2015

Preconception and Interconception Health[1] refer to the state of a woman's health before and between pregnancies. Preconception and interconception health care is a set of interventions to identify and modify biomedical, behavioral and social risks to a woman's health or pregnancy outcome through prevention and management. The goal of the care is to promote the current and future wellbeing of the woman and enhance the health of any future pregnancy and child.

Why Preconception/Interconception Care and Health Matter

- A woman's health during her reproductive years influences her overall wellbeing.
- A woman's health and wellness habits will directly influence those of her family.
- A woman's health directly affects the wellbeing of any children she may have.
- A woman who enters pregnancy at a healthy weight may have a reduction in poor maternal-fetal outcomes and decreased lifelong risk for chronic diseases for both the mother and child.
- A woman who retains weight gained during pregnancy is at increased risk of obesity, chronic diseases including diabetes or insulin resistance, and has a higher risk of postpartum depression.
- Babies born at either low or high birth weights are at risk for lifelong chronic disease and obesity.
- Babies born to women who experience preconception health care should be less likely to be premature, low or high birthweight, have a birth defect or other disabling condition.

Introduction

Women need access to preventive and clinical care during their reproductive years for their own wellbeing and for children they may have. This includes attention to dietary adequacy, healthy weight and any medical nutrition therapy and preventive nutrition needs. This brief addresses both public health and clinical aspects of preconception and interconception health for women. It also focuses on delineating the role of nutrition and nutrition professionals in providing preconception health and health care. To simplify terminology, the term preconception will be used for both preconception and interconception periods.

Preconception Health and Health Care

About 30 years ago, concerned professionals began looking at improving poor pregnancy outcomes by addressing the health status of women prior to pregnancy. This framework, known as preconception care, consists of related activities that focus on the primary prevention of many poor pregnancy outcomes, such as congenital anomalies, which are difficult or impossible to alter once a woman is pregnant. Preconception care also provides a timely opportunity to positively influence factors associated with poor pregnancy outcomes, such as interconception length, chronic disease control and unintended conception.[2]

Over time, this approach has become more common. The Centers for Disease Control and Prevention (CDC) considers preconception health[3] as the health of women (and men) within their reproductive years encompassing high levels of wellness. This approach includes taking steps now to protect the health of a baby a woman ***might*** have sometime in the future. However, all women can benefit from preconception health, regardless of pregnancy intention.

The concepts underpinning preconception health are based upon those associated with promoting good health. The public health goal in addressing preconception health is to create environments where it is easy for women to be healthy. This is done by enhancing factors associated with good health (e.g. access to health care) and reducing those that have a negative influence (e.g. smoking). It includes living in an environment with clean air; engaging in health promoting behaviors such as physical activity and heathy eating; and providing the knowledge and resources needed to plan pregnancies. Preconception health and health care require multiple, sustainable interventions that occur concurrently to improve overall women's health. Changes are needed in policy, systems and environment, as well as in clinical practice for preconception health to be fully realized.

It is important that all women have access to preconception care as part of routine health encounters. The goal is to integrate preconception care concepts into clinical care

and make it widely available, so that women ask for this care, providers offer it and insurers reimburse for services. Preconception care is the clinical care a woman receives that addresses those factors known to increase the chances of having a healthy baby, tailored to her specific needs. This care includes health assessment and maintenance across the life span addressing childbearing and contraceptive considerations along with women's general health concerns. An important component is **reproductive life planning** that involves activities to help a woman plan, based on her values and resources, how to achieve personal goals about whether or when to have children.[4]

A challenge associated with preconception care is **unintended pregnancy**. According to the Guttmacher Institute,[5] in the United States, about 51 percent or 3.4 million pregnancies each year are unintended. Most American families want two children and to achieve this, the average woman spends about five years pregnant, postpartum or trying to become pregnant. More than three-quarters of her reproductive life is spent trying to avoid an unintended pregnancy.

If a woman is unaware she is pregnant she cannot attend to the critical needs of the very early prenatal period. Unintended births are associated with adverse maternal and child health outcomes, such as delayed prenatal care, premature birth and negative physical and mental health effects for children. Low-income, cohabiting and minority women aged 18–24 are the most likely to experience an unintended pregnancy[6] and these are the women least likely to receive preconception care.

Resources

The National Preconception Health and Healthcare Initiative is a leader in promoting preconception health. The Initiative is a public-private partnership which engages the United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) and the Health Resources Services Agency (HRSA), and other government agencies, nonprofit organizations, professional organizations and hundreds of individuals. This site offers information for women and men, tools for health professionals, reproductive life planning, surveillance indicators and more. This group has led the effort to create policy, guidelines, tools and resources.

As part of the National Preconception Health and Healthcare Initiative, the Before, Between and Beyond Pregnancy website was established as a comprehensive clinical resource.

Organizing Frameworks Supporting a Preconception Health Approach

The following are a set of theories that underpin a preconception health approach to women's and children's health. Together they create an understanding about the multiple threads that lead to wellness and health; the role of the individual and other factors; and the elongated time frame in which supports and hindrances to health must be considered.

Social Determinants of Health

The **Social Determinants of Health** are economic and social conditions that influence the health of people and communities and are related to health outcomes. According to the Centers for Disease Control and Prevention (CDC)[7], addressing social determinants of health is a primary approach to achieving health equity. The determinants of health are factors that contribute to a person's current state of health. These factors may be biological, socioeconomic, psychosocial, behavioral, or social in nature. Theoretically, genes, biology, and health behaviors together account for about 25 percent of population health. The other approximately 75 percent of population health is influenced by the social determinants of health that include: social environment (such as discrimination, gender, or income), physical environment/total ecology, and health services/ medical care.

Life Course Theory

Preconception care is also consistent with **Life Course Theory (LCT)**. According to the Maternal and Child Health Bureau,[8] LCT is a conceptual framework that helps explain health and disease patterns, particularly health disparities, across populations and over time. LCT is population focused, and firmly rooted in social determinants and social equity models. This theory hypothesizes that birth outcomes are impacted by the long-term interaction of a woman's biology, behavior, psychology and the social/environmental protective factors (e.g. healthy eating) and risk factors (e.g. inadequate folic acid intake).

There is an intergenerational effect where the health of one generation affects the health of the next. Maintaining a woman's health prior to and between pregnancies is entirely consistent with this approach, recognizing that the health of the mother and child cannot totally be separated. While interconception care is traditionally viewed as short-term, LCT treats this time frame as open-ended beginning with the end of one pregnancy and ending only after the next conception has been diagnosed or the woman is no longer able to conceive.

Fetal Origins Hypothesis

The **Fetal Origins Hypothesis** (also known as the Barker Hypothesis) amplifies the importance of nutrition throughout the life course of a woman and her child. Evidence links adverse exposures in early life to chronic disease susceptibility in adulthood. Nutrition is a major intrauterine environmental factor that alters expression of the fetal genome and may have lifelong consequences. These changes may result in increased incidence of certain diseases such as obesity, high blood pressure and heart disease in adulthood. Promoting optimal nutrition not only ensures optimal fetal development, but will also reduce the risk of chronic diseases in adults.[9] Studies show that both over and under nutrition have detrimental effects on the child's risk of adult diseases including propensity for obesity. Also, too much and too little intake of nutrients can alter fetal programming.

Nutrition, Preconception Health and Health Care

The role of nutrition as part of good health, chronic disease and pregnancy outcomes is well established. Thus nutrition is recognized as a component of preconception health and health care. Nutrition has both clinical and public health aspects. The clinical aspect requires working with individuals about their diet, habits, weight and overall health. The public health aspect addresses creating environments where healthy eating is the easy choice. Creating these environments is built on policy, systems and environmental change efforts.

Three areas emerge when considering the role of nutrition as part of preconception health. They are: dietary adequacy; achieving and maintaining a healthy weight; and nutrition as part of existing health care conditions.

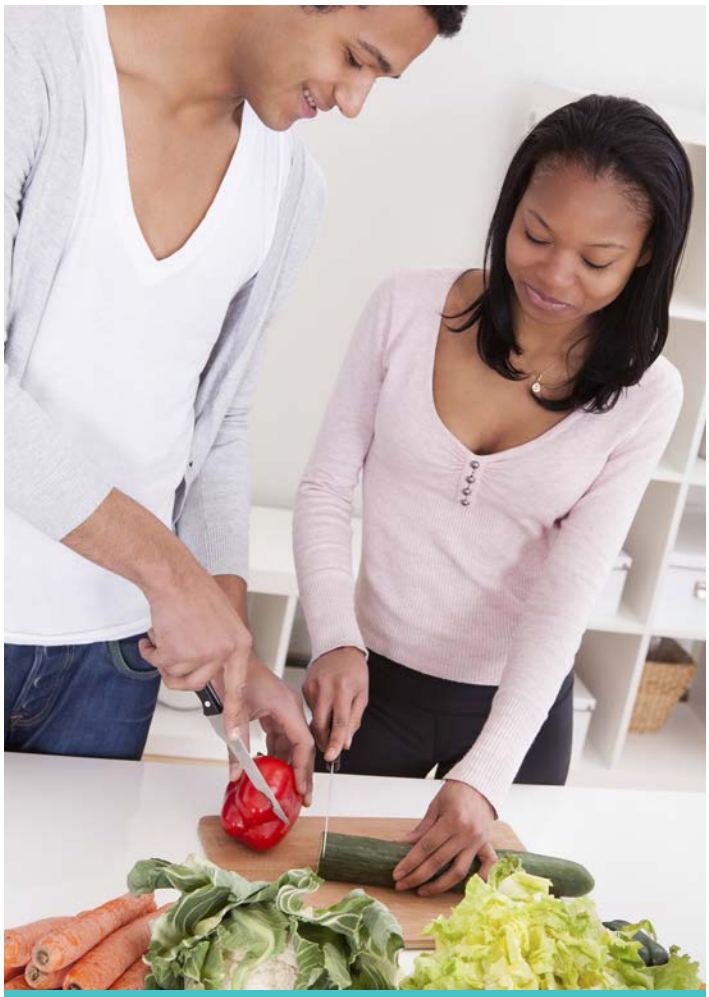
Dietary Adequacy

All women should be encouraged to consume nutrient-dense foods and beverages. Healthy eating has a two-fold aspect. It is important for a woman's health today and into the future. It is important for the health of the children as mothers are essential role models who purchase food, provide meals and model positive eating behavior.

Many women need assistance in improving some aspect of their diet and need the knowledge and skills to make healthier choices. A 2014 CDC, Morbidity and Mortality Weekly Report[10] on preconception health indicated that the reported average consumption of adequate fruit and vegetable intake was 25 percent.

Other social and physical factors that influence an individual's eating behaviors include: social support; societal and cultural norms; food and agricultural policies, food assistance programs; economic price systems; and access to and availability of healthier foods.[11] From an environmental perspective, communities often need assistance making healthy food options available and affordable, especially for vulnerable populations. Food security and eliminating hunger are important aspects.

One noted nutrient during the preconception period is folic acid. It has proven preventive properties against neural tube defects such as anencephaly and spina bifida, which are among most common congenital anomalies. However, this protective effect is needed in the early weeks of pregnancy, long before many women know they are pregnant. A recent study of reproductive aged



All women should be encouraged to consume nutrient-dense foods and beverages.

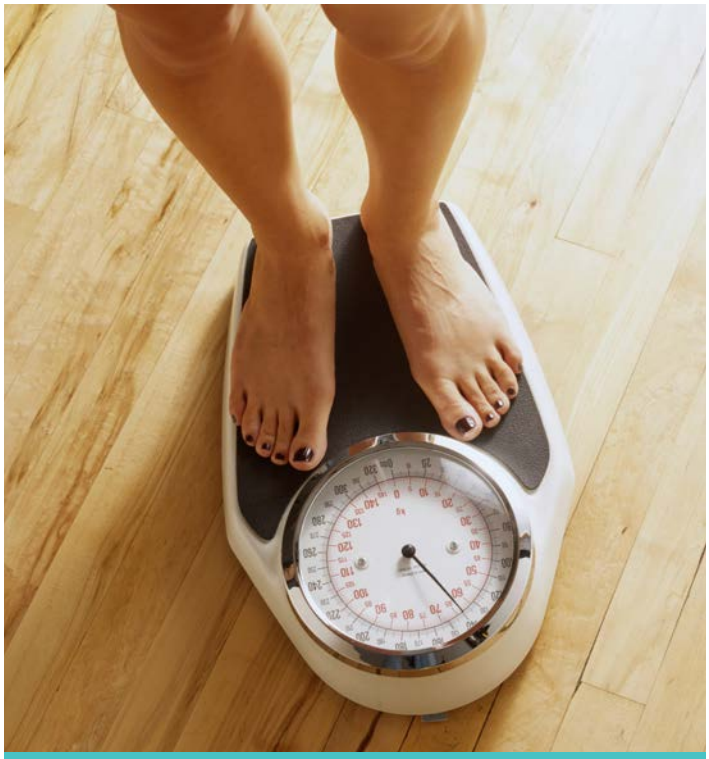
women[12] reported only 30 percent of women reported consuming a folic acid supplement during the month prior to pregnancy. It is difficult to consume the RDA for folate during pregnancy from diet alone thus supplementation and consumption of foods fortified with folic acid are recommended prior to and during pregnancy. Women are also encouraged to consume foods rich in this nutrient.

Achieve and Maintain a Healthy Weight

Maintaining a healthy weight is an important recommendation for all women of reproductive age. For the individual woman, interventions to improve weight are based on efforts to support a healthy lifestyle including healthy eating and physical activity. Again, factors associated with these efforts include: addressing individuals' knowledge and skills; reducing exposure to foods low in nutritional value and high in calories; and increasing opportunities for physical activity.[13] Community level activities include those that support efforts to maintain physical activity, consume a healthy diet and provide interventions when weight status is no longer at a healthy level.

Deviations from a healthy weight are of concern for both a woman and her future children. Pregnancy Nutrition Surveillance System[14] data indicate that one third of all pregnant women in America are obese. Half of non-pregnant women of child-bearing age (20-39) are either overweight or obese and 30 percent of girls between 12-19 years of age are overweight or obese. Underweight also has health consequences. The highest prevalence of underweight is among Asians and the highest prevalence of overweight and obesity is among Black, American Indian and Hispanic mothers.[15] The following are some of the concerns associated with under and overweight, especially during pregnancy.

- Chronic health conditions associated with being overweight or obese are diabetes, coronary heart disease, high blood cholesterol, stroke, hypertension, gallbladder disease, osteoarthritis, sleep apnea and other breathing problems and some cancers (endometrial, breast, colon). [16]
- Being overweight or obese prior to pregnancy carries risks for both the mother and the fetus. Prepregnancy obesity is associated with infertility and miscarriage, as well as an increased risk of poor outcomes such as prematurity, stillbirths and need for assisted delivery.[17, 18]
- Obese women are less likely to initiate and sustain breastfeeding.[19]
- Overweight and obesity prior to pregnancy is a risk factor for spina bifida and cardiac defects.[20]



Deviations from a healthy weight are of concern for both a woman and her future children.

- Underweight women are at increased risk of infertility. If pregnancy is achieved, their infants are at higher risk for low birthweight, fetal growth problems, cleft lip, perinatal mortality and other pregnancy complications.[21, 22]

It is best to support achieving a healthy weight prior to pregnancy. Adherence to the Institute of Medicine's pregnancy weight gain recommendations[23] is encouraged once a pregnancy is underway. After pregnancy, addressing postpartum weight reduction is an important aspect of interconception care. Women often retain excess weight gained during pregnancy thus increasing the risk for entering a subsequent pregnancy at a higher weight. This may lead to an ongoing cycle resulting in obesity. Nearly half of normal weight and two thirds of overweight women have been found to exceed the 1990 IOM gestational weight gain guidelines.[24] Women exceeding the guidelines have

The role of nutrition in chronic illness such as diabetes or hypertension must be addressed.

been shown in several studies to be at increased risk for adverse maternal and neonatal outcomes, and association with excessive gestational weight gain and postpartum weight retention. This is particularly true among women who are Black as well as from low socio-economic status backgrounds. Short interconception spacing, combined with high gestational weight gain, and four or more births are associated with risk of obesity. [25, 26, 27, 29, 29]

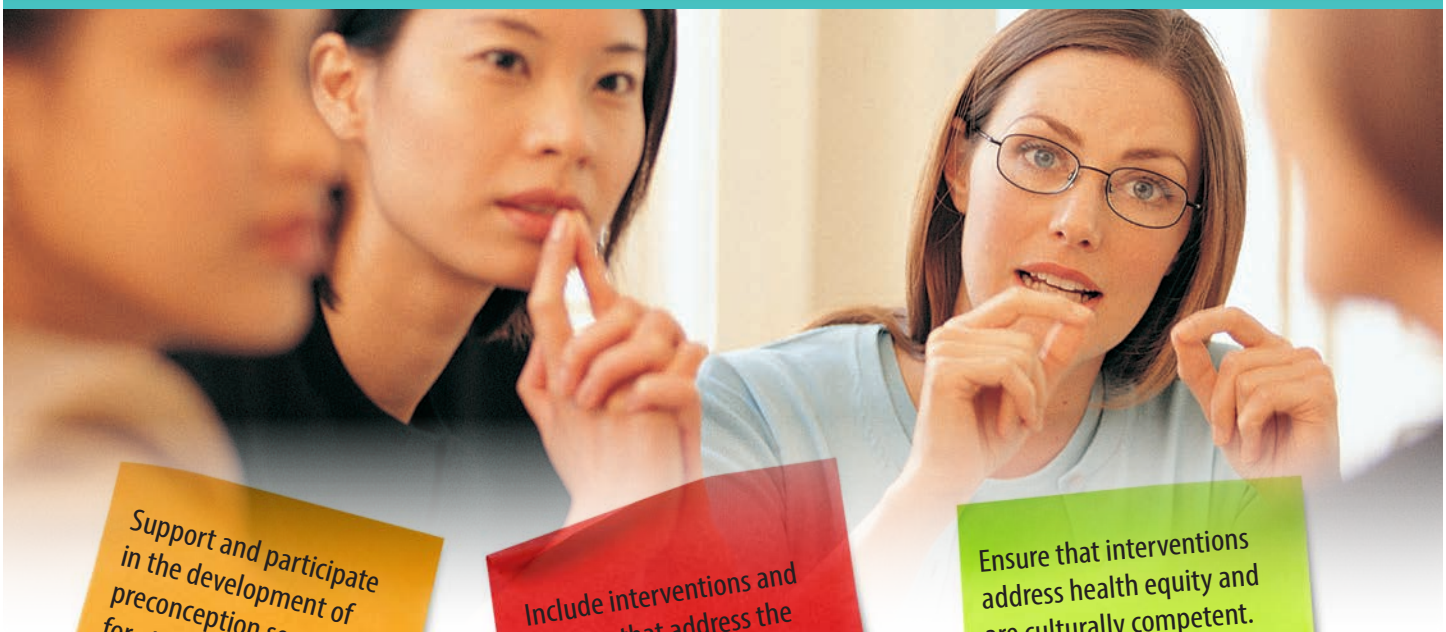
Nutrition and Existing Health Conditions

The role of nutrition in chronic illness such as diabetes or hypertension must also be addressed. Women under medical care for chronic conditions such as diabetes, hypertension and metabolic syndrome often require medical nutrition therapy as part of their preconception and pregnancy clinical care. Acute conditions such as anemia are treated with diet and medication. Other conditions, like epilepsy and HIV infection, require medications that may alter nutritional status. Some high-risk pregnancy conditions like preterm birth, gestational diabetes or hypertension may reoccur in subsequent pregnancies. Several of these adverse health conditions have a nutrition component, which should be addressed between subsequent pregnancies.

Summary

Dietary quality, healthy weight and medical nutrition therapy (for women with existing health conditions) are important components of preconception care, as they affect women's short and long-term health and future prenatal outcomes. Preconception nutrition topics include: entering pregnancy at a healthy weight, dietary quality and the use of folic acid. Post-partum nutrition efforts include: returning to a healthy weight, dietary quality and support for breastfeeding. Medical nutrition therapy must also be provided as part of the treatment for certain health conditions.

What Public Health Nutritionists Can Do to Support Preconception Care



Support and participate in the development of preconception services for at-risk women and encourage women to use these services.

Include interventions and services that address the nutritional aspects of preconception health.

Ensure that interventions address health equity and are culturally competent.

Use a policy, systems and environmental change framework to support preconception care as a component of women's and children's health promotion.

Address overall dietary quality, weight status including postpartum weight loss and encourage the consumption of folic acid in fortified foods and supplements.

Provide medical nutrition therapy as part of treatment of relevant health concerns.

Encourage attendance at postpartum and other medical visits and asking providers about preconception/interconception health care.

How Public Health Nutritionists Can Adapt WIC Programs' Activities to Support Preconception Care

WIC services can be adapted to reflect an interconception approach that is culturally appropriate. Postpartum care is routine in WIC and by adopting a broader interpretation, an interconception approach may be incorporated. By more effectively assisting a woman to achieve high levels of nutritional wellness WIC staff can influence her short and long term health and the health of any future children.

- Consider using an interconception based approach to postpartum visits for every woman, regardless of her breastfeeding status. Center education on the woman's concern about her health and possible subsequent pregnancies.
- Given the challenges associated with losing weight postpartum, consider interventions in this area.
- Reinforce the importance of positive maternal health habits as she is the role model for family health.

The following are some specific interventions:

- Integrate relevant elements of interconception care into existing programs and services.
- Highlight nutrition-related factors to address prior to next pregnancy.
- Ensure services are culturally appropriate.
- Assist the woman with prioritizing her interconception needs.
- Discuss reproductive life planning and advise women to seek preconception care and contraception from health care provider; offer needed referrals.
- Discuss nutrition-related factors to address prior to next pregnancy.
- Address ongoing medical nutrition therapy needs.
- Reinforce the need for being physically active every day.
- Emphasize avoiding smoking, alcohol and harmful substances when planning next pregnancy.

— Notes —

[1]Minnesota Department of Health. Preconception and Interconception Health page. http://www.health.state.mn.us/divs/fh/mch/preconception. Retrieved April 2015.

[2]Moos, MK, Bandura, M Posner SF, Lu MC. Chapter 5: Quality Improvement Opportunities in Preconception and Interconception Care. March of Dimes. Toward Improving the Outcomes of Pregnancy III. Pg. 46. https://www2.aap.org/sections/perinatal/pdf/TIOPIIIChapter5.pdf.

[3]Centers for Disease Control and Prevention. Preconception Health and Health Care. August 2014. http://www.cdc.gov/preconception/overview.html. Retrieved October 2015.

[4]Moos, MK, Bandura, M Posner SF, Lu MC. Chapter 5: Quality Improvement Opportunities in Preconception and Interconception Care. March of Dimes. Toward Improving the Outcomes of Pregnancy III. Pg. 47. https://www2.aap.org/sections/perinatal/pdf/TIOPIIIChapter5.pdf. Retrieved April 2015.

[5]Guttmacher Institute. Unintended Pregnancy in the US Fact Sheet. July 2015. http://www.guttmacher.org/pubs/FB-Unintended-Pregnancy-US.html Retrieved October 2015.

[6]IBID

[7]Centers for Disease Control and Prevention. Social Determinants of Health. March 2014. http://www.cdc.gov/socialdeterminants/FAQ.html. Retrieved April 2015.

[8]U.S. Department of Health and Human Services Health Resources and Services Administration, Maternal and Child Health Bureau. Rethinking MCH: The Life Course Model as an Organizing Framework. November, 2010. Pgs 2-3. http://mchb.hrsa.gov/lifecourse/rethinkingmchlifecourse.pdf. Retrieved April 2015.

[9]Wadhwa PD, Buss C, Entringer S, Swanson JM. Developmental Origins of Health and Disease: Brief History of the Approach and Current Focus on Epigenetic Mechanisms. Semin Reprod Med. 2009 September; 27(5): 358–368. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2862635/. Retrieved April 2015.

[10]Robbins CL, Zapata, LB, Farr SL, et al. Core State Preconception Health Indicators — Pregnancy Risk Assessment Monitoring System and Behavioral Risk Factor Surveillance System, 2009. 2014;63: (Pg. 10). http://www.cdc.gov/mmwr/pdf/ss/ss6303.pdf. Retrieved April 2015.

[11]Healthy People 2020. Nutrition and Weight Status. http://www.healthypeople.gov/2020/topics-objectives/topic/nutrition-and-weight-status. Retrieved April 2015.

[12]Robbins, CL, Zapata, LB. Farr, SL. Et al. PhD Core State Preconception Health Indicators — Pregnancy Risk Assessment Monitoring System and Behavioral Risk Factor Surveillance System, 2009. 2014;63:(Pg. 10). http://www.cdc.gov/mmwr/pdf/ss/ss6303.pdf. Retrieved April 2015.

[13]Healthy People 2020. Nutrition and Weight Status. http://www.healthypeople.gov/2020/topics-objectives/topic/nutrition-and-weight-status. Retrieved April 2015.

[14]Chu SY, Kimm SY, Bish CL. Prepregnancy Obesity Prevalence in the United States, 2004–2005. JMCH. September 2009, Volume 13, Issue 5, pp 614-620.

[15]IBID

[16]National Academies of Sciences, Institute of Medicine. Weight Gain During Pregnancy: Reexamining the Guidelines. Washington, DC: The National Academies Press, 2009.

[17]Centers for Disease Control and Prevention. Healthy Weight Healthy Pregnancy http://www.cdc.gov/pregnancy/features/feature-healthy-weight-healthy-pregnancy.html August 2015. Retrieved October 2015.

[18]Overcash RT, LaCoursiere DY. The clinical approach to obesity in pregnancy. Clin Obstetrics Gynecolog. 2014;57(3): 485-500.

[19]Rasmussen KM. Association of maternal obesity before conception with poor lactation performance. Annu Rev Nutr. 2007;27:103-121.

[20]Rasmussen, SA, Chu SY, Kim SY. Maternal obesity and risk of neural tube defects: a metaanalysis. / Am J Obstet Gynecol. 2008 Jun;198(6):611-9.

[21]Centers for Disease Control and Prevention. Pregnancy and Pediatric Nutrition Surveillance System http://www.cdc.gov/pednss/what_is/pnss_health_indicators.htm. March 2011. Retrieved April 2015.

[22]Waller, KD, Shaw GM, Rasmussen SA et al. Prepregnancy Obesity as a Risk Factor for Structural Birth Defects Arch Pediatr Adolesc Med. 2007;161(8):745-750.

[23]National Academies of Sciences, Institute of Medicine. Weight Gain During Pregnancy: Reexamining the Guidelines. Washington, DC: The National Academies Press, 2009.

[24]Chu SY. Callaghan WM. Bish CL. D'Angelo D. Gestational weight gain by body mass index among US women delivering live births, 2004–2005: Fueling future obesity. Am J Obstet Gynecol. 2009; Mar; 200(3):271.e1-7.

[25]Siega-Riz AM, Viswanathan M, Moos M-K, et al. A systematic review of outcomes of maternal weight gain according to the Institute of Medicine recommendations: birthweight, fetal growth, and postpartum weight retention. Am J Obstet Gynecol 2009;201:339.e1-14.

[26]Keppel KG, Taffel SM. Pregnancy-related weight gain and retention: Implications of the 1990 Institute of Medicine guidelines. Am J Public Health 1993;83(8):1100-3.

[27]Davis EM, Babineau DC, Wang X, et al. Short inter-pregnancy intervals, parity, excessive pregnancy weight gain and risk of maternal obesity. Maternal and child health journal. 2014;18(3):554-562.

[28]Harris HE, Ellison GT, Holliday M. Is there an independent association between parity and maternal weight gain? Ann Hum Biol. 1997;24(6):507–19.

[29]Olson CM, Strawderman MS, Hinton PS et al. Gestational weight gain and postpartum behaviors associated with weight change from early pregnancy to 1 y postpartum. Int J Obes Relat Metab Disord. 2003;27:117-127.

This project was supported in part by the Health Resources and Services Administration, Maternal and Child Health Bureau (contract # T79MC00007) through a grant provided to the University of Minnesota, School of Public Health. 12/8/2015

ASPHN
Advancing Health Through Leadership
formerly ASTPHND

Association of State Public Health Nutritionists

P.O. Box 1001 • Johnstown, PA 15907-1001

[tel] 814.255.2829 • [fax] 814.255.6514

[web] **www.asphn.org** • [facebook] www.facebook.com/asphn