The Ecology of Breast Cancer: Evidence and Implications for RDNs

March 25, 2015
3:00 – 4:00 pm EST

Sponsored by...
WELCOME

MODERATOR:

LYNN MONAHAN, DCN, MPH, RDN, LDN

Co-Chair, Education Committee, Hunger and Environmental Nutrition (HEN) Dietetic Practice Group

Assistant Professor, Department of Nutrition, West Chester University, West Chester, PA.
Hunger and Environmental Nutrition (HEN) Dietetic Practice Group

HEN Vision
Optimize the nation’s health by promoting access to nutritious food and clean water from a secure and sustainable food system.

HEN Mission
Empower members to be leaders in sustainable and accessible food and water systems.

Sustainability
HEN defines sustainability as: "A sustainable and resilient food system [that] conserves and renews natural resources, advances social justice and animal welfare, builds community wealth, and fulfills the food and nutrition needs of all eaters now and in the future."

(Harmon A. & Tagtow A., 2008)
Hunger and Environmental Nutrition (HEN) Dietetic Practice Group

Member Benefits:
• FREE online access to the *Journal of Hunger and Environmental Nutrition*
• Quarterly newsletter and webinars with CPE opportunities
• Lively Electronic Mailing List (EML)
• Strategic network relationships
• Educational Resources on Food System Topics: *Organic Talking Points, Antibiotic Use in Agriculture, and more*...
• HEN Speaker’s Bureau
• HEN awards and recognition
• Scholarship opportunities for international members
• Reduced rate for student members!

www.HENdpg.org
ON Mission and Vision
Vision: ON DPG is the leading resource and professional organization for oncology nutrition experts across the continuum of care, and through this role, we will further the availability of quality nutrition care to all individuals affected by cancer.

Mission: To serve the needs of registered dietitians working in cancer prevention, treatment, and survivorship in clinical, community, and research careers."

ON Philosophy
To be a resource for oncology nutrition experts across the continuum of care.

ON Members
The practice of oncology nutrition covers research, prevention, treatment, recovery, palliative care, and hospice. The ON DPG provides dietetic professionals with resources and networking opportunities to deal with the complexities of oncology practice. Members work in clinical, public health, education, and research settings.
Oncology Nutrition Dietetic Practice Group (ON DPG)

Member Benefits:

• [www.oncologynutrition.org](http://www.oncologynutrition.org) - a resource for both professionals and the public.

• **Oncology Nutrition Connection** *(ONC)* — a quarterly, peer-reviewed newsletter

• **Electronic Mailing List** *(EML)*

• **Webinars** — featuring world-renowned cancer experts speaking on hot topics in oncology nutrition.

• **PowerPoint Presentation Library**

• **Awards**

• **Oncology Nutrition Symposium** — our biennial conference

• **Products** — up-to-date resources including: *Oncology Nutrition for Clinical Practice*, Oncology Evidence-Based Practice Toolkit, The Complete Resource Kit for Oncology Nutrition, and Patient-Generated Subjective Global Assessment Video and DVD

www.oncologynutrition.org
PRESENTERS

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The Ecology of Breast Cancer: The Promise of Prevention and the Hope for Healing

Ted Schettler  MD, MPH
Science and Environmental Health Network

www.sehn.org
Breast cancer as a design problem
Breast Cancer

• About 14 percent of all new cancer cases and the third leading cause of cancer death in the U.S.
• Immigrant studies and breast cancer trends show that more than genetics and personal behavior is involved
• Breast cancer is a disease of communities and populations as well as of individuals
• A public health challenge: How you think about it determines what you do. (population-wide approaches vs. strategies that focus on high-risk individuals)
• Many known and suspected, interacting risk factors
• Ecological (eco-social) framework
Multi-level; multi-factorial; Interactions and relationships are primary features; History and time are important features;
Life-course perspective; windows of vulnerability:
fetal development, infancy, childhood, puberty, adolescence
Established risk factors for breast cancer—in no particular order

- Early age at menarche, late age at first birth, nulliparity, and late age at menopause
- Family history of breast cancer
- Physical inactivity
- Leanness in early life; obesity in later life
- Higher peak height growth velocity
- Dense breasts
- Alcohol consumption
- Tobacco smoking
- Ionizing radiation
- Use of combined estrogen plus progestin hormone replacement
- Recent use of oral contraceptives
Diet and breast cancer

- Observational studies (not interventional)
- Until recently, most studies have focused on adult diet and risk, with an emphasis on specific macro- and micro-nutrients
- Most epidemiologic studies have included large preponderance of white women
- Most studies have failed to address exercise as a confounder or effect modifier
- No studies in people have examined whether diet modifies the response to environmental chemicals, but laboratory animal studies commonly show this happens
Diet and breast cancer

• Recent trends
  – More attention to childhood, adolescent, and early adult diets with growing evidence of their importance
  – Dietary pattern analysis
Dietary fat—summary

- Higher amounts of saturated fat, trans fats, and animal fats modestly increase risk
- Omega 3 and omega 6 fatty acids are essential FAs
- But, high omega 6/omega 3 FA ratio probably increases risk
- Substituting omega 6s with omega 3s and/or olive oil is associated with lower risk
Fruits, vegetables

- Higher intake associated with decreased risk (~25%)
- Higher soy consumption > lower risk; effect size larger in Asians and Asian Americans (may be due to much higher intake of whole soy products)
- Phenolic compounds in fruits and vegetables have multiple mechanisms of action that can reduce risk and improve outcomes (e.g., epigenetic modifications, altered gene expression, increased apoptosis)
Dietary pattern analysis—adult women

• Mediterranean-like dietary pattern associated with modestly decreased risk

• “Western/unhealthy” diet associated with increased risk (higher amounts of red/processed meat, refined grains, sweets, high-fat dairy)
Childhood/adolescent diet and risk factors

- More dietary vegetable protein, fat, nuts in girls 9-15 associated with lower risk of benign breast disease at age 30 (Growing Up Today Study) [proliferative BBD increases the risk of breast cancer]
- Higher adolescent dietary fiber > lower risk of BBD (NHSII)
- Menarche 2.7 mos. earlier in girls 9-15 consuming > 1.5 sugar-sweetened beverages daily compared to < 2 servings weekly (Growing Up Today Study)
- Some evidence that higher dietary meat in childhood advances the age of puberty; (Berkey, Am J Epid, 2000)
- Higher milk intake ages 9-14 > higher peak height growth velocity (GUTS)
- Higher dietary flavenols/isoflavones associated with later breast development (~5 mos.) (Mervish, Nutr Res, 2013; BCERP)
Childhood, adolescent, early adult diet

- Higher consumption of whole soy food in childhood and adolescence > 50% lower breast cancer risk (stronger evidence, bigger effect in Asians)
- Higher intake of red meat in adolescence > 35% increase in pre-menopausal breast cancer risk (NHS II; 12 yrs.)
- Higher red meat in early adult diet > 22% risk of pre- and post-menopausal breast cancer (NHS II, 20 yrs.)
- Substituting one serving/day of red meat with legumes or poultry, (or combined with nuts or fish), was associated with a 14% lower risk of breast cancer overall and a 14% lower risk of premenopausal breast cancer.
Vitamin D and breast cancer

• Animal and *in vitro* studies support a role for vitamin D
  – low dietary levels increase mammary gland tumors after exposure to carcinogen
  – Vitamin D reduces aromatase levels, promotes cellular differentiation and apoptosis in breast tissue
• Most but not all studies find higher levels of vitamin D associated with lower risk of BC
• Vitamin D supplements after diagnosis and treatment associated with lower risk of recurrence.
Vitamin D

- Endocrine Society (>30 ng/mL 25(OH)D) and Institute of Medicine analysis (> 20 ng/mL) disagree on what constitutes an adequate level (IOM looked only at bone health)
- Using Endocrine Society guidelines, over 50% of the US population has inadequate vitamin D levels
- American Academy of Pediatrics recommends that all infants receive vitamin D supplement
- ACOG recommends testing women at risk of low vitamin D and supplementing as needed
Exercise, physical activity

• Increased physical activity helps to prevent post-menopausal breast cancer (20-80% lower risk), colorectal, endometrial cancer (strong evidence)

• Evidence for reduction of pre-menopausal BC is not as strong; more consistent evidence of risk reduction in former athletes

• Exercise after diagnosis and treatment improves quality of life; many studies show reduced risk of all-cause or BC-specific mortality
Exercise, physical activity for cancer prevention

- 30-60 min. moderate-intensity exercise 5 days/wk; children and teens: 60 min daily (AICR)
- Most children, adolescents, adults are not regularly physically active even close to these levels
- Determinants of exercise levels:
  - Family and social support: particularly adolescents
  - Personal history of exercise; personal health; job strain; stress; overweight
  - Neighborhood walkability, design, access to recreation facilities,
Combined risk factor reduction

- Post-menopausal
  - EPIC (European Investigation into Cancer and Nutrition); >200,000 women followed prospectively; median follow up 11 ys.
  - 20-25% reduction in breast cancer incidence with highest scores on combinations of healthy lifestyles (diet, exercise, weight control, smoking, alcohol)
  - [dietary criteria: Intakes of seven dietary factors were combined for the diet score: cereal fiber, folate, the ratio of polyunsaturated to saturated fat, fatty fish (as a marker for omega-3 fatty acids), margarine (as a marker for industrially produced trans-fats), glycemic load, and fruits and vegetables] (McKenzie, IJC, 2014)
Combined interventions: women with breast cancer

- WHEL (Women’s Healthy Eating and Living) study
  - Pre- and post-menopausal women (~3000)
  - Dietary intervention: plant-based & reduction in dietary fat
  - No effect on prognosis, but higher baseline carotenoids associated with delayed recurrence (average 7.3 yrs follow up)
  - Over 10 yrs; higher fruit and vegetable consumption along with higher levels of exercise > reduced death rate by half (93% vs. 86% survival)

- [Three fairly large studies find no evidence of adverse effects of dietary soy on breast cancer prognosis and considerable evidence of a beneficial role]
Average HEI-2010 scores for Americans by age group

Higher score; Lower consumption

What We Eat in America, NHANES 2009-10

Food and Nutrient Intakes, and Health: Current Status and Trends
Conclusions; a challenge

• Prevalent dietary patterns are associated with increased breast cancer risk

• Childhood and adolescent diets substantially affect breast cancer risk, even more than adult diets

• Healthy dietary patterns, along with other interventions, reduce breast cancer risk and improve outcomes

• Identify opportunities for population-wide risk reduction
  – A large number of people exposed to an average risk will produce more cases of a disease than a small number of people exposed to a high risk.
  – This means that risk reduction across a population will prevent more cases than efforts aimed at high-risk individuals
Thank you

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The Ecology of Breast Cancer: Implications for RDNs

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Applications to practice

Research on human health effects is still at the very early stages – more research coming soon!

Dietetics professionals should:

- be prepared to critically evaluate the research studies as they emerge
- consider the sources of information
- synthesize the entire body of literature rather than acting on the results of any single study

Precautionary principle is warranted wherever possible.
Precautionary principle

"When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."

When counseling patients/clients . . .

• Assess patient/client readiness for information about environmental exposures.

• Recognize that environmental chemicals are ubiquitous. It is not possible to completely eliminate exposure.

• Maintaining a healthy body weight and avoiding smoking are well established lifestyle factors that are associated with decreased cancer risk, and will also decrease exposure to environmental chemicals.
Counseling clients/patients to limit dietary sources of environmental exposures

- Prepare food from scratch whenever possible
- Choose minimally processed foods
- Store foods in inert (glass or metal) containers
- Never heat foods in plastic containers or dishes
- Do not place plastics in the dishwasher
- Avoid plastics with the recycling codes 3 (contains phthalates), 6 and 7 (contains BPA)
- Avoid leaving plastic water bottles in warm places (e.g. your car on a hot summer day!)
Other important sources of exposure

• Cosmetics
• Personal care products
• Thermal paper/receipts
• Smoking (including e-cigarettes)
• Some extended release over the counter medications and dietary supplements

Hand lotions and sanitizers may enhance absorption through the skin
HEALTH CARE FOOD PURCHASING POWER
Hospitals and health care systems can use their substantial buying power to help build a healthier food system.

HEALTHIER HOSPITAL FOOD SERVICE
Every day, health care food service staff have an opportunity to encourage healthy habits and sustainable food choices.

Hospitals as Anchor Institutions
Improving Community Food Environments
- by modeling good nutrition and improving environmental health inside and outside their facilities
- by collaborating with community-based programs to support a healthy, regional food system and increased access to healthy food

Healthy Food System Infographics
These new infographics demonstrate the health sector's ability to build healthy food systems

» Find Out More

Healthy Care Without Harm: Toward a vision of restorative health

https://noharm-uscanada.org/
Additional resources for professional development

Breast Cancer and the Environment: Prioritizing Prevention
Interagency Breast Cancer & Environmental Research Coordinating Committee (National Institute for Environmental Health Science, National Cancer Institute- 2013)
http://www.niehs.nih.gov/about/boards/ibcercc

State of the Science of Endocrine Disrupting Chemicals
World Health Organization (2012)

Reducing Environmental Cancer Risk – What We Can Do Now
President’s Cancer Panel (2009)
http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP_Report_08-09_508.pdf
Additional resources for professional development

Endocrine Society statements on Endocrine Disrupting Chemicals
http://press.endocrine.org/edc

Pediatric Environmental Health Specialty Units (PEHSU)
Fact Sheets for patients and providers
http://www.pehsu.net/facts.html#fact_sh
Environmental Health Perspectives Honors Theo Colborn

3/2/15: Theo Colborn, research scientist and environmental activist, coined the term “endocrine disruptor,” Theo played a watershed role in the field of environmental health science, particularly in raising public awareness of the effects of chemical contaminants on human health and the environment.

Read the full article

A Story of Health

http://www.healthandenvironment.org/
Academy of Nutrition and Dietetics: Standards of Professional Performance for Registered Dietitian Nutritionists (Competent, Proficient, and Expert) in Sustainable, Resilient, and Healthy Food and Water Systems

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ABSTRACT
Sustainability is the ability of a system to be maintained over the long term. Resilience is the ability of a system to withstand disturbances and continue to function in a sustainable manner. Issues of sustainability and resilience apply to all aspects of nutrition and dietetics practice, can be practiced at both the program and systems level, and are broader than any one specific practice setting or individual intervention. Given an increasing need to apply principles of sustainability and resilience to nutrition and dietetics practice, as well as growing interest among the public and by Registered Dietitian Nutritionists of health issues related to food and water systems, the Hunger and Environmental Nutrition Dietetic Practice Group, with guidance from the Academy of Nutrition and Dietetics Quality Management Committee, has developed the Standards of Professional Performance as a tool for Registered Dietitian Nutritionists working in sustainable, resilient, and healthy food and water systems to assess their current skill levels and to identify areas for further professional development in this emerging practice area. This Standards of Professional Performance document covers six standards of professional performance: quality in practice, competence and accountability, provision of services, application of research, communication and application of knowledge, and utilization and management of resources. Within each standard, specific indicators provide measurable action statements that illustrate how sustainable, resilient, and healthy food and water systems principles can be applied to practice. The indicators describe three skill levels (competent, proficient, and expert) for Registered Dietitian Nutritionists working in sustainable, resilient, and healthy food and water systems.

Questions
Upcoming Webinars

• **HEN**:  
  – Benefits of Organically-Produced Foods: Review of Research and Implications for Practice  
  – *Friday, April 17, 2015, 2:00-3:30pm ET*  
  – For more information and to register:  
    [www.hendpg.org/page/current-webinars](http://www.hendpg.org/page/current-webinars)

• **ON**:  
  – *Save the Date*: Tuesday, May 12th, 2015  
  – *Next Webinar*: Pediatric Nutrition  
  – Registration information will be emailed out soon