

BIBLIOGRAPHY BY CATEGORY FOR WHEL NEWS/WEBSITE

Women’s Healthy Eating and Living (WHEL) Study

UPDATED WITH INTRODUCTIONS – 8/17/07

(based on 7-24-07 WHEL Bibliography)

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Breast Cancer Recurrence and Survival

Most cancer survivors want to know what steps they can take in their day-to-day lives to prevent their cancer from returning. The WHEL Study was designed to address the question of whether a diet very high in vegetables, fruits, fiber, and low in fat could reduce breast cancer recurrence. In addition, the data collected on more than 3000 breast cancer survivors over an average of 7 years has allowed us to look at how several other factors may be related to breast cancer survival, including physical activity, blood carotenoids, and hot flashes. The questions we have addressed so far are covered in the following publications.

1. Pierce JP, Faerber S, Wright FA, Rock CL, Newman V, Flatt SW, Kealey S, Jones VE, Caan BJ, Gold EB, Haan M, Hollenbach KA, Jones L, Marshall JR, Ritenbaugh C, Stefanick ML, Thomson C, Wasserman L, Natarajan L, Gilpin EA, Thomas RG, for the WHEL Study Group. A randomized trial of the effect of a plant-based dietary pattern on additional breast cancer events and survival: Women’s Healthy Eating and Living (WHEL) Study. *Control Clin Trials* 2002;23:728-756.
2. Rock CL, Flatt SW, Natarajan L, Thomson CA, Bardwell WA, Newman VA, Hollenbach KA, Jones L, Caan BJ, Pierce JP. Plasma carotenoids and recurrence-free survival in women with a history of breast cancer. *J Clin Oncol* 2005;23:6631-6638.
3. Pierce JP, Stefanick ML, Flatt SW, Natarajan L, Sternfeld B, Madlensky L, Al-Delaimy WK, Thomson CA, Kealey S, Hajek R, Parker BA, Newman VA, Caan B, Rock CL. Greater survival after breast cancer in physically active women with high vegetable-fruit intake regardless of obesity. *J Clin Oncol* 2007;25:2345-2351
4. Pierce JP, Natarajan L, Caan BJ, Parker BA, Greenberg ER, Flatt SW, Rock CL, Kealey S, Al-Delaimy WK, Bardwell WA, Carlson R, Emond JA, Faerber S, Gold EB, Hajek RA, Hollenbach K, Jones LA, Karanja N, Madlensky L, Marshall J, Newman VA, Ritenbaugh C, Thomson CA, Wasserman L, Stefanick ML. The influence of a very high vegetable-fruit-fiber, low-fat diet on prognosis following treatment for breast cancer. The Women’s Healthy Eating and Living (WHEL) randomized trial. *JAMA* 2007;298:289-298.

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5. Mortimer JE, Flatt SW, Parker BA, Gold EB, Wasserman L, Natarajan L, Pierce JP; For the WHEL Study Group. Tamoxifen, hot flashes and recurrence in breast cancer. *Breast Cancer Res Treat.* 2007; May 31 (Epub ahead of print).

Dietary Change/Telephone Counseling

It is well known that changing a health-related behavior can be a challenge. To help women in the WHEL intervention group adopt a diet very high in vegetables, fruits, and fiber and low in fat, the WHEL Study used an innovative telephone counseling program, supplemented by newsletters and cooking classes. The dietary changes achieved and maintained were some of the biggest differences in dietary pattern ever reported in a large randomized clinical trial, providing further evidence of the effectiveness of telephone counseling in helping people to change behaviors. The following publications describe the intervention and the dietary change achieved in the WHEL Study.

6. Pierce JP, Faerber S, Wright FA, Newman V, Flatt SW, Kealey S, Rock CL, Hryniuk W, Greenberg ER. Feasibility of a randomized trial of a high-vegetable diet to prevent breast cancer recurrence. *Nutr Cancer* 1997;28:282-288.
7. Pierce JP, Newman VA, Flatt SW, Faerber S, Rock CL, Natarajan L, Caan BJ, Gold EB, Hollenbach KA, Wasserman L, Jones L, Ritenbaugh C, Stefanick ML, Thomson CA, Kealey S, for the WHEL Study Group. Telephone counseling intervention significantly increases intakes of micronutrient- and phytochemical-rich vegetables, fruit, and fiber in breast cancer survivors. *J Nutr* 2004;134:452-458.
8. Newman VA, Thomson CA, Rock CL, Flatt SW, Kealey S, Bardwell WA, Caan BJ, Pierce JP for the Women's Healthy Eating and Living (WHEL) Study Group. Achieving substantial changes in eating behavior among women previously treated for breast cancer—an overview of the intervention. *J Am Diet Assoc* 2005;105:382-391.
9. Pierce JP, Newman VA, Natarajan L, Flatt SW, Al-Delaimy WK, Caan BJ, Emond JA, Faerber S, Gold EB, Hajek RA, Hollenbach KA, Jones LA, Karanja N, Kealey S, Madlensky L, Marshall JR, Ritenbaugh C, Rock CL, Stefanick ML, Thomson CA, Wasserman L, Parker BA. Telephone counseling helps maintain long-term adherence to a high-vegetable dietary pattern. *The Journal of Nutrition (in press)*.

Dietary Intake

Over the course of the WHEL Study, we collected detailed information on what participants were eating. Dietary recalls collected over the telephone conducted at regular intervals were the main method used to gather dietary intake data. This data has allowed us to characterize the diets of breast cancer survivors, and examine associations between dietary intake and other variables.

10. Caan BJ, Flatt SW, Rock CL, Ritenbaugh C, Newman V, Pierce JP, for the WHEL Study Group. Low energy reporting in women at risk for breast cancer recurrence. *Cancer Epidemiol Biomarkers Prev* 2000;9:1091-1097.

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12. Thomson CA, Flatt SW, Rock CL, Ritenbaugh C, Newman V, Pierce JP. Increased fruit, vegetable and fiber intake and lower fat intake reported among women previously treated for invasive breast cancer. *J Am Diet Assoc* 2002;102:801-808.
13. Gold EB, Flatt SW, Pierce JP, Bardwell WA, Hajek RA, Newman VA, Rock CL, Stefanick ML. Dietary factors and vasomotor symptoms in breast cancer survivors, the WHEL Study. *Menopause* 2006;13:423-433.
14. Thomson CA, Rock CL, Caan BJ, Flatt SW, Al-Delaimy W, Newman VI, Hajek RA, Chilton J, Pierce JP. Increase in cruciferous vegetable intake in women previously treated for breast cancer participating in a dietary intervention trial. *Nutr Cancer* 2007;57:11-19.

Dietary Intake Biomarkers

WHEL Study participants gave blood samples throughout the study. To date, the main analyses performed on these samples have been related to carotenoids. Carotenoids are compounds that play a large role in the colorful appearance of many plants, and research suggests that consuming carotenoid-containing foods may decrease disease risk. WHEL Study participants who consumed more vegetables and fruits had greater blood concentration of carotenoids, which provides an objective measure to confirm the self-reported dietary intake assessed by 24-hour recall. We also measured and report on plasma triacylglycerol, high-density lipoprotein cholesterol, reproductive steroid hormones, homocysteine, Insulin-like growth factor I, insulin-like growth factor I binding protein 1, insulin, glucose, and leptin in a subset of WHEL women.

15. Rock CL, Flatt SW, Wright FA, Faerber S, Newman V, Kealey S, Pierce JP. Responsiveness of carotenoids to a high-vegetable diet intervention designed to prevent breast cancer recurrence. *Cancer Epidemiol Biomarkers Prev* 1997;6:617-623.
16. McEligot AJ, Rock CL, Shanks TG, Faerber S, Flatt SW, Newman V, Pierce JP. Comparison of serum carotenoid responses between women consuming vegetable juice and women consuming raw or cooked vegetables. *Cancer Epidemiol Biomarkers Prev* 1999;8:227-231.
17. McEligot AJ, Rock CL, Flatt SW, Newman V, Faerber S, Pierce JP. Plasma carotenoids are biomarkers of long-term high vegetable intake in women with breast cancer." *J Nutr* 1999;129:2258-2263.
18. Rock CL, Flatt SW, Thomson C, Stefanick ML, Newman VA, Jones L, Natarajan L, Pierce JP, Chang RJ, Witztum JL. Plasma triacylglycerol and high-density lipoprotein

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cholesterol concentrations confirm self-reported changes in carbohydrate and fat intakes in women in a diet intervention trial. *J Nutr* 2004;134:342-347.

19. Rock CL, Flatt SW, Thomson CA, Stefanick ML, Newman VA, Jones L, Natarajan L, Ritenbaugh C, Hollenbach KA, Pierce JP, Chang RJ. Effects of high-fiber, low-fat diet intervention on serum concentrations of reproductive steroid hormones in women with a history of breast cancer. *J Clin Oncol* 2004;22:2379-2387.
20. Thomson CA, Giuliano AR, Shaw JW, Rock CL, Ritenbaugh CK, Hakim IA, Hollenbach KA, Alberts DS, Pierce JP. Diet and biomarkers of oxidative damage in women previously treated for breast cancer. *Nutr Cancer* 2005;51:146-154.
21. McEligot AJ, Rock CL, Gilpin EA, Pierce JP. Responsiveness of homocysteine concentrations to food and supplemental folate intakes in smokers and never-smokers enrolled in a diet intervention trial. *Nic Tob Res* 2006;8:57-66.
22. Pierce JP, Natarajan L, Sun S, Al-Delaimy WK, Flatt SW, Kealey S, Rock CL, Thomson CA, Newman VA, Ritenbaugh C, Gold EB, Caan BJ. Increases in plasma carotenoid concentrations in response to a major dietary change in the WHEL Study. *Cancer Epidemiol Biomarkers Prev* 2006;15:1886-1892.
23. Al-Delaimy WK, Natarajan L, Rock CL, Sun S, Flatt SW, Pierce JP. Insulin-like growth factor I, insulin-like growth factor I binding protein 1, insulin, glucose, and leptin serum levels are not influenced by a reduced-fat, high-fiber diet intervention. *Cancer Epidemiol Biomarkers Prev* 2006;15:1238-1239.
24. Thomson CA, Rock CL, Pierce JP. Plasma and dietary carotenoids are associated with reduced oxidative stress in women previously treated for breast cancer. *Cancer Epidemiology, Biomarkers and Prevention* (in press).

Dietary Measurement Methodology

One of the most challenging aspects of dietary intervention studies is getting an accurate measure of a participant's dietary intake. The WHEL Study used three methods to assess dietary intake, providing an excellent opportunity to examine methodological issues related to the different methods. Two methods were self-report measures: one was repeated 24-hour recalls which obtained intake within a 3-week period (primary measure), and the other used a food frequency questionnaire to obtain usual intake during the prior 3-month period. The third method was a biochemical validation (plasma carotenoid concentrations).

25. Newman V, Faerber S, Zoumas C, Rock CL. Amount of raw vegetables and fruits needed to yield 1 c juice. *J Am Diet Assoc* 2002; 102:975:977.
26. Thomson CA, Giuliano A, Rock CL, Ritenbaugh CK, Flatt SW, Faerber S, Newman V, Graver E, Hartz V, Whitacre R, Parker F, Pierce JP, Marshall JR. Measuring dietary change in a diet intervention trial: comparing food frequency questionnaire and dietary recalls. *Am J Epidemiol* 2003;157:754-762.

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27. Natarajan L, Rock CL, Major JM, Thomson CA, Caan BJ, Flatt SW, Chilton JA, Hollenbach KA, Newman VA, Faerber S, Ritenbaugh C, Gold E, Stefanick ML, Jones LA, Marshall JR, Pierce JP, for the WHEL Study Group. On the importance of using multiple methods of dietary assessment. *Epidemiology* 2004; 15:738-745.
28. Natarajan L, Flatt SW, Sun X, Gamst AC, Major JM, Rock CL, Pierce JP. Validity and systematic error in measuring carotenoid consumption with dietary self-report instruments. *Am J Epidemiol.* 2006;163:770-778.

Dietary Supplement Use

The large and ever-growing number of dietary supplements available makes it difficult to accurately assess what people are consuming. Unfortunately, details for various brands and formulations were not available in a convenient database, which posed a challenge for WHEL Study investigators. Because dietary supplement use may influence overall nutritional status, or increase risk of excess intakes of nutrients, details about supplement use were an important component of the WHEL Study. To address this problem, we developed a comprehensive database of dietary supplements. Generally, the use of dietary supplements by various populations has not been well described. These WHEL Study publications were among the first to depict supplement use in breast cancer survivors.

29. Rock CL, Newman V, Flatt SW, Faerber S, Wright FA, Pierce JP, for WHEL Study Group. Nutrient intakes from foods and dietary supplements in women at risk for breast cancer recurrence. *Nutr Cancer* 1997;29:133-139.
30. Newman V, Rock CL, Faerber S, Flatt SW, Wright FA, Pierce JP, for WHEL Study Group. Dietary supplement use by women at risk for breast cancer recurrence. *J Am Diet Assoc* 1998; 98(3):285-292.
31. Rock CL, Newman VA, Neuhouser ML, Major J, Barnett MJ. Antioxidant supplement use in cancer survivors and the general population. *J Nutr* 2004;134:3194S-3195S.

Physical Activity

Many studies have shown that physical activity after a diagnosis of breast cancer is associated with a better quality of life, and new research suggests that being physically active might extend survival in women with breast cancer. Determining the best way to accurately assess physical activity levels in a large sample of women is a challenge for researchers, and few studies have assessed physical activity level after a diagnosis of breast cancer. The WHEL Study collected information on physical activity, and a subsample of WHEL women participated in a study to help determine the accuracy of physical activity measures. The information presented in the publications below will help new studies investigating the relationship between physical activity and breast cancer survival.

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33. Hong S, Bardwell WA, Natarajan L, Flatt SW, Rock CL, Newman VA, Madlensky L, Mills PJ, Dimsdale JE, Thomson CA, Hajek RA, Chilton JA, Pierce JP. Correlates of physical activity level in breast cancer survivors participating in the Women's Healthy Eating and Living (WHEL) Study. *Breast Cancer Res Treat*. 2007;101:225-232.
34. Johnson-Kozlow M, Rock CL, Gilpin EA, Hollenbach KA, Pierce JP. Validation of the WHI brief physical activity questionnaire among women diagnosed with breast cancer. *Am J Health Behav*. 2007;31:193-202.

Quality of Life and Psychosocial

Many researchers believe that measures of a cancer survivor's Quality of life are important to consider as a supplement to objective clinical or biological measures of disease. The increasing use of these measures highlights a growing appreciation of the importance of how patients feel in addition to the traditional focus on disease outcomes. Psychosocial functioning is another critical aspect of a breast cancer survivor's health that deserves more research. The WHEL Study collected information on quality of life and psychosocial functioning, and published several papers related to this area of research.

35. Rock CL, McEligot AJ, Flatt SW, Sobo EJ, Wilfley DE, Jones VE, Hollenbach KA, Marx RD. Eating pathology and obesity in women at risk for breast cancer recurrence. *Int J Eat Disord* 2000;27:172-179.
36. McEligot AJ, Rock CL, Sobo EJ, Flatt SW. Food avoidance by women at risk for breast cancer recurrence. *J Cancer Educ* 2000;15:151-155.
37. Bardwell WA, Major JM, Rock CL, Newman VA, Thomson CA, Chilton JA, Dimsdale JE, Pierce JP, for the WHEL Study Group. Health related quality of life in women previously treated for early stage breast cancer. *Psycho-Oncology* 2004;13:595-672.
38. Thornton AA, Madlensky L, Flatt SW, Kaplan RM, Pierce JP, for the Women's Healthy Eating and Living (WHEL) Study Group. The impact of a second breast cancer diagnosis on health related quality of life. *Breast Cancer Res Treat* 2005;92:25-33.
39. Yost K, Haan MN, Levine R, Gold E. Comparing SF-36 scores across three groups of women with different health profiles. *Qual Life Res* 2005;14:1251-1261.
40. Bardwell WA, Natarajan L, Dimsdale JE, Rock CL, Mortimer JE, Hollenbach, Pierce JP. Objective cancer-related variables are not associated with depressive symptoms in women treated for early-stage breast cancer. *J Clin Oncol* 2006;24:2420-2427.
41. Bardwell W, Profant J, Casden DR, Dimsdale JE, Ancoli-Israel S, Natarajan L, Rock CL, Pierce JP. The relative importance of specific risk factors for insomnia in women

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treated for early-stage breast cancer. *Psycho-oncology* 2007; Apr 11 (Epub ahead of print).

Weight Management

Weight gain has been reported in the majority of women undergoing adjuvant therapy for breast cancer. Multiple reasons for marked post-diagnosis weight gain have been suggested including receiving chemotherapy, being or becoming postmenopausal after diagnosis, decreased physical activity and increased total caloric intake. Weight gain following breast cancer diagnosis appears to be associated with loss of lean muscle mass. Studying factors related to weight gain in breast cancer survivors is an important area of research, as obesity has generally been associated with a poorer prognosis. The WHEL Study provided a good opportunity to investigate factors related to weight gain, and published the following papers.

42. Rock CL, Flatt SW, Newman V, Caan BJ, Haan MN, Stefanick ML, Faerber S, Pierce JP, for the WHEL Study Group. Factors associated with weight gain in women after diagnosis of breast cancer. *J Am Diet Assoc* 1999;99:1212-1219.
43. Rock CL, Thomson C, Caan BJ, Flatt SW, Newman V, Ritenbaugh C, Marshall JR, Hollenbach KA, Stefanick ML, Pierce JP, for the WHEL Study Group. Reduction in fat intake is not associated with weight loss in most women after breast cancer diagnosis. Evidence from a randomized controlled trial. *Cancer* 2001;91:25-34.
44. Wasserman L, Flatt SW, Natarajan L, Laughlin G, Matusalem M, Faerber S, Rock CL, Barrett-Connor E, Pierce JP. Correlates of obesity in postmenopausal women with breast cancer: comparison of genetic, demographic, disease-related, life history and dietary factors. *Int J Obesity* 2004; 28:49-56.
45. Thomson CA, Rock CL, Giuliano AR, Newton TR, Cui H, Reid PM, Green TL, Alberts DS. Longitudinal changes in body weight and body composition among women previously treated for breast cancer consuming a high-vegetable, fruit and fiber, low-fat diet. *Eur J Nutr* 2004;487:1-8.
46. Caan BJ, Emond JA, Natarajan L, Castillo A, Gunderson E, Habel L, Jones L, Newman VA, Rock CL, Slattery ML, Stefanick ML, Sternfeld B, Thomson CA, Pierce JP. Post diagnosis weight gain and breast cancer recurrence among women with early stage breast cancer. *Breast Cancer Res Treat* 2006;99:47-57.
47. Saquib N, Flatt S, Natarajan L, Thomson CA, Bardwell W, Caan B, Rock CL, Pierce JP. Weight gain and recovery of pre-cancer weight after breast cancer treatments: evidence from the Women's Healthy Eating and Living (WHEL) Study. *Breast Cancer Res Treat* 2006; Nov 23 (Epub ahead of print).
48. Saquib N, Natarajan L, Rock C, Flatt S, Madlensky L, Kealey S, Pierce J. The impact of a long-term reduction in dietary energy density on body weight within a randomized diet trial. *Nutrition and Cancer* (in press).

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Other

The WHEL Study has also published papers relating to cost, statistical issues, and family history.

49. Thomson CA, Emery S. The cost of cancer preventive dietary practices among breast cancer survivors. *Oncol Econ* 2000;1:51-56.
50. Yost K., Levine R, Gold, E. Multiple imputation for survey data that are missing by design: A validation study. *Am J Epidemiol* 2003;157(11 supplement):S34.
51. Madlensky L, Flatt SW, Bardwell WA, Rock CL, Pierce JP. Is family history related to preventive health behaviors and medical management in breast cancer patients? *Breast Cancer Res Treat* 2005;90:47-54.