



## In this Issue

February 2010

**This month's edition of InspireHealth's Research Updates focuses on the importance of diet and exercise for cancer prevention.**

For example, Kim et al. report that high consumption of fatty fish is associated with a reduced risk (up to 80%) for breast cancer. Bertuccio and colleagues conclude from their dietary study in northern Italy that dietary patterns rich in fruits and vegetables protect against gastric cancer (40% protection), whereas dietary patterns rich in meats and animal fats show a positive association with gastric cancer (2-fold increased risk).

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Several articles this month highlight the fact that physical activity is protective against a variety of cancer types. For prostate cancer, not sitting for most of the time during work or occupational activity and walking or bicycling more than 30 min per day during adult life is associated with a 20% reduced incidence of prostate cancer (Orsini et al.). Women with a high level of long-term physical activity had lower risk of breast cancer death (47%) than women with low activity levels (West-Wright et al.).

The study of the month by Oliffe et al. describes the importance of humor in prostate cancer support groups in British Columbia.

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### Study of the Month

**Research Updates** is InspireHealth's monthly publication that informs those interested about authoritative articles in integrated cancer care. Articles are selected based on their evidence and relevance to integrated cancer care.

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### Breast Cancer

Kim, J, S. Y. Lim, A. Shin, et al. **Fatty Fish and Fish Omega-3 Fatty Acid Intakes Decrease the Breast Cancer Risk: A Case-Control Study.** *BMC Cancer*. 2009 9216.

**BACKGROUND:** Although it is believed that fish omega-3 fatty acids may decrease breast cancer risk, epidemiological evidence has been inconclusive. This study examined the association between fish and fish omega-3 fatty acids intake with the risk of breast cancer in a case-control study of Korean women. **METHODS:** We recruited 358 incident breast cancer patients and 360 controls with no history of malignant neoplasm from the National Cancer Center Hospital between July 2007 and April 2008. The study participants were given a 103-item food intake frequency questionnaire to determine their dietary consumption of fish (fatty and lean fish) and omega-3 fatty acids derived from fish (eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA)). **RESULTS:** Using a multivariate logistic regression model, high intake of fatty fish was associated with a reduced risk for breast cancer in both pre- and postmenopausal women (OR [95% CI] for highest vs.

lowest intake quartiles, p for trend: 0.19 [0.08 to 0.45], p < 0.001 for premenopausal women, 0.27 [0.11 to 0.66], p = 0.005 for postmenopausal women). Similarly, reductions in breast cancer risk were observed among postmenopausal subjects who consumed more than 0.101 g of EPA (OR [95% CI]: 0.38 [0.15 to 0.96]) and 0.213 g of DHA (OR [95% CI]: 0.32 [0.13 to 0.82]) from fish per day compared to the reference group who consumed less than 0.014 g of EPA and 0.037 g of DHA per day. Among premenopausal women, there was a significant reduction in breast cancer risk for the highest intake quartiles of omega-3 fatty acids (ORs [95% CI]: 0.46 [0.22 to 0.96]), compared to the reference group who consumed the lowest quartile of intake. **CONCLUSION:** These results suggest that high consumption of fatty fish is associated with a reduced risk for breast cancer, and that the intake of omega-3 fatty acids from fish is inversely associated with postmenopausal breast cancer risk.

West-Wright, CN, K. D. Henderson, J. Sullivan-Halley, et al. **Long-Term and Recent Recreational Physical Activity and Survival After Breast Cancer: The**

**California Teachers Study.** *Cancer Epidemiology Biomarkers and Prevention.* 2009 November; 1811: 2851-2859.

Introduction: Long-term physical activity is associated with lower breast cancer risk. Little information exists on its association with subsequent survival. Methods: California Teachers Study cohort members provided information in 1995-1996 on long-term (high school through age 54 years) and recent (past 3 years) participation in moderate and strenuous recreational physical activities. The 3,539 women diagnosed with invasive breast cancer after cohort entry and through December 31, 2004, were followed through December 31, 2005. Of these, 460 women died, 221 from breast cancer. Moderate and strenuous physical activities were combined into low ([less-than or equal to]0.50 h/wk/y of any activity), intermediate (0.51-3.0 h/wk/y of moderate or strenuous activity but no activity >3.0 h/wk/y), or high activity (>3.0 h/wk/y of either activity type). Multivariable relative risks (RR) and 95% confidence intervals (95% CI) for mortality were estimated using Cox proportional hazards methods, adjusting for race/ethnicity, estrogen receptor status, disease stage, and baseline information on comorbidities, body mass index, and caloric intake. Results: Women with high or intermediate levels of long-term physical activity had lower risk of breast cancer death (RR, 0.53; 95% CI, 0.35-0.80; and RR, 0.65; 95% CI, 0.45-0.93, respectively) than women with low activity levels. These associations were consistent across estrogen receptor status and disease stage, but were confined to overweight women. Deaths due to causes other than breast cancer were related only to recent activity. Conclusions: Consistent long-term participation in physical activity before breast cancer diagnosis may lower risk of breast cancer death, providing further justification for public health strategies to increase physical activity throughout the lifespan.

## Colorectal Cancer

Nayak, SP, M. P. Sasi, M. P. Sreejayan and S. Mandal. **A Case-Control Study of Roles of Diet in Colorectal Carcinoma in a South Indian Population.** *Asian Pacific Journal of Cancer Prevention: Apjcp.* 2009 Oct-Dec; 104: 565-568.

INTRODUCTION: The worldwide incidence of colorectal cancer has increased rapidly in the past few decades and dietary habits have been implicated in the cause. Though the Indian diet varies substantially from western diet, there have not been detailed studies on any association. MATERIALS AND METHODS: This is hospital based case control study enrolling 108 cases and 324 controls, all hailing from the Malabar region of Kerala, India. The subjects were interviewed using food frequency questionnaires for commonly consumed dietary items in the region. RESULTS: A strong association was found between colorectal cancer and tapioca (OR= 2.7 p= 0.001), beef (OR= 4.25, p= 0.000) and pungent spices (OR= 9.62, p= 0.018). Fruits and vegetables showed strong inverse association (OR= 0.15 p= 0.002). Fish consumption on a daily basis showed a 25% reduction in risk on univariate analysis. Heavy consumption of sugar (OR= 2.80) and tobacco use (OR= 8.79) showed significant high risk. CONCLUSIONS: There is strong evidence from our study that intake of beef, refined carbohydrates and tobacco can promote colorectal cancer.

Our study has also thrown light on some of the other commonly consumed items, like tapioca and spices, which have positive associations. These are commonly consumed in Malabar region of Kerala. A cohort study is now needed to confirm our findings.

## Nutrition

Bertuccio, P, V. Edefonti, F. Bravi, et al. **Nutrient Dietary Patterns and Gastric Cancer Risk in Italy.** *Cancer Epidemiology Biomarkers and Prevention.* 2009 November; 1811:2882-2886.

Background: There have been several studies on diet and gastric cancer, but only a few investigations have considered the role of dietary patterns. Methods: We investigated gastric cancer risk in relation to dietary patterns in a case-control study conducted in northern Italy between 1997 and 2007, including 230 patients with incident, histologically confirmed gastric cancer and 547 frequency-matched controls, admitted to the same hospitals as cases, with acute nonneoplastic conditions. Dietary habits were investigated through a validated food frequency questionnaire including 78 foods and beverages. We identified a posteriori dietary patterns on a selected set of 28 micro- and macro-nutrients through an exploratory principal component factor analysis. We estimated the odds ratios (OR) and the corresponding 95% confidence intervals (95% CI) using conditional logistic regression models on quartiles of factor scores. Results: We identified four major dietary patterns, named "animal products", "vitamins and fiber", "vegetable unsaturated fatty acids", and "starch-rich". We observed a positive association between gastric cancer risk and the "animal products" (OR, 2.13; 95% CI, 1.34-3.40, for the highest versus the lowest score quartile) and the "starch-rich" (OR, 1.67; 95% CI, 1.01-2.77) dietary patterns. The "vitamins and fiber" pattern (OR, 0.60; 95% CI, 0.37-0.99) was inversely associated with gastric cancer, whereas no significant association emerged with the "vegetable unsaturated fatty acids" pattern (OR, 0.89; 95% CI, 0.56-1.42). Conclusions: Our analysis suggests a protective effect against gastric cancer risk of dietary patterns rich in fruits and vegetables, and a positive association of dietary patterns rich in meats and animal fats and starchy foods.

Skeie, G, A. Hjartaker, T. Braaten and E. Lund. **Dietary Change among Breast and Colorectal Cancer Survivors and Cancer-Free Women in the Norwegian Women and Cancer Cohort Study.** *Cancer Causes and Control.* 2009 December; 2010: 1955-1966.

Objective: To study diet before and after diagnosis of breast and colorectal cancers compared with diet in cancer-free women in the Norwegian Women and Cancer study. Methods: This paper reports dietary changes from a data collection in 1996-1999 to another in 2002-2005. A total of 43,847 cancer-free women aged 41-70 years answered the baseline questionnaire on diet and lifestyle, 130 women developed colorectal cancer and 563 breast cancer. Dietary change in the three groups was compared, for breast cancer a comparison was made according to stage and time since diagnosis. Results: Breast cancer survivors increased fruit and vegetable consumption with 81 g compared to 42 g in colorectal cancer survivors and

50 g in cancer-free women (p difference in change <0.001). Milk consumption decreased among cancer-free women, but not among colorectal cancer survivors (p = 0.007). Significantly more cancer survivors quit smoking (p < 0.001). There were no differences in change of alcohol consumption or BMI. In breast cancer survivors, differences increased with time since diagnosis, and stage II survivors made larger changes than stage I survivors. Conclusions: Cancer survivors showed little change toward cancer-preventive guidelines, although more advanced stage and being more than 2.4 years post diagnosis was associated with greater change in diet and smoking behaviors.

Tang, NP, H. Li, Y. L. Qiu, G. M. Zhou and J. Ma. **Tea Consumption and Risk of Endometrial Cancer: A Metaanalysis.** *American Journal of Obstetrics & Gynecology.* 2009 Dec; 2016: 605.e1-605.e8.

**OBJECTIVE:** The objective of the study was to assess the association between tea consumption and endometrial cancer. **STUDY DESIGN:** Studies were identified by searching PubMed and EMBASE databases and screening the references of retrieved articles. The summary relative risk (RR) with 95% confidence interval (CI) was calculated. **RESULTS:** The combined RR for ever drinkers vs non/lowest drinkers was 0.85 (95% CI, 0.77-0.94). Compared with non/lowest drinkers, the summary RR was 0.88 (95% CI, 0.78-0.98) for low to moderate drinkers and 0.75 (95% CI, 0.64-0.88) for high drinkers. An increase in tea intake of 2 cups/day was associated with a 25% decreased risk of endometrial cancer. In subgroup analyses, tea consumption was significantly associated with reduced endometrial cancer risk in Asian studies and studies using interviewing techniques. Furthermore, the protective effect of green tea on endometrial cancer seemed more evident than that of black tea. **CONCLUSION:** Findings from this metaanalysis suggest that tea consumption may reduce the risk of endometrial cancer. Because of the limited number of studies, further prospective studies are needed to explore the protective effect of tea on endometrial cancer.

## Pancreatic Cancer

Zhang, J, I. B. Dhakal, M. D. Gross, et al. **Physical Activity, Diet, and Pancreatic Cancer: A Population-Based, Case-Control Study in Minnesota.** *Nutrition & Cancer.* 2009 614: 457-465.

Although mounting evidence suggests that insulin resistance is involved in pancreatic carcinogenesis, few epidemiologic studies have comprehensively investigated the role of lifestyle factors influencing this metabolic disorder in the etiology of pancreatic cancer. We sought to examine this problem in a case-control study conducted in 1994-1998 in Minnesota. Cases (n = 186), aged 20 yr or older, were ascertained from all hospitals in the metropolitan area of the Twin Cities and the Mayo Clinic; from the latter, only cases residing in the Upper Midwest of the United States were recruited. Controls (n = 554) were randomly selected from the general population and frequency matched to cases by age (within 5 yr) and sex. Odds ratios (OR) and 95% confidence intervals (95% CI) were estimated using unconditional logistic regression. After adjustment for confounders, physical activity was

associated with a reduced risk, but this protective effect was confined to light activity and moderate activity only (OR = 0.55, 95% CI = 0.30-0.97, P(trend) = 0.038 and OR = 0.51, 95% CI = 0.28-0.93, P(trend) = 0.07, for highest vs. lowest quartile, respectively). An increased risk was found for dietary intakes of energy and fat but was statistically significant for saturated and polyunsaturated fat only. Of note, no appreciable difference in the magnitude of the associations existed between saturated, monounsaturated, and polyunsaturated fat. Compared with individuals in the lowest quartile of fiber intake, the risk was approximately halved for those in the third (OR = 0.49, 95% CI = 0.26-0.94) and the highest quartile (OR = 0.52, 95% CI = 0.21-1.30). Our study lends support to the hypothesis that dietary and other lifestyle factors influencing insulin resistance modulate pancreatic cancer risk.

## Prostate Cancer

Orsini, N, R. Bellocco, M. Bottai, et al. **A Prospective Study of Lifetime Physical Activity and Prostate Cancer Incidence and Mortality.** *Br J Cancer.* 2009 December; 10111: 1932-1938.

**Background:** The possible benefit of lifetime physical activity (PA) in reducing prostate cancer incidence and mortality is unclear. **Methods:** A prospective cohort of 45 887 men aged 45-79 years was followed up from January 1998 to December 2007 for prostate cancer incidence (n2735) and to December 2006 for its subtypes and for fatal (n190) prostate cancer. **Results:** We observed an inverse association between lifetime (average of age 30 and 50 years, and baseline age) total PA levels and prostate cancer risk. Multivariate-adjusted incidence in the top quartile of lifetime total PA decreased by 16% (95% confidence interval (CI)2-27%) compared with that in the bottom quartile. We also observed an inverse association between average lifetime work or occupational activity and walking or bicycling duration and prostate cancer risk. Compared with men who mostly sit during their main work or occupation, men who sit half of the time experienced a 20% lower risk (95% CI7-31%). The rate ratio linearly decreased by 7% (95% CI1-12%) for total, 8% (95% CI0-16%) for localized and 12% (95% CI2-20%) for advanced prostate cancer for every 30 min per day increment of lifetime walking or bicycling in the range of 30 to 120 min per day. **Conclusions:** Our results suggest that not sitting for most of the time during work or occupational activity and walking or bicycling more than 30 min per day during adult life is associated with reduced incidence of prostate cancer.

Bidoli, E, R. Talamini, A. Zucchetto, et al. **Dietary Vitamins E and C and Prostate Cancer Risk.** *Acta Oncol.* 2009 486: 890-894.

**Background.** The epidemiologic evidence on dietary vitamins E and C and prostate cancer is controversial. Therefore, a case-control study was carried out to investigate the role of dietary intake of vitamins E and C in the etiology of prostate cancer. **Material and methods.** Cases were 1 294 men with incident, histologically confirmed prostate cancer, admitted to the major teaching and general hospitals of five Italian areas between 1991 and 2002. Controls were 1 451 men admitted for acute,

non-neoplastic conditions to the same hospitals. Information on dietary habits and nutrient intake was elicited using a validated food frequency questionnaire including 78 food groups and recipes. Odds ratios (OR) and 95% confidence intervals (CI) for increasing levels of vitamin intake were estimated after allowance for total energy intake and other confounding factors. Results. Vitamin E showed a significant inverse association with prostate cancer (OR = 0.78 for the highest versus the lowest tertile of intake, 95% CI: 0.58-0.96; p-value for trend = 0.02), whereas for vitamin C the inverse association was of borderline statistical significance (OR = 0.86; 95% CI: 0.65-1.08). Results were consistent in strata of age, body mass index, and family history of prostate cancer. Discussion. The present study shows an inverse association between dietary intake of vitamins E and prostate cancer incidence. This finding is likely to reflect the influence of diet itself since supplementation or food fortification with vitamins is rare in the Italian population.

We are grateful to the **Prostate Cancer Foundation BC** for their generous support.



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## Exercise

Laukkanen, JA, E. Pukkala, R. Rauramaa, T. H. Makikallio, A. T. Toriola and S. Kurl. **Cardiorespiratory Fitness, Lifestyle Factors and Cancer Risk and Mortality in Finnish Men.** *Eur J Cancer.* 2010 January; 462: 355-363.

Background: Physical fitness along with lifestyle factors may have important roles in the prevention of cancer. We examined the relationship between common lifestyle factors such as energy expenditure, physical activity and maximal oxygen uptake (VO<sub>2</sub>max), nutrition and smoking habits and the risk of cancer. Methods: A population-based cohort study was carried out in 2268 men from Eastern Finland with no history of cancer. They were followed up for an average of 16.7 years. The outcome measures were cancer incidence (n = 387) and cancer mortality (n = 159). Results: Men with VO<sub>2</sub>max of more than 33.2 mL/kg/min (highest tertile) had 27% (95% confidence interval (CI) 0.56-0.97) decreased cancer incidence and 37% (95% CI 0.40-0.97) reduced cancer mortality than men with VO<sub>2</sub>max of less than 26.9 mL/kg/min (lowest tertile) after adjustment for age, examination year, alcohol, smoking, socioeconomic status, waist-to-hip ratio and energy, fibre and fat intake. The risk reduction was mainly due to decreased risk of lung cancer in fit men. The adjusted risk of cancer was 0.73 (95% CI 0.55-0.98) among fit (VO<sub>2</sub>max [greater-than or equal to] 26.9 mL/kg/min) men with the total energy expenditure of physical activity over 2500 kcal/week. A total of 290 active (energy expenditure >2500 kcal and at least 2 h of physical activity per week) men with a favourable lifestyle (good fitness, balanced diet and non-smoking) had an adjusted relative risk of 0.63 (95% CI 0.46-0.87) for cancer. Conclusion: Favourable lifestyle including good cardiorespiratory fitness and healthy dietary habits with active and non-smoking lifestyle considerably reduces the risk of cancer.

## Study of the Month

Oliffe, JL, J. Ogrodniczuk, J. L. Bottorff, T. G. Hislop and M. Halpin. **Connecting Humor, Health, and Masculinities at Prostate Cancer Support Groups.** *Psychooncology.* 2009 Sep; 189: 916-926.

OBJECTIVE: Many commentaries about men's health practices and masculinities indicate that men do not typically engage with self-health or acknowledge illness, let alone openly discuss their health concerns with other men. Prostate cancer support groups (PCSGs) appear to run contrary to such ideals, yet the factors that influence men's attendance and engagement at group meetings are poorly understood. As part of a larger PCSG study, we noticed that humor was central to many group interactions and this prompted us to examine the connections between humor, health, and masculinities. METHODS: A qualitative ethnographic design was used to direct fieldwork and conduct participant observations at the meetings of 16 PCSGs in British Columbia, Canada. Individual semi-structured interviews were completed with 54 men who attended PCSGs to better understand their perceptions about the use of humor at group meetings. RESULTS: Four themes, disarming stoicism, marking the boundaries, rekindling and reformulating men's sexuality, and when humor goes south were drawn from the analyses. Overall, humor was used to promote inclusiveness, mark the boundaries for providing and receiving mutual help, and develop masculine group norms around men's sexuality. Although there were many benefits to humor there were also some instances when well-intended banter caused discomfort for attendees. CONCLUSIONS: The importance of group leadership was central to preserving the benefits of humor, and the specificities of how humor is used at PCSGs may provide direction for clinical practice and the design of future community-based men's health promotion programs.

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