

**PROGRAM
and
ABSTRACTS**

24th Annual Meeting

***American Society
of Preventive
Oncology***

March 5-7, 2000

**Hyatt Regency
Bethesda, Maryland**

American Society of Preventive Oncology

24th Annual Meeting

Program Chair:

E. Robert Greenberg, MD

Norris Cotton Cancer Center

Dartmouth Medical School

This meeting is sponsored by The American Society of Preventive Oncology, The Cancer Research Foundation of America, SmithKline Beecham, AstraZeneca, and a conference grant from the National Institutes of Health/National Cancer Institute.

The **American Society of Preventive Oncology** is an active and growing organization that is striving to: 1) promote the exchange and dissemination of information and ideas relating to cancer prevention and control; 2) identify and stimulate research areas in cancer prevention and control; and 3) foster the implementation of programs in cancer prevention and control.

After attending the **24th Annual Meeting** of the American Society of Preventive Oncology, participants should be better able to:

- * gain a better understanding about the relationship between science and policy
- * improve understanding regarding dietary recommendations and their implications
- * understand about challenges and controversies in cancer screening
- * understand the challenges of cancer diagnosis
- * comprehend the array of opportunities in biobehavioral research
- * understand new initiatives in cancer screening research

Meetings of the American Society of Preventive Oncology are organized for professionals in clinical, educational or research disciplines who appreciate the challenges of a multidisciplinary scientific forum and who are committed to a comprehensive approach to cancer prevention and control.

2000 Program Committee

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FOR THE FUTURE. . .

Please take a few minutes at the close of the meeting to complete the questionnaire available at the registration table. This will help future Program Committees and conference staff to better meet your professional and logistical needs.

The 2001 Meeting, which will be the 25th Anniversary celebration of "ASPO", is scheduled for March 11-13, 2001, at the Roosevelt Hotel in New York City. It's especially fitting that this "Anniversary Meeting" be held in New York, since that is where ASPO was conceived in 1976.

CONDENSED MEETING PROGRAM

Sunday, March 5

SMALL GROUP MEETINGS – (Not open to all attendees unless specified)

8:00 am – 7:00 pm	Registration (open to all)
8:30 am – 12:00 pm	General Meeting for NCI/K07 Fellows
12:00 pm – 4:00 pm	New Investigators' Workshop Organizer: Alfred I. Neugut, MD, PhD , Columbia University
4:00 – 6:00 pm	Cancer Center Associate Directors for Cancer Prevention & Control
5:30 – 7:30 pm	Social Mixer for Junior/Senior ASPO Members (open to all)

Monday, March 6

GENERAL SESSION BEGINS

7:00 AM – 5:00 pm	Registration
7:30 – 8:45 am	Study Group Breakfasts: Molecular Epidemiology Cancer Screening
9:00 – 10:00 am	Welcome, Keynote Address "Physical Activity and the Prevention of Cancer" Leslie Bernstein, PhD , University of Southern California
10:15 – 11:45 am	Symposium: Challenges in Science and Practice of Cancer Screening: The Case of Prostate Cancer Screening Chair: Barry Kramer, MD, MPH , National Cancer Institute
11:45 am – 12:15 pm	ASPO Business Meeting
12:15 pm	Lunch on your own (Poster set-up) ASPO Junior Members Professional Development Seminar
1:15 – 2:45 pm	Symposium: Hot Communications Issues for "Healthy Diet" Studies Chair: Peter Greenwald, MD , National Cancer Institute
3:00 – 3:45 pm	Distinguished Achievement Award Address
3:45 – 5:00 pm	Plenary Paper Session
5:00 – 5:30 pm	Informal Break (last chance to put up posters)
5:30 – 7:30 pm	Poster Session and Reception
7:30 pm	Presentation of "Best Poster" and Fellowship Awards

Tuesday, March 7

7:00 am – 3:00 pm	Registration
7:30 – 8:45 am	Study Group Breakfasts: Chemoprevention Diet & Nutrition
8:45 – 9:45 am	Joseph W. Cullen Award Presentation & Lecture
10:00 – 11:45 am	Symposium: Taxonomy of Cancer Chair: E. Robert Greenberg, MD , Dartmouth Medical School
11:45 am – 1:00 pm	Lunch on your own
1:00 – 2:15 pm	Two Concurrent Paper Sessions (details & locations in body of program)
2:30 – 4:00 pm	Symposium: New Directions in Biobehavioral Research Chair: Robert Croyle, PhD , National Cancer Institute
4:00 pm	Conclusion of Program

ASPO 2000 – Program Details

Sunday, March 5

SMALL GROUP MEETINGS – (not open to all attendees unless specified)

8:00 am – 7:00 pm **Registration**
Meeting Room Foyer **(open to all)**

8:30 am – 12:00 pm **General Meeting for NCI/K07 Fellows**
Cabinet/Judiciary Room

12:00 pm – 4:00 pm **New Investigators Workshop**
Executive Boardroom

Organizer: **Alfred I. Neugut, MD, PhD**
Columbia Univ. School of Public Health

Faculty: **Jeanne S. Mandelblatt, MD, MPH**
Georgetown University Medical Center

Suzanne M. Miller, PhD
Fox Chase Cancer Center

Zuo-Feng Zhang, MD, PhD
UCLA School of Public Health

4:00 pm – 6:00 pm **Special Meeting of Cancer Center Associate Directors**
Cabinet/Judiciary Room **for Cancer Prevention & Control**

5:30 pm – 7:00 pm **Social Mixer for Junior/Senior ASPO Members**
Fellini's Bar **(open to all registered attendees)**

6:30 pm – 10:00 pm **ASPO Executive Committee Meeting –**
Fellini's Restaurant **Working Dinner**

GENERAL SESSION BEGINS

Monday, March 6

7:00 am – 5:00 pm
Haverford Foyer

Registration

7:30 am – 8:45 am

Study Group Breakfasts – Hot Topics

Waterford Room

Molecular Epidemiology

Chair: **Bruce Trock, PhD**
Georgetown University Medical Center

“Laser Capture Microdissection and Protein Signatures: Novel Biomarkers for Exposure, Detection & Progression”

Presenter: **Emanuel F. Petricoin, PhD**
Division of Cytokine Biology, FDA

Lalique Room

Cancer Screening

Chair: **Kathy Helzlsouer, MD**
Johns Hopkins School of Medicine

Joined by: **Barry Kramer, MD**
National Cancer Institute

Discussion topic: *Controversies in Screening: Spiral CT Scan for Lung Cancer Screening – Is the Window of Opportunity Still Open?*

9:00 am – 10:00 am
Cabinet/Judiciary Room

Welcome -- **Alfred I. Neugut, MD, PhD**
E. Robert Greenberg, MD

Keynote Address

“Physical Activity and the Prevention of Cancer”

Leslie Bernstein, PhD
University of Southern California

10:00 am – 10:15 am **Break**

10:15 am – 11:45 am

Symposium:

*Challenges in Science and Practice of Cancer Screening:
The Case of Prostate Cancer Screening*

Chair: **Barry Kramer, MD, MPH**
National Cancer Institute

"Challenges in Interpreting Population Trends"

Eric J. (Rocky) Feuer, PhD
National Cancer Institute

"Behavioral Issues: Framing Risk Communications"

Evelyn Chan, MD
The University of Texas Medical Center

"The Interface of Science and Policy"

Steve Woolf, MD, MPH
Medical College of Virginia

General Discussion: (25 minutes)

11:45 am – 12:15 pm

ASPO Business Meeting

12:15 pm – 1:15 pm

Lunch on your own (Poster Set-up)
Posters – *Haverford/Baccarat Room*

Waterford Room

**Professional Development Seminar
for ASPO Junior Members**

*"Cancer Prevention Career Promoters:
Becoming Independent Scientists"*

Douglas Weed, MD, PhD
National Cancer Institute

Sponsored by the Cancer Research Foundation of America

1:15 – 2:45 pm

Symposium:

Hot Communications Issues for "Healthy Diet" Studies

Chair: **Peter Greenwald, MD**

National Cancer Institute

"The Politics of Dietary Recommendations"

Marion Nestle, PhD

Nutrition and Food Studies

New York University

"When Unwarranted Faith Leads to Unethical Dietary Recommendations"

Heidi Malm, PhD

Philosophy Department

Loyola University, Chicago

"Advantages and Challenges of the Internet for Dietary Studies"

Cheryl Rock, PhD

Cancer Prevention & Control

University of California, San Diego

General Discussion: (25 minutes)

2:45 – 3:00 pm

Break

3:00 – 3:45 pm

Distinguished Achievement Award Address

Margaret R. Spitz, MD

Department of Epidemiology

The UT M. D. Anderson Cancer Center

"Susceptibility – A Chink in the Armor"

3:45 – 5:00 pm

Plenary Paper Session

Chair: **Alfred I. Neugut, MD, PhD**
Columbia University School of Public Health

3:45 pm

Rosalind Breslow, PhD, MPH
Centers for Disease Control
Division of Cancer Prevention & Control

*"Consistent Recreational Physical Activity, Weight Change,
and Breast Cancer: NHANES I Epidemiologic
Follow-up Study"*

4:00 pm

Frank L. Meyskens, Jr., MD
Director, Chao Family Comprehensive Cancer Center
College of Medicine, University of California, Irvine

*"Phase IIa Chemoprevention Trial of Bowman-Birk Inhibitor
Concentrate in Patients with Oral Leukoplakia"*

4:15 pm

Pamela Marcus, MS, PhD
National Cancer Institute
Division of Cancer Prevention

*"Lung Cancer Mortality in the Mayo Lung Project: The Impact
of Extended Follow-up"*

4:30 pm

Margaret T. Mandelson, PhD
Group Health Cooperative
Center for Health Studies

*"Mammographic Breast Density in Relation to Interval Versus
Screen-Detected Cancer"*

4:45 pm

Stephen D. Hursting, PhD, MPH
National Cancer Institute
Division of Cancer Prevention

*"Low-Dose Genistein Induces Cyclin-Dependent Kinase
Inhibitors and G1 Cell Cycle Arrest in Prostate
Cancer Cells"*

Rosalind Breslow

3:45 pm

Consistent Recreational Physical Activity, Weight Change, and Breast Cancer: NHANES I Epidemiologic Follow-up Study. Breslow RA, Ballard-Barbash R, Munoz K, Graubard BI. *Institution of 1st author:* CDC, Atlanta, GA.

Purpose: To study the association between consistent recreational physical activity, weight change, and breast cancer in the Epidemiologic Follow-up Study (NHEFS) of the first National Nutrition and Health Examination Survey (NHANES I, 1971-75).

Methods: The analytic cohort, followed through 1992 (median 9.2 years), included 5995 women free of breast cancer in 1982-84. Activity and weight were assessed in 1971-75 and 1982-84. Levels of combined activity at these two points-in-time were categorized as 'low', 'moderate/inconsistent', and 'high'. Weight changes between 1971-75 and 1982-84 and between age 25 and age in 1982-84 were determined. Data were analyzed using Cox proportional hazards regression with activity models adjusted for weight change, and weight change models adjusted for activity. Both models were adjusted for height and breast cancer risk factors.

Results: 138 women developed invasive breast cancer.

Women age 50+ with consistently high activity (compared to consistently low) had a 60 percent reduction in risk (relative risk = 0.4; 95% confidence interval: 0.2 to 0.9, $p < 0.05$).

Consistent activity was not associated with breast cancer risk in women age <50. The association between consistent activity and breast cancer was not modified by weight change.

Weight change was not associated with breast cancer and consistent activity did not modify the association.

Conclusions: Consistently high exercise may reduce breast cancer risk in women age 50+; in this sample it did so regardless of weight history.

Frank L. Meyskens, Jr.

4:00 pm

Phase IIa Chemoprevention Trial of Bowman-Birk Inhibitor Concentrate in Patients with Oral Leukoplakia, Meyskens Jr., F.L., Armstrong, W., Wan, S.W., Taylor, T.H., Nguyen, Q., Jensen, J., Thompson, W., Lagerberg, W., Kennedy, A., Chao Family Comprehensive Cancer Center, University of California Irvine and Department of Radiation Oncology, University of Pennsylvania. Bowman Birk Inhibitor (BBI) is a protease inhibitor derived from soybeans that has demonstrated chemopreventive activity in a number of in vitro and animal systems. We conducted a short-term (one month) clinical trial of a BBI concentrate (C) in patients with oral leukoplakia. BBIC was administered to thirty-two subjects with oral leukoplakia to assess toxicity, clinical response (change in lesion area) and effect on surrogate endpoint biomarkers (levels of serum and mucosal cell *neu* protein and mucosal cell protease activity (PA)). BBIC was nontoxic in doses up to 1066 chymotrypsin inhibitory units (CIU) a day. Overall, a 24.3% decrease in total lesion area was observed following treatment and a trend towards a dose response relationship between dose and degree of clinical response was observed ($p=0.08$). Blinded analysis of lesion photographs confirmed this relationship ($p<0.01$). The level of pretreatment PA influenced the change in PA ($p<0.01$). A dose dependent increase in change in serum *neu* protein was also observed ($p<0.05$) and change in serum *neu* was associated with improved clinical response. These results indicate BBIC warrants further investigation in a randomized Phase IIb clinical trial.

Pamela Marcus

4:15 pm

Lung cancer mortality in the Mayo Lung Project: the impact of extended follow-up. PM Marcus, EJ Bergstralh, RM Fagerstrom, DE Williams, R Fontana, WF Taylor, PC Prorok

Purpose: The Mayo Lung Project (MLP), a randomized, controlled clinical trial of lung cancer screening conducted in 9211 male smokers between 1971 and 1983, observed no reduction in lung cancer mortality with an intense regimen of chest x-ray and sputum cytology (every 4 months for 6 years) as compared with usual care (recommendation for same tests annually). Because the trial may have lacked necessary follow-up time to observe a mortality benefit, we have extended follow-up through 1996. **Methods:** A National Death Index Plus search was performed to determine vital status, date of death, and cause of death for participants with unknown vital status (n=6523). Mortality rates equaled number of deaths divided by person-years (PY) of follow-up. Kaplan-Meier estimates were used to calculate survival curves for cases diagnosed prior to 7/1/83. **Results:** Lung cancer mortality was similar in the screened and usual care arms (4.7 and 4.5 per 1000 PY, respectively). All-cause mortality was similar also (35.8 vs. 35.7 per 1000 PY). Using cases diagnosed prior to 7/1/83, the two arms experienced similar lung cancer survival for late-stage disease, but the screened arm fared better for early-stage disease (median survival: 16.0 vs. 5.0 years; 5-year survival: 68% vs. 48%). **Conclusions:** In the MLP individuals who received frequent chest x-ray and sputum cytology did not experience reduced lung cancer mortality, even with extensive follow-up. The observation of similar mortality but better early-stage disease survival among screened individuals coupled with long-term follow-up suggests that indolent lesions may have been identified in the screened arm.

Margaret T. Mandelson

4:30 pm

Mammographic Breast Density in Relation to Interval versus Screen-Detected Cancer M.T. Mandelson, N. Oestreicher, P.L. Porter, S.H. Taplin, E. White

Purpose: Screening mammography is the best available method to reduce mortality from breast cancer, yet it is widely recognized that some cancers cannot be detected by mammography and are detected in the interval after a negative examination. This study was conducted to investigate whether mammographic breast density is related to interval cancer risk.

Methods: This study was conducted within a cohort of women participating in mammography screening between 1988 and 1993 in a large HMO based in Seattle, Washington. Eligible study women were diagnosed with a first primary invasive breast cancer within 24 months after their last screening mammogram. Women were classified as interval cases if their breast cancer occurred after a negative or benign assessment or as screen-detected "controls" if diagnosed after a positive screening mammogram. Index mammograms were reviewed by a single study radiologist for density using the American College of Radiology BI-RADS system. Data from 149 cases of interval cancer and 388 cases of screen-detected cancer were available for analysis. **Results:** Sensitivity sharply declined as density increased, from 80% among women with predominantly fatty breasts to 30% in women with extremely dense breasts. Women with extremely dense breasts had a six-fold odds of interval cancer (odds ratio=6.1, 95% CI 2.0-19.4) after adjustment for age, menopausal status, use of hormone replacement therapy and body mass index. These results were generally similar for women over and under age 50 and became stronger when interval cancers were restricted to those not identified on both the initial reading and retrospective review of the mammogram (odds ratio=9.5, 95% CI 2.8-32.3). **Conclusion:** Based on results from this study and from prior studies, mammographic breast density appears to be a major risk factor for interval cancer.

Stephen D. Hursting

4:45 pm

Title: Low-Dose Genistein Induces Cyclin-Dependent Kinase Inhibitors and G1 Cell Cycle Arrest in Prostate Cancer Cells.

Authors: Hursting S, Shen J, Klein R, Guan Y, Chang S, Wei Q.

Affiliation of 1st Author: National Cancer Institute, Bethesda, MD

The soy isoflavone genistein reportedly has anti-prostate cancer activity but the underlying mechanisms are unknown. We studied the anti-proliferative and apoptosis-inducing effects of genistein in the human prostate cancer cell line LNCaP. Viable cell number was assessed by chromogenic assay; cell cycle progression and apoptosis were evaluated by flow cytometry; and the expression of prostate specific antigen (PSA) and several cell cycle- and apoptotic-related genes and their gene products was determined by Northern blot analysis, Western blot analysis, and/or polymerase chain reaction (PCR)-based assays. Physiologic concentrations of genistein ($\leq 20 \mu\text{M}$) decreased LNCaP viable cell number in a dose-dependent manner, induced a G1 cell cycle block, decreased PSA mRNA expression, increased *p27^{KIP1}* and *p21^{WAF1}* (mRNA and protein) but had no effect on apoptosis or the mRNA expression of the apoptosis- and cell cycle-related markers *Bcl-2*, *Bax*, *Rb*, or proliferating cell nuclear antigen (*PCNA*). Higher concentrations of genistein ($> 20 \mu\text{M}$) did induce apoptosis. We conclude that genistein (at physiologic concentrations) exerts potent anti-proliferative effects on LNCaP cells by inducing a G1 cell cycle block. The cell cycle effects of genistein may be mediated by increased levels of *p27^{KIP1}* and *p21^{WAF1}*, which are negative cell cycle regulators that act as cyclin-dependent kinase inhibitors and that have been recently linked with prostate carcinogenesis. These findings may provide insights into the mechanisms underlying the apparent anti-prostate cancer effects of soy consumption observed in epidemiologic studies.

5:00 – 5:30 pm

Informal break (last chance to put up your poster)

5:30 – 7:30 pm

Haverford/Baccarat

Poster Session and Reception

7:30 pm

Presentation of “Best Poster” Award

Presentation of Cancer Prevention Research Fellowship

Carolyn Aldige’, President

Cancer Research Foundation of America

Tuesday, March 7

7:00 – 3:00 pm
Haverford Foyer

Registration

7:30 – 8:45 am

Study Group Breakfasts – Hot Topics

Haverford

Chemoprevention

Chair: **Roberd M. Bostick, MD, MPH**
University of South Carolina
South Carolina Cancer Center

Featured Presenter:

Sandra M. Swain, PhD
National Cancer Institute
Medicine Branch

“Ductal Carcinoma in situ”

NSABP – B24

Sponsored by AstraZeneca

Baccarat

Diet & Nutrition

Chair: **R. Sue McPherson, PhD**
The UT Houston School of Public Health
Human Nutrition Center

Topic to be announced

8:45 – 9:45 am
Cabinet/Judiciary Room

Joseph W. Cullen Memorial Award & Lecture

Susan J. Curry, PhD
Group Health Cooperative
Center for Health Studies

"Title to be Announced"

The Joseph W. Cullen Award is sponsored by
SmithKline Beecham

9:45 – 10:00 am

Break

10:00 – 11:45 am

Symposium:
Taxonomy of Cancer

Chair: **E. Robert Greenberg, MD**
Norris Cotton Cancer Center
Dartmouth Medical School

"Pseudocancer: When is a Cancer Not a Cancer?"
William Black, MD
Dartmouth Medical School

"Beyond the Microscope: What Will PCR Add to Diagnosis?"
Edison Liu, MD
National Cancer Institute

"Why Do Pathologists Disagree?"
David Page, MD
Vanderbilt University

General Discussion: (25 minutes)

11:45 – 1:00 pm

Lunch on your own

1:00 – 2:15 pm

Two Concurrent Paper Sessions
Description & Locations on Following Pages

Session I – Epidemiology/Genetics/Biomarkers/Prevention

Cabinet/Judiciary Room

Chair:

Mary Beth Terry, PhD
Columbia University

1:00 pm

Herbert Yu, MD, PhD

LSU Health Sciences Center
Department of Medicine

“High Plasma Insulin-like Growth Factors (IGFs) and IGF Binding Protein-3 (IGFBT-3) are Associated with Breast Cancer Risk in Chinese Women”

1:15 pm

Melissa Bondy, PhD

The UT M. D. Anderson Cancer Center
Department of Epidemiology

“Oxidative Damage Levels in Breast and Colorectal Cancer Patients in Egypt”

1:30 pm

Cornelia Ulrich, PhD

Fred Hutchinson Cancer Research Center
Cancer Prevention Research Program

“Epoxide Hydrolase Polymorphisms, Smoking, and Risk of Colorectal Adenomatous Polyps”

1:45 pm

Qingyi Wei, MD, PhD

The UT M. D. Anderson Cancer Center
Department of Epidemiology

“Dietary Folate Intake Increases Cellular DNA Repair Capacity in a Healthy Population”

2:00 pm

Roberd M. Bostick, MD, MPH

University of South Carolina
South Carolina Cancer Center

“Antioxidant Micronutrients and Colorectal Epithelial Cell Proliferation in Adenoma Patients”

2:15 – 2:30

Break

Herbert Yu

1:00 pm

High Plasma Insulin-like Growth Factors (IGFs) and IGF Binding Protein-3 (IGFBP-3) are Associated with Breast Cancer Risk in Chinese Women. Yu H¹, Shu XO², Li BDL¹, Dia Q², Berkel H¹, Ji F³, Zheng W². ¹Feist-Weiller Cancer Center LSU Health Sciences Center, Shreveport, LA 71130; ²University of South Carolina, Columbia, SC 29208; ³Shanghai Cancer Institute, Shanghai, P.R. China.

Peptide hormone IGFs, including IGF-I and IGF-II, play an important role in regulating cell proliferation, differentiation and programmed cell death. Findings from recent epidemiologic studies, both case-control and cohort, suggest that high IGF-I and low IGFBP-3 in circulation may be risk factors for breast cancer in premenopausal women. Evidence from human and animal studies also indicates that diet and nutritional status affect serum levels of IGF-I and IGFBP-3. Since most of the epidemiologic studies reported so far were conducted in Caucasians, it remains to be determined if the association of IGF with breast cancer exists in populations with dietary habits different from Caucasians. **Purpose:** To examine the association of IGFs and IGFBP-3 with breast cancer risk in Chinese women. **Methods:** We selected 181 breast cancer patients and 181 age- and menopausal status-matched healthy controls from a large case-control study conducted in Shanghai. The cases were newly diagnosed and previously untreated breast cancer patients. Heparin plasma samples from the cases and controls were collected for measurement of IGF-I, IGF-II and IGFBP-3 with use of commercial ELISA kits (DSL, Texas). Conditional logistic regression analysis was employed to evaluate the associations of IGFs and IGFBP-3 with breast cancer risk. Levels of the biomarkers were classified into low, medium, and high groups based on the tertile distribution of the marker in the control group. **Results:** In comparison to the lowest tertile, the odds ratios (ORs) for IGF-I after adjusting for menopausal status were 1.31 ($p=0.349$) for the middle tertile and 1.82 ($p=0.048$) for the highest tertile. The adjusted ORs were 1.17 ($p=0.615$) and 1.83 ($p=0.043$), respectively, for IGF-II, and were 1.73 ($p=0.063$) and 2.94 ($p<0.001$), respectively, for IGFBP-3. Tests for a trend were all statistically significant ($p<0.05$). IGFBP-3 has the strongest association with breast cancer risk as compared to IGF-I and IGF-II. **Conclusions:** Findings of this study confirm that high IGF-I is a risk factor for breast cancer. The positive associations of IGF-II and IGFBP-3 with breast cancer risk from this study are different from those observed in Caucasians, suggesting possible involvement of lifestyle and diet in the association of these growth factors with breast cancer risk. (Supported by NIH grants CA 83050 and CA 64277)

Melissa Bondy
1:15 pm

Oxidative Damage Levels in Breast and Colorectal Cancer Patients in Egypt

Melissa L. Bondy, Amr S. Soliman, Donghui Li, John DiGiovanni, Suri Vulimiri, Bernard Levin

Departments of Epidemiology, Gastrointestinal Medical Oncology, and Carcinogenesis and Division of Cancer Prevention, The University of Texas M. D. Anderson Cancer Center, Houston, TX

Egypt has extensive environmental pollution as well as high incidence of young onset breast and colorectal cancers. We conducted this study to investigate if environmental pollution is reflected in markers of exposures of Egyptians in general or those with specific type of cancers. Using ^{32}P postlabeling method, we measured 8-hydroxydeoxyguanine levels (8-OH-dG/ 10^5), a measure of oxidative DNA damage, in lymphocytes of three groups of women: (1) premenopausal breast cancer patients ($N=22$), (2) colorectal cancer patients ($N=25$), and (3) controls ($N=30$). We found significantly higher levels of 8-OH-dG in breast cancer patients (175.1 ± 120.2) compared with colorectal cancer patients (43.8 ± 13.1), and controls (35.3 ± 56.5) ($P < 0.001$). Furthermore, levels in patients and controls were significantly higher than levels observed among normal non-smoking female controls in the U.S. (4.2 ± 0.9) ($P < 0.001$). The high levels of 8-OH-dG levels in Egyptians confirm the reported high environmental exposures. Higher oxidative damage in breast cancer patients compared with colorectal cancers indicates that high 8-OH-dG levels are possibly related to breast but not colorectal cancer. Further studies are needed to determine specific environmental exposures that may lead to high oxidative damage in this population of young onset breast cancers.

Cornelia Ulrich

1:30 pm

Epoxide hydrolase polymorphisms, smoking, and risk of colorectal adenomatous polyps.

Ulrich CM, Bigler J, Fosdick L, Bostick R, Whitton J, Potter JD. Fred Hutchinson Cancer Research Center, Seattle, WA, 98109, University of Minnesota, Minneapolis, MN, 55454.

Epoxide hydrolases (EPHX) play an important role in both the activation and detoxification of exogenous chemicals such as polycyclic aromatic hydrocarbons. We investigated an association between the polymorphisms at exon3 (Tyr113His) and exon4 (His139Arg), and colorectal adenomas within a case-control study of adenomatous polyps. Cases (n=523) were diagnosed with colonoscopically confirmed adenomas; controls (n=630) were polyp-free at colonoscopy. 8.2% and 3.4% of the population were homozygous variant for the exon3 and exon4 polymorphism, respectively (42.8% and 32.5% were heterozygous). Multivariate-adjusted odds ratios (ORs) and 95% confidence intervals for exon3 status were 1.0 (0.8-1.3) (Tyr/His vs Tyr/Tyr) and 1.4 (0.9-2.2) (His/His vs Tyr/Tyr). A two-fold increase in risk with current smoking compared to never smokers was seen independent of exon3 genotype. ORs for main effects for the exon4 polymorphism were close to 1.0.

The increased risk of colorectal adenoma associated with current smoking was more pronounced among double heterozygotes for the exon3/exon4 EPHX1 polymorphisms (OR=4.9 (2.0-11.9) compared to never smokers with wildtype/wildtype). A similarly increased risk was observed among individuals who lacked a wildtype allele in both exons (OR=4.3 (2.0-9.3) compared to never smokers with at least one wildtype allele). These results suggest that the EPHX1 polymorphisms in exon3 and exon4 are not strongly associated with risk of colorectal adenomas. However, the combination of current smoking and lack of wildtype EPHX1 alleles appears to be associated with an increased risk of colorectal adenomas.

Qingyi Wei
1:45 pm

Dietary Folate Intake Increases Cellular DNA Repair Capacity in a Healthy Population. Q.Wei, P. Pillow, Z. Guo, C. Duphorne, and M. R. Spitz. Department of Epidemiology, The University of Texas M. D. Anderson Cancer Center, Houston, Texas 77030.

DNA repair is central in maintaining genetic integrity and normal cellular functions as well as controlling abnormal cell growth. Defective DNA repair function in human carcinogenesis is implicated in familial cancer syndromes. Folate is involved in de novo biosynthesis of oligonucleotides needed by DNA repair process and folate insufficiency has been linked to human cancer development. Therefore, we hypothesized that deficiency in folate intake may lead to reduced cellular DNA repair capacity (DRC). In this study of 335 apparently healthy individuals, we investigated the effects of select host factors such as age, sex, ethnicity, smoking, drinking, and dietary folate intake on DRC. Dietary folate intake was assessed by a structured food frequency questionnaire and standardized by caloric intake (per 1,000 kilocalorie). DRC was measured by the host-cell reactivation assay in primary lymphocytes. The DRC distribution was approximately normal in this study population. When folate intake was divided into the tertiles, the DRC of those in the upper tertile of intake ($n=117$) was increased by nearly 7% compared with those in the lower tertile ($n=112$). The difference was statistically significant ($P=0.014$). In a general linear regression model using DRC as the dependent variable, dietary folate intake was the only significantly positive predictor among other independent variables including age, sex, pack years of smoking, and years of alcohol consumption. This finding has important public health implications and warrants further investigation of the role of folate in cancer prevention (Supported by NIH grants CA70334, CA74851, and CA55769)

Robert M. Bostick

2:00 pm

Antioxidant Micronutrients and Colorectal Epithelial Cell Proliferation in Adenoma Patients

Bostick R, Crook T, Hazlett L, Parrish R, Overm P

Basic science and several observational epidemiologic studies suggest that antioxidant micronutrients may reduce the risk of colon cancer. To assess the efficacy of antioxidant micronutrients in normalizing colorectal epithelial cell proliferation (CECP), a putative biomarker of risk for colon cancer, we conducted a preliminary, randomized, double blind, placebo-controlled clinical trial of an antioxidant micronutrient combination (dl- α -tocopherol acetate 800 mg, β carotene 24 mg, vitamin C 1.0 g, l-selenomethionine 200 μ g, riboflavin 7.2 mg, niacin 80 mg, Zn 60 mg, Mn 5 mg) vs placebo in 47 patients with a history of sporadic adenomas. CECP was summarized by the labeling index (LI), an indicator of proliferation rate, and the distribution index (DI), an indicator of an extension of the colon crypt proliferative zone into the upper, or luminal, 40% of the crypts. CECP was assessed at baseline and at 1 and 2 months follow-up by immunohistochemical detection of PCNA. Results were analyzed by repeated measures analysis of covariance. Mean (SD) LIs by visit were 9.9 (4.4), 13.1 (4.7), and 12.2 (7.79) for the antioxidant group, and 11.1 (5.2), 17.3 (9.3), and 13.7 (7.8) for the placebo group; p values for treatment effects were 0.29 for the 2-month visit, and 0.94 for the four month visit. Mean (SD) DIs by visit were 0.04 (0.04), 0.05 (0.03), and 0.05 (0.04) for the antioxidant group, and 0.04 (0.04), 0.06 (0.04), and 0.05 (0.04) for the placebo group; p-values for treatment effects were 0.88 for the 2-month visit, and 0.92 for the 4-month visit. These preliminary data do not suggest that colorectal epithelial cell proliferation can be modulated in sporadic adenoma patients over 4 months by the antioxidant micronutrient combination used in this study.

Session II – Diet & Nutrition/Screening/Behavioral Science/Tobacco

Congressional Room

Chair:

Gad Rennert, MD, PhD

National Israeli K.H. Cancer Control Ctr.

1:00 pm

Rachael Stolzenberg-Solomon, PhD, RD

National Cancer Institute

Cancer Prevention Studies Branch

“Dietary Folate and Pancreas Cancer Risk in a Prospective Cohort of Male Smokers”

1:15 pm

Wendy Demark-Wahnefried, PhD

Duke University Medical Center

Department of Surgery

“Effect of Short-Term Flaxseed Supplementation and Fat Modification in Men with Prostate Cancer”

1:30 pm

Bruce Ling, MD, MPH

University of Pittsburgh

Division of General Medicine

“Factors Which Affect Adherence to Repeat Screening Flexible Sigmoidoscopy in the Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial”

1:45 pm

Jo Anne L. Earp, ScD

University of North Carolina at Chapel Hill

UNC Lineberger Comprehensive Cancer Center

“Closing the Racial Gap in Mammography Use”

2:00 pm

Robert A. Schnoll, PhD

Fox Chase Cancer Center

Psychology & Behavioral Medicine

“Predictors and Rates of Smoking Among Cancer Patients”

2:15 – 2:30 pm

Break

Rachael Stolzenberg-Solomon
1:00 pm

Title: Dietary Folate and Pancreas Cancer Risk in a Prospective cohort of Male Smokers

Author(s): Stolzenberg-Solomon RZ, Pietinen P, Barrett MJ, Taylor PR, Virtamo J, Albanes D

Institution of 1st author: Cancer Prevention Studies Branch, National Cancer Institute, Bethesda, MD. 20892

We examined whether dietary folate and other factors known to influence methyl group availability were prospectively associated with the development of exocrine pancreas cancer within the Alpha-Tocopherol, Beta-Carotene Cancer Prevention (ATBC) Study cohort. Of the 27,111 healthy male smokers aged 50-69 years who completed a self-administered dietary questionnaire at baseline, 157 developed pancreas cancer during 12 years of follow-up. Comparing the highest quartile to the lowest, the adjusted relative risk (RR) for dietary folate intake was .55 (95% confidence interval [CI], .34-.88, P trend= .04).

Dietary methionine intake and alcohol consumption did not modify of this association nor were they significantly associated with pancreas cancer. Cigarette smoking was also significantly associated with increased risk (cigarettes per day: RR=1.83, 95% CI 1.10-3.02, p-trend=.03). The results from this prospective study support the hypothesis that consuming adequate dietary folate may reduce the risk of pancreas cancer and confirm the risk associated with cigarette smoking.

Wendy Demark-Wahnefried

1:15 pm

Effect of Short-Term Flaxseed Supplementation and Fat Modification in Men with Prostate Cancer

Demark-Wahnefried W, Price D, Polascik T, Anderson E, Robertson C, Walther P, Paulson D, Gannon M & Vollmer R. Durham, NC

Previous research in both animals & humans suggests that dietary fat & fiber affect the hormonal & eicosanoid milieu, & may influence the progression of hormonally-linked cancers. A pilot study was undertaken to explore whether a flaxseed supplemented (30 g/day), fat restricted ($\leq 20\%$ of energy) diet could affect indices related to prostatic neoplasia among men diagnosed with early stage prostate cancer. Diets were imposed short-term, during a 3-4 week period prior to prostatectomy.

Data suggest that the dietary regimen is associated with significant decreases in free androgen index (28.4 ± 17.5 to $21.9 \pm 12.8\%$; $p = .027$), total testosterone (378 ± 119 to 318 ± 121 ng/dl; $p = .045$), & total cholesterol (196 ± 36 to 162 ± 24 mg/dl; $p < .001$) ($N=15$). While no differences were observed in prostate specific antigen (PSA) overall, when men with Gleason sums ≤ 6 were analyzed, a significant decrease in PSA was noted (8.3 ± 4.6 to 6.7 ± 3.8 ng/dl; $p = 0.009$; $N=6$). No change was detected in IGF-1 levels. A trend toward decreased proliferation was observed when histologic sections from treated patients were compared to untreated historic cases (matched on age, race, PSA at diagnosis, biopsy Gleason sum, disease laterality, & % positive biopsy cores/total biopsy cores); MIB-1 levels were 3.7 ± 5.0 vs 8.0 ± 9.1 , respectively ($p=0.11$). No differences were observed with regard to apoptotic indices; i.e. bcl-2, p53 & TUNEL. These data provide evidence that a flaxseed supplemented, fat restricted diet may have a biological effect on established prostate cancer which may be mediated through a hormonal mechanism & suggests a need for further study to determine the benefit of this dietary regimen as either a complementary or preventive therapy.

Bruce Ling
1:30 pm

Factors which affect adherence to repeat screening flexible sigmoidoscopy in the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial. Weissfeld JL, Ling BS, Schoen RE, Bresalier R, Riley T.

INTRODUCTION: Adherence with repeat screening flexible sigmoidoscopy (FSG) may be compromised by a negative experience sometimes associated with this invasive procedure. Therefore, we measured factors affecting adherence to repeat FSG. METHODS: PLCO, a NCI community-based randomized clinical trial with 10 U.S. screening centers, includes subjects offered periodic multimodality cancer screening. RESULTS: 10,802 (83%) of 13,062 60 to 74 year-old subjects who underwent baseline FSG accepted repeat FSG when offered three years later (Nov 1996 to Sept 1998). 1405 (11%) refused repeat FSG. Ensuing analyses excluded 855 (6%) who missed the repeat FSG for miscellaneous reasons, which included concurrent illness, new residence remote from screening center, and procedure performed or planned by personal physician. 11% (1405 of 12,207) refused repeat FSG. Subgroups significantly more likely to refuse included women (15%), non-Hispanic blacks (17%), current smokers (18%), and persons with technically inadequate baseline FSG (22%). Age and education were not strongly or consistently associated with refusal. CONCLUSION: PLCO shows that very high rates of repeat FSG can be achieved despite the discomfort sometimes associated with the procedure. Sociodemographic characteristics predicted refusal somewhat. Further research should generalize PLCO results to non-research settings, identify more specific predictors of refusal, and test interventions designed to maximize repeat screening FSG.

Jo Anne L. Earp
1:45 pm

Closing the Racial Gap in Mammography Use. Earp JA, Rauscher G, O'Malley MS. UNC Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill.

Purpose: We previously reported that in the North Carolina Breast Cancer Screening Program, a lay health adviser (LHA) intervention targeted to African American women in 5 rural eastern NC counties increased their mammography use. We used data from the same program to determine whether the intervention also reduced the racial gap in breast cancer screening.

Methods: We compared the change (baseline to first follow-up) in self-reported mammography use in the past two years among 391 African American and 408 White women in the 5 intervention counties. Follow-up response rates were 79% and 81%, respectively.

Results: Overall, intervention was associated with a reduction in the racial gap in mammography use in the past two years from 27% at baseline to 16% at follow-up ($p=0.002$). Among lower income women (annual income $< \$12,000$ per year) the gap was reduced from 18% to 1% ($p=0.004$). Similar trends were seen for other measures of mammography use (ever had a mammogram, had a mammogram in the past year, and ever heard of mammography).

Conclusion: When racial disparities in breast cancer screening exist, a "natural helper" LHA intervention appears effective in reducing the racial gap, especially among lower income women.

Robert A. Schnoll

2:00 pm

Title: Predictors and rates of smoking among cancer patients
Authors: R. Schnoll, Ph.D., S. Miller, Ph.D., M. Malstrom,
B.S., C. James, B.A., M. Unger, M.D., C. Langer, M.D., J.
Ridge, M.D., Ph.D., M. Goldberg, M.D., B. Movsas, M.D.
Affiliation: Fox Chase Cancer Center

This study examined the rate of continued smoking among patients with head, neck, and lung cancer, and assessed predictors of smoking behavior. After diagnosis and treatment, 53% of patients were still smoking. Predictors of greater readiness to quit included: being male ($\beta = -.42$), a lower level of addiction ($\beta = -.57$), greater self-efficacy to avoid smoking during stress ($\beta = .43$), and fewer health-related intrusive thoughts ($\beta = -.35$) ($F[4,20] = 8.8, p < .01$). Self-efficacy and distress accounted for a significant amount of unique variance in readiness to quit ($R^2 = .14$), over and above that which was explained by gender and level of nicotine addiction ($R^2 = .54$) ($F[2,16] = 3.7, p < .05$). Predictors of the number of 24-hour quit attempts included: lower endorsement of the cons of quitting (i.e., "I like the image of being a smoker") ($\beta = -.44$), greater endorsement of the pros of quitting ($\beta = .44$) (i.e., "I'm embarrassed to have to smoke"), and greater use of blunting coping ($\beta = .45$). The pros and cons of quitting and blunting accounted for a significant amount of unique variance ($R^2 = .55$), over and above that which was explained by gender and level of nicotine addiction ($R^2 = .23$) ($F[5,13] = 6.74, p < .05$). Since continued smoking among cancer patients is a significant clinical problem, the present results suggest that cessation treatments provided at diagnosis should be tailored to the patients' biological and psychological profile.

2:15 – 2:30 pm

Break

2:30 – 4:00 pm

Symposium:

New Directions in Biobehavioral Research

Chair: **Robert Croyle, PhD**

National Cancer Institute

“New Directions in Psychoneuroimmunology”

Dana Bovbjerg, PhD

Mt. Sinai School of Medicine

“Current Issues in the Psychobiology of Tobacco Use”

Ovide Pomerleau, PhD

University of Michigan

“Social Relationships and Cancer”

Vicki Helgeson, PhD

Carnegie-Mellon University

4:00 pm

Conclusion of Program

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for
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Presentation*

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Bone mineral density (BMD), endogenous hormones, and risk in postmenopausal breast cancer. Buist DSM, LaCroix AZ, Barlow WE, White E, Cauley JA, Bauer DC, Weiss NS. **Background:** A person's BMD is a function of his/her genetic makeup, age, levels of endogenous hormones and binding proteins, and lifestyle factors. In two cohorts BMD has been shown to predict breast cancer risk in postmenopausal women. **Purpose:** This case-cohort study was designed to examine whether total hip BMD is independently associated with breast cancer over and above its association with other determinants including levels of endogenous hormones. **Methods:** Our study population was selected from a cohort of 8213 postmenopausal women who were screened for the Fracture Intervention Trial in 1992, at which time BMD was assessed and blood samples were obtained and stored. In this cohort 109 women developed incident breast cancer during 4 years of follow-up. 173 other randomly selected women from the larger cohort were also selected for this study. Radioimmunoassay was used on baseline sera to measure total and bioavailable estradiol and testosterone, as well as sex-hormone binding globulin. Estimates of the relative risk (RR) of breast cancer by BMD quartile were obtained using Cox proportional hazards with robust variance adjustment. **Results:** Relative to women in the lower fourth of the BMD distribution, those in the upper 75% had an increased risk of breast cancer. The RR associated with being in the upper fourth was 2.8. After adjusting for blood levels of the measured hormones, calendar year, age, and geographic center the corresponding RR was 2.5 (95% confidence interval (CI) 1.0, 6.1). When body-mass index and number of years since menopause were added to the multivariate analysis, that RR decreased to 1.4 (95% CI 0.5, 3.7). **Conclusions:** These results suggest that BMD may not influence breast cancer risk independent of its relationship with endogenous hormones and known (measured) covariates.

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An Empirical Study of the Use of Living Versus Deceased Controls: Associations With Liver Cancer in the Selected Cancers Study. H.I. Hall, L.S. Caplan, S.S. Coughlin, R.S. Levine, and K. Zhu (Centers for Disease Control and Prevention, Atlanta, Georgia)

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There has been ongoing controversy over the optimal selection of controls for deceased cases in case-control studies. Using data from a study of cancer among men that selected both live ($n = 1910$) and deceased controls ($n = 596$) for cases of liver cancer (109 deceased cases, 59 living cases), we examined the effects of using information from proxy respondents and living respondents on observed associations between liver cancer and selected risk factors. Cases diagnosed in 1984-88 were selected from 8 population-based cancer registries. Live controls were recruited by random digit dialing and deceased controls from death certificate files. Controls were matched to cases on geographic area, age, and race. Odds ratios, adjusted for the matching variables, and 95% confidence intervals were calculated. Odds ratios calculated from information provided by proxy respondents compared to information from live cases and controls were attenuated towards the null value for history of hepatitis (4.7 vs. 14.9), blood transfusions (1.1 vs. 7.8), and cirrhosis (4.3 vs. 20.4). Odds ratios of similar magnitude were found when all cases were compared to live controls, except for cirrhosis (OR=68.0). Odds ratios of similar magnitude were found for smoking, irrespective of the type of controls used. Selection of live controls is recommended to decrease misclassification in measures of exposure.

A COHORT STUDY OF NITRATE LEVELS IN MUNICIPAL DRINKING WATER AND CANCER RISK. Cerhan J (Mayo Clinic, Rochester, MN), Weyer P, Kross B, Hallberg G, Kantamneni J, Breuer G, Jones M, Zheng W, Lynch C.

Nitrate contamination of drinking water may present a cancer risk since nitrate is endogenously reduced to nitrite and subsequent nitrosation reactions give rise to N-nitroso compounds; these compounds are highly carcinogenic and can act systemically. However, there are no cohort studies simultaneously evaluating cancer risk across multiple sites and adjusting for other cancer risk factors. We analyzed the cancer risk in a cohort of 16,536 Iowa women who were age 55-69 years at baseline in 1986 and had been on the same municipal water supply more than 10 years (87% >20 years). Nitrate exposure was assessed using public databases for municipal water supplies in Iowa, and each woman was assigned an exposure level based on the average level for her community from 1955-88 (quartile cutpoints: 1.05, 3.25, 6.25 mg/l NO_3^- -N). Cancer incidence (n=2,842) from 1986 through 1997 was determined by linkage to the Iowa Cancer Registry. For all cancers, there was no association with nitrate in drinking water, nor were there associations for lymphoma or leukemia or cancers of the colon, rectum, breast, lung, pancreas, or kidney. There were positive associations for bladder cancer (age-adjusted relative risks (RR) for nitrate quartiles: 1, 2.7, 2.6, 4.0; p-trend=0.01) and ovarian cancer (RRs: 1, 1.3, 2.8, 2.4; p-trend=0.004), and an inverse association for uterine cancer (RRs: 1, 0.9, 0.9, 0.6; p-trend=0.05). Adjustment for smoking, vitamin C intake, dietary nitrate, water source and other cancer risk factors did not alter these results. The positive association for bladder cancer is consistent with some ecologic data; the associations for ovarian and uterine cancer are more novel and require confirmation.

TESTIS CANCER AND BODY SIZE. Chang S, Zhang Q, Strom S, Amato R, Sigurdson A. **PURPOSE** Studies of adult body size and testis cancer have not yielded strong associations, perhaps because studies did not consider histopathologic tumor types separately. **METHODS** In a hospital-based study of 115 men with testis cancer (57 non-seminoma, 32 seminoma, 26 mixed-germ cell) and 120 friend-matched controls (we excluded cases and controls with cryptorchidism), we evaluated the relationship between height, weight and body mass index ($\text{BMI}=\text{wt in kg}/\text{ht in m}^2$) and testis cancer risk. We also examined whether risk varied by histopathologic type. **RESULTS** Cases and controls did not differ in mean height, weight or BMI, even after stratifying by histopathologic type, although men with mixed-cell tumors reported weighing slightly more at diagnosis (89.1 kg) than controls (85.5 kg, $P=0.50$). Conditional logistic regression revealed no consistent trends in risk for NHLBI/NIH categories of body size for all cancers combined or by tumor type. However, after adjusting for smoking status, income, and education, being 6 feet or taller relative to being shorter was associated with increased risk of non-seminomatous testis cancer, albeit non-significantly so [odds ratio (OR)=4.44, 95% confidence interval (CI)=0.84-23.39], but not with risk of seminomatous (OR=0.59, 95% CI=0.13-2.80) or mixed-germ cell cancer (OR=0.99, 95% CI=0.18-5.57). **CONCLUSIONS** Our finding that being tall is associated with increased risk of non-seminomatous but not other types of testis cancer suggests that the etiology of subtypes may differ and future studies should consider evaluating histopathologic types separately. Moreover, as men with vastly different heights and weights can have the same BMI, there are advantages to evaluating height separately.

Drs. Sigurdson and Chang were supported by a NCI Cancer Prevention Educational Grant (CA57730). Dr. Chang is currently supported in part by funding from the Cancer Research Foundation of America and the American Cancer Society.

URINARY ESTROGEN METABOLITES AND RISK OF BREAST CANCER

Crane MM, Sepkovic D, Robertson NR, Sticca RP, Eggert J, Bradlow HL.

Purpose: To determine if the ratio of urinary 2-hydroxyestrone (2OHE₁) to 16- α -hydroxyestrone (16 α OHE₁) is lower in breast cancer cases than controls.

Methods: Cases came from one surgical practice and samples were collected prior to systemic therapy; age-race-matched controls were sampled from women undergoing screening mammogram. A separate laboratory, blinded to case/control status, determined metabolite levels by immunoassay (all assays were done at one time using the same batch of kits).

Results. Mean (sd) metabolite ratios were lower in the 68 postmenopausal cases 1.50 (0.8) than the 66 controls 2.00 (1.1), driven by lower levels of 2OHE₁ (16 α OHE₁ levels were similar). This pattern was present within strata for race (black, white), breast cancer risk factors (family history; height, alcohol use) and some (smoking, regular exercise) but not all inducers (cruciferous vegetable consumption). The crude odds ratio for the middle and lowest tertiles versus the highest were 1.3 and 2.9 respectively (p for trend = 0.01); and were 1.3 (0.5, 3.6) and 3.4 (1.3, 8.9) after adjustment for family history, parity, estrogen replacement, alcohol use, height and smoking. Ratios were higher in premenopausal cases than controls.

Conclusion. Estrogen metabolite ratios are weakly associated with risk of breast cancer in postmenopausal women.

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Human Papillomavirus (HPV) Infection at the US-Mexico Border. Giuliano AR*, Papenfuss M*, Abrahamsen M*, de Zapien J*, Denman C*, Stephan J*, Ortega L[†], Navarro JL*, Nour M*, Hatch K*. *U. of Arizona, [†]Colegio de Sonora, [‡]AZ Dept. of Health Services, [§]Secretariat de Salud Publica de Sonora.

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Latin America has one of the highest cervical cancer incidence rates in the world. In the US, the rate is disproportionately higher among Hispanics compared with white, non-Hispanic women. US Hispanic women have an elevated risk for the precursor lesion, squamous intraepithelial lesions of the cervix, which significantly impacts health care costs for diagnosis and treatment. The US-Mexico border presents an opportunity to study the factors which contribute to the differences in cervical cancer rates among women in the same geographic region but of different ethnicities. To determine the prevalence and define the risk factors for HPV infection, the cause of cervical cancer, we conducted a cross-sectional study. 2309 women ages ≥ 15 yr. were recruited from clinics located in 4 AZ, US and 4 Sonora, MX border communities. The overall prevalence of high risk type HPV infections at the US-MX border was 15% with no significant differences by country. HPV infection was independently inversely associated with age (AOR=0.2) and acculturation (AOR=0.6), and positively associated with unmarried status (AOR=3.0), lifetime number of male sexual partners (AOR=3.5), *C. trachomatis* infection (AOR=2.1), and use of Norplant (AOR=4.5) and injectable (AOR=1.8) contraceptives. Despite a lower risk profile, women in MX and less acculturated US women had the highest overall risk for HPV infection.

BODY MASS INDEX, ALCOHOL DRINKING AND THE RISK OF ORAL LEUKOPLAKIA

M Hashibe, R Sankaranarayanan, G Thomas, B Kuruvilla, B Mathew, T Somanathan, DM Parkin, ZF Zhang. *Department of Epidemiology, UCLA School of Public Health, Los Angeles*

PURPOSE Although tobacco habits have been associated with the risk of oral leukoplakia, alcohol drinking and body mass index (BMI) as risk factors and the interactions among various factors have not been well established. The purpose of this study is to evaluate the independent effects of BMI, drinking and the possible interactions among various factors on the risk of oral leukoplakia. **METHODS** A case-control study was conducted, with data from an on-going randomized oral cancer screening trial in Kerala, India. Trained health workers conducted interviews with structured questionnaires and then identified oral leukoplakia cases with oral visual inspections. The logistic regression model in SAS was used to estimate odds ratios (OR) and their 95% confidence intervals (CI). **RESULTS** A total of 988 leukoplakia cases and 47,773 controls were included in the analysis. An inverse dose-response relationship was indicated between BMI and the risk of oral leukoplakia (P for trend=0.0004), when adjusted for age, sex, education, alcohol drinking, tobacco chewing and smoking. Alcohol was a significant risk factor when age, sex, education, BMI, tobacco chewing and smoking were adjusted (OR=1.5, 95%CI=1.3-1.8). Among tobacco chewing, smoking and drinking, no obvious positive interactions were seen on the risk of oral leukoplakia. More than additive interactions were suggested between chewing tobacco and fruit intake, and between chewing tobacco and vegetable intake. **CONCLUSIONS** Low BMI and alcohol drinking were found to be independent risk factors for oral leukoplakia.

TEMPORAL PATTERNS OF PROSTATE CANCER INCIDENCE, MORTALITY AND SURVIVAL IN PENNSYLVANIA

Mutlu Hayran, M.D.¹, Joel Weissfeld, M.D., M.P.H.¹, Gene Weinberg, Dr.P.H.²
¹University of Pittsburgh Cancer Institute, Division of Cancer Prevention and Control, ²Pennsylvania Department of Health

Prostate cancer is the most common incident and the second most common fatal cancer among US men. According to 1995 Pennsylvania cancer registry data, prostate cancer accounted for 11.6% and 15.5% of all cancer deaths in whites and blacks respectively. U.S. incidence increased 50% between 89-93 mostly due to the introduction of PSA screening. Incidence has since declined. Prostate cancer incidence and mortality in Pennsylvania parallel US rates.

We obtained updated 1985-95 incident prostate cancer case data from the Pennsylvania Cancer Registry, with fact and date of death determined through matching against the 1985-96 Pennsylvania vital statistics register. Using mortality and population counts provided by the Pennsylvania Department of Health, we calculated age, race, and calendar year-specific all cause mortality rates for Pennsylvania men. The standard life table methods (SPSS 7.0) were used to estimate cumulative survival and standard errors following prostate cancer diagnosis. We used the Ederer method (1961) to estimate relative survival, the ratio between observed and expected (age, race, and calendar year-specific) survival.

Over all stages, observed and relative survival were worse among black men, relative to white men. Except for 10-year relative survival following the diagnosis of regional stage disease, stage-specific 1-, 3-, 5-, and 10-year relative survival rates were similar among black and white men. For black men, but not white men, 10-year relative survival varied with age at diagnosis.

Relatively unfavorable diagnostic stage is probably the major explanation for poorer survival among black Pennsylvania males. However, race-related differences in long term survival after a diagnosis of regional stage disease may be due to differences in quality of medical care or underlying tumor biology. Outcomes for younger (<50) and older (>70) black men account for race related differences in long term relative survival.

Visceral fat content in men with adenocarcinoma of the esophagus. Meehan M, Schoen RE, Weissfeld JL, Thaete FL, Luketich JD.

INTRODUCTION: Body mass index (BMI), an obesity measure, has been associated with esophageal adenocarcinoma. We explored specific associations between intra-abdominal obesity and esophageal adenocarcinoma. Intra-abdominal obesity may mediate esophageal neoplasia via effects on intra-abdominal pressure, gastroesophageal reflux, or circulating growth factors. **METHODS:** Cases included 23 40-80 year-old white men with esophageal adenocarcinoma and pre-treatment staging abdominal computerized tomograms (CT). We reviewed medical records for risk factors, stage, treatment, recurrence, and survival. Controls included 80 55-74 year-old white men undergoing cancer screening. We used the L4-L5 vertebral CT slice to quantify visceral fat content. **RESULTS:** Cases and controls were similar with respect to age, BMI, and height. Current weight averaged 82 kg (range 63-108 kg) in cases and 88 kg (range 64-127 kg) in controls ($p=.04$). Cases lost an average of 6.2 kg from self-reported usual body weight. Visceral fat content was less in cases (mean 140 cm², range 22-279 cm²) than controls (mean 210 cm², range 50-576 cm² $p<.001$). Adjusting visceral fat for self-reported weight loss could account for no more than half of this difference. Survival was worse in cases with low visceral fat content or low body weight. **CONCLUSION:** Relative to controls, cases had less, not more, visceral fat. Pre-diagnostic weight loss from advancing disease explained much of this difference. Survival analyses indicate low visceral fat is a marker for advanced disease. Studies of etiology must use pre-symptomatic obesity measures.

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Progress in the War On Cancer, Revisited. Remington PL, Trentham-Dietz A. University of Wisconsin, Madison, WI 53705.

Previous reviews of the progress in cancer control have produced mixed results. We examined trends in all-cause cancer mortality from 1986 to 1996 in the United States, using underlying cause data from the Centers for Disease Control online WONDER database. Indirect standardization (using the mortality rates in 1986) was used to calculate the expected number of cancer deaths in 1996, by age, gender, and cause, assuming that the rates in 1986 had not changed. In the U.S. in 1996, there were 10,800 fewer cancer deaths than expected — a result of 15,700 fewer cancer deaths among men and 4,900 more deaths among women. The decline in deaths among men resulted from fewer deaths from lung cancer (N=7,700), colon cancer (N=5,000), and other cancers (N=3,400). More men than expected died from prostate cancer (N=400), especially those aged 85 and older. The increase in deaths among women resulted from more deaths from lung cancer (N=14,900) and fewer deaths from colon cancer (N=4,700), breast cancer (N=3,900) and all other cancers (N=1,400). The increased death rate from cancer in women was concentrated in women aged 65 and older. Long-term trends in smoking and cancer screening — with associated changes in lung, colon, and breast cancer mortality — account for almost all of the progress in cancer control over the past decade.

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Risk and Protective Factors of Stomach Cancer in Chinese Population

V. Setiawan, Z. Zhang, G. Yu, Y. Li, M. Lu, M. Wang, C. Guo, S. Yu and R. Kurtz.

Few studies have reported the risk and protective factors of stomach cancer in the high-risk Chinese population. We assessed dietary, environmental and genetic factors that may be associated with stomach cancer in a population based case-control study of 144 stomach cancer cases and 438 healthy controls from Yangzhong County, China. Data were collected by standard questionnaire and blood samples were collected for GSTM1/GSTT1 genotyping and *Helicobacter pylori* assay. In the data analysis using SAS, age, gender education, body mass index (BMI), alcohol drinking, pack-year of smoking and fruit and salt intake were included in the logistic regression models to calculate the odds ratios (OR) and their 95% confidence intervals (CI). Green tea drinking was found to be protective (OR=0.48; 95% CI 0.22-1.07). Salt intake was positively associated with stomach cancer (OR=2.73; 95% CI 1.05-7.13). Tobacco smoking and alcohol drinking were not associated with the risk of stomach cancer. High BMI was protective (p for trend 0.01). The OR of *H. pylori* infection was 0.59 (95% CI 0.26-1.34). No obvious association was observed between GSTM1 null genotype, however, GSTT1 null genotype (OR=2.50; 95% CI 1.01-6.22) may be associated with the risk of stomach cancer. Our results suggest the dietary and possible genetic effects on the risk of stomach cancer and *H. pylori* infection may not be associated with invasive stomach cancer in the high-risk population.

Seroprevalence to Human Herpesvirus-8 in Egyptian Adults

Amr S. Soliman, Eric A. Engels, Melissa L. Bondy, Hussein M Khaled, Bernard Levin. Department of Epidemiology and Division of Cancer Prevention, The University of Texas M. D. Anderson Cancer Center; Viral Epidemiology Branch, Division of Cancer Epidemiology and Genetics, The National Cancer Institute, Bethesda, MD; and The National Cancer Institute, Cairo University, Egypt.

Epidemiologic observations in Western countries suggest an association between human herpesvirus 8 (HHV8) and Kaposi sarcoma that occurs frequently in AIDS patients. While most studies suggest sexual contact as the main route of HHV8 transmission, a recent study has shown high seroprevalence of HHV8 in Egyptian children implying that there are other routes of transmission. HHV8 seroprevalence among Egyptian adults is unknown. We conducted a pilot study to determine the prevalence of HHV8 antibodies and possible associated factors in a group of Egyptian adults. We used an enzyme immunoassay to detect antibodies to a recombinant HHV8 glycoprotein (K8.1), using sera from 98 general population controls (17-58 years old, mean age = 34) who participated in our earlier studies on colorectal cancer in Egypt.

HHV8 antibodies were detected in 18 subjects (18%). HHV8 seroprevalence was higher in women (14/65, 22%) than in men (4/33, 12%) although this difference was not significant ($p=0.4$). Seroprevalence did not differ by age but differed by rural/urban residence. Seroprevalence in rural subjects was higher (12/46, 26%) than in urban subjects (6/52, 11%; $p=0.07$). HHV8 seroprevalence among Egyptian adults seen in this study is similar to rates in other Mediterranean countries, such as Italy and Israel. Additional studies in Egypt might further address differences in seroprevalence among men and women and between urban and rural populations.

Health Status Among Female Long-term Survivors of Colorectal Cancer. Trentham-Dietz A, Remington PL, Newcomb PA. University of Wisconsin Comprehensive Cancer Center, Madison, WI 53705.

We conducted a follow-up study to evaluate the effects of colon and rectal cancer among women in Wisconsin. Newly-diagnosed cancer patients were initially identified from the state-wide tumor registry for a population-based case-control study. Vital status was verified through death certificate linkages. Among the 726 women interviewed soon after their primary diagnosis of colorectal cancer in 1990-91, 39% were deceased in 1999. Sixty-one percent of the survivors (N=269) completed mailed surveys containing the SF-36 health survey and other questions regarding their current health. Women answered an ordinal scale question regarding their current general health with five answer options: "excellent" (5%), "very good" (41%), "good" (35%), "fair" (16%), and "poor" (3%). Differences in self-reported general health were not observed according to age ($P=0.3$), current body mass index ($P=0.2$), current use of postmenopausal hormones ($P=0.3$), or factors related to colon cancer, including extent of disease at the initial colorectal cancer diagnosis ($P=0.5$), having an ostomy ($P=0.8$), having a second cancer diagnosis ($P=0.3$), or current use of alternative therapies ($P=0.3$). Women with fewer co-morbidities (including but not limited to arthritis, hypertension, and depression; $P<0.001$), non-smokers ($P=0.04$), and women with higher household incomes ($P=0.006$) were more likely to report excellent or very good general health rather than good, fair, or poor general health. This analysis suggests that prevention of chronic diseases is important for improving the overall long-term health of women diagnosed with colorectal cancer.

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Premenopausal Breast Cancer Risk Factors in Vietnamese Women. Trentham-Dietz A, Love RR, Newcomb PA. University of Wisconsin, Madison, WI 53706.

Little is known regarding risk factors for breast cancer in women living in Southeast Asia and how these compare with other populations. Women newly diagnosed with regionally advanced breast cancer aged 20-59 and participating in an ongoing clinical trial since 1995 in three cities in Vietnam were included in our case-control study. Age-matched healthy controls were concurrently recruited from visitors to non-cancer patients in the same hospitals as the breast cancer patients. Information on reproductive and menstrual experiences, alcohol consumption, height and weight, diet, personal and family medical history, and demographics was obtained by in-person interviews for 677 cases and 640 controls. Multivariable odds ratios (OR) and 95% confidence intervals (CI) were estimated using logistic regression models including terms for age, education, and age at first birth. History of breast cancer in a mother, sister, or daughter was not significantly associated with risk (OR 0.78, CI 0.34-1.80). Significant trends in risk were not observed for age at menarche ($P=0.9$), parity ($P=0.7$) or body mass ($P=0.3$). However, later age at first birth was associated with increased risk of breast cancer (OR 1.53, CI 1.20-1.95 for age at first birth ≥ 25 vs. <25 years). Consumption of beer or rice vodka was associated with increased risk (OR 2.43, CI 0.99-5.96 for ever vs. never). Higher spousal education also appeared to increase risk of breast cancer (OR 1.51, CI 0.99-2.29 for college vs. primary education). These data suggest that behaviors associated with emerging lifestyle factors may have a stronger association with risk of premenopausal breast cancer among Southeast Asian women than family history and other endogenous factors associated with risk among studies of Western women.

Title: Association of Basal Cell Skin Cancers with Other Cancers

Authors: Friedman GD, Tekawa IS

Institution: Kaiser Permanente Medical Care Program and Stanford University School of Medicine

Purpose: We evaluated the reported excess risk of some other cancers in persons with basal cell skin cancer (BCSC).

Methods: We identified 3164 persons with both (1) BCSC diagnosed in 1974-89 from surgical pathology files of the Kaiser Permanente (KP) Medical Center in Oakland, California and (2) multiphasic health checkups with extensive computer-stored health and risk-factor data. For each BCSC case, up to five comparison subjects were selected, matched for age, sex, skin color, length of membership in KP and date of checkup. Other cancers were ascertained from local tumor registry files with follow-up through 1997. We analyzed all cancer sites combined, plus individual sites with at least 70 cases during follow-up and sites with previously reported links to BCSC. **Results:** For all cancers combined, the BCSC patients had both a greater prevalence of preexisting cancer. (Odds ratio=1.4, 95% CI 1.2-1.6) and risk of subsequent cancer (Risk ratio=1.2, CI 1.1-1.4). Significant elevations (lower confidence limit > 1.00) of preexisting prevalence were also noted for skin melanoma (OR=3.9, CI 2.5-6.2) and bladder cancer (OR=1.8, CI 1.1-2.9). For subsequent cancers significant or borderline elevations were noted for cancers of the mouth and throat 1.6(0.9-3.1), lung 1.4(1.0-1.8), melanoma 2.2(1.6-3.0), breast 1.3(1.0-1.7), kidney 1.6(0.9-3.1), nonHodgkins lymphoma 1.3(0.8-2.2), and leukemia 1.5(0.8-2.6). Sites with no association included: colon/rectum, pancreas, larynx, cervix, uterus, prostate, testis and bladder. Control for relevant risk factors had little or no effect on the associations. **Conclusions:** BCSC was associated with some other cancers, but not with all the cancer sites that have been reported by others.

CLINICAL FEATURES OF 2,389 PRIMARY LUNG CANCER PATIENTS. P Yang, J Johnson, H Tazelaar, D Midthun, M Allen, T Lesnick, J Jett, C Deschamps, E Edell, R Meyer, J Myers, G Croghan, R Hurt, J Offord, S Swenson, A Patel, V Trastek, T Sellers, D Miller, R Marks. Mayo Clinic, Rochester, MN USA

To capture the dynamic changes of patients' clinical presentation, progression, and prognosis of lung cancer, an infrastructure was developed to rapidly recruit patients for research. Demographics, smoking history, disease features at diagnosis, and clinical outcome of all lung cancer patients, from April 1997 to September 1999, were examined. Of the 2,389 new patients, 25% were current smokers, 65% past smokers, and 10% never-smokers. The proportions (%) of adenocarcinoma, squamous cell, and small cell carcinoma between males and females were 41 vs. 51, 32 vs. 17, and 5 vs. 11, respectively. Sixteen percent had at least one first-degree relative with lung cancer. Ten percent were diagnosed ≤ 50 years of age. The representation (%) of clinical stages IA, IB, IIA, IIB, IIIA, IIIB, and IV for non-small cell cases were 19, 19, 3, 9, 16, 10, and 23, respectively. For small cell cases, 66.7% were limited stage and 33.3% extensive stage. Over 94% of stage I/II patients received surgical treatment. Among stage III/IV patients, <10% were not treated. One year after diagnosis, 96% of stage IA and 18% of stage IIIB patients were alive. Our patient database enables us to provide timely results on the clinical features, causes, progression, and prognosis of lung cancer.

Purpose: Few studies have examined the prevalence of symptoms prior to diagnosis of ovarian cancer, and none have done so in light of women's usual state of health. This was undertaken in a case-control study of ovarian cancer.

Methods: Cases were identified at two hospitals, Memorial Sloan-Kettering Cancer Center and New York Hospital between 1994 and 1997 (n=168). Controls were recruited from three sources: friends of cases, random digit dialing, and a commercial mailing list (n=251). **Results:** The most common symptoms among cases were: unusual bloating, fullness and pressure in the abdomen (71%), unusual abdominal pain or lower back pain (52%), and lack of energy (43%). The odds ratios and 95% confidence intervals for these three symptoms were: 25.2 (15.6-40.9); 6.2 (4.0-9.6); and 3.9 (2.5-6.1) respectively. Bloating was reported as constant (versus intermittent) by 61% of cases compared to 36% of controls. This symptom was of more recent onset among cases than controls (4.9 months vs. 7.6 months, $p < 0.01$). **Conclusions:** Unusual bloating, fullness and pressure of the abdomen or pelvis, unusual abdominal or back pain, and lack of energy were much more common in cases than in controls.

Information on symptoms for ovarian cancer, such as this, may make women more aware of changes thus encouraging them to seek care earlier.

Patterns and determinants of breast cancer detection methods among women aged 20-44 (United States). Coates RJ, Uhler RJ, Brogan DR, Gammon MD, Malone K, Swanson CA, Flagg ER, Brinton LA. *Institution of 1st Author:* CDC, Atlanta, GA.

Purpose: While much has been published on the prevalence and determinants of mammography utilization in the general population, data are limited on the methods by which tumors are detected among women with breast cancer, and only one study, in an older population, has been published on determinants of detection methods. This study examined patterns and determinants for women aged 20-44 years newly diagnosed in 1990-1992 in 3 areas of the United States.

Methods: Information came from a population-based case-control study of 1619 breast cancer cases, 13% of whom had *in situ* cancer. In-person interviews collected information on how cancers were detected and on potential determinants.

Results: For all women, 71 percent of the cancers were identified by self-detection, 9 percent by routine clinical breast exam (CBE), and 20 percent by routine mammography. For women aged 40-44 years, the percentages were similar: 65, 10, and 25, respectively. Self-detection was inversely associated with age and history of mammography utilization and positively associated with history of breast self exam (BSE), adjusted for other determinants. Both detection by mammography and detection by CBE were associated positively with history of mammography use and negatively with BSE history.

Conclusion: Most breast cancers in younger women, including those age 40-44, are self-detected. While a history of mammography utilization reduces the likelihood of self-detection, a history of BSE may not.

Breast and Cervical Cancer Screening Practices Among Asian and Pacific Islander Women in the United States, 1994-1997. Coughlin S, Uhler R. Division of Cancer Prevention Control, NCCDPHP, CDC, Atlanta, GA

Recent studies suggest that Asian and Pacific Islander women in the United States may under-use cancer screening tests.

We examined the breast and cervical cancer screening practices of 4,748 Asian and Pacific Islander women in 49 states from 1994 through 1997 using data from the Behavioral Risk Factor Surveillance System (BRFSS).

About 71.1% (95% confidence interval [CI] = 65.3% to 76.9%) of women in this sample aged 50 years or older had a mammogram in the past 2 years. About 73.1% (95% CI = 70.7% to 75.4%) of women aged 18 years or older who had not undergone a hysterectomy had a Papanicolaou test in the past 3 years. Women with health insurance and those who had seen a physician in the past year were more likely to have been screened.

These results underscore the need for continued efforts to ensure that Asian and Pacific Islander women who are medically underserved have access to cancer screening services.

Breast and Cervical Cancer Screening Practices Among Hispanic Women in the US and Puerto Rico, 1996-1997. Coughlin S, Uhler R. Division of Cancer Prevention and Control, NCCDPHP, CDC, Atlanta, GA.

Results from recent studies suggest that Hispanic women in the U.S. may under-use cancer screening tests and have important barriers to screening.

We examined the breast and cervical cancer screening practices of Hispanic women in 50 states, the District of Columbia, and Puerto Rico from 1996 through 1997 by using data from the Behavioral Risk Factor Surveillance System (BRFSS).

About 79.6% (95% confidence interval [CI] = 77.8% to 81.4%) of 4,736 women in this sample aged 40 years or older had received a mammogram in the past 2 years. About 78.0 percent (95% CI = 76.6% to 79.4%) of 8,595 women aged 18 years or older who had not undergone a hysterectomy had received a Papanicolaou test in the past 3 years. Women with lower incomes and those with less education were less likely to be screened ($p < .001$ in each instance). Women who had seen a physician in the past year and those with health insurance coverage were much more likely to have been screened ($p < .0001$). For example, among those Hispanic women aged 40 years or older who had any health insurance coverage ($n = 3,976$), 70.3% (95% CI 68.2%-72.5%) had had a mammogram in the past 2 years as compared with only 47.7% (95% CI 42.3%-53.2%) of women without health insurance coverage ($n = 724$).

These results underscore the need for continued efforts to ensure that Hispanic women who are medically underserved have access to cancer screening services.

Medicare coverage and screening flexible sigmoidoscopy practices of physicians. Froom A, Weissfeld JL, Schoen RE, Ling BS, Trauth J, Weinberg G.

PURPOSE: In January 1998, Medicare started covering screening flexible sigmoidoscopy (FSG). In 1999, we surveyed practicing physicians to determine awareness of the Medicare benefit and current FSG practices. **METHODS:** 95 (64%) of 149 primary care physicians (general practice, family practice, internal medicine, geriatrics) or general surgery practicing in two circumscribed regions of southwest Pennsylvania completed mailed or telephoned questionnaires. **RESULTS:** The 95 respondents (80 men and 15 women) included 77 primary care physicians and 18 surgeons who finished medical school between 1946 and 1995 (1977 median). 93% spent at least 50% effort in direct patient care. 59% were unaware of Medicare coverage for FSG. Though 68% reported scheduling or referring any patient for FSG during the past 12 months, only 26% referred or scheduled more than one patient per month. Even though 68% favored insurance coverage for FSG, only 30% and 10% cited patient costs and reimbursement level, respectively, as influential factors when deciding whether to recommend FSG. **CONCLUSION:** One year after introduction, a majority of physicians appeared unaware of Medicare coverage for FSG. Though many physicians reported scheduling or referring patients for FSG, relatively few scheduled or referred more than one patient per month. Physicians' perceptions regarding costs and reimbursement did not emerge as major barriers to a physician recommendation. Though greater effort may be needed to inform physicians about the availability of Medicare coverage, greater awareness may not change physician practice.

Telecolposcopy: a Feasibility Study
AM Lopez, F Garcia, KD Hatch, RS Weinstein

Background: Cervical cancer is a common, easily preventable malignancy. Cervical dysplasia has been well-documented to precede the development of frank malignancy. Women in rural communities are less likely to have access to the colposcopy care necessary to evaluate abnormal pap smears. Telecolposcopy technology allows for interpretation of colposcopic images at a distance.

Methods: Women presenting to a university clinic for colposcopy evaluation of an abnormal pap smear were recruited for this study. At the time of the in-person exam, a separate colposcopist independently reviewed the cervical images on a computer video screen. Correlations were made between the in-person colposcopy, telecolposcopy and biopsy results.

Results: Nine of the participants identified as Hispanic. The remainder (7) were Caucasian, non-Hispanic. The correspondence was 75% for in-person colposcopy and the telecolposcopy. The concordance with the biopsy was 50% for colposcopy and 50% for telecolposcopy.

Conclusions: Participants did not express discomfort with the equipment or the transmission of the images. Differences in acceptance of the technology were not noted between Hispanic and Caucasian, non-Hispanic females. This preliminary study reveals the telecolposcope's diagnostic accuracy to be in range with in-person colposcopy and points to the need for further investigation.

Royak-Schaler, R., DeVellis, B.M., Lannin, D.R., Wilson, K.R., Greene, W., & Bynoe, M.

The PARTNERS in Breast Cancer Education Program was designed to investigate the relationship between risk communication by providers and informed screening decisions in a population-based sample of African American women. Baseline data (N = 428) was analyzed to determine predictors of screening compliance for women in their forties and those over 50. Logistic stepwise regression determined that doctor's discussions about risk, family history, and screening were the strongest predictor of compliance with mammography, clinical breast examination, and breast self-examination separately and in combination for both age groups. For each unit increase in reported doctor discussions, women in their 40s were 1.81 times ($p < 0.001$; 95% CI = 1.35-2.42) as likely to report screening compliance with each modality. Those over 50 were more than 1.64 times ($p < 0.001$; 95% CI = 1.21-2.22) as likely to be compliant. Participants who had female physicians were 2.29 times ($p < 0.01$; 95% CI = 1.17-4.49) as likely to report receiving information about risk, family history, and screening frequency than those with male physicians. These findings highlight the important role of risk communication in promoting behaviors which lead to routine early detection, and the need for risk communication among primary care providers and their women patients.

Primary Care and Receipt of Regular Breast, Cervical and Colorectal Cancer Screening in Low-Income Women.

O'Malley AS, Forrest CF, Mandelblatt J. Georgetown University Medical Center, Lombardi Cancer Center.

Purpose: Despite lower incidence rates for many cancers, low-income minority women have higher rates of cancer mortality, than white and more economically advantaged women do. To examine the specific features of primary care that promote regular use of breast, cervical and colorectal cancer screening for low-income, urban, minority women.

Methods: A bilingual telephone (CATI) survey of a population-based sample of 600 low-income women in Washington, D.C. to be conducted Dec, 1999- Jan, 2000.

Results: Preliminary data have shown that low-income minority women who had a usual source of care, and continuity with a clinician at that site, were significantly more likely to have "ever" and "recently" received pap smears (OR=2.63, $p \leq .01$; OR=2.00 $p \leq .05$), clinical breast exams (OR=2.83, $p \leq .01$; OR=2.65, $p \leq .01$) and mammograms (OR=2.30 $p \leq .05$; 1.40) respectively, than were women without a usual source of care. Data from focus groups show that low-income minority women find particular features of primary care (*accessibility, patient-provider relationship, and comprehensiveness*) especially important. We will conduct a population-based survey to further assess which particular features of primary care were most important to low-income, minority women; and, whether attainment of those features was associated with receipt of regular breast, cervical and colorectal cancer screening.

Conclusions: Survey findings will guide a future intervention that modifies one or more important features of primary care in order to increase breast, cervical, and colorectal cancer screening in community primary care settings.

DETERMINANTS OF FOBT SCREENING IN A COMMUNITY-BASED PROGRAM Sheinfeld Gorin, SN, Neugut, AI, Schmitt, K. Joseph L Mailman School of Public Health of Columbia University.

This study examined self-reported FOBT among uninsured or underinsured Hispanic and African American women. The community-based sample (N=221) included women age 50 or older who were recruited for a state-funded mammogram and FOBT over the past 9 months. Overall, 66% of this sample returned the FOBT, relative to population-based rates of 26-43% of eligible adults. Eighty four percent of the women were Hispanic (primarily from the Dominican Republic). Forty three percent of the sample was married, and 51% were at least high school graduates. Only 7% of the women had elevated personal or familial risks from polyps, ulcerative colitis, Crohn's disease, or HPCC. Twenty one percent had received a previous FOBT, longer than one year ago. Compared to others their age, 66% felt that they were more likely to develop colorectal cancer, although, overall, 94% felt that the benefits of FOBT screening were greater than any problems from the testing, and 85% were unafraid of an abnormal result. Multiple logistic regression revealed that those who feared abnormal results of screening, and who had increased personal and familial risks were significantly less likely to return the FOBT than others in this sample ($p < .05$).

The results demonstrate that colorectal cancer screening rates can be increased among racial and ethnic minority groups who are underinsured or uninsured. Further, counseling may yield increased FOBT screening, and subsequent reductions in mortality.

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CHARACTERISTICS OF WOMEN ATTENDING A "ONE-STOP SHOPPING" BREAST HEALTH CENTER

GD Etheredge¹, SS Coughlin², M Sintich¹, C Shorter¹, N Dhurandhar¹, ¹Tulane University Medical Center, New Orleans, LA; ² formerly at Tulane, presently at CDC, Atlanta, GA.

PURPOSE: To characterize preventive practices, prior utilization of cancer screening tests and risk factors for cancer in women attending a One-Stop Shopping Breast Health Center during its start-up period (4/96-5/96).

METHODS: At intake, women were given a self-administered questionnaire which included questions about medical history, previous utilization of cancer screening tests, preventive practices, and risk factors for cancer. These permitted the nurse to individually tailor health education messages (such as diet modification and smoking cessation), for each woman.

RESULTS: The first 56 women who attended the Center ranged in age from 31 to 70 years. Seventy-five percent of the women were self-identified white, 63% were married, 79% were employed, and 73% had an HMO or private health insurance. Eighty-two percent reported ever having had a mammogram. While all women reported ever having had a Pap smear, only 76% had had one within the last year.

CONCLUSIONS: The Breast Health Center plays an important role in administering health education to busy, employed women, and in potentially detecting cancers early in their course. To have an impact on high cancer mortality rates, Breast Health Centers will need to reach more women from minority groups and low socioeconomic status through increased community outreach.

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Reproducibility in TVU Assessment of Postmenopausal Ovaries. Modugno, F., Weissfeld, J., Hill, L. University of Pittsburgh and Magee Womens Hospital, Pittsburgh, PA. Because of the high fatality rate of ovarian cancer, early detection remains the best way to combat this devastating disease. Transvaginal ultrasound (TVU) is one screening technique currently being evaluated in a cancer screening trial. To help ensure screening test reproducibility, we have employed explicit protocols for training and certifying all TVU examiners, as well as for conducting TVU exams. To evaluate the interexaminer variation in the assessment of postmenopausal ovaries, 188 participants undergoing TVU were reassessed by a second TVU exam. Although first examiners tended to describe significantly larger left ($p < 0.001$) but smaller right ($p = 0.036$) ovaries, as well as fewer ovarian abnormalities, examiners agreed on the test interpretation 93% of the time (Kappa value = 0.846). In only two cases (1%) were the differences in interpretation such that the two examiners recommended different follow-up procedures. This study demonstrates that by adhering to specific training, certification and examination protocols, TVU reproducibility is excellent. Such protocols may well serve as a standard for TVU training and examination.

Factors associating with Squamous Intraepithelial lesion among women with an ASCUS Cytologic Diagnosis.

Lousuebsakul V, Knutsen SMF, Singh PN, Gram IT, Akin MRM

Purpose: To identify the possible prognostic factors for Squamous Intraepithelial lesions (SIL) among Atypical cells of Undetermined Significance (ASCUS) women.

Methods: This study included all Pap Smears diagnosed as ASCUS ($n = 1660$) from clinics in the Southern California area from January 1992 to June 1998. We conducted a logistic regression analysis with SIL status as the dependent variable and the following independent variables: patient age, method of follow-up chosen after ASCUS diagnosis, type of health care coverage and 1997 median household income.

Results: There was a 10-fold decrease in odds of SIL for follow-up by repeat pap smears relative to follow-up by Colposcopic biopsy (OR = 0.09, 95%CI = 0.07-0.1). The odds of SIL was significantly higher among younger women at 25 years or younger compared to those older than 55 years (OR = 2.9, 95%CI = 1.4 - 5.9).

Conclusions: A decreased in the odds for SIL among repeat pap smears compared to Colposcopic biopsy could due to lack of regression time to normal cytology among Colposcopic Biopsy follow-up. ASCUS among young women could be a marker for low-graded lesions, but not so among older woman.

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Jackson, V Taylor, S Schwartz.
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stages of breast cancer screening adoption
American women. **Methods:** A cross-
population-based survey conducted by bilingual and
bicultural interviewers. We classified respondents to four
stages of screening adoption: pre-
contemplation/contemplation; relapsed; action; and
maintenance. **Results:** *Clinical Breast Exam (CBE)* -
Twenty nine percent, 23%, 22% and 26% of the women were
in the pre-contemplation/contemplation, relapsed, action and
maintenance stages respectively. We found significant
associations between stage of adoption and the following
factors: age; education, marital status; age at immigration;
percent of life resided in US; physician gender; physician
ethnicity; and self-efficacy. Multivariate analyses identified
female Asian physicians, belief cancer is curable, education,
and transportation to be predictors of the maintenance stage.
Screening mammography - Our results showed 31%, 26%,
18%, and 24% of the women were in the pre-
contemplation/contemplation, relapsed, action and
maintenance stages respectively. Stages of adoption were
associated with physician ethnicity, self-efficacy, and health
insurance. Only physician characteristics and duration of
residence in US predicted mammography maintenance in
multivariate analyses. **Conclusion:** With only a quarter of
women in the maintenance stages of breast cancer screening,
our results support the need to promote regular screening
among Cambodian-American women.

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Cervical Cancer Risk Assessment (CECRAS) scale: A method of determining individual risk of developing cervical cancer

Authors: Cyrus-David, M., Daling, J, Evans, G, Levine, D.

Objective: To describe the design and results of initial validation of the Cervical Cancer Risk Assessment (CECRAS) scale as an means of evaluating a woman's personal risk of developing cervical cancer.

Methods: Major risk factors for cervical cancer were identified from published literature. Risk factors were arbitrarily assigned numeric values through a weighting process based on the odd ratios of the variables within each reviewed study and consensus definition of a high-risk status. Individual's risk was categorized into low, moderate, high, and ultra-high categories based on the total score obtained. The resulting scoring system was validated with data from a case-control study by logistic regression analyses with the determination of sensitivities and specificity. Appropriate screening frequencies were suggested based on risk categories.

Results: There was a 68% concordance rate in the association of risk scores to cases as well as controls. A linear relationship existed between the risk of developing cervical cancer and the scores of the scale with the low (<20), moderate (>=20-<45), high (>=45-<75), and ultrahigh (>=75) categories having the odd ratios of 1.0, 3.98, 3.10 and 11.47 (p = 0.0001) respectively.

Conclusions: The CECRAS scale is an adequate tool for individual risk assessment for cervical cancer. It also provides guidance for counseling on the interval of Pap smear utilization especially in special populations and developing countries.

Chemoprevention of Breast Cancer with Selective Estrogen Receptor Modulators (SERMs): An Assessment of the Health Seeking Behavior of High risk women.

Author: Cyrus-David, M.

Purpose of study: The goal was to assess the behavior of women at high risk of developing cancer with particular reference to breast cancer chemoprevention with SERMs such as tamoxifen and raloxifen.

Methods: This was a cross-sectional qualitative survey on a non-random, ethnographic sample of 27 high risk female participants who live in Forsyth County, NC. A series of 3 focus group discussions were recorded, transcribed and analyzed sequentially. Data coding, reduction, and display were software-aided. The responses were validated by an iterative process and participant review.

Results: Educational level appeared to predict a participant's knowledge of breast cancer. Perceived susceptibility significantly predicted a participant's willingness to request clinical risk assessment for possible placement on chemoprevention treatment. Caucasian participants were more aware of the availability of SERMs for breast cancer chemoprevention than their African-American counterparts of similar educational level. The most important perceived barriers were the uncertainty of individual risk, the side effects of the agents, cost of treatment, and lack of coverage by health insurance policy. Other significant barriers were the burden of peri-menopausal medications, and poor physician-patient communication especially among the African-American participants.

Conclusions: The findings suggest that knowledge of breast cancer chemoprevention was limited, and these high risk participants were not likely to subscribe to breast cancer chemoprevention treatment.

N-(4-hydroxyphenyl) retinamide (4-HPR) radiosensitization in bladder cancer cells is through modulation of DNA-damage and -repair genes

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Although N-(4-hydroxyphenyl) retinamide (4-HPR), a retinoid derivative, has been used as a chemopreventive agent of bladder cancer in clinical trials, little is known about its mechanisms of action against bladder cancer cells. To investigate the effect of 4-HPR on DNA damage and repair, we evaluated the baseline expression (mRNA) of selected DNA-damage and -repair genes (*GADD45*, *hMLH1*, *hMSH2*, *XRCC1*, *ATM*, and *RAD51*) and their responses to 4-HPR treatment in six well-characterized bladder cancer cell lines as well as normal lymphocytes and normal bladder epithelial cells. The mRNA expression was measured by a multiplex reverse transcription-polymerase chain reaction (RT-PCR) assay followed by examination of cell growth, *p53* mutations, chromosome aberrations, and apoptosis. Several bladder cancer cell lines expressed a low or nondetectable level of *GADD45* and *XRCC1*. However, 4-HPR treatment increased *GADD45* expression but did not affect *XRCC1* expression. The increase in *GADD45* expression was dose-dependent and *p53*-dependent. Interestingly, low-dose 4-HPR combined with low-dose of gamma irradiation had a synergistic effect on radiosensitivity and apoptosis. The modulation of radiosensitivity and apoptosis by 4-HPR appeared to be mediated by suppressing the *RAD51* expression in bladder cancer cells. These findings may have clinical implications and an extended investigation is underway. (CPZ is supported by NIH/NCI grant CA75966 and QW is supported by NIH/NCI grant CA70334).

Developmental Changes in the Mammary Gland in Response to Exercise Training: Impact for Breast Carcinogenesis

K Westerlind, H Lennox, K Gibson, D Wolf, R Strange

Physical activity appears to result in reduced risk for developing breast cancer. The mechanism underlying this inhibition is unknown. This study examined the effect of 8 wks of moderate intensity exercise on normal mammary gland development. It was hypothesized that exercise would result in a reduction in terminal end buds (TEB), a carcinogen-susceptible structure. 170 female Sprague Dawley rats were stratified by wt and randomized to baseline (n=10), exercise (EX; n=80) or sham-exercise (SHAM; n=80) group. Protocols started at 28 days of age (DOA). Exercise consisted of motorized treadmill running, 15% grade, 20-25 m/min, 30 min/d, 5 d/wk. This protocol has previously been shown to result in mammary cancer inhibition. Forty rats (20 EX, 20 SHAM) were sacrificed every 2 wks (42, 56, 70, 84 DOA) to histologically evaluate mammary glands. Total TEBs and TEBs/mm were measured in whole mounts. Additional measurements were body, heart, adrenal, soleus weights, tibia length, serum estradiol (E2), progesterone (P), and growth hormone (GH), and estrus cycle phase. No difference in body wt, tibia length, or organ wts was observed between EX and SHAM at the 4 time points. No significant difference in TEB number (absolute or relative) was observed although there were fewer ($p=0.09$) in the EX (20.7; n=7) than SHAM (32.0; n=8) at 4 wks. This was evident only in animals sacrificed during proestrus/estrus. No difference was observed in E2 or P levels between EX and SHAM. GH was lower at 8 wks in EX vs SHAM ($p=0.15$). Although the data provide no definitive evidence that moderate exercise results in developmental changes to the mammary gland, the findings at 56 DOA require further investigation.

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BREAST CANCER SCREENING FOR BLACK WOMEN WITH LOW LITERACY. E.A. Coleman, C.C. Mohrmann, S.K. Coon, J.E. Lord, University of Arkansas for Medical Sciences at Little Rock, Arkansas, USA 72205

We reviewed current available breast cancer screening literature. None of the materials met all the following criteria: appropriate for low literacy women, culturally sensitive, and accurate in illustrating correct breast self-exam (BSE) techniques. Thus, we are pilot testing two easy-to-read documents we developed. A pamphlet illustrates how to perform BSE and advises women to follow breast cancer screening guidelines. A motivational book helps black women overcome barriers to breast cancer screening. There is no evidence to support whether drawings or photographic illustrations are more effective in conveying the importance of breast cancer screening and the technical aspects of BSE. A total of 150 women from work sites, churches and civic organizations participate in focus groups of 10 women each. The study applies an experimental, pretest-posttest design with each focus group randomly assigned to one of two groups. By random assignment each group receives either the material with photographs or drawings. Study instruments include the Rapid Estimate of Adult Literacy in Medicine test; a questionnaire on knowledge of, compliance with and intent to follow breast cancer screening guidelines; and BSE performance scoring tool. Data analysis will be completed January 2000.

Colorectal Cancer Beliefs of Rural Black Church Members. Campbell M, Haughton L, Beatty B, Jones B, Jackson E, Carr C, Tessaro I. UNC Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill

The WATCH (Wellness for African Americans Through Churches) project is a multi-level intervention to improve diet, physical activity, and screening for prevention of colorectal cancer. Baseline data from 900 members of 12 black churches in eastern North Carolina, and focus groups discussions with members of pilot churches were used to determine beliefs, barriers, and readiness to change targeted behaviors.

Approximately 70% of participants were female, median age was 50, and 56% were married. The majority of respondents were overweight, and less than 20% met 5 a Day guidelines or had regular physical activity most days of the week. Most (60%) believed that colorectal cancer risk is lower for women compared to men. Less than 20% of those 50 and older were obtaining recommended screening (annual FOBT and/or sigmoidoscopy in the last 5 years) and the majority were in the precontemplation stage of change regarding screening. The most cited barriers to exercise and diet change were having no one to exercise with (28%) and cost of healthier foods (31%) respectively. Barriers to screening included not having it recommended by a health provider (59%), pain (27%), and cost (19%). Focus group discussions revealed that participants believe African American patients do not receive the same quality of care, including preventive health counseling and services, compared to whites. Participants expressed willingness to ask for screening tests but lack the knowledge of what is recommended.

EXERCISE THERAPY BEFORE AND DURING HIGH-DOSE CHEMOTHERAPY AND AUTOLOGOUS PERIPHERAL STEM CELL TRANSPLANTATION FOR PATIENTS WITH MULTIPLE MYELOMA. E.A. Coleman, S.K. Coon, J. Hall-Barrow, J. Gerlinger, University of Arkansas for Medical Sciences, Arkansas Cancer Research Center, Little Rock, Arkansas, USA, 72205

Cancer and adverse effects of treatment and subsequent decrease in physical activity impairs functional status and quality of life. This pilot study with 30 outpatients randomized to one of two groups tests the feasibility of exercise therapy in multiple myeloma patients undergoing high dose chemotherapy and tandem transplants. The hypothesis is that patients who receive a prescribed, individualized exercise program will experience: 1) better performance status, 3) better bone health, and 4) better nocturnal sleep and 4) less fatigue. The exercise program consists of both aerobic and strength-building components beginning prior to treatment with high dose chemotherapy and transplant. All patients receive tests for aerobic capacity (Balke Modified testing protocol on treadmill) and strength of upper and lower extremities (testing on Keiser pneumatic equipment); and anthropometric, whole body density, mood (Profile of Mood States), bone densitometry, and sleep (actigraph and Epworth Sleepiness Scale), measurements. These data are collected at baseline, and just prior to their first and second transplants. Patients keep a daily activity/exercise log and a research assistant calls weekly to check on activity/exercise. Currently 20 patients are enrolled in the study. Repeated measures analysis of variance will be used to examine the hypothesis.

BREAST CANCER AND THE OLDER WOMAN: SURGERY TYPE AND SEXUAL ACTIVITY

Crane LA, Kaplan CP, Cyran E, Byers T, Palmer L.
University of Colorado Health Sciences Center, University
of California, San Francisco, and Colorado Foundation for
Medical Care.

Purpose: to examine the relationship between type of surgery and sexual activity for older women with early stage breast cancer. **Methods:** Telephone interviews were conducted with 198 women who were diagnosed with breast cancer at age 65 or over identified from the Colorado State Cancer Registry. **Results:** Concern over sex was reported to affect the decision of treatment type by 9% of the women who had lumpectomies, but by none of the women who had mastectomies. Women who received lumpectomies were somewhat more likely to report that being sexually active was important to their overall happiness (51% vs. 38%; $p=0.08$). 24% of the respondents reported being sexually active in the past year (which was 1.5 - 6 years after breast cancer surgery), with no difference by type of treatment. Overall, 9% reported that surgery for breast cancer had affected their sex lives, with no difference by surgery type. Being sexually active was not related to SF-12 physical or emotional health scores. Only 6% of women reported that their physician discussed the effects of breast surgery on their sex lives, and among those whose doctors did *not* discuss it, 11% reported that they wished their doctors had. **Conclusions:** Sex is an important aspect of older breast cancer patients' lives, and when sex is considered in the decision of breast cancer surgery, results suggest that women tend to choose lumpectomy. However, it does not appear that sex is often considered in the decision-making process, and doctors rarely discuss it. Sexual activity *after* breast cancer does not appear to be affected by type of treatment.

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PREDICTING PARENTS' SUN PROTECTION OF THEIR BABIES.

Crane LA, Deas AM, Morelli J, Mokrohisky S, Byers T,
Murphy J, Calonge BN. University of Colorado Health
Sciences Center.

Purpose: Childhood sun exposure is a major risk factor for the development of adult skin cancer, including malignant melanoma. This study examined predictors of parents' sun protection behaviors for their one-year old children. **Methods:** 314 parents (mostly mothers) were interviewed by telephone in 1998 when their children were 1-6 months of age, and again in the summer of 1999 when their children were about 12 months of age. **Results:** In 1998, parents reported intending to use the following sun protection strategies for their child: sunscreen - 99.7%, clothing - 44.6%, hats - 90.8%, avoiding the mid-day sun - 73.9%, and shade - 95.5%. In 1999, parents reported that they usually or always use the following sun protection strategies: sunscreen - 87.9%, clothing - 43.6%, hats - 60.2%, avoiding the mid-day sun - 64.6%, and shade - 87.3%. The strongest baseline predictors of child sun protection at one year follow-up were parents' intentions and parents' own sun protection practices. Knowledge, perceptions of susceptibility and severity, practical barriers, social norms and perceived efficacy of sun protection strategies did not predict behavior. Only 8-13% of variance in follow-up behavior was predicted in multiple linear regressions for each sun protection strategy. **Conclusion:** Behavior change interventions for skin cancer prevention should focus on parents' behaviors directed toward *themselves* as well as toward their young children. Unexplained variance in behavior may be related to important situational factors not measured in this study. The sunscreen "message" has been largely received, but more emphasis needs to be placed on other sun protection strategies such as avoiding the mid-day sun and wearing protective clothing.

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Diefenbach, M. A., Ph.D., Neff, S. E., MPH, Hanks, G. E., MD, Greenberg, R. E., MD, Miller, S. M., Ph.D., Engstrom, P. F., MD
Fox Chase Cancer Center, Philadelphia, PA

This study assessed treatment beliefs, expectations and treatment decision making of men diagnosed with early stage prostate cancer. Following a treatment consultation with a radiation oncologist or a surgeon, patients (N=96) were recruited to participate in the study. Patients were on average 66 years old, married (82%), and Caucasian (88%). Patients (n=29; 30%) who decided on surgical treatment were significantly younger ($M = 61$ years) than patients (n=67; 70%) who decided on radiation therapy ($M = 68.5$ years). Patients who opted for radiation therapy perceived surgery as significantly more painful ($p < .001$), more invasive ($p < .001$), more inconvenient ($p < .009$), and having a greater risk of side-effects ($p < .001$), compared to patients who opted for surgery. Patients who were significantly more worried about urinary problems ($p < .001$), bowel problems ($p < .001$), fatigue ($p < .001$), and a longer recovery time ($p < .001$) were more likely to opt for radiation treatment. In sum, prostate cancer patients who chose radiation therapy valued the perceived convenience and non-invasiveness of the procedure, and worried more about potential treatment related side-effects.

Sun Risk and Prevention Behavior Topics in the Suburban School Curriculum. CA Demko and EA Borawski Dept. of Epidemiology and Biostatistics, Center for Adolescent Health, Case Western Reserve Univ., Cleveland, Ohio. A survey was mailed to suburban K-12 teachers to determine what information was being taught regarding sun overexposure risks and prevention behaviors. Of 58 returned surveys, 49 respondents were responsible for some/all of the health curriculum, 3 were science teachers, and 6 did not complete the survey beyond the screening questions. In grade schools (GS), 16/26 teachers covered these topics, generally under safety issues. In middle schools (MS), 16/17 teachers included these topics, generally within the 'skin' module. At the high school level (HS), 8/9 teachers covered the topics within a 'cancer unit'. At MS and HS levels, the most emphasized consequence of sun overexposure was overwhelmingly skin cancer, while GS teachers emphasized sunburn and skin cancer equally. All teachers provided examples of situations for potential sun overexposure. Sunscreen use and physical barriers were taught slightly more often than sun avoidance as means of prevention. Although not included in the graded course of study, 26/29 MS and HS teachers believed these topics should be taught. Nine GS teachers did not believe these were grade school topics and six GS teachers indicated these topics were parents' responsibility or already receive sufficient media attention. Most teachers do see value in including these topics. However, the strong emphasis on long-term consequences may not be meaningful to young people.

Title: Social Support and Immune Function in Women at risk for Cervical Cancer

Author(s): C. Fang, S. Miller, V. Green, M. Mills, C. Mangan, R. Belch, and S. Douglas

Institution of 1st Author: Fox Chase Cancer Center

Purpose: The purpose of this study was to examine the relationship between social support and immune responses among women at risk for cervical cancer. **Methods:** Participants were 36 women undergoing diagnostic follow-up (i.e., colposcopy) after an abnormal Pap smear result. Psychological and immunologic assessments were collected at an initial colposcopy (i.e., baseline) and at a 6-month follow-up colposcopy. Psychological assessments included measures of negative affect and the short form of the Social Support Questionnaire (SSQ). To assess immunocompetence (i.e., helper T cells), a sample of blood was obtained at baseline and at a six-month follow-up. **Results:** Hierarchical regression analyses revealed that greater satisfaction with one's social support was associated with significantly higher numbers of circulating helper T cells (CD4⁺) at the time of the 6-month follow-up, after controlling for baseline levels of helper T cells and baseline levels of negative affect. **Conclusion:** Higher levels of social support appear to be associated with enhanced immune functioning in women at risk for cervical cancer. The findings suggest that it may be important to evaluate the impact of social support on progression of precancerous cervical lesions.

Title: Developing a telephone intervention to assist women in understanding inherited breast/ovarian cancer risk

Authors: Fleisher, L., Miller, S., Schnoll, R., McKeown-Conn, N., Brower, L.

Affiliation: Fox Chase Cancer Center

Many women do not understand the information needed to determine inherited cancer risk, as well the process and content of risk assessment/genetic testing. This Department of Defense-funded, 3-year randomized study is designed to increase a woman's knowledge of: 1) determinants of a genetic predisposition to breast/ovarian cancer, 2) personal family history and other risk factors, 3) the benefits/drawbacks of genetic testing, and 4) the actual process of risk assessment/genetic testing. The intervention, based upon the Cognitive-Social Health Information Processing (C-SHIP) model, targets key psychosocial variables found to be associated with adherence to cancer-relevant health-protective behaviors and will be provided to women calling the National Cancer Institute's Cancer Information Service (CIS) at Fox Chase Cancer Center. A formative evaluation was conducted, using structured interviews and focus groups with women at perceived or actual increased risk for inherited breast/ovarian cancer, and genetic counselors/nurses from high risk programs.

Melissa M. Honour, Paul B. Jacobsen, Laurie LaMonde, Julio Pow-Sang, & Kathryn Kash, Moffitt Cancer Center

The recent identification of several candidate genes has raised the possibility of developing a clinical genetic test to determine prostate cancer susceptibility. The present study examined future readiness to undergo testing among unaffected male first-degree relatives (FDRs) of men with prostate cancer ($n=37$; range 45-71 years). Participants completed measures of interest, readiness and pros and cons for genetic testing adapted from previous research on FDRs of women with breast cancer. Greater readiness to undergo testing was expected to be related to the relative strength of perceived advantages and disadvantages (pros and cons) of learning one's susceptibility status. Ninety-two percent of participants expressed interest in testing if it were currently available. As expected, higher cons scores were related to decreased readiness ($r=-.52$, $p<.001$) and higher pros scores related to increased readiness ($r=.30$, $p<.07$). In addition, a more positive decisional balance (pros minus cons) was related to greater readiness to undergo testing ($r=.49$, $p<.001$). These results demonstrate the general readiness of FDRs to undergo genetic testing for prostate cancer susceptibility and provide evidence of the utility of the decisional balance model in explaining readiness to undergo testing.

Social Exchange of Cigarettes Among Adolescents J. Forster, V. Chen, T. Blaine, C. Perry

As laws restricting youth access to tobacco from retail sources take effect, non-retail, or social, sources have become adolescents' primary means of obtaining cigarettes. The substitution of social for retail sources is evident in the results of a 1998 survey of 16,000 eighth, ninth and tenth grade students in 29 Minnesota cities. We conducted this survey as part of the assessment for two community trials to address youth smoking. We included questions about use of a variety of retail and social sources, and we explored in detail students' acquisition of cigarettes from other adolescents, and their provision of cigarettes to others. Over 70% of students who reported ever smoking had obtained their most recent cigarette from a teenager outside the family. More than half reported getting a cigarette from another teenager in the previous month, and of those, 80% identified more than one teenage source. Over 50% of all respondents reported a black market for tobacco exists in their school, and 46% of ever-smokers had bought tobacco from another teenager. Almost one fourth of all students said they had given tobacco products to another teenager at least once, most often to a friend or acquaintance and less often to a sibling or stranger. We have used factor analysis with the variables from the student survey to develop scales that represent obtaining cigarettes from social sources and providing cigarettes to other teens. These scales were used as dependent variables in multivariate analyses to determine predictors of social exchange.

Laurie A. LaMonde, Paul B. Jacobsen, Melissa Honour,
Julio Pow-Sang, & Kathryn Kash, Moffitt Cancer Center,
Tampa, FL

The present study examined the intention to undergo PSA screening and its correlates among unaffected male FDRs of prostate cancer patients ($N=38$, range 45-72 years). Based on protection motivation theory, it was hypothesized that stronger intentions to undergo PSA screening would be related to greater perceived severity and vulnerability regarding prostate cancer and stronger self-efficacy and response efficacy beliefs about PSA screening. Results indicated that the most FDRs (60.5%) intended to have a PSA test in the next year. Factors positively ($p < .05$) associated with screening intentions included prior receipt of a PSA test and, as expected, greater perceived ability to engage in screening and greater perceived effectiveness of screening as a diagnostic tool. Contrary to expectations, perceived severity and vulnerability were not related to screening intentions ($p \geq .43$). These results indicate that a high percentage of FDRs plan to undergo PSA testing, an intention that is consistent with their past behavior. In addition, findings suggest that FDRs are motivated to undergo PSA testing more by beliefs about the ease and efficacy of screening than by worries and concerns about developing prostate cancer.

Knowledge and preference for breast conservation therapy
among women without breast cancer.
Lazovich D, Raab KK, Gurney JG, Chen H.

In 1990, an NIH Consensus Development Conference recommended breast conservation therapy (BCT), rather than mastectomy, for the majority of women with Stage I or II invasive breast cancer. Studies to evaluate women's choice of surgery have typically been conducted after breast cancer surgery; there are no recent studies which have sought to learn what women *without* breast cancer know about the disease and its treatment. Consequently, we interviewed 419 adult women in Minnesota, who were selected at random and without a history of breast cancer, to ascertain what percentage could correctly report that cure was the same for BCT and mastectomy, what percentage would state a preference for BCT rather than mastectomy, and characteristics associated with these outcomes. Nearly all women had heard of both mastectomy and BCT; 37% correctly reported that the two treatments were equally efficacious. Given a scenario where they were diagnosed with breast cancer amenable to either treatment, 58% of participants stated a preference for BCT. Older women were less likely than younger women to know that cure was the same for BCT and mastectomy (adjusted OR = 0.5, 95% CI 0.2,1.0), and women residing in urban areas were more likely to prefer BCT over mastectomy compared to rural residents (adjusted OR = 2.5, 95% CI 1.5,4.1). No discernable patterns for knowledge or preference were observed with marital status, education, income, prior mammography or breast cancer treatment of friends or relatives. Comparing these findings to women diagnosed with breast cancer in Minnesota, BCT was found to be performed less frequently than preference for such therapy among women in our study would suggest. Educating women prior to diagnosis about breast cancer treatment options, and exploring reasons for the gap between actual utilization of BCT and pre-diagnosis preference, may be indicated.

Undergoing genetic testing for cancer risk is a stressful situation. Little is known, however, about the types of coping strategies used to manage testing-related stress. This report describes women's self-reported use of coping strategies after genetic counseling, but before receiving test results for hereditary breast-ovarian predisposition. These data are part of a study describing relationships among mental representations of cancer/testing, coping strategies, and cancer surveillance. A purposive sample of 80 Caucasian women ($\bar{x}=44$; $sd=12$) completed questionnaires after receiving genetic counseling. Thirty (37%) had a diagnosis of breast or ovarian cancer while 51 (63%) did not. Coping was measured by Scheier's and Carver's COPE Scale, a 60-item, 4-point rating scale ranging from 1 (Not doing at all) to 4 (Doing a lot). Frequently reported coping strategies were: seeking support from religion ($\bar{x}=2.32$; $sd=.92$); accepting the situation ($\bar{x}=2.32$; $sd=.90$); reinterpretation ($\bar{x}=2.24$; $sd=.76$); seeking emotional support ($\bar{x}=1.90$; $sd=.71$) and anticipatory planning ($\bar{x}=1.86$; $sd=.74$). Least reported strategies were disengaging mentally ($\bar{x}=1.31$; $sd=.40$) and behaviorally ($\bar{x}=1.11$; $sd=.21$). There were significant positive correlations between scores on the COPE subscales and scores on Horowitz's Impact of Events Scale ($r=.27$ to $.47$, $p\leq.02$) and Lerman et al.'s Cancer Worry Scale ($r=.26$ to $.53$, $p\leq.02$). Findings suggest these women engaged primarily in emotion-focused coping at this "waiting" stage in the testing process and their reported amount of coping was positively related to feelings of emotional distress. Funding source: K01 NINR 00098-03.

Communication between physicians and elderly women with early stage breast cancer

Liang W, Burnett C, Rowland J, Meropol N, Eggert L, Hwang Y, Silliman R, Weeks JC, Mandelblatt JS

Purpose: To evaluate the influences of physician-patient communication on patients' involvement in treatment decision-making, treatment received, and satisfaction with care among elderly women with early-stage breast cancer.

Methods: During 1995 to 1999, 613 elderly women (age 67+) with early stage breast cancer and their breast cancer surgeons were interviewed at multiple sites in the U.S. Communication was measured by scales of physician-patient communication and the number of treatment options discussed. Logistic regression was used to examine the relationships between communication and outcomes.

Results: After controlling for clinical and other variables, patients who received more treatment information were more likely to report being involved in treatment decisions ($OR=1.56$ [1.11-2.22]) and getting breast conserving surgery and radiotherapy ($OR=2.33$ [1.52-3.57]) than patients getting less information. Surgeons who were trained in surgical oncology or who treated a high volume of breast cancer patients were more likely to have greater interaction with patients ($OR=1.75$ [1.09-2.82] and 1.85 [1.10-3.11]). This interaction was, in turn, positively associated with patients' satisfaction with breast cancer care ($OR=2.38$ [1.27-4.44]).

Conclusions: Physician-patient communication is related to breast cancer patients' involvement in making treatment decisions, receipt of definitive treatment, and satisfaction. The quality of care for elderly breast cancer patients may be improved through interventions that improve communication in the physician-patient dyad.

DEPRESSIVE SYMPTOMS IN A LARGE AFRICAN AMERICAN KINDRED LINKED TO A BRCA1 MUTATION

Kinney, AY, Choi, Y-A, Baily, CA, and Croyle, RT

Purpose: We examined predictors of depressive symptoms in a large, extended African American kindred (K2099) linked to a *BRCA1* mutation.

Methods: This cross-sectional survey elicited information on sociodemographics, medical history, risk perceptions, and cancer-related stress symptoms. The outcome of interest was the presence of depressive symptoms. Ninety-five male and female K2099 members who were unaware of their *BRCA1* mutation carrier status completed a structured personal or telephone interview.

Results: The overall prevalence of symptoms of depression was 41% and the mean score on the Center for Epidemiologic Studies Depression Scale was 15.0 (SD = 12.5). Sixty-six percent of the respondents indicated that they wished to talk to a health care provider regarding their family history of cancer. In the final logistic regression model, the predictors of depressive symptoms were lower educational level (odds ratio (OR) = 9.7; 95% confidence interval (CI) = 1.2-82.1), frequency of periods of avoidance as a response to having a family history cancer (OR = 1.1; 95% CI = 1.0-1.2, for each unit increase on the avoidance subscale of the Revised Impact of Events Scale), age (OR = 1.4; 95% CI = 1.0-2.0, for every increase in age category), and desire to talk to a health care provider about risk of familial cancer (OR = 2.7; 95% CI = 0.9-8.4).

Conclusions: Our findings suggest that frequency of using avoidance to deal with familial cancer issues is an ineffective coping strategy. Our data also indicate that psychological support may be beneficial and diagnostic follow-up for depression may be indicated in a substantial number of these family members.

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Effect of Lifestyle Pattern on Dietary Change
O'Halloran P., Lazovich D., Patterson R., Beresford S.

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Tailoring interventions to population subgroups based on similar lifestyle patterns has been suggested for improving the effectiveness of health promotion efforts; however, few studies have examined the effect of lifestyle pattern on behavior change. Previously, we reported that self-help materials with physician advice was effective in decreasing fat intake and fat behavior score and increasing fiber score, but not fiber intake, among individuals receiving care from physicians assigned to deliver the intervention relative to usual care. Using data from this study, we assessed whether the observed changes in dietary intake and dietary behavior varied according to baseline lifestyle patterns of study participants. Based on similarities in alcohol intake, smoking, diet quality, and exercise, we grouped participants into 6 health lifestyle patterns: drinking (10%), smoking (13%), passive (23%), good diet (30%), fitness (8%), and health promoting (17%). Within each lifestyle pattern, we compared changes from baseline in fat and fiber intake, and fat and fiber behavior score, at 3 months and 12 months, for intervention versus control participants. For all four outcome measures and at both time points, intervention participants with a fitness lifestyle pattern at baseline made substantially greater dietary changes than similar control participants, compared to those with other lifestyle patterns. For drinkers, the effect of the intervention was generally in the opposite direction from what was expected. Changes in diet among smokers were often smaller than the overall effect at 3 months, and were not maintained at one year. Intervention-control comparisons within the remaining lifestyle patterns showed dietary changes that were similar to the changes previously reported. Although a test for interaction was not significant for any of the dietary outcomes, the extent of dietary change observed within some of the lifestyle patterns suggests that these patterns could be useful to develop more effective interventions to change behavior.

Tercyak, K. P., Hughes, C., Main D., & Lerman, C.

The purpose of the present study was to identify demographic, personality, and social support factors that contribute to cancer-specific distress and general distress among persons enrolled in a hereditary nonpolyposis colon cancer (HNPCC) family registry. It was hypothesized that distress would be related to lower levels of optimism and social support. Participants were 211 cancer-free adult male and female members of 10 extended HNPCC families. Participants were contacted by telephone to participate in an observational study of genetic counseling and testing for HNPCC gene mutations. Data were collected at baseline, prior to the offer of receipt of test results. Cancer-specific distress was assessed using the Impact of Events Scale (IES); general distress was assessed with the Center for Epidemiologic Studies Depression Scale (CES-D). The results of a hierarchical regression of general distress indicated that persons with higher levels of general distress were less likely to be male ($\beta = -3.48$, $p = .001$), less optimistic ($\beta = -0.63$, $p = .0001$), and had less family support ($\beta = -0.24$, $p = .0001$) ($R^2 = .32$, $p = .0001$). Persons with higher levels of cancer-specific distress were less likely to be college educated ($\beta = -6.06$, $p = .02$) and less optimistic ($\beta = -0.76$, $p = .003$) ($R^2 = .10$, $p = .0001$). These findings suggest that among persons at risk for colon cancer, women and persons with less education, less optimism, and less social support may be most prone to experience distress. Such individuals may be more vulnerable to adverse effects of genetic testing and might benefit from adjunct counseling efforts to bolster optimism and family functioning.

Reliability of Self-reported Lifetime Number of Mammograms. Rauscher G, O'Malley MS, Earp JA. UNC Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill.

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Purpose: The number of lifetime mammograms has been suggested as a basis for measuring long-term mammography compliance. We used longitudinal data from the NC Breast Cancer Screening Program to assess the reliability of self-reported lifetime number of mammograms.

Methods: For 929 women with no history of abnormal mammograms or breast lumps, we compared self-reports at baseline and first follow-up (mean interval, 34 months). We developed a reliability measure that incorporated the expected change in lifetime use based on use at baseline and follow-up and the interval between interviews.

Results: Overall, reliability was 59%. Reliability was most strongly associated with the number of lifetime mammograms at baseline, ranging from 94% for women with no mammograms to 10% for women with ten or more mammograms. Adjusting for baseline lifetime report reversed the associations between reliability and other factors. Lower education, for example, which was initially associated with greater reliability, was associated with lower reliability after adjustment.

Conclusions: Measures of long-term compliance based on self-reported number of lifetime mammograms may not be reliable. Increased use, which is associated with lower reliability, must be taken into account when evaluating other factors related to reliability.

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Risk Factors and Cancer Screening Among Native Americans in Eastern North Carolina. Stark N. and Bell R. Native Americans, a highly diverse ethnic minority group, rank second behind African Americans in years of potential life lost before age 65. Little is known about health practices and lifestyle behaviors of Native Americans in the southeastern US that may increase cancer risk. The purpose of this abstract is to report cancer screening practices among the Lumbee tribe, a state-recognized tribe who reside principally in rural eastern NC and who live in and receive health care in the local community. Lumbee Indians (age \geq 18 years) enrolled as tribal members were randomly selected to participate in a telephone survey of chronic disease risk factors and preventive health behaviors. A total of 1,178 surveys (58% female) were completed by trained Lumbee interviewers. 22.5% of all surveyed reported no health insurance, 21.4% were financially unable to see a doctor, 23.5% reported their health as fair or poor, and 21.6% were financially unable to purchase medication. Preliminary data reveal that among Lumbee women over age 40, 98% of women had ever had a pap smear, 85% had ever received a mammogram and 82.4% reported regular SBE. Among Lumbee men over age 40, 58.6% of men had ever received prostate screening. About 45% of the sample over age 40 had ever had a colon cancer screen. This practice was slightly higher among men (49.1% compared to women [49.5%]). These data indicate fairly high rates of self-reported cancer screening among Lumbee Indians. Further analyses will reveal factors associated with inadequate screening practices in this population.

Baseline Quality of Life (QOL) Characteristics Among Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial Participants at Georgetown University

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Limited information is available regarding demographic and QOL characteristics of participants in cancer screening trials. This study describes the feasibility of collecting QOL data in the PLCO trial and reports baseline characteristics for a subsample of participants.

We conducted a telephone interview with new enrollees from the Georgetown site (N= 432; 93% response rate). Subjects' mean age was 64.2 years, 53% were female, 88% were white, 63% had at least a college degree, and 80% had a family history (FH) of cancer.

Subjects reported higher levels of QOL (MOS SF-12) compared to age-matched norms ($p < .001$). Overall, there were low levels of worry about cancer (52% never/rarely worried). However, worry about cancer was more common among women ($p < .01$), non-whites ($p < .05$), those with a positive FH ($p = .04$), and younger persons ($p < .01$).

Subjects were highly satisfied with their decision to participate ($X = 4.6/5$ point scale). The three most frequently endorsed reasons for participation were: contribution to science (88.4%), Georgetown's reputation (73.8%), and for peace of mind about cancer (67.4%). Differences in reasons for participation were associated with gender, ethnicity, family history, and QOL. Despite subjects' high level of education and interest in participating in a cancer screening trial, knowledge of cancer screening guidelines was poor, particularly among older (vs. younger) subjects ($p < .001$).

This study demonstrates the feasibility of collecting QOL and related measures as part of a cancer screening trial. Documenting the impact of cancer screening on QOL is needed, particularly if screening is not mandated by the trial, and screening for any of these cancers continues to be a personal decision.

The Emerging Role of African American Pastors as Health Promotion Leaders.

C. Washington, A. Ammerman, D. Garson-Angert, B. Jackson, B. Weathers, C. Bani, B. Switzer, G. Davis, J. Paige UNC-Chapel Hill

Purpose: Due to the central role of churches in the African American Community, intervention research now includes churches as intervention sites, but few studies have examined the unique role of Pastors as health promotion agents and leaders of organizational change within churches.

Methods: In a 5 year NCI funded church-based nutrition project, PRAISE!, we are implementing a Pastor-focused intervention model with Pastor activation of a church leadership team to refine, implement, and evaluate health promotion activities, and a Pastor education program (including CE credits) with a spiritual focus on dietary change and health promotion leadership development. Process and outcome surveys assess Pastor and congregation interest and involvement with health promotion at the church.

Results: 58 Pastors, representing 60 church units in 8 NC counties (urban and rural) signed Memos of Agreement with PRAISE! At baseline, 47% of congregants reported no health ministry at their church, with 75% indicating Pastors are vital in initiating such programs. Pastors were seen as most influential on new program ideas (35%) relative to other church leaders (25%), or congregants (32%). Regarding dietary change, 71% of primary food preparers indicated it is "very important" that Pastors enjoy their cooking, while at baseline, only 28% "agreed a lot" that Pastors encourage healthier dishes for church functions. So far, all PRAISE! Pastors have activated leadership teams (8 to 13 members), and 87% have attended at least one of 3 Pastor education programs.

Conclusions: Our data suggest that Pastors have a unique and potentially significant role in health promotion.

Health Behaviors of Cancer Survivors. Radimer KL, Arab L. This study examines current behaviors of cancer survivors that are or are hypothesized to be associated with reduced cancer risk or recurrence, or improved prognosis. Data from NHANES III were used to compare current behaviors of respondents reporting a prior diagnosis of skin or other cancers with those reporting no chronic disease (healthy), adjusting for gender, age, race, education, and income. Both groups of cancer survivors (skin and other cancers) were more likely to have quit smoking than healthy people. Nonetheless, all were equally likely to be current smokers. Cancer survivors were no more likely to exercise than healthy people. Lower percentages of other cancers survivors reported eating at least five servings of fruit and vegetables than healthy people; percentages were similar for healthy people and skin cancer survivors. Alcohol consumption was higher in skin cancer than other cancer survivors, although neither differed from the healthy group. The percentage of other cancer survivors reporting use of vitamin, mineral, or botanic supplements, or analgesics was similar to that of healthy people, while these percentages were somewhat higher in skin cancer survivors. Thus, at the time of NHANES III, with the exception of smoking cessation, there were few differences in the profiles of cancer survivors and healthy people in relation to behaviors potentially related to reduction of risk of cancer recurrence or prognosis. Given the recent reporting of cancer-related claims regarding some of these behaviors in the popular press, results may be very different in future NHANES.

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Food Insecurity and Cancer Prevention. Radimer KL Food insecurity means the inability to acquire enough nutritionally adequate, safe, and acceptable food in socially acceptable ways, due to insufficient resources. It can be considered an indicator of both nutritional deprivation and social disparity. This presentation reviews data to introduce the hypothesis that food insecurity may contribute to higher cancer rates in people with low incomes via its association with lower fruit and vegetable intake. Qualitative work has portrayed the lack of fruit and vegetables in food insecure households. Data from a variety of surveys have generally shown lower intake of fruit and vegetables, as well as of nutrients associated with fruit and vegetable intake such as vitamin C and folate, in people in food insecure compared with secure households. Similarly, household food inventories showed lesser amounts of fruit and vegetable stores available in food insufficient compared with sufficient households. Some of this difference may be due to the low income status of the food insecure, since low fruit and vegetable intake is evident in some low income populations. However, the associations with lower fruit and vegetable intake or stores were seen in analyses accounting for economic status, suggesting that the association exists independently of low income. Given the reduction in cancer risk often associated with fruit and vegetable intake, elimination of food insecurity may contribute toward reducing the higher rates of cancer seen in low income populations.

MFW families may be exposed to mutagenic and potentially carcinogenic pesticides. This study was conducted to assess if MFWs are occupationally exposed to pesticides. Eighteen families were recruited from southeast, Texas. We measured OCP in 62 individuals in this high-risk population (26 adults, 36 children). Measurable levels were found among all adults for seven of 21 OCP (DDT, DDE, β/δ -HBCs, λ /oxy-chlordanes, trans-nonachlor), and two (DDE, mirex) were detected in all but one child. The mean levels derived from the population tested by the reference laboratory that conducted our analyses [DDE 3.2 ± 18 , mirex < 0.3 ng/ml (ppb)] were much lower than the means in our study (DDE 8.1 ± 13 , mirex 1.7 ± 0.7). Statistically significant difference in levels was observed in DDE (adults 15.4 ± 17.2 vs. children 2.5 ± 2.1); $p < 0.001$. Levels among children not exposed in the fields (25%), showed DDE levels ≥ 3.2 , and 29% of them obtained mirex levels > 0.3 . In our study, a dose-response relationship was observed in DDE levels with age ($p < 0.001$). Although this study can not be generalized to the entire MFW population, it indicates MFW families have high OCP serum levels, most of which had been banned in the U. S. decades ago. The prevalence of these potentially carcinogenic agents during childhood indicates the need to monitor this vulnerable population for biomarkers predictive of deleterious health outcomes. (supported by NCI CA55769).

Saliva as a Medium for Investigating Inter-individual Differences in Ovarian Steroid Hormone Levels. Gann PH, Giovanazzi S, Van Horn L, Branning A, Chatterton R. Northwestern University Medical School, Chicago

Purpose: Measurement of ovarian steroid concentrations in serial daily saliva samples could offer advantages in studies comparing long-term endogenous hormone exposure in premenopausal women. We have adapted ultrasensitive radioimmunoassays for extraction-free measurement of estradiol (E2) and progesterone (PG) in saliva. The purpose of the present study was to evaluate the consistency of E2 and PG levels in saliva in the same women across menstrual cycles, and to compare this to the variation observed between women. **Methods:** 12 healthy women provided daily saliva samples for two consecutive menstrual cycles; all samples were assayed for E2 and PG. A single mid-luteal serum sample was collected 7-8 days after detection of an LH peak in urine. We plotted individual cycle profiles and computed intraclass correlation coefficients (ICC) for various definitions of peak and cumulative daily hormone level. **Results:** For peak PG, determined as the maximal running 3-day mean, ICC = 0.68. For cumulative PG, based on 8 consecutive cycle days (+2-+9), ICCs were 0.72 to 0.77 when reverse dating, LH peak or rise in salivary PG determined day 0. For E2, ICCs ranged from 0.69 to 0.75 by various dating methods for the 5 pre-ovulatory days (-4 -0), and from 0.81 to 0.90 for the 15 days from the center of the cycle (-6 -+8). With exclusion of just the first 5 days of the cycle, the ICC for E2 was 0.91. **Conclusions:** These results indicate that daily saliva samples can be combined to clarify the inter-individual differences in E2 and PG levels in premenopausal women, and that these inter-individual differences might be greater than previously imagined.

Urinary Lignans, Potential Measures of Fiber Intake in African Americans After Wheat Bran Supplementation

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Purpose: To determine if urinary lignans are potential biomarkers of wheat bran intake among African Americans.

Methods: Thirty-nine African Americans, 33 women & 6 men, 40-70 years old, consented to provide background information including dietary intake frequency and a 24-hour urinary sample prior to daily supplementation with 1/2 cup of a riboflavin-spiked wheat bran cereal (11.6 g insoluble fiber + 28 mg riboflavin) for up to 6 weeks. In a former inpatient study, the B2-spiked fiber was highly correlated in a dose response with urinary B2 excretion ($r=0.96$, $p<0.01$) and served here as the primary biomarker of adherence.

Results: Urinary B2 levels increased from 0.8 ± 0.05 mg/day (mean \pm se) at baseline to 7.3 ± 0.5 mg/day after supplementation, indicating good adherence ($p=0.0001$). Paired pre versus post wheat bran supplementation increased significantly urinary levels of enterolactone (86 ± 12 vs 146 ± 39 nmol/mmol creatinine, $p<0.03$). Other nonsignificant urinary variables were: enterodiol, equol, daidzein, and genistein.

Conclusions: With a small n, the mammalian lignan, enterolactone is increased with wheat bran intake and has potential as a biomarker of whole grain intake in a free living population.

Funding: NINR-R01-NR03552; NIH-GCRC-RR00046; NCI-P30-CA-16086S1; Kelloggs in kind.

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CpG Island Methylation in the Promoter Region of the Glutathione S-Transferase p1 (GSTP1) Gene in Peripheral Blood DNA and Prostate Cancer Risk. Yu H, van Wert JM, Eastham J, Smith M, Bashambu M, Glass J, Singal R. (Feist-Weiller Cancer Center, LSU Health Sciences Center and Overton Brooks VA Medical Center, Shreveport, LA 71130) Glutathione S-transferases (GSTs) are a group of cytosolic enzymes that catalyze the conjugation of a large number of electrophilic compounds with glutathione. Binding of glutathione to the compounds including many carcinogens and mutagens serves as an early step of detoxification. Loss of the pi class GST (GSTP1) activity is found to be associated with cancer risk. Studies show that CpG island methylation in the promoter region of the GSTP1 gene suppresses the transcription of the GSTP1 gene and that the methylation is frequently found in prostate cancer tissues as compared to normal tissues. **Purpose:** To examine the association between GSTP1 methylation in peripheral blood DNA and prostate cancer risk. **Methods:** We compared GSTP1 methylation between 21 prostate cancer patients and 60 age- and race-matched normal controls who participated in a prostate cancer screening program. Heparin plasma samples were collected from these subjects. DNA from buffy coats was extracted and analyzed using a methylation-specific PCR (MSP) method to detect DNA methylation in the promoter region of the GSTP1 gene. Conditional logistic regression analysis was used to examine the association between GSTP1 methylation and prostate cancer risk. **Results:** We found that GSTP1 methylation in peripheral blood DNA occurred more frequently in the cases than in controls, 33.5% versus 16.7% ($p=0.126$). The difference was statistically significant in Caucasians, 50.0% versus 12.1% ($p=0.013$), but not in African Americans, 11.1% versus 22.2% ($p=0.652$). Median PSA levels were higher in patients who had unmethylated GSTP1 than in those who had methylated GSTP1, 8.02 ng/ml versus 1.11 ng/ml ($p=0.091$). No association was found between age and GSTP1 methylation. Univariate logistic regression analysis showed that the risk for prostate cancer was increased in men who had methylated GSTP1, OR=2.33, but the difference was not significant ($p=0.141$). However, after adjusting for PSA levels in the analysis, the odds ratio was statistically significant, OR=5.00 ($p=0.03$). **Conclusion:** Findings of this pilot study suggest that GSTP1 methylation is a risk factor for prostate cancer.

CYTOCHROME P450 2E1 GENETIC POLYMORPHISMS AND THE RISK OF GASTRIC CANCER IN A CHINESE POPULATION. L Cai, S Yu, ZF Zhang. *Department of Epidemiology, Fujian Medical University, Fuzhou, Fujian, China*

Objectives: Genetic polymorphism in enzymes involved in carcinogen metabolism has been found to influence cancer susceptibility. The purpose of this study was to determine whether cytochrome P450 2E1 (CYP2E1) polymorphisms were associated with gastric cancer risk. **Methods:** There were 91 gastric cancer patients and 94 healthy controls. Subjects completed a standardized questionnaire including demographic data, diet intake, and alcohol and tobacco consumption. PCR-RFLP revealed three CYP2E1 genotypes, namely, heterozygote (C1/C2) and two homozygotes (C1/C1 and C2/C2). **Results:** The frequency of variant genotypes (C1/C2 and C2/C2) in gastric cancer cases and controls was 36.26% and 24.47%, respectively. The rare homozygous C2/C2 genotype was found in 6 patients with gastric cancer (6.59%), whereas the controls only showed one (1.06%). However, the difference was not statistically significant ($P=0.069$). Gastric cancer patients were more likely to carry genotype C1/C2 (odds ratios =1.50) and C2/C2 (OR =7.34) than controls. (P for trend=0.032). The frequencies of genotypes with the C2 allele (C1/C2 and C2/C2) were compared with those of genotypes without C2 (C1/C1) among gastric cancer patients and controls according to the pattern of gastric cancer risk factors. The subjects exposed to these gastric cancer risk factors and carrying the C2 allele seemed to have a higher risk of developing gastric cancer. **Conclusions:** Polymorphic CYP2E1 gene may play some role in development of gastric cancer in a Chinese population.

FISH SAUCE AND GASTRIC CANCER: AN ECOLOGICAL STUDY IN FUJIAN PROVINCE, CHINA. L Cai, SZ Yu, WM Ye, YN Yi, ZF Zhang.

Background Fujian Province, China has one of the high-risk areas for gastric cancer in China. The mutagenicity of fish sauce (traditional condiment) has been reported by several experimental studies. However, there have been no reports from population-based epidemiological studies on the association between consumption of fish sauce and risk of gastric cancer. **Methods** An ecological study was carried out for gastric cancer in the Fujian province from 1993 to 1996. A total of 11,000 subjects from 55 townships were randomly selected from 10 counties within Fujian province. All subjects were local residents, within the age group of 45-74 years. Trained interviewers conducted interviews with a standardized questionnaire, which covered dietary habits, tobacco and alcohol consumption and history of chronic gastric diseases. Mortality data were obtained from the national retrospective investigations of causes of cancer deaths conducted in the same study period. **Results** The results showed a significant correlation between monthly consumption of fish sauce and mortality rate of gastric cancer. Pearson's coefficient of correlation was statistically significant with $r = 0.7356$ for males, $r = 0.5246$ for females ($P < 0.01$). In the multivariate analysis, consumption of fish sauce still showed an association with the risk of gastric cancer. No significant positive correlations between esophagus cancer, liver cancer, colon cancer and consumption of fish sauce were observed. **Conclusions** This study indicates that long-term intake of fish sauce may be related to high mortality rate of gastric cancer. Consumption of fish sauce was possibly one of the important and unique etiologic factors of gastric cancer in the Fujian province.

Sensitivity of Combined Allele Specific Oligonucleotide Testing for Common Mutations Plus Protein Truncation Assay vs. Full Gene Sequencing for Detection of BRCA1 and BRCA2 Mutations. Klemp JR, Brady DA, Fabian CJ.

Thirty-one women at increased risk for breast cancer on the basis of family history or a prior precancerous biopsy underwent germline genetic testing for BRCA1 and BRCA2 mutations in conjunction with a chemoprevention research protocol. None of the 31 women had previously had a BRCA1 or BRCA2 mutation identified in a family member and only 18 had personal or family histories which satisfied current ASCO guidelines for genetic testing. Two different methodologies were used: first, allele specific oligonucleotide testing (ASO) for common mutations was combined with a protein truncation assay (OncorMed); and then full gene sequencing was performed (Myriad Genetics).

On the basis of ASO and protein truncation assays at OncorMed, a deleterious mutation was identified in one of the 31 subjects. Subsequent full sequencing at Myriad of the same 31 subjects revealed two deleterious mutations and five mutations of uncertain significance.

Full gene sequencing appeared superior to ASO for common mutations combined with a protein truncation assay in detecting mutations present ($p=0.014$ McNemar's Test).

Although sensitivity for detecting mutations is improved by using full gene sequencing, it is not clear from this small cohort that specificity for a functional BRCA1/BRCA2 protein is markedly enhanced by using full sequencing versus a combination of allele specific oligonucleotide testing for common mutations combined with a protein truncation assay.

Hepatitis B and C Virus Infection and Hepatocellular Carcinoma in Israel's Ethnically Heterogeneous Population

Almog R, Low M, Lahat N, Gershtein V, Shapiro S, Shouval D, Rennert G

CHS Natl Cancer Control Center, Carmel and Hadassah medical Centers, Jerusalem & Haifa, Israel

Purpose: To assess the association of hepatitis B virus (HBV) and hepatitis C virus (HCV) infections with HCC.

Methods: A national population-based case-control study was performed. The study included interviews of incident cases of HCC diagnosed between 1994 and 1996, and of controls individually matched for age, sex, religion and district. Blood samples were collected from each participant. Procedures for determining HBV or HCV infection included ELISA and PCR.

Results: Preliminary results from the first 42 cases and 69 controls are presented. The OR for the presence of HbsAg or HBV DNA was 12.5 (95% confidence interval 2.6-60.1) and for the presence of anti HCV antibodies or HCV RNA 33.5 (95% confidence interval 7.2-154.9). 12.8% of the cases were positive for both HBV and HCV. Differences in the strength of association of HBV and HCV infection were found by gender and ethnic group. Mean daily alcohol intake of more than 50 g ethanol was associated with an increased risk of 4.7 for HCC (95% CI 1.4-15.6).

Conclusions: HBV infection is the main known risk factor for HCC in Israel. Our results show that HCV infection is an important and even stronger risk factor. The different role these viruses play in diverse ethnic groups points to both genetic and environmental interactions.

Breast Cancer Screening of High Risk Populations

Rennert G., Kutner D., Rennert HS.

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Israel*

Objectives: To evaluate if women with family history of breast cancer have a different mammography detection profile than women without family history.

Methods: All women diagnosed with a new primary breast cancer in 1997 in Israel were included. Family history was available for 1081 women of the total of 2814 women with breast cancer. The women were divided into those detected by screening (418), undetected by screening (50), detected by clinical mammography (548) and missed by clinical mammography (65). **Results:** Among the women with family history 67 breast cancers were detected through mammography screening and another 122 through clinical mammography. Detection rates were similar between the women with and without family history. Recall rates in the prevalence round were significantly higher in the women with family history than among those without family history. Women under the age of 50 with a family history of breast cancer tended to be missed more often by screening mammography than women of the same age without family history (30.8% vs. 15.6%, n.s.). Nodal status was similar, but tumor size tended to be larger in young women with family history. One third of the screen-detected tumors in women under 50 with family history were DCIS, compared to only 12.5% in those without family history.

Population screening with fecal occult blood test

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Center and Technion Faculty of Medicine, Haifa, Israel*

Background Screening for colorectal cancer using fecal occult blood testing was shown effective in reducing mortality. The largest HMO in Israel initiated use of Hemoccult Sensa to study the field performance of this test.

Methods All primary care physicians were invited to order tests for their asymptomatic patients, ages 50-74. The results of 45,166 tests performed, among them 22,193 for the first time, are reported. **Results** Seventy-eight cancers were detected, yielding a cancer detection rate of 2.61/1,000 screened. Of the screen detected cancers 44.5% (prevalence round) and 58.9% (incidence round) were detected in Dukes A and in-situ stages. The overall estimated sensitivity of the test (median follow-up: 35 months) was 85.3% for the first round with specificity of 95.5%. The sensitivity for left side tumors (87.9%) was higher than for right-side or rectal tumors (78.6%). The positive predictive value (PPV) for cancer increased with increasing number of positive fields. Four or more positive fields had a PPV of 16-26% for cancer and of 46-71% for all tumors. **Conclusions** Population screening with a sensitive FOBT performs well outside of a trial setting, detecting a high proportion of the expected tumors with a favorable stage distribution. Given its proven power to significantly reduce mortality, use of this test should be strongly advised to both medical organizations and the healthy population at average risk.

Effect of hormone replacement therapy (HRT) on mammography findings

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National Israeli Breast Cancer Detection Program, Ministry of Health and Israel Cancer Association, Haifa, Israel

Objectives: To evaluate if women on Hormone replacement therapy have a different mammography detection profile than women not on HRT. **Methods:** All women diagnosed with a new primary breast cancer in 1997 in Israel were studied. HRT-use status was available for 1081 women of the total of 2814 women with breast cancer detected that year in Israel. Cases were divided into those detected through screening, missed by screening, detected through clinical mammograph (CM) and missed by CM. HRT use was further evaluated in two duration groups (1-5 years, 6+ years) **Results:** Women on HRT were more often missed during screening than women not on HRT (17.9% vs. 9.7% correspondingly, $p=0.059$). Women on HRT who were detected by screening were diagnosed more often with DCIS (27.9%) than screened women not on HRT (13.1%, $p=0.013$). HRT users were also found at screening to be more node negative than non users. With longer periods of use the nodal status became even more favorable in the HRT users. Size of invasive tumors did not differ between HRT users and non-users. The high miss rate and the low lymph node involvement were also noticed among the HRT users who were diagnosed by CM. These results call attention to major changes in screening mammography performance in the world, as more women go on HRT.

Personal dosimeters for skin cancer prevention

Gad Rennert, Ori Faran

CHS Cancer Control Center & Skyrad Ltd., Haifa, Israel

Skin cancer is the most common cancer and one of the most preventable types of cancer in the world. An essential first step toward prevention, however, is to significantly increase individuals' awareness of the harmful effect of UV radiation.

A recent breakthrough has given rise to a novel, low-cost Personal Dosimeter that warns the user when she/he has been exposed to a UV radiation dose exceeding the medically recommended MED (Minimal Erythema Dose) for their skin type. This sticker or hand strap (Skyrad Ltd. Israel), comprised of photochromic additive imbedded in a polymer film, changes color based on the UV dosage level to which it has been exposed. This lightweight technology can be worn either directly on the skin or on clothing, in no way limiting the user's activity. It can be calibrated for different doses, and can also be modified so that direct application of sunscreen to the device will not affect its operation or accuracy. The Dosimeter operates at temperatures up to 50 °C and 100% humidity. The Personal Dosimeter has been tested in sunlight using the Solar Light Co. PMA2100 digital dosimeter, at different times throughout both the day and the year. After being immersed in saltwater for a week, and being exposed to a temperature of 50 °C for one month, the device continued to operate correctly, remaining completely undamaged by these exposures. This device is an ideal solution to alerting the public to the danger of overexposure to the sun, and to encouraging the modification of daily habits surrounding outdoor activities and deserves the attention of the

Dietary Changes During Adulthood and Risk of Colorectal Adenomas. Chiu BC, Chow WH, Rothman N, Lynch J, Sinha R.

Purpose: Diet has been hypothesized to play a role in the etiology of colorectal adenomas; however, little is known about the effects of dietary changes from adult to middle age. **Methods:** We analyzed data from a case-control study that was conducted at the National Naval Medical Center (Bethesda, MD). Cases (n=146; median age=58) were diagnosed with colorectal adenomas at sigmoidoscopy. Controls (n=228; median age=57) were screened with sigmoidoscopy and found not to have colorectal adenomas. Dietary habits during the year before sigmoidoscopy and when subjects were 30 years old were collected by a food frequency questionnaire. Dietary changes were calculated by subtracting intake of specific food item at age 30 from intake at present time. Associations with dietary changes were estimated by odds ratios (ORs) and 95% confidence intervals (CIs), adjusted for age, total energy, physical activity, pack-years of smoking, and use of NSAID. **Results:** Compared to subjects with the highest quartile of intake reduction since age 30 years, risks of colorectal adenomas was increased for those with smaller reduction in intake of various types red meat, particularly for beef (OR=1.8; CI=0.9-4.0; p-trend=0.04), beef steaks (1.6; 0.7-3.9; p-trend=0.03), hamburgers (1.7; 0.6-4.3; p-trend=0.03), and pork chops/ham (5.1; 2.0-13.4; p-trend<0.001). In contrast, lowering risks were seen for those with increasing intake of poultry, fish, fruits, and vegetables. Subjects in the highest quartile of increase in consumption of chicken/turkey (0.5; 0.3-0.9; p-trend=0.04) and vegetables (0.4; 0.2-0.9; p-trend=0.006) had a significantly reduced risk, compared to those in the lowest quartile of increase. **Conclusion:** Irrespective of intake at age 30 years, a decrease in consumption of red meat and an increase in consumption of poultry and vegetables since age 30 were associated with a decreased risk of colorectal adenomas.

Familial cancer in an Israeli set-up

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Many of the recent discoveries in the field of cancer genetics were described to be of increased prevalence in the Jewish population. In addition, the mutations in the Jews are many times of one or more common types. Consultation of families with history of cancer in Israel is of a unique nature and has a potential for a more fruitful intervention.

Obstacles to such activity are, the many times small size of the Jewish Ashkenazi families, the immigration history of this group and the wipe-out effect of a generation in the Holocaust. Of more than 3,000 approaches to the familial cancer service, more than 500 families were phenotypically defined as hereditary, involving mainly breast, colon, ovary and pancreas cancers. The consultation process is based on helping the healthy family members and is usually not initiated by the cancer patients but their families. Sixty families have already been consulted after testing positive for BRCA genes mutations and another 40 families are in the process of being tested for these mutations. Significant differences in the clinical presentation of cancers in carriers of the various BRCA mutations were noted (age at onset, frequency of bilaterality, involvement of cancer of other sites).

Increased Weight & Body Fatness Associated with Chemotherapy for Breast Cancer...& what can be done?
Demark-Wahnefried W, Halabi S, Hars V, Winer E, Marcom PK, Blackwell K, Harris L, & Rimer BK. Durham, NC

Weight gain is a common side effect reported by breast cancer patients who receive adjuvant chemotherapy, yet few controlled studies have been performed to determine reasons for this energy imbalance & how to prevent it. We undertook a study among premenopausal stage I or II breast cancer patients to determine changes in body weight & composition (via dual energy x-ray absorptiometry), resting metabolic rate (RMR), energy intake & expenditure that occurred in the year following diagnosis in 34 patients treated with adjuvant chemotherapy (AC) vs 17 patients who received only localized treatment (LT)(surgery ± radiation). Although no significant difference in mean weight gain was noted between patients on AC (2.7 kg) vs patients on LT (1.2 kg); patients on AC experienced significantly greater increases in fat mass ($p=.015$), & % body fat ($p=.006$), as well as a trend toward decreased lean body mass ($p=.059$). While levels of physical activity decreased over time, there was not a significant difference between groups. No differences were observed in energy intake or RMR.

In order to curb weight gain & prevent gains in body fat & loss of lean body mass, an intervention (low fat, fruits & vegetable diet + exercise) is being piloted on patients receiving AC. Preliminary data ($N=5$) suggest that such a program can curb weight gain & improve body composition; i.e., weight change -1.8 kg vs $+2.7$ kg; %body fat change -1.7% vs $+1.5\%$; fat mass change -1.6 kg vs $+3.0$ kg & lean body mass: $+0.1$ kg vs -0.8 kg. In summary, although profound changes in body composition occur in association with AC; interventions that promote physical activity & dietary change may be helpful in curtailing these effects.

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ROLE OF LUNG MACROPHAGES IN EXPERIMENTAL LUNG TUMOR METASTASIS FOLLOWING EXERCISE.

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We have seen decreased B16 melanoma lung tumor metastasis and increased lung macrophage (mφ) cytotoxicity (in vitro) after a fatiguing exercise bout in mice. We investigated the in vivo role of the macrophage (mφ) in this exercise model using carrageenan (CAR) or liposome-encapsulated clodronate (LIP), mφ depleting agents. C57BL/6 mice were randomly assigned to control (CON) or fatiguing exercise (EX) conditions (~3h) within CAR or LIP experiments. B16 melanoma cells were injected i.v. following exercise, and 10 d later, lung tumor foci counted. Two-way ANOVA revealed increased tumors with CAR ($p=0.03$) but no effect of EX ($p=0.66$). A repeat experiment injecting more B16 cells found increased tumors with CAR ($p<0.01$) and a decrease with EX ($p=0.02$), but no significant interaction between treatments ($p=0.53$), suggesting no role for the mφ in the exercise effect. In the LIP experiment, there were more tumors with LIP ($p=0.01$) but not effect of EX ($p=0.77$). In contrast to previous work, this data suggests small and inconsistent effects of a single bout of fatiguing exercise on B16 melanoma metastasis. Any exercise effects do not appear to be due to enhanced mφ function.

LHC is a Cancer Prevention Fellow, National Cancer Institute.

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Dietary practices and knowledge of fat and fiber among black church members in the Bronx, NY

K. Glover, B.A., A. Moadel Ph.D., P. Lukoschek, M.D., M.P.H. Albert Einstein College of Medicine, Bronx NY

This study examined the relationships between nutritional knowledge and dietary intake among a black, urban sample. 100 participants recruited at church services responded to a telephone survey between December 1998 and August 1999 (70% response rate). Respondents were 68% female, a mean age of 50 ($sd=13.29$), with 42% having less than a college education. Nutritional knowledge was measured through questions about fat and fiber content of common foods such as rice, red meat, butter, and fruit. 90% of high fat foods were correctly identified as high in fat. While all high fiber items were correctly identified as such, half of participants incorrectly identified white rice and pasta as high in fiber. Based on reported dietary intake over 24 hours, the mean number of high fat/low fiber foods consumed was 4.3 ($sd=1.32$) of a possible 13. Consumption of high fiber foods included whole grains (20%) and beans (39%), while high fat items most frequently consumed were fried food (27%), processed meats (18%), and cheese (17%). Knowledge of fiber emerged as the single most important predictor of dietary intake beyond sociodemographic factors ($p<.02$). This study highlights specific nutritional knowledge deficits (i.e., fiber) as a potential target for cancer education.

Psychosocial determinants of fruit and vegetable consumption among Mexican American college-students

Evans A, Sawyer-Morse MK, Betsinger A.

The purpose of this study was to determine significant psychosocial antecedents of fruit and vegetable consumption among Hispanic college students.

As part of a larger study, students ($N=177$) from a minority college campus in the Southwest completed a survey designed to assess current dietary habits, beliefs, attitudes, the stages of change construct from the Transtheoretical Model (TTM) and perceived social support. The majority of the participants were female (67%), Mexican American (54%), with a mean age of 19.

Results indicated that at least 65% of the students were consuming less than 3 servings of fruit and/or vegetables per day. Multiple regression analyses indicated that a three variable model (stages of change, fat intake, and perceived social support) accounted for 21 % of the variance ($R\text{-square}=.214$, $p<.00$) for daily fruit and vegetable consumption.

Epidemiologic evidence suggests that high fruit and vegetable consumption decreases the risk of certain types of cancer. Results from this study indicate that Mexican-American college students are not consuming the recommended number of daily servings for fruit and vegetables. Results also underscore the need to address perceived social support and the interaction of current dietary patterns (e.g. fat intake) with fruit and vegetable consumption in interventions targeted to this population. Additionally, stages of change classification may increase effectiveness of the intervention.

Neuhouser ML, Kristal AR, Patterson RE, Thompson IM

Recent unexpected findings from randomized controlled trials showed that dietary supplement use affects cancer risk. Specifically, the antioxidants vitamin E and selenium have shown protective effects for prostate cancer, while beta-carotene increased the risk for lung cancer. We investigated the use of dietary supplements by 16,222 participants in the Prostate Cancer Prevention Trial (PCPT), a Phase III double-blinded placebo controlled trial of the drug finasteride (Proscar) for the primary prevention of prostate cancer. Sixty-one percent of PCPT participants reported use of any supplement. About one-half of participants used a multivitamin, and a third reported use of vitamins E or C. Supplement users were more likely to be white, college educated, and non-smokers compared to participants who did not use supplements (all $p < 0.001$). Supplement users obtained 96% of their total daily intake of vitamin E, 71% of vitamin C, 42% of beta-carotene and 13% of selenium from supplements. The joint effect of two or more agents presumed to have chemopreventive effects (e.g., antioxidants and finasteride) is unknown. We conclude that because dietary supplements are used by nearly two thirds of the study sample and the antioxidant ingredients may confer independent cancer preventive effects, analytical models of study findings should include exposure measurement of dietary supplements with appropriate tests for interaction. Our results can be generalized to similar chemoprevention trials.

Development of a Dietary Acculturation Scale
for Chinese-Americans

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Our objective was to develop a scale that can serve as an indicator of the extent to which a Chinese immigrant has adopted Western eating patterns (dietary acculturation) or maintained the traditional Chinese diet. Data are from 170 Chinese women in Seattle, WA, and Vancouver, BC, Canada. We collected information on sociodemographics; traditional acculturation indices (media preferences; food preferences; beliefs about medicine; and age at immigration); items reflective of Westernization of eating patterns and the Chinese diet (to develop the Dietary Acculturation Scale); and four dietary outcomes: fruit/vegetable intake; fat behaviors; and fat- and fruit/vegetable-related changes since immigration. Younger, married, educated, high-income women who were employed outside the home had the highest dietary acculturation scores. Acculturated women reported more high-fat behaviors, had made more healthful fruit/vegetable changes since immigration, and had a higher daily mean intake of fruits/vegetables compared to unacculturated women (4.15 ± 0.36 and 3.33 ± 0.35 respectively), all $p \leq 0.05$. We found good agreement between the Dietary Acculturation Scale and traditional acculturation indices, but associations of the latter with dietary outcomes were inconsistent. These findings demonstrate the usefulness of a scale specifically designed to measure dietary acculturation in better understanding dietary change in Chinese immigrants. Using dimension-specific acculturation scales can improve the accuracy of acculturation research findings.

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The American Cancer Society estimates that about one-third of United States cancer deaths are due to dietary factors. Diets that are low in fruits and vegetables have been associated with increased incidence and mortality from various cancers. On the basis of the strength and consistency of this association, the National Cancer Institute initiated the 5 A Day Program to encourage Americans to eat five or more servings of fruits and vegetables every day. This is one of the Healthy People 2000 objectives, as well as a model for community nutrition education programs.

We assessed fruit and vegetable consumption as part of a population-based health survey conducted in Washington County, Maryland in 1998. A total of 14,497 persons responded. Participation was greatest among women and older persons. The mean daily servings of fruits and vegetables (excluding fried potatoes) was 3.02 for males and 3.48 for females. Only 14.6 percent of males and 21.9 percent of females reported consuming five or more servings of fruits and/or vegetables daily. Female gender (OR 1.64) and advancing age (55-64 yrs OR 1.88, 65-74 yrs OR 2.29, 75+ yrs OR 2.43) were associated with increased intake. Consumption increased with education (OR 2.06). Income and marital status had an inconsistent effect.

In conclusion, in spite of recommendations promoted during the past 7 years and the strong evidence for a beneficial effect, our findings are consistent with those of others in that few individuals approach the recommended level of intake of fruits and vegetables. It appears that health education regarding diet may need to be targeted to specific groups.

Nutrition Assessment and Education of Four Girl Scout Troops in Detroit. Djuric, Z., Cadwell, W.F., Doliveck, R., Heilbrun, L., Lababidi, S., Casey, R.J. and Dereski, M.O. Karmanos Cancer Institute, and Wayne State University, Detroit, MI.

The impact of nutrition on breast cancer prevention may be greatest during adolescence. The goal of this pilot study was to develop methods which would improve the eating habits of 10-11 year old Girl Scouts from the Detroit area. Two suburban troops and two inner-city Detroit troops were selected for participation. The diets of both the mothers and daughters were analyzed for nutrient intakes using food frequency questionnaires and food diaries, respectively. The families received newsletters and calendars monthly. The girls also participated in monthly troop meetings with study staff during the 6-month intervention. At the end of the program, there was a one-week long summer day camp. The baseline dietary data indicated that both the mothers and daughters in all troops had lower-than recommended mean fiber intakes, and mean intakes did not meet both the fat and fruit/vegetable intake recommendations in any troop. Relatively lower fat and higher fruit/vegetable intakes were reported by the mothers from the two troops who had higher education levels (one urban troop and one suburban troop). The diets of the girls were, however, somewhat better overall in the suburban versus urban troops, and this may have been influenced by the school lunch programs. Families in the suburban but not urban troops reported intake of soy products. Families in the suburban troops also ate meals together more frequently than the families in the urban troops. Thus, different intervention strategies may be needed in suburban and urban areas. Funded in part by the State of Michigan

Sources of phytoestrogens in the American diet: experience from a case-control study.
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Phytoestrogens have been postulated to have anticarcinogenic properties. In a recently published study, we examined prostate cancer (PC) risk and phytoestrogen intake in a group of 190 white American men, and we reported that men with PC consumed smaller amounts of genistein, daidzein, and coumestrol than controls. Here we present the major food sources of these nutrients. Foods were ranked beginning with the main nutrient source. For controls, 75% of the daily average intake of genistein is provided by consuming the equivalent of 1.5 in³ of tofu, 5 oz of breakfast drinks, 2 teaspoon (tsp) of soybeans, and 1 tsp of imitation bacon bits on a weekly basis. On average, PC cases received half the amount of genistein from tofu and breakfast drinks, none from soybeans, and more than twice the amount from imitation bacon bits. Tofu (1.3 in³), soybeans (2 tsp), and bacon bits (1 tsp) provided most of the daidzein in the controls as compared to bacon bits (3 tsp), miso soup (1 tsp), and tofu (1 in³) in cases. Refried/pinto beans provided more than 95% of coumestrol in both groups (equivalent to ½ cup). Main difference in quercetin intake was due to cranberry juice (controls, ½ cup vs. 1 cup in cases), since both groups consumed similar amounts of black tea, onions and apples. Similarly, cases consumed twice the amount of myricetin from cranberry juice (9 oz controls, 19 oz cases) and comparable amounts from tea and red wine. Our data suggest that the food sources of phytoestrogens are similar in cases and controls, but amounts consumed differ. Since many of these foods are already integrated into the American diet, any nutritional interventions developed should capitalize on these phytoestrogen sources. Supported by grants CA68578 and DAMD 17-98-1-8471, and the MD Anderson Prostate Cancer Research Program

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Helping Tobacco Users to Quit: Pharm-Assists' Counseling Role

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Although the availability of pharmaceutical aids for tobacco cessation renders the pharmacist as a logical candidate for providing intervention to tobacco users, previous studies have shown that pharmacists typically are not active in this role. With a goal of gaining a clear picture of pharmacists' attitudes toward providing tobacco cessation counseling, surveys were mailed to all licensed pharmacists in four counties in California (54% response, N=1,159 replies).

Results indicated that 7% of respondents have had formal training for providing tobacco cessation counseling. Of nearly 700 pharmacists who have direct patient contact, 93% indicated that receiving specialized training for tobacco counseling would increase the quality of their counseling, and 70% indicated that it would increase the number of patients that they counsel. Eighty-eight percent reported an interest in receiving specialized training to obtain these skills. Among pharmacists in settings where non-prescription patches and gum are sold, the top three barriers to providing counseling for use of these products were: not always aware when patches and gum are being bought, inadequate time, and inadequate pharmacy staffing. Of all pharmacists surveyed, 87% believe that the pharmacy profession should be more active in tobacco cessation.

By serving as a communication link between the health care system and tobacco users, pharmacists are uniquely positioned to be a cornerstone for tobacco cessation efforts. Although few pharmacists have received formal training for providing support for cessation, there appears to be substantial professional interest in further developing this role.

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Household exposure to passive cigarette smoking and serum micronutrient concentrations

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Passive smoking has been associated with adverse health outcomes, such as lung cancer and ischemic heart disease. The question of whether these associations are causal has generated controversy, partly because of the potential for confounding by diet. We conducted a cross-sectional study in Washington County, Maryland to assess the relationship between exposure to passive smoking and serum micronutrient concentrations.

In 1975, the smoking habits of adult household members were measured in a private census of county residents. The serum micronutrient data were obtained by pooling the assay results from controls in nested case-control studies conducted over a 13-year period from serum collected and stored in 1974. The serum micronutrient data were linked to the census data for 1,590 individuals.

Among men, exposure to passive smoking at home was associated with serum beta-carotene concentrations that were 29% lower ($p < .05$) among never smokers and 18% lower ($p < .05$) among former smokers than among those not exposed to passive smoking. These associations were not observed among women. The results for total carotenoids, alpha-carotene, and cryptoxanthin mimicked those for beta-carotene, in that serum concentrations were lower among nonsmoking men—but not women—exposed to passive smoking at home. There was no evidence that exposure to passive smoking was associated with serum concentrations of lycopene, retinol, alpha-tocopherol, gamma-tocopherol, or lutein/zeaxanthin.

The association of passive smoking with serum concentrations of selected carotenoids observed among men but not women probably occurred via a pathway that involved shared diets rather than direct depletion of antioxidant micronutrients from smoke exposure. The null findings observed among women suggests that serum micronutrient concentrations are an unlikely source of confounding in studies of health effects of passive smoking among women.

Nicotine replacement therapy use among a cohort of smokers.

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Nicotine replacement therapy (NRT) offers promise for assisting smokers to stop or reduce smoking, but little is known about its use in the general population. As part of ongoing follow-up of a cohort established in 1989 in Washington County, Maryland, a questionnaire mailed in 1998 included a question about NRT use. This study reports NRT use among the 1,954 respondents who were current smokers in 1989 and provided data on NRT use and smoking habits 1998.

Overall, 36% of the smokers in 1989 had used NRT by 1998; among NRT users, 29% used gum only, 44% used patch only, and 27% used both gum and patch. The prevalence of NRT use among these smokers increased from 12% among those smoking < 5 cigarettes per day to 45% among those smoking ≥ 35 cigarettes per day ($p_{trend} < .001$). Additional factors associated with NRT use were more education ($p < .01$ for > 12 versus ≤ 12 years) and younger age ($p < .001$ for < 55 versus ≥ 55 years).

When NRT use was assessed in relation to smoking status in 1998, 30% of NRT users compared to 39% of nonusers had quit smoking ($p < .01$). Among persistent smokers, the likelihood of reducing the number of cigarettes smoked per day was similar among NRT users (40%) and nonusers (41%).

NRT use was highly prevalent among this cohort of smokers, particularly among the heavy smokers. Compared to nonusers, NRT users were less likely to have stopped smoking and equally likely to have cut down the frequency of smoking. This may reflect a propensity of more addicted smokers to use nicotine-containing products in their efforts to quit smoking.

A cancer control survey of African Americans
in inner-city Baltimore

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African Americans suffer a disproportionate share of the U.S. cancer burden. Information is needed about their views concerning cancer to facilitate development of culturally appropriate cancer prevention strategies. In 1998 a survey was conducted among African Americans in Baltimore to address this information gap. Three community residents were trained and conducted in-person interviews with 202 adults.

Cancer was perceived as the single greatest threat to the health of the African American community in Baltimore. More than 50% of the respondents worried about cancer. Cancer was perceived as a greater threat ($p=.03$) and was a greater source of worry ($p<.001$) among those who had experienced a cancer diagnosis among someone in their close surroundings. 77% of respondents provided correct responses to three or fewer of five items concerning knowledge of cancer risk factors. Women ($p=.02$), nonsmokers ($p=.004$), and those with more education ($p=.04$) and higher income ($p=.007$) were more knowledgeable of cancer risk factors. Over 70% of the respondents were aware of ≥ 9 of 14 cancer signs or symptoms.

The vast majority of respondents agreed they would want to know if they had cancer (91%) and that cancer is potentially curable if detected early (93%). Examples of misperceptions about cancer were that surgery causes cancer to spread (58%) and bruising can cause cancer (20%).

This community was aware of the burden cancer poses, knowledgeable of cancer warning signs, and held favorable views toward detection. Areas to target for improvement include knowledge of cancer risk factors and overcoming some common misperceptions about cancer.