

**PROGRAM
and
ABSTRACTS**

22nd Annual Meeting

*American Society
of Preventive Oncology*

March 4-6, 1998

Hyatt Regency Bethesda
Bethesda, Maryland

Program Chair: **Roberd M. Bostick, MD, MPH**
The Bowman Gray School of Medicine
of Wake Forest University

Sponsored by: The American Society of Preventive Oncology, SmithKline Beecham,
and a conference grant from the National Institutes of Health/
National Cancer Institute.

American Society of Preventive Oncology

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 **22nd Annual Meeting** of the American Society of Preventive Oncology, participants should be better able to:

- * comprehend state-of-the-art research on markers of cancer susceptibility
- * improve existing skills and gain new skills & understanding about recruitment of subjects in cancer prevention trials
- * understand about new intermediate markers for intervention trials
- * design community-wide interventions aimed at reducing cancer risk
- * comprehend the array of research opportunities for cancer prevention in cancer cooperative groups
- * 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.

Special Acknowledgements

The ASPO Executive Committee offers special thanks to Program Chair, **Dr. Robin Bostick**, for his extraordinary commitment in facilitating the arrangement of the program for this meeting.

The Executive Committee also wishes to thank the co-sponsors of this 22nd Annual Meeting. The sponsors have given the Program Committee complete latitude in choosing the speakers and topics which are underwritten by their contributions.

ASPO - 1998

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1998 Program Committee

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Richard R. Love, MD, MS
University of Wisconsin
School of Medicine

FOR THE FUTURE...

Please take a few minutes at the close of the meeting to complete the evaluation form at the back of this printed program. This will help future Program Committees and conference staff to better meet your professional and logistical needs. When you see any of the following people during the course of the meeting, they will welcome your comments. They constitute the Program Committee for the 1999 Meeting, which is scheduled for March 13-17, 1999, at the J.W. Marriott in Houston, Texas.

Chair: **Scott Lippman, MD**, The UT M. D. Anderson Cancer Center
Caryn Lerman, PhD, Georgetown University, Lombardi Cancer Center
Gary Goodman, MD, MS, Fred Hutchinson Cancer Research Center
Sheila Prindiville, MD, MPH, University of Colorado Health Sciences Center

PREVIEW OF THE 1999 MEETING...

Keynote Speaker: **Waun Ki Hong, MD**, M. D. Anderson Cancer Center

Symposia: *Methodologic Issues in Chemoprevention Trials*
Chair: **Gary Goodman, MD, MS**

Molecular Approaches to Cancer Prevention and Detection
Chair: **David Sidransky, MD**, Johns Hopkins University

Molecular Aspects of Nicotine Dependence
Chair: **Caryn Lerman, PhD**

Condensed Meeting Program

---For your quick review. Greater detail is available in the following pages.---

Wednesday, March 4

- 8:00 am - 8:00 pm **Registration**
- 9:00 am - 5:00 pm **Molecular Epidemiology Workshop** (Separate fee required)
Chair: Fred Kadlubar, PhD, National Center for Toxicological Research
- 9:00 am - 5:00 pm **Preventing Colon Cancer Workshop** (Separate fee required)
Chair: Graham Colditz, MD, DrPH, Harvard Medical School
- 9:00 am - 5:00 pm **Grant Writing Workshop** for NCI/K07 Fellows
(pre-registration required)
- 1:00 pm - 5:00 pm **General Meeting for NCI/K07 Fellows**
- 1:00 pm - 5:00 pm **New Investigators' Workshop**
Organizer: Alfred I. Neugut, MD, PhD
Columbia University School of Public Health
(Open only to those whose applications have been selected)
- 5:00 pm - 6:30 pm **Cancer Center Associate Directors/Cancer Prevention & Control**
- 6:30 pm - 10:00 pm **ASPO Executive Committee Meeting**

Thursday, March 5

- 7:00 am - 5:00 pm **Registration**
- 7:30 am **Study Group Breakfasts (Chemoprevention and Tobacco)**
- 9:00 am **Welcome and Distinguished Achievement Award Address**
- 10:30 am **Plenary Paper Session**
- Lunch on your own/Poster Set-up
- 1:15 pm **Symposium: "Ready, Set, Go...Stop"**
Chair: Wendy Demark-Wahnefried, PhD, Duke University Medical Center
- 3:30 pm **Two Concurrent Paper Sessions (Epidemiology and Screening)**
- 5:15 pm **NCI Listens**
- 6:00 pm **Poster Session and Reception**
- 8:00 pm **Presentation of "Best Poster" Award**
- 8:00 pm **Presentation - CRFA/ASPO Cancer Prevention Research Fellowship**

Friday, March 6

- 7:00 am - 5:00 pm **Registration**
- 7:30 am **Study Group Breakfasts (Diet/Nutrition & Women's Cancers)**
- 9:00 am **Symposium: "Trials and Tribulations of Community Intervention"**
Chair: Mary B. Daly, MD, PhD, Fox Chase Cancer Center
- 10:45 am - 11:14 **ASPO Business Meeting**
- 11:15 am **Joseph W. Cullen Memorial Award and Lecture**
- Lunch on your own
- 1:15 pm **Symposium: "Molecular Markers -- Are they Magic?"**
Chair: Melissa Bondy, PhD, The UT M. D. Anderson Cancer Center
- 3:15 pm **Two Concurrent Paper Sessions (Behav Sci/Tobacco and Chemoprevention/Nutrition/Biomarkers/Genetics)**
- Conclusion of Program**

ASPO '98 - Program Details

Wednesday, March 4

- 8:00 am - 8:00 pm **REGISTRATION**
- 9:00 am - 5:00 pm **Molecular Epidemiology Workshop** (\$75 fee required)
Haverford/
Baccarat
Fred Kadlubar, PhD, Chair
National Center for Toxicological Research
(Materials will be available at the Workshop)
- 9:00 am - 5:00 pm **Preventing Colon Cancer Workshop** (\$50 fee required)
Graham Colditz, MD, DrPH, Chair
Harvard Medical School
(Materials will be available at the Workshop)
- 9:00 am - 5:00 pm **Grant Writing Workshop** for NCI Fellows (pre-registration required)
Judiciary Suite
- 1:00 pm - 5:00 pm **New Investigators' Workshop**
(Open only to those whose applications have been reviewed & accepted)
Executive
Boardroom
- Organizer: **Alfred I. Neugut, MD, PhD, Organizer**
Columbia University
- Faculty: **John A. Baron, MD**
Dartmouth Medical School
Robert A. Hiatt, MD, PhD
Kaiser Permanente, Division of Research
Jeanne S. Mandelblatt, MD, MPH
Georgetown University Medical School
Polly A. Newcomb, PhD
Fred Hutchinson Cancer Research Center
Elizabeth A. Holly, PhD
University of California, San Francisco
- 1:00 pm - 5:00 pm **General Meeting for NCI/K07 Fellows**
Embassy Room
- 5:00 pm - 6:30 pm **Cancer Center Associate Directors/Cancer Prevention & Control**
Diplomat/
Ambassador
- 6:30 pm - 10:00 pm **ASPO Executive Committee Meeting**
Diplomat/
Ambassador

ASPO 1998 -- General Session

Thursday, March 5

REGISTRATION -- 7:00 am - 5:00 pm

7:30 - 8:45 am Hot Topics Breakfast Sessions (Two Concurrent Sessions)

Chemoprevention:

Haverford

Co-Chairs: **Roberd M. Bostick, MD, MPH**
Bowman Gray School of Medicine

Mary B. Daly, MD, PhD
Fox Chase Cancer Center

Presenter: **Gary W. Kelloff, MD**
National Cancer Center

Tobacco:

Baccarat

Co-Chairs: **Paul Cinciripini, PhD**
The UT M. D. Anderson Cancer Center

Susan Curry, PhD
Group Health Cooperative

Details available at the Registration Table

9:00 am - 10:15 am **Welcome: Margaret R. Spitz, MD**
Cabinet/Judiciary The UT M. D. Anderson Cancer Center
ASPO President

Presentation of Distinguished Achievement Award

Recipient: **Peter Greenwald, MD**
National Cancer Institute
Division of Cancer Prevention

"Chemoprevention and Nutrition in Preventive Oncology"

10:15 am

Break

Thursday, March 5, cont'd.

10:30 am - 12:15 pm **Plenary Paper Session**

Cabinet/Judiciary

Chair: **Roberd M. Bostick, MD, MPH**
Bowman Gray School of Medicine

- 10:30 am **Wong-Ho Chow**
National Cancer Institute
Division of Cancer Epidemiology & Genetics
"Body Mass Index and Risk of Adenocarcinomas of the Esophagus and Gastric Cardia"
- 10:50 am **Stephen Hursting**
The UT M. D. Anderson Cancer Center
Department of Epidemiology
"Chemoprevention of Azoxymethane-Induced Aberrant Crypt Foci and Colon Tumors in p53-Deficient Mice by Sulindac"
- 11:10 am **Caryn Lerman**
Georgetown University Medical Center
Lombardi Cancer Research Center
"Dopamine D4 Receptors and the Risk of Cigarette Smoking in African Americans and Caucasians"
- 11:30 am **Emily White**
Fred Hutchinson Cancer Research Center
"Week in Menstrual Cycle and Mammographic Breast Density Among Women Age 40-49"
- 11:50 am **Xifeng Wu**
The UT M. D. Anderson Cancer Center
"Benzo[a]pyrene Diol Epoxide Sensitivity and Risk of Head and Neck Cancer"

(Abstracts immediately follow on left hand pages)

March 5, cont'd.

12:15 pm Lunch on your own // Poster Set-up
Posters in Haverford/Baccarat

1:15 pm **Symposium:**
Cabinet/Judiciary

"Ready, Set, Go...Stop"

Chair: **Wendy Demark-Wahnefried, PhD**
Duke University Medical Center

"Recruitment--Achieving Total Numbers and Minority Accrual"

Otis W. Brawley, MD
Office of Special Populations, NCI/NIH

"Consent: The Patient's Perspective in the Era of Genetic Testing"

Robert T. Croyle, PhD
University of Utah, Department of Psychology

"Effective Use of Behavioral Theory and Findings to Optimize Adherence"

Suzanne M. Miller, PhD
Fox Chase Cancer Center

*"Establishing Stopping Rules for Prevention Trials:
Lessons Learned from CARET"*

Gilbert S. Omenn, MD, PhD
University of Michigan
Executive Vice President for Medical Affairs

3:30 pm - 5:15 pm Two Concurrent Paper Sessions

SESSION A: Cancer Epidemiology
SESSION B: Cancer Screening

Wong-Ho Chow

10:30 am

**BODY MASS INDEX AND RISK OF ADENOCARCINOMAS
OF THE ESOPHAGUS AND GASTRIC CARDIA**

Chow WH, Blot WJ, Vaughan TL, Risch HA, Gammon MD,
Farrow DC, Mayne ST, Schoenberg JB, Fraumeni JF, Jr

Purpose: To examine the effects of obesity on esophageal and gastric cardia adenocarcinomas, whose incidence rates have risen sharply in industrialized countries, and on squamous cell carcinoma of the esophagus and non-cardia gastric adenocarcinoma, whose incidence has been stable or declined.

Methods: In a population-based case-control study in 3 geographic areas in the United States, we interviewed 293 patients newly diagnosed with esophageal adenocarcinoma, 261 with gastric cardia adenocarcinoma, 221 with esophageal squamous cell carcinoma, 368 with non-cardia gastric adenocarcinoma, and 589 control subjects. Associations with body mass index were estimated by odds ratios (ORs) and 95% confidence intervals (CIs), adjusted for geographic center, age, sex, race, cigarette smoking and proxy status. **Results:** The ORs for esophageal adenocarcinoma rose with increasing usual adult BMI, from 1.3 (CI=0.8-2.2) to 2.0 (CI=1.3-3.3) to 2.9 (CI=1.8-4.7) in the second to fourth quartiles (p for trend <0.0001). The magnitude of association with BMI was greater among the younger age groups and among non-smokers. The ORs for gastric cardia adenocarcinoma rose moderately with increasing usual BMI, reaching 1.6 (CI=1.1-2.6) in the highest quartile. In contrast, usual BMI was not associated with risk of esophageal squamous cell carcinoma or non-cardia gastric adenocarcinoma.

Conclusions: Our findings provide strong evidence that obesity is an important risk factor for esophageal and gastric cardia adenocarcinomas, and suggest that the increasing prevalence of obesity in the United States may contribute to the upward incidence trends.

Stephen Hursting

10:50 am

Chemoprevention of Azoxymethane-Induced Aberrant Crypt Foci and Colon Tumors in p53-Deficient Mice by Sulindac. S. Hursting, M. Velasco, C. Woods, D. Wang, K. McKee, M. Wargovich. University of Texas- M.D. Anderson Cancer Center, Houston, TX 77030.

Hemizygous p53-knockout (p53^{+/-}) mice spontaneously develop a variety of neoplasms at an early age relative to wild-type (p53^{+/+}) mice (median survival=18 months v. 25 months). However, spontaneous colon tumors are rare in these mice. The purpose of this study was to determine whether p53^{+/-} mice demonstrate heightened susceptibility to colon tumorigenesis induced by the carcinogen azoxymethane (AOM). We also evaluated the chemopreventive effect of the non-steroidal anti-inflammatory drug sulindac, which has been shown to block AOM-induced tumors in mice and rats. Forty weanling female p53^{+/-} mice and 48 female p53^{+/+} mice were administered AOM (8 mg/kg body weight, i.p., once/week for 4 weeks). Following the final injection, the mice were randomized (20-24 mice/genotype/diet treatment) to receive: i) control diet (AIN-76A); or ii) AIN-76A diet + sulindac (125 mg/kg diet). All mice were euthanized after 32 weeks of diet treatment and their colons formalin-fixed and histopathologically analyzed for aberrant crypt foci (ACF) and colon tumors. The p53^{+/-} mice fed control diet developed, on average, 6.4 ACF compared to 3.1 ACF for the p53^{+/+} mice fed control diet ($p<0.01$), 4.8 ACF for the sulindac-treated p53^{+/-} mice ($p=0.08$), and 1.9 ACF for the sulindac-treated p53^{+/+} mice ($p<0.01$). Genotype and treatment differences were also observed for colon tumor development: 41% of the control diet-fed p53^{+/-} mice developed colon tumors compared to 18% of control-fed p53^{+/+} mice ($p<0.01$), 13% of sulindac-treated p53^{+/-} mice ($p<0.01$), and 12% of sulindac-treated p53^{+/+} mice ($p<0.01$). These findings suggest that: i) p53^{+/-} mice, relative to p53^{+/+} mice, show increased susceptibility to AOM-induced ACF and colon tumors; ii) this increased susceptibility to AOM can be offset, at least in part, by sulindac; and iii) p53^{+/-} mice provide a useful model for studying gene-environment interactions relevant to colon cancer prevention. Supported by grant P30 CA16672.

Caryn Lerman

11:10 am

DOPAMINE D4 RECEPTORS AND THE RISK OF CIGARETTE SMOKING IN AFRICAN AMERICANS AND CAUCASIANS. Lerman C., Caporaso N.E., Audrain J., Boyd N.R., Main D., Bowman E.D., Shields P.

Purpose: Nicotine has been implicated in the stimulation of brain reward mechanisms via central neuronal dopaminergic pathways. We evaluated the association of smoking and smoking cessation with a functionally active dopamine D4 receptor 48 base pair variable nucleotide tandem repeat (VNTR) polymorphism. **Methods:** Smokers (n=283) and nonsmokers (n=192) were recruited through local media for a case-control study of smoking. Smokers underwent a single minimal contact session of smoking cessation counseling, and then were followed for up to one year. **Results:** African Americans (n=72) who were heterozygous or homozygous for the long-repeat allele (i.e., S/L or L/L) had a higher risk of smoking (O.R.=7.7, 95% C.I.=1.5, 39.9; p=0.006), shorter time to the first cigarette in the morning (p=0.03) and earlier age at smoking initiation (p=0.09), compared with those with homozygote S/S genotypes. Following smoking cessation counseling, none of the African American smokers with the S/L or L/L genotypes were abstinent at two months, compared with 35% of the smokers who were homozygous S/S (p=0.02). The analysis of Caucasians (n=403) did not suggest a similar smoking risk for the D4 genotypes (O.R.=1.0, 95% C.I.=0.6, 1.6; p=0.90), or an association with smoking cessation (p=0.75). **Conclusions:** While the number of African Americans is small, this study is consistent with the hypothesis that the L alleles of the dopamine D4 receptor gene increase the risk of smoking and smoking relapse. These individuals may be prone to use nicotine to stimulate synaptic dopamine transmission, and therefore, may be less responsive to minimal contact smoking cessation treatment.

Emily White

11:30 am

WEEK IN MENSTRUAL CYCLE AND MAMMOGRAPHIC BREAST DENSITY AMONG WOMEN AGE 40-49 E White, P Velentgas, MT Mandelson, CD Lehman, JG Elmore, P Porter, SH Taplin. Fred Hutchinson Cancer Research Center and Group Health Cooperative, Seattle WA

Background: Mammography is less effective for women age 40-49 than for older women, which has led to a call for research on approaches to improve the performance of mammography among younger women. One factor that may influence mammography performance is breast density. Younger women have greater mammographic breast density on average, and increased breast density reduces the sensitivity and specificity of mammography. However, breast density may not be a fixed measure since the structure of the breast is influenced by hormonal changes. This study was conducted to investigate whether breast density varies by week of menstrual cycle. **Methods:** Premenopausal women age 40-49 years not on exogenous hormones who had a mammogram at a large health maintenance organization during 1996 were included (n= 2933). Week in menstrual cycle was based on self report of last menstrual bleeding and usual cycle length. Breast density was classified by the radiologist using the American College of Radiology classification system. **Results:** A smaller proportion of women had "extremely dense" breasts during week 1 (24%) and week 2 (24%) of their menstrual cycle than during weeks 3 (29%) and 4 (29%) ($p=0.025$ for a linear relationship between density and week of cycle, adjusted for body mass index, race, age at first birth, family history, cycle length and indication for exam). The relationship was stronger for women in the lower half of body mass index, the group who have the greatest breast density, than for those in the upper half. **Conclusion:** These findings add evidence that timing of a woman's mammogram during the follicular phase of her menstrual cycle may improve the accuracy of mammography for premenopausal women in their forties.

Xifeng Wu

11:50 am

Benzo[a]pyrene Diol Epoxide Sensitivity and Risk of Head and Neck Cancer. Wu XF, Gu J, Hong WK, Jiang H, Lee JK, Winn RJ, and Spitz MR. The University of Texas M. D. Anderson Cancer Center and School of Public Health, Houston, TX 77030 (Supported by CA 52051, CA55769, and CA68437).

Purpose: Benzo[a]pyrene diol epoxide (BPDE) is the metabolic product of benzo[a]pyrene (B[a]P), a constituent of tobacco smoke. We used a case-control study design to test the hypothesis that BPDE-induced lymphocytic chromosome aberrations may reflect inherited genetic susceptibility, and that individuals with such aberrations are at increased risk for cancer. **Methods:** Lymphocytes from primary blood cultures of 83 controls and 84 patients with head and neck cancer were treated with 2 μ M BPDE for 24 h, and the frequency of induced chromatid breakage was determined in Giemsa stained slide preparations. Cases were tested at baseline and before randomization into a chemoprevention program. Controls were identified from ongoing lung cancer studies and matched to cases on age, sex, ethnicity, and smoking status. **Results:** The cases had significantly more breaks than the controls, with the mean breaks per cell being 0.77 for cases and 0.49 for controls ($P < 0.0001$). Sixty-four percent of the cases were sensitive to BPDE (≥ 0.60 break/cell which was the 75th percentile value in the controls) compared with 27.2% of the controls. After adjustment by age, sex, ethnicity, and smoking status, a significantly elevated odds ratio(ORs) of 4.74 for BPDE sensitivity and risk of head and neck cancer was noted. When subjects were categorized into quartiles of breaks/cell values, there was a dose response relationship between cancer risk and BPDE sensitivity. The adjusted ORs for individuals with increasing breaks/cell were 5.14, 8.34, and 20.59, respectively. The ORs for BPDE sensitivity were even higher in former smokers (OR=11.18) compared to current smokers (OR=2.19), and higher in younger patients (OR=7.53) compared to older patients (OR=2.66). **Conclusion:** Previously we have shown that bleomycin is an excellent cancer risk predictor. This study showed that BPDE sensitivity may be a more relevant biological marker for predicting head and neck cancer risk.

March 5, cont'd.

12:15 pm

Lunch on your own // Poster Set-up

1:15 pm

Symposium:

"Ready, Set, Go...Stop"

Chair: **Wendy Demark-Wahnefried, PhD**
Duke University Medical Center

"Recruitment--Achieving Total Numbers and Minority Accrual"

Otis W. Brawley, MD
Office of Special Populations, NCI/NIH

"Consent: The Patient's Perspective in the Era of Genetic Testing"

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*"Establishing Stopping Rules for Prevention Trials:
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Gilbert S. Omenn, MD, PhD
University of Michigan
Executive Vice President for Medical Affairs

3:30 pm - 5:15 pm

Two Concurrent Paper Sessions

SESSION A: Cancer Epidemiology
SESSION B: Cancer Screening

March 5, cont'd.

3:30 pm - 5:15 pm SESSION A: **Cancer Epidemiology Paper Session**
Cabinet/Judiciary

Chair: **Wei Zheng, MD, PhD**
University of Minnesota

3:30 pm

James Cerhan

The University of Iowa
Department of Preventive Medicine

"A Cohort Study of Diet and Prostate Cancer Risk"

3:50 pm

Pia Fish

Fred Hutchinson Cancer Research Center
Cancer Prevention Research Program

"The Modifying Effect of Body Weight on the Risk of Breast Cancer Associated with Postmenopausal Hormone Replacement Therapy"

4:10 pm

Habibul Ahsan

Columbia School of Public Health
Division of Epidemiology

"Risk of Colorectal Cancer Among First-Degree Relatives of Patients with Colorectal Adenomatous Polyps"

4:30 pm

Stephanie Smith-Warner

Harvard School of Public Health
Department of Nutrition

"Population Attributable Risk of Breast Cancer Due to Reproductive Factors"

4:50 pm

Pirjo Pietinen

National Public Health Institute of Finland
Department of Nutrition

"Diet and Risk of Colorectal Cancer in a Cohort of Finnish Men"

James Cerhan

3:30 pm

A Cohort Study of Diet and Prostate Cancer Risk. Cerhan J, Chiu B, Putnam S, Parker A, Robbins M, Lynch C, Cantor K, Torner J, Wallace R. The University of Iowa, Iowa City, IA 52242 and the National Cancer Institute, Bethesda, MD 20892 [KC].

Diets high in fat and red meat have been hypothesized to promote prostate cancer, while there is some evidence that lycopene may be protective. We evaluated these and other dietary associations using a population-based cohort of 1,575 cancer-free Iowa men aged 40-86 years who completed a mailed questionnaire (including a 55-item food frequency questionnaire) at baseline enrollment from 1987-90 (80% response rate). The cancer and mortality experience of the cohort through 1995 was determined by linkage to several databases including the Iowa Cancer Registry and Medicare enrollment files; only three men were lost to follow-up, and 101 incident prostate cancer cases were identified. In age and energy adjusted analyses, higher intake of linoleic acid, carbohydrate, and vitamin C were positively associated with prostate cancer risk, while intake of lycopene, retinol, and total protein were inversely associated with risk; there were no associations with saturated fat, oleic acid, red meat, vitamin A, or alpha or beta carotene. In the final multivariate model which included age, total energy, and other non-dietary factors, higher intake (highest versus lowest tertile) of linoleic acid (Relative Risk (RR)= 2.7; 95% confidence interval 1.4-5.1; p -trend=0.002), carbohydrate (RR=4.3; 2.1-8.9; p -trend=0.001), lycopene (RR=0.5; 0.3-0.9; p -trend=0.03), retinol (RR=0.6; 0.3-1.1; p -trend=0.09), and red meat (RR=1.6; 0.8-3.1; p -trend=0.2) were associated with prostate cancer risk; total protein was no longer associated with risk after multivariate adjustment. Exclusion of well-differentiated/localized cases strengthened these estimates and eliminated the association for vitamin C. These data support a role for linoleic acid and red meat in prostate carcinogenesis, and a protective role for lycopene and retinol. The strong positive association with carbohydrate is novel and requires confirmation.

Pia Fish

3:50 pm

The modifying effect of body weight on the risk of breast cancer associated with postmenopausal hormone replacement therapy.

Fish P; Daling JR; Voigt LF; Cushing KL; Newcomb PA; Muscat JE; Sellers TA; van den Brandt PA; Potter JD

Purpose: To assess the association between hormone replacement therapy (HRT) and breast cancer risk according to body weight. Methods: We identified published studies of breast cancer risk and HRT (estrogen-only and estrogen-progestin) that also presented data on body weight. The collaborating scientists provided data on eight case-control and four cohort studies using our specified cut-points and confounders (2516 cases, 2646 controls; 624 cases, 139,555 person years). Risk ratios, weighted for study size, were calculated for the combined data set. Results: In the case-control studies, among the women in the lowest quartile of body weight, the association of ever-use and long-term use of HRT with breast cancer risk, compared to never users, was $OR=1.23$ (CI 1.03-1.46) and $OR=1.28$ (CI 1.02-1.62), respectively. Among women in the upper quartile for body weight, the corresponding risk estimates were $OR=0.89$ (CI 0.69-1.14) and $OR=0.92$ (CI 0.61-1.38). In the cohort studies, ever-users in the lowest quartile of body weight had $RR=1.54$ (CI 1.06-2.23) and long-term users, $RR=1.56$ (CI 0.93-2.63). In the upper quartile for body weight, ever-use risk was estimated at $RR=0.73$ (CI 0.55-0.98), and extended use at $RR=0.50$ (CI 0.29-0.86). Conclusions: The association between HRT and breast cancer risk is modified by weight; all the increased risk is seen among lean but not heavy women.

Habibul Ahsan

4:10 pm

**Risk of Colorectal Cancer Among First-Degree Relatives of
Patients with Colorectal Adenomatous Polyps**

Ahsan H, Neugut AI, Garbowski GC, Jacobson JS, Forde KA,
Treat MR, Waye JD

Division of Epidemiology, Columbia School of Public Health,
New York, New York

While the risk of colorectal cancer among family members of patients with colorectal cancer is well documented, the risk among family members of patients with colorectal adenomas is less clearly documented. This colonoscopy-based study in New York City, employing a reconstructed cohort design, examined the risk of colorectal cancer among 1554 first-degree relatives of 244 patients with newly diagnosed adenomas as compared to 2173 first-degree relatives of 362 endoscopically "clean" controls, utilizing Cox proportional hazards regression analyses adjusted for age, sex and race. The risk of colorectal cancer was elevated (RR 1.55, 95% CI 1.11-2.17) among first-degree relatives of patients with newly diagnosed adenomas as compared to those of controls. The risk of colorectal cancer among family members increased with decreasing age at diagnosis of adenoma among probands. Among first-degree relatives of patients whose adenoma was diagnosed at age 50 or before, the risk was more than four times (RR 4.36, 95% CI 2.24-8.51) that of first-degree relatives of patients whose adenoma was diagnosed at an age more than 60. First-degree relatives of patients with newly diagnosed adenomas, particularly those diagnosed at age 50 or younger, are at significantly increased risk for colorectal cancer.

Stephanie Smith-Warner

4:30 pm

Population Attributable Risk of Breast Cancer due to Reproductive Factors, Anthropometric Factors and Alcohol Intake. S.A. Smith-Warner, D. Spiegelman and D.J. Hunter for the Pooling Project of Prospective Studies of Diet and Cancer Investigators, Harvard School of Public Health, Boston, MA 02115.

The potential impact of lifestyle and reproductive factors for breast cancer has been evaluated by estimating the population attributable risk due to these factors. The population attributable risk is the proportion of breast cancer cases that would be avoided if the risk factor distribution of a high risk population changed to that of a low risk population. We estimated population attributable risks for postmenopausal breast cancer as a function of seven established breast cancer risk factors: age at menarche, parity, age at first birth, age at menopause, body mass index, height, and alcohol intake. The cutpoint for each dichotomous variable was the median value of that variable from a 1983 survey of 65 rural Chinese counties (Chen J et al. Diet, Life-style and Mortality in China. A Study of the Characteristics of 65 Chinese Counties. Oxford: Oxford University Press, 1990), an area with low breast cancer rates. The relative risks for these factors were estimated from the Pooling Project of Prospective Studies of Diet and Cancer. U.S. population prevalences for the breast cancer risk factors were estimated from the Cancer Epidemiology Supplement of the 1987 National Health Interview Survey. The population attributable risks for individual risk factors ranged from 2% for alcohol to 29% for age at menarche. The combined population attributable risk was 44% for the four reproductive factors, 32% for the two anthropometric factors, and 63% for all seven factors. Thus, a large proportion of the difference in breast cancer rates between a country with high breast cancer rates (such as the United States) and China may be attributable to differences in the reproductive and anthropometric factors between these two populations.

Pirjo Pietinen

4:50 pm

Diet and Risk of Colorectal Cancer in a Cohort of Finnish Men.

Pietinen P , Malila N , Virtanen M , Hartman T, Albanes D ,
Virtamo J. National Public Health Institute, Helsinki, Finland and
National Cancer Institute, Bethesda, MD.

1. Purpose of study. We investigated the association between diet and risk of colorectal cancer in a trial-based cohort of 29 133 smoking men aged 50 to 69 years.

2. Methods. The men participated in the Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study and 27 104 men completed a validated dietary questionnaire at baseline. After on average 8 years of follow-up we documented 194 cases of colorectal cancer. The analyses were carried out using the Cox proportional hazards model. All the analyses were carried out adjusting for age and trial supplement group.

3. Results. Calcium intake was found to be significantly inversely associated with risk of colorectal cancer. The relative risk for men in the highest quartile of calcium intake was 0.62 (95 % CI 0.42-0.93) compared with men in the lowest quartile of intake. Intake of dietary fiber was not associated with risk of colorectal cancer (relative risk in the highest vs. the lowest quartile of intake 0.99 (95 % CI 0.66-1.50), nor was fat intake (relative risk 0.79, 95 % CI 0.54-1.17).

Consumption of dairy products was inversely associated with risk of colorectal cancer. For men in the top quartile of milk consumption, the relative risk of colorectal cancer was 0.64 (95 % CI 0.32-0.96) compared with men in the lowest quartile. The consumption of meat was not associated with risk of colorectal cancer, and no association was found for different types of meat, either. Frequency of consumption of fried meat was also not associated with risk of colorectal cancer. Vegetable or fruit consumption were not associated with risk of colorectal cancer, either.

4. Conclusions. In this population consuming a diet high in calcium, fat, meat and fiber, only calcium intake was inversely associated with risk of colorectal cancer.

March 5, cont'd.

3:30 pm - 5:15 pm SESSION B: **Cancer Screening Paper Session**

Potomac/Patuxent

Chair: **Electra Paskett, PhD**
Wake Forest University School of Medicine

3:30 pm **W. Thomas London**

Fox Chase Cancer Center
Population Science

*"Differences in Risk of Hepatocellular Carcinoma (HCC)
Between Senegal and Haimen City, P.R. China: The
Malaria-peanut Hypotheses"*

3:50 pm

Mack Ruffin

University of Michigan
Department of Family Medicine

*"Knowledge and Attitude Regarding Prostate Cancer Screening
Among Men in Michigan"*

4:10 pm

Alan Kristal

Fred Hutchinson Cancer Research Center
Cancer Prevention Research Program

*"Trends and Predictors of Prostate Cancer Screening in
Washington State"*

4:30 pm

Thomas Vogt

University of Hawaii
Cancer Research Center of Hawaii

*"Screening Interval and Stage at Diagnosis for Cervical and
Breast Cancer"*

4:50 pm

Margaret Mandelson

Group Health Cooperative
Center for Health Studies

"Recall Accuracy of Fecal Occult Blood Testing"

W. Thomas London

3:30 pm

Differences in risk of hepatocellular carcinoma (HCC) between Senegal and Haimen City, P.R. China: The malaria-peanut hypotheses. London WT, Evans AA, McGlynn KM, Ross E, Shen FM, Chen GC, Chen G, Gao LL, M'Boup S, Dramé B, Diallo A, Niouky G, Fall C, Johnston J.

Purpose: To explain the >10 fold mortality from HCC in Haimen City, China than Senegal, West Africa.

Prospective studies revealed HCC age-standardized mortalities of 168/10⁵/yr among 60,954 men in Haimen City [878/10⁵/yr in hepatitis B virus (HBV) carriers] and 17/10⁵/yr among 19,469 military men in Senegal (68/10⁵/yr in HBV carriers). Exposures to the 2 major risk factors for HCC are higher in Senegal. Age-standardized prevalence of chronic HBV infection [HBsAg(+)] is 20% in the Senegalese, 17% in the Haimen cohort. Exposure to aflatoxin B1 (AFB1), as assayed by serum AFB1-albumin adducts, was universal & high among Senegalese, low among Chinese. Among HBV carriers, serum HBV DNA (by Southern blot) was detected in >25% of Haimen Chinese throughout adult life, whereas by age 30 <4% of Senegalese were HBV DNA(+). If persistence of high levels of HBV replication is partly responsible for the increased risk of HCC in Haimen, why is HBV replication so low in Senegal?

Hypotheses: 1) Chronic, recurrent attacks of malaria in Senegal cause production of cytokines (tumor necrosis factor- α , interferon- γ) which degrade HBV intermediates, suppress HBV replication, reduce viral load, & HCC risk. 24/49 Senegalese soldiers followed for 1 yr had 1-3 febrile illnesses diagnosed & treated as malaria.

2) Carcinogenicity of AFB1 exposure in Senegal is reduced by high folate (from peanuts, ~100 μ g/g), low alcohol consumption; increased by low folate, high alcohol consumption in China. Folic acid, alcohol are associated with availability of methyl groups for methylation of DNA. Reduced DNA methylation may increase HCC risk.

Mack Ruffin

3:50 pm

Knowledge And Attitude Regarding Prostate Cancer Screening Among Men In Michigan

M.T. Ruffin, J. Zimmerman, P. Valliere, R. Mohr
University of Michigan and Michigan Public Health Institute

Purpose: To investigate how much men in Michigan know about prostate cancer and what they are doing to detect its presence early.

Methods: A telephone survey was conducted with a stratified random-digit-dial sample of 2,671 adults aged 40 and above in Michigan. Only men (n=1,197) were asked questions that related to prostate cancer. African-American men were oversampled to ensure adequate number of respondents for analysis (n = 847, or about 32% of the total sample).

Results: Of all eligible adults contacted, 61.2% completed the survey. Most men sampled (68.7%) report that they have had a digital rectal examination (DRE) sometime in their life. Almost two-thirds (64.7%) of Caucasian men report having had a screening DRE, compared with just less than half (46.5%) of all African-Americans. In contrast, 31.0% of all men sampled report having had a PSA test sometime in their life. Several attributes distinguish respondents who are significantly more likely than others to report that they have had a screening PSA test: they are more likely to be Caucasian [OR = 3.11 (1.35-7.17)]; knowledgeable of the controversies surrounding routine PSA testing [OR 3.06 (2.07-4.05)]; have a family history of prostate cancer [OR = 1.88 (1.25-2.84)]; have had a recent check-up [OR = 1.39 (1.13-1.71)]; are likely to be older [OR = 1.10 (1.08-1.13)]; and have high levels of knowledge of prostate cancer [OR = 1.20 (1.07-1.33)]. The leading reason provided for never having had a DRE or PSA was lack of a perceived need to be screened (61.2% DRE and 69.0% PSA). Logistic regression models are under development to evaluate the various predictors of being screened for prostate cancer. Men reporting never having had either screening test for prostate cancer, 91.3% would do so upon recommendation of a doctor.

Conclusion: The findings suggest a need for public health policy in Michigan to help better inform men about prostate cancer and the methods available for its early detection.

Alan Kristal

4:10 pm

Trends and Predictors of Prostate Cancer Screening in Washington State. Close D, Kristal A, Li S, Patterson R, White E. Fred Hutchinson Cancer Research Center, Seattle, WA.

This report describes trends in prostate cancer screening (PCS), contrasting screening before (1989) and after (1995) prostate-specific antigen (PSA) was widely available, and associations of demographic and health-related characteristics on PCS. Data are from two random-digit dial Washington State surveys and analyses are restricted to men ages 40-79. After adjustment for sampling probability and the state census, 50.9% of men in 1989 (N = 411) reported PCS by digital rectal exam (DRE) in the previous 2 years, compared to 53.6% in 1995 (N = 332) reporting any PCS (DRE and/or PSA). Trends did not differ by education or income, but screening rates increased from 66.6% to 78.1% in men age 60+ ($p < 0.05$). In 1995, 17.7% received DRE only, 16.4% PSA only and 44.0% both. In 1995, PCS included PSA for 29.8% of men under age 50, 58.8% in those 50-59, and 77.8% in those 60-79. Relative odds for any PCS were 5.5 for age 60+ vs. <50, 2.4 for 16+ years of education vs. ≤ 12 , and 4.0 for 2+ physician visits in previous 2 years vs. none (controlled for other demographics, all $p < 0.05$). Characteristics generally associated with good health, including low body mass index and low fat and high fruit and vegetable intakes, were also significantly associated with PCS. We conclude that the introduction of PSA has had little impact on the proportion of men screened for prostate cancer, though it has changed screening procedures and outcomes.

Thomas Vogt

4:30

Screening interval and stage at diagnosis for cervical and breast cancer.

Vogt TM, La Chance PA, Glass A

Purpose: To determine the relationship between screening interval and stage at diagnosis of breast and cervical cancers among members of a large HMO.

Methods: The intervals since last screening screening were compared for invasive and noninvasive cases of breast and cervical cancer. Cervical cancer patients had a diagnosis of severe atypia-dysplasia (N=4,323), dysplasia (N=1,468), suspicious-microinvasion-in situ cervical carcinoma (N=143) and invasive cervical cancer (N=778). Breast patients had diagnoses of LCIS (N=14), DCIS (N=129), and breast cancer stages 2-9 (N=778). The proportion of women not screened for two, three, four, and five or more years prior to diagnosis was calculated for each stage at diagnosis.

Results: 23% of all eligible women had not received a pap smear in 3 or more years; 43% of women with atypia had not been screened in 3+years; 68% of women with invasive cervical cancer had not been screened in 3+ years, and 62% of invasive cervical cancer cases had not been screened for 5+ years prior to diagnosis. 13% of all women eligible had not received a mammogram in 3+ years; 8.4% of LCIS/DCIS patients, and 14.5% of cancer, stages 2-9, respectively, had not been screened in 3+ years.

Conclusions: Women who are rarely or never screened constitute a disproportionate percentage of invasive cervical cancer patients, but not of breast cancer patients. Efforts to improve cervical cancer screening should focus heavily on outreach to those not screened in the last 3-5 years rather than on the general population.

Margaret Mandelson

4:50 pm

Recall accuracy of fecal occult blood testing.

MT Mandelson, A LaCroix, L Anderson, N Lee, M Nadel

Most studies that validate self-reported cancer screening have focussed on Pap smears and mammograms while comparatively little is known about recall of colorectal cancer (crc) screening tests. Recent screening guidelines include a recommendation for annual fecal occult blood (FOB) testing and self-reported utilization is frequently the sole source of data available to researchers and clinicians. This study validated FOB testing ascertained by a telephone questionnaire in a sample of 1094 women 50 to 80 years of age surveyed about their use of clinical preventive services at Group Health Cooperative, a managed care organization in western Washington state.

Seventy percent of study women reported at least one FOB test in the previous five years. Testing was significantly related to older age, years since last routine preventive examination, prior mammography, and personal history of colorectal polyps. Current smokers were less likely to report testing ($p < .05$) and first degree family history of crc was unrelated to testing patterns. Rates of testing by self-report were 11% higher than the true prevalence in this population and agreement between self-report and record review was fair (kappa 0.57; 95% CI: 0.52-0.62). Sensitivity of self-report was high, 0.90, while over one third of women with no record of a test reported that one occurred resulting in a specificity of 0.64. Logistic regression analysis showed that older women and women whose physicians strongly encourage crc screening were most likely to accurately recall prior FOB tests. Race, education, smoking and health history were unrelated to agreement between survey data and laboratory records.

The self-report is the most commonly available information about the occurrence and timing of cancer detection procedures, but these findings show that it should be used cautiously for both clinical decision making and for research and surveillance.

March 5, cont'd.

5:15 pm - 6:00 pm
Cabinet/Judiciary

NCI Listens

The Board of Scientific Advisors (BSA) of the National Cancer Institute (NCI) believes it is important to interact with and receive feedback from the clinical and laboratory research communities affected by NCI policies. BSA Members and NCI staff invite conference participants to join them for this session. A brief presentation will be given by NCI staff emphasizing the status of grant funding, the By-Pass Budget, and the status of several new initiatives including a review of various Program Review Group reports. The brief presentation will be followed by an open question and answer period. The NCI is committed to providing written feedback to the Society concerning issues raised during the session. The BSA hopes that conference participants will take advantage of this opportunity to raise their concerns.

Chair: **Mary B. Daly, MD, PhD**
Associate Director, Cancer Control Science Program
Fox Chase Cancer Center

Speaker: *An Overview of NCI Programs & Initiatives*

Barbara Rimer, PhD
Director, Division of Cancer Prevention and
Population Science
National Cancer Institute, N I H

Participants: *Question & Answer Session*

Virginia L. Ernster, PhD
Professor, Department of Epidemiology & Biostat.
School of Medicine, University of California,
San Francisco

Paulette S. Gray, PhD
Executive Secretary, BSA
Deputy Director, Division of Extramural Activities
National Cancer Institute, N I H

Peter Greenwald, MD
Acting Director, Division of Cancer Prevention
National Cancer Institute, N I H

Caryn E. Lerman, PhD
Director, Cancer Genetics
Lombardi Cancer Research Center
Georgetown University Medical Center

March 5, cont'd.

6:00 pm - 8:00 pm

Haverford/

Baccarat

Poster Session & Reception

8:00 pm

Presentation of "Best Poster" Award

8:00 pm

Introduction of 1998 Recipient of the Cancer Prevention Research Fellowship

Carolyn Aldige'

President, Cancer Research Foundation of America

This Fellowship is sponsored by the Cancer Research Foundation of America and the American Society of Preventive Oncology, and is funded by "CRFA".

Friday, March 6

7:00 am - 3:00 pm

Registration

7:30 am - 8:45 am

Hot Topics Breakfast Sessions (Two Concurrent Sessions)

Diet & Nutrition:

Haverford

Chair: **R. Sue McPherson, PhD**

The UT School of Public Health

Details available at the Registration Table

Women's Cancers

Baccarat

Chair: **Kathy Helzlsouer, MD, MHS**

Johns Hopkins University

School of Hygiene & Public Health

Details available at the Registration Table

March 6, cont'd.

9:00 am

Symposium:

Cabinet/Judiciary

"Trials and Tribulations of Community Interventions"

Chair: **Mary B. Daly, MD, PhD**
Fox Chase Cancer Center

"From Research to Action: Fruit & Vegetable Interventions for Cancer Prevention"

Jerianne Heimendinger, ScD
AMC Cancer Research Center

"Federal-State Partnerships in Cancer Screening"

Nancy Lee, MD
Centers for Disease Control
Division of Cancer Prevention & Control

"Chemoprevention in the Community Oncology Setting"

Richard Kosierowski, MD
North Penn Hospital

10:30 am

Break

10:45-11:15 am

ASPO Business Meeting

11:15 am

Joseph W. Cullen Memorial Award and Lecture

Jack E. Henningfield, PhD
Johns Hopkins University School of Medicine
Dept. of Psychiatry and Behavioral Science
Pinney Associates
Vice President, Research & Health Policy

"Tobacco Addiction: Science, Medicine and Public Health Policy"

The Joseph W. Cullen Award is given annually to memorialize the many contributions of Joe Cullen. Dr. Cullen was an active ASPO member and Program Coordinator for the National Cancer Institute's Smoking Tobacco and Cancer Program. ASPO is grateful to SmithKline Beecham for sponsoring this award.

March 6. cont'd.

1:15 pm

Symposium

Cabinet/Judiciary

"Molecular Markers -- Are They Magic?"

Chair:

Melissa Bondy, PhD

The UT M. D. Anderson Cancer Center

"Markers of Susceptibility"

Fred Kadlubar, PhD

National Center for Toxicological Research
Division of Molecular Epidemiology

"Intermediate Endpoint Markers"

Arthur Schatzkin, MD, PhD

National Cancer Institute

"Markers of Exposure"

Curtis Harris, PhD

National Cancer Institute
Laboratory of Human Carcinogenesis

3:00 pm

Break

3:15 pm - 5:00 pm

Two Concurrent Paper Sessions

SESSION C: Tobacco/Behavioral Science

SESSION D: Chemoprevention/Nutrition/Biomarkers/Genetics

March 6, cont'd.

3:15 pm

SESSION C: **Tobacco/Behavioral Science
Paper Session**

Cabinet/Judiciary

Chair: **Michael O'Malley, PhD, MSPH**
University of North Carolina at Chapel Hill

3:15 pm

Neal R. Boyd, Jr.

Fox Chase Cancer Center
Tobacco Control Research

"A Tailored CIS Intervention for African American Smokers"

3:35 pm

Gary D. Friedman

Kaiser Permanente, Division of Research

"Cigar Smoking and Cancer Incidence"

3:55 pm

Ellen R. Gritz

The UT M. D. Anderson Cancer Center
Department of Behavioral Science

Smoking Behavior in a Tri-Ethnic Sample of Adolescents"

4:15 pm

Isaac M. Lipkus

Duke University Medical Center, Dept. of Psychiatry

*"Lowering the Perceived Risk of Breast Cancer Does Not Deter
Women from Getting a Future Mammogram"*

4:35 pm

Lori A. Crane

University of Colorado Health Science Center

*"Physicians' and Physician Assistants' Recommendations
for Cancer Screening in Colorado"*

(Abstracts follow immediately on left-hand pages)

Neal R. Boyd, Jr.

3:15 pm

A TAILORED CIS INTERVENTION FOR AFRICAN AMERICAN SMOKERS

Orleans, C.T., Boyd, N.R., Bingler, R., Heller, D., Fairclough, D., McClatchey, M., Sutton, C.

This paper presents results of a two-year study of tailored counseling strategies among African American smokers ($n=1,422$) who called four regional NCI Cancer Information Service (CIS) offices in response to a radio-based media campaign in 14 communities. Callers were randomly assigned to receive either the standard CIS quit smoking counseling and guide (*Clearing the Air*) or counseling and a guide (*Pathways to Freedom*) tailored to the quitting needs and barriers of African American smokers. Callers were predominantly female (63.5%), aged 20-49 (88%), with a HS education or more (84%). Mean smoking history was 18 years; mean smoking rate was 19 cigarettes/day. Standard ($n=689$) and Tailored ($n=733$) group S's did not differ on most baseline measures, but Standard Group S's were more likely to be in the preparation stage ($p=0.012$).

On most measures, Standard and Tailored counseling/guides received similar ratings, but the Tailored guide was rated as having more appealing photos ($p=0.001$) and as being more appropriate for family members ($p=0.003$). Six month follow-up with 893 S's (response rates = 63% Standard, 62% Tailored) showed significantly more quit attempts ($p=0.002$) and greater use of pre-quitting strategies ($p<0.05$) among Tailored than Standard S's, but no differences in self-reported one-week abstinence (9.1% Standard, 10.1% Tailored) (ns). An unplanned, opportunistic 12-month follow-up of S's recruited in the last year of the study ($n=445$) (response rates = 57% Standard, 60% Tailored) showed a significantly higher quit rate (8.8% Standard, 15% Tailored) for Tailored S's ($p=0.031$). Results show promise for radio-based strategies to reach underserved smokers, and for tailored approaches to boost quit attempts and success rates among African American smokers.

Gary D. Friedman

3:35 pm

CIGAR SMOKING AND CANCER INCIDENCE.

Friedman GD, Tekawa IS, Iribarren C, Sidney S.

Cigar smoking has undergone a resurgence in recent years but its health effects have not been studied extensively. We compared the incidence through 1996 of cancer in 1810 men who reported current cigar smoking at Kaiser Permanente multiphasic health checkups in 1964-1973 with that in 22,654 nonsmoking men. Age at examination ranged from 20 to 91 years (mean 40.6) and all subjects denied ever smoking cigarettes or a pipe. The cigar smoker/nonsmoker age adjusted rate ratio for all cancers (except nonmelanoma skin) based on 210/1973 cases was 1.11 (95% confidence interval 0.97-1.28). The corresponding numbers for selected sites were as follows: lung: 11/57, 2.05 (1.08-3.91), mouth and pharynx: 8/42, 2.01 (0.95-4.29) all upper aerodigestive: 10/61, 1.74 (0.89-3.40), all cigarette-related cancers: 42/313, 1.41 (1.02-1.94). Cigar smoking does involve some increased cancer risk including an apparent two-fold increase in cancers of the lung and of the mouth and pharynx.

Ellen R. Gritz

3:55 pm

Smoking Behavior in a Tri-Ethnic Sample of Adolescents

Gritz ER, Prokhorov AV, de Moor CA, Department of Behavioral Science, UT M. D. Anderson Cancer Center, Houston, Texas

As part of the NCI-funded "Smoking Initiation in African-American Youth" project, a volunteer cohort of 5th, 8th, and 12th grade students were followed over a 2-year period. Data presented here are based on a survey at the two-year follow-up. Smoking behavior was characterized among a tri-ethnic sample that included 334 White, 301 African-American, and 180 Hispanic adolescents.

Consistent with previous studies, white students regularly smoked in substantially higher proportions (12.6%) than African-American students (3.7%), with Hispanic adolescents in-between (4.4%). The modified Fagerström Tolerance Questionnaire revealed the highest percentage of smokers with substantial degree of nicotine dependence among Whites, followed by African-Americans, followed by Hispanics. Withdrawal symptoms were also most prevalent among Whites, followed by African-Americans, followed by Hispanics adolescents. However, these data should be interpreted with caution due to the small numbers of subjects.

In conclusion, smoking prevalence and selected characteristics among adolescent smokers appeared to vary by ethnicity. The results of this study may help develop theory-based, culturally appropriate smoking intervention programs for adolescents.

Supported by grant R01 CA64068 from the National Cancer Institute "Smoking Initiation in African-American Youth", Ellen R. Gritz, Ph.D., P.I.

Isaac M. Lipkus

4:15 pm

Lowering the perceived risk of breast cancer does not deter women from getting a future mammogram

Isaac M. Lipkus, Monica Biradavolu, and Barbara K. Rimer

Women often overestimate their risk of getting breast cancer. We examined whether improving accuracy by giving women individualized estimates of their objective risk alters significantly: 1) their future estimates of risk, and 2) their intention to get mammograms. 122 women ($M_{\text{age}} = 47.9$) were asked on a 0 to 100 scale for their perceived 10 year and lifetime risk of getting breast cancer, emotional reactions toward getting breast cancer (i.e., sum of feeling worried, fearful and anxious) and their intentions to get a future mammogram. Two weeks later, these women were provided with their objective 10 year risk of getting breast cancer using the Gail et al. (1989) algorithm (range 1.4% - 6.5%). Ss were then asked for their views, using 7-point Likert scales, of the accuracy, credibility, and trustworthiness of their objective estimate, their 10 year and lifetime risk of getting breast cancer, emotional reactions toward getting breast cancer, and their intentions to have a mammogram.

Women found their objective 10 year risk to be accurate ($M=5.4$), credible ($M=5.6$), and trustworthy ($M=5.5$), and the estimate served to decrease their perceived 10 year ($M_{\text{pre}} = 29.6$ vs. $M_{\text{post}} = 21.0$, $p<.001$) and lifetime risk ($M_{\text{pre}} = 36.3$ vs. $M_{\text{post}} = 29.1$, $p<.001$). The estimate also reduced women's negative emotions about getting breast cancer ($M_{\text{pre}} = 6.3$ vs. $M_{\text{post}} = 5.9$, $p<.05$). Providing women with their risk increased intentions (16.0% of Ss) or did not alter their intent to get a mammogram (68.9% of Ss). These results suggest that: 1) while women accepted the validity of the risk estimate, they continued to feel their risk was higher than indicated, and 2) informing women of their lower than expected risk did not decrease their intent to have a future mammogram.

Lori A. Crane

4:35 pm

**PHYSICIANS' AND PHYSICIAN ASSISTANTS'
RECOMMENDATIONS FOR CANCER SCREENING IN
COLORADO**

Crane LA, Ehlers G, Byers TE, Crockett G, Roark R, Roper K.
University of Colorado Health Sciences Center

Research in smoking cessation and screening mammography has found that physician advice has a significant impact on patient behavior. The purpose of this study was to determine the cancer screening recommendations and prevention counseling habits of Colorado health care providers, and examine how personal experience of providers might affect these practices. In 1996, 302 family practice physicians (FPPs) and physician assistants (PAs) practicing in the state of Colorado responded to a mailed survey regarding their own preventive behaviors and the recommendations that they make to patients (response rate 68% after two mailings and a telephone call). As a group, PAs recommended that cancer screening using fecal occult blood test (FOBT), sigmoidoscopy, prostate specific antigen (PSA), and mammography begin at a younger age than was recommended by FPPs. Recommendations of FPPs were generally more in line with national guidelines. Females, those practicing family medicine (FPPs and PAs combined), and those who practice more primary prevention were more likely than others to routinely counsel patients on diet and exercise. Having personally had an FOBT, digital rectal exam, or total skin exam was significantly related to recommending these exams to patients, with odds ratios in the range of 2.2-3.3. Female practitioners were more likely to believe in the benefits of early detection of cancer, but for all providers, belief in the benefits was significantly related only to recommending PSA testing. These results suggest that practitioners' own beliefs and behaviors affect their medical practice related to cancer prevention and screening. The results also suggest that PAs may, in some cases, be over-recommending cancer screening tests.

March 6. cont'd.

3:15 pm

**SESSION D: Chemoprevention/Nutrition/
Biomarkers/Genetics Paper Session**

Potomac/Patuxent

Chair: **Anna Giuliano, PhD**
University of Arizona Cancer Center

3:15 pm

Wendy Demark-Wahnefried

Duke University Medical Center
Department of Surgery

*"Fruit and Vegetable Consumption of Rural African Americans:
Baseline survey Results of the Black Churches United for
Better Health 5 a Day Project"*

3:35 pm

Lie Cheng

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

"DNA Repair and Lung Cancer -- A Case Control Study"

3:55 pm

Stimson P. Schantz

Memorial Sloan-Kettering Cancer Center
Department of Surgery

"Mutagen-Sensitivity and 3p Losses in Head and Neck Cancer"

4:15 pm

Richard R. Love

University of Wisconsin
Department of Medicine

*"A Trial of Low-Dose DFMO on Individuals at Risk for
Colon Cancer"*

4:35 pm

Chanita Hughes

Georgetown University Medical Center
Lombardi Cancer Center

*"Factors Associated with Participation in Pre-Test Education
among African American Women"*

Wendy Demark-Wahnefried

3:15 pm

Fruit and Vegetable Consumption of Rural African Americans: Baseline Survey Results of the Black Churches United for Better Health 5 A Day Project McClelland J, Demark-Wahnefried W, Mustian D, Lashley J, Cowan A, Campbell MK. NC State University, Raleigh; Duke University Medical Center, Durham; University of NC at Chapel Hill and NC Division of Adult Health Promotion, Raleigh

Purpose: To determine baseline fruit and vegetable (F&V) consumption (total and specific) among rural African Americans participating in a 5 A Day intervention study and factors associated with intake.

Methods: A telephone survey was administered to 3,737 adult members of 50 Black churches from 10 rural counties in North Carolina. The survey measured demographic characteristics, knowledge and beliefs regarding cancer and nutrition, and food frequency data related specifically to F&V consumption. Associations between F&V consumption and income, education, age, gender, marital status, the presence of children within the household, and knowledge specific to the 5 A Day program were explored using descriptive and regression analyses.

Results: Preliminary analyses show a mean intake of 3.7 ± 2.4 daily servings of F&V's within this population of rural African Americans. Strong associations were found between F&V intake and both age and gender ($p < 0.001$), with older females consuming the most, and younger males consuming the least F&V's.

Conclusion: Preliminary findings from this population parallel national studies showing U.S. intakes fall short of the 5 A Day guidelines. Gender and age were strongly associated with F&V intake. Results reinforce the need to promote the 5 A Day message/program. Such messages may prove of optimal benefit if targeted specifically to younger adult males whose intakes are especially low.

Lie Cheng

3:35 pm

DNA Repair and Lung Cancer--A Case-Control Study.

Cheng L, Guo ZZ, Hong WK, Spitz MR, Wei Q. Department of Epidemiology and Thoracic/Head and Neck Medical Oncology, University of Texas MD Anderson Cancer Center, Houston, TX 77030

Susceptibility to tobacco-related cancers may be influenced by genetically determined variation in DNA repair capability that is responsible for DNA damage removal. It has been shown that unrepaired DNA damage can result in mutations in tumor suppressor genes such as p53. To study the role of DNA repair capacity (DRC) in lung cancer, we conducted a case-control study to test the hypothesis that decreased DRC is associated with increased risk of lung cancer. DRC was measured in mitogen-stimulated peripheral blood lymphocytes by the host cell reactivation assay, which measures cellular repair of a reporter gene damaged by benzo(a)pyrene diol epoxide (60 μ M), an ultimate tobacco carcinogen. Among 82 newly diagnosed cases and 86 healthy controls frequency-matched on age, sex, ethnicity and tobacco use, we observed a more than 30% decrease in the mean DRC level between cases (8.5%) and controls (12.3%) ($P < 0.01$). Using the median DRC value (10.1%) of the controls as the cutoff point, the cases were significantly more likely than controls to have reduced DRC (odds ratio, 2.8; 95% confidence interval, 1.4–5.5). There was a dose-response pattern observed (trend test: $P < 0.01$). In addition, young cases (<65 years) and former and current smokers were more likely than controls to have reduced DRC. Our results suggest that individuals with reduced DRC are at higher risk of developing lung cancer (supported by CA55769, CA68437 and CA70334).

Stimson P. Schantz

3:55 pm

MUTAGEN -SENSITIVITY AND 3p LOSSES IN HEAD AND NECK CANCER Schantz S, Huang Q, Hsu T, Huvos A, Chaganti R

The interaction between environmental exposures and host-susceptibility may lead to specific mutational events within head and neck cancer. To better understand the relationship of mutagen sensitivity and tobacco and/or alcohol consumption on HNSSC carcinogenesis, we examined LOH on chromosome 3p in 59 HNSCC using 10 highly informative microsatellite markers. Forty-six of the 59 invasive cancers showed allelic loss at one or more loci. Consistent with previous investigations, three discrete regions of deletions were identified: 3p13-14, 3p21-22, and 3p25. The frequency and types of deletions were dependent upon tobacco and alcohol exposures. LOH involving any of the informative loci increased with increasing tobacco exposure, reaching 67% loss of informative loci in those who smoked ≥ 20 cigarettes per day versus 40% loss in non-smokers ($p < 0.01$). The distal arm of 3p was most frequently influenced by tobacco exposure. In contrast, heavy alcohol use was associated with whole arm loss of chromosome 3p rather than identifiable site-specific damage. In both instances, the presence of mutagen-sensitivity within an individual patient enhanced the probability of tobacco- and alcohol-related mutational events. This was most evident in those with heavy alcohol use in which the odds-ratio of whole arm loss increased over 20-fold (95% CI, 1.6-321.9) in those individuals who were both mutagen sensitive as well as who drank more than 29 drinks per week ($p < 0.05$). Furthermore, patients with whole arm loss were also more likely to present with cervical lymph node metastases and advanced stage disease than patients with partial losses. Results indicate that various environmental exposures as well as the expression of mutagen-sensitivity will influence the types of chromosomal 3p allelic losses in head and neck cancers as well as the behavior of disease once it develops.

Richard R. Love

4:15 pm

Love RR, Jacoby R, Newton MA, Tutsch KD, Simon K, Pomplun M, Verma AJ, Univ. of Wisconsin School of Medicine, Madison, WI

DFMO is an irreversible inhibitor of ornithine decarboxylase, the key enzyme in mammalian polyamine biosynthesis. The goal of this study was to determine the effects of DFMO 0.5 g/m²/day as a single oral dose on polyamine and ODC levels in rectal, rectosigmoidal and cecal colonic mucosae of individuals at risk for colon cancer because of a personal history of adenomatous polyps of the colon or a family history of colon cancer in at least one first-degree relative. A second goal was to determine toxicity of this treatment given over 1 year.

45 randomized subjects had a flexible sigmoidoscopy with no preparation and a colonoscopy after lavage preparation at baseline, a sigmoidoscopy with no preparation after 3 months, and both procedures (as at baseline) after 12 months, with mucosal biopsies taken from the rectosigmoid area (sigmoidoscopy) or rectal and cecal areas (colonoscopy) for evaluations of ODC and polyamine levels.

Significantly decreased levels of putrescine and spermidine were found in rectosigmoid colonic mucosae of DFMO-treated (N=24) compared to placebo (N=21) subjects at 3 (p=0.03 and 0.04) and 12 months (p=0.005, p=0.004). Similar trends, none reaching statistical significance, were found for polyamine levels in rectal and cecal mucosae. No significant ODC levels differences were detected. Three DFMO recipients (12.5%) developed clinically noticeable and audiologically demonstrated hearing loss which was reversible and attributed to DFMO after 3 (2 subjects) and 12 months (1 subject).

The tissue polyamine changes demonstrated in this study are consistent with findings in other studies in colon and other tissues. Implications: the ototoxicity findings here suggest that investigation of other DFMO schedules such as ones with a drug "holiday" will be a necessary step before phase III chemoprevention studies can be pursued. Supported by NIH CA 59352.

Chanita Hughes

4:35 pm

FACTORS ASSOCIATED WITH PARTICIPATION IN PRE-TEST EDUCATION AMONG AFRICAN AMERICAN WOMEN

Hughes, C., Benkendorf, J., Johnson, L., Kerner, J., Lerman, C.

The purpose of this study was to identify factors associated with participation in an individual BRCA1 pre-test education session among African American women. Subjects were 164 African American women ages 18-75 who had a family history of breast or ovarian cancer who were recruited to participate in a randomized trial of pre-test education about genetic testing for BRCA1 mutations. Chi square tests of association and logistic regression analysis were conducted to identify demographic and psychological variables associated with participation in the total sample and in two educational strata (some college education or less and college graduate or higher). Predictors of participation in the total sample included age (≥ 40 vs. < 40 , OR=2.2, 95% CI=1.13, 4.30), employment status (employed full-time vs. employed part-time or not employed, OR=2.4, 95% CI=1.17, 5.10), and intrusive thoughts about cancer (above median vs. below median, OR=.38, 95% CI=0.19, 0.72). Among women with some college education or less, age (OR=2.5, 95% CI=1.08, 5.97), employment status (OR=3.0, 95% CI=1.21, 7.44), and intrusive thoughts about cancer (OR=0.21, 95% CI=0.90, 0.51) were predictors of participation. Among women who were college graduates or higher, attitudes about exploitation in medical research predicted participation (OR=3.2, CI=1.04, 9.85). These findings suggest that barriers to participation in genetics research among African American women may be frequent intrusive thoughts about cancer and negative attitudes about participation in medical research.

Abstracts Accepted for Poster Presentation

The following abstracts have been accepted for poster presentation. If, for some reason, some of these are not presented at the poster session, the number in the program will be cross-referenced with the poster number in the poster directory.

Urinary Cadmium and Risk for Incident Prostate Cancer

Bostick R, Ennever F, Shelton B, Jones B, Case D, Zaccaro D, Fleming R, Swarts S, Vitolins M

Occupational studies suggest that cadmium exposure may increase the risk for prostate cancer. To investigate the relation of body cadmium load as indicated by urinary cadmium level, we conducted a community-based case-control study in the Piedmont region of North Carolina of men aged 50 years and older and without a prior history of cancer. Cases were identified through area urology and radiation oncology practices within days of diagnosis and studied prior to treatment. Controls were randomly selected from the community. Urinary cadmium and creatinine levels were obtained from random urine samples on 110 incident prostate cancer cases and 255 community controls frequency matched on age, race, and zip code. Cadmium levels were determined using atomic absorption spectrometry; reliability (Pearson correlation coefficient) was $r = 0.78$. The mean (\pm SD) level of cadmium was 6.6 (6.0) $\mu\text{g}/\text{mg}$ of creatinine in controls, 6.9 (7.2) in all cases ($p = 0.82$), 6.7 (7.5) in cases with in situ/localized disease, and 8.2 (6.3) in cases with regional/distant spread ($p = 0.22$). Cadmium per mg of creatinine was categorized according to quartiles and multiple logistic regression was used to calculate odds ratios (ORs) adjusted for multiple risk factors. Multivariate-adjusted ORs across the quartiles were, 1) for all cases combined, 1.0, 0.80, 0.61, and 0.91 (p trend = 0.64); 2) for cases with in situ/localized disease, 1.0, 0.83, 0.50, and 0.79 (p trend = 0.31); 3) for cases with regional/distant spread, 1.0, 2.25, 3.17, and 3.78 (p trend = 0.12); 4) for whites, 1.0, 0.91, 0.59, and 0.80 (p trend = 0.50); and 5) for blacks, 1.0, 0.79, 2.42, and 4.83 (p trend = 0.40). These data from this small study, although not statistically significant, support more definitive study for the hypotheses that cadmium exposure may 1) increase the risk of prostate cancer, primarily in blacks, and 2) increase the risk of progression of prostate cancer from localized to invasive disease.

2

DIET AND TESTICULAR CANCER Sigurdson AJ, Pillow P, Duphorne CM, Mastromarino CL, Strom SS. The University of Texas M. D. Anderson Cancer Center (MDACC)

Endogenous and exogenous hormonal alterations may increase the risk of testicular cancer (TC). From reports on TC and other hormonally-related cancers, we hypothesized that a diet lower in dietary fat and higher in dark green & deep yellow fruits & vegetables (F&V) might reduce TC risk. We also evaluated several plant constituents with phytoestrogenic properties to determine their role in the protective effect of F&V. In a case-control study, we identified 187 cases with a first primary TC, who were ages 18-50 years and diagnosed at MDACC during 1990-96 and 148 controls who were friends of the cases. Cases and controls completed a mailed survey which included a modified version of the NCI's Health Habits and History Questionnaire (HHHQ). We added phytoestrogens to the program, DIETSYS, used for HHHQ analysis. After excluding incomplete questionnaires, 160 cases and 136 friend controls were available for analysis. Nutrient density for dietary components of interest were calculated per 1000 kilocalories. Significant univariate associations were found for quartiles of dietary fats and F&V in the directions hypothesized, but no association with phytoestrogen quartiles and TC risk were seen. In multivariate logistic regression analysis, adjusting for age, education, and cryptorchidism; TC risk increased with increasing saturated fat intake. Odds ratios and confidence intervals (CI) for quartile of daily intake <12 g, 12-13 g, 14-15 g and >15 g of saturated fat per 1000 kcal were 1.0 (referent), 1.2 (95% CI=0.5-2.7), 2.5 (95% CI=1.2-5.4) and 3.5 (95% CI=1.7-7.5), respectively. In the same model F&V showed a non-significant inverse relationship. The possible role of dietary saturated fat intake on TC risk should be further evaluated.

Supported by NCI grant R25-CA57730 and RO1 CA68578

ADULT HEIGHT AND EPITHELIAL OVARIAN CANCER

Cottreau C, Ness R, Grisso J.A, Strom B.L, Morgan M, Wheeler J, Weissfeld J.

Recent studies have associated adult height with certain cancers, including breast cancer. Indicators of adult height, such as genetic factors and childhood nutrition are thought to play a role in this association. Until now very little has been reported on the relationship between height and ovarian cancer. This relationship was examined using interim data from a population-based case-control study of epithelial ovarian cancer. Cases (n=509) were aged 18-70 and diagnosed with epithelial ovarian cancer in selected Delaware Valley counties during 1994-1997. Controls (n=1039) were frequency matched for age using 5 year strata, and ascertained through random digit dialing and Health Care Financing Administration files. Information on adult height came from in-person interviews. Height was positively associated with the increased risk for ovarian cancer (p-trend= 0.002). Women in the highest quartile for height as compared to women in the lowest quartile for height, had an odds ratio (OR) of 1.57 (95% confidence interval (CI) 1.17-2.12) after adjusting for age, parity, oral contraceptive use, body mass index and family history of ovarian cancer. When the analysis was limited to women under the age of 50 a stronger positive association was found (OR=1.91, 95% CI 1.22-2.98) for the highest quartile vs. the lowest quartile. These results indicate a relationship between height and epithelial ovarian cancer, particularly among younger women. The hormonal and metabolic mechanisms that are responsible for this relationship are not well defined and need further study.

3

HORMONAL RISK FACTORS AND TESTICULAR CANCER

Sigurdson AJ, Amato RJ, Hutchinson LH, Mastromarino CL, Gu Y, Strom SS. The University of Texas M. D. Anderson Cancer Center (MDACC)

The cause of testicular cancer (TC) is not known and hypotheses suggest that an altered hormonal milieu may increase risk of TC. We examined xenoestrogen exposure, and indirect indices of androgen level plus maternal pregnancy estrogens in a case-control study. Cases were diagnosed at MDACC during 1990-96 with a first primary TC and were 18-50 years of age. Controls (n=148) were friends of the cases (n=187), and all completed a mailed questionnaire. Case mothers (n=147) and control mothers (n= 86) were interviewed by phone about pregnancy related information. After adjusting for age and education using multivariate logistic regression, history of cryptorchidism and heavy marijuana smoking appeared to increase TC risk while severe adolescent acne and self reported balding were related to decreased risk.

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)
Cryptorchidism (yes vs. no)	4.76	1.27 - 17.9
History of severe acne (yes vs. no)	0.51	0.26 - 0.99
Self reported balding (yes vs. no)	0.57	0.33 - 0.98
Smoked marijuana seven or more times per week (yes vs. no)	2.45	0.94 - 6.39

In a separate model that included mother's pregnancy information, only severe nausea in the first trimester was associated with increased TC risk (OR = 2.4, 95% CI: 1.1-5.3). No associations were found for xenoestrogen exposure, early puberty, body mass index or sedentary lifestyle. The protective association of severe acne and TC has been reported in some studies but not others. The increased risk of TC from marijuana smoking and benefit of balding have not been reported before. TC may be associated with endogenous androgen metabolism, although more research is needed to understand the possible hormonal mechanisms.

Supported by NCI grant R25-CA57730

p53 Protein Overexpression in Relation to Epidemiologic Risk Factors for Breast Cancer in Young Women. Gammon MD (Columbia University), Hibshoosh H, Terry MB, Bose S, Schoenberg JA, Brinton LA, Bernstein JL, Thompson WD.

Mutations in the *p53* tumor suppressor gene have been implicated in almost all cancer including breast cancer. To evaluate whether classification of breast cancer cases by the presence of *p53* protein overexpression reveals etiologically distinct subgroups, we analyzed archived tumor tissue from a population-based case-control study of breast cancer in women under 45 conducted in New Jersey between 1990 and 1992. The parent study included in-person interviews with 509 newly diagnosed cases and 462 controls identified by random digit dialing. Paraffin-embedded blocks were successfully retrieved for 401 (78.8%) cases and protein overexpression was successfully determined for 375 cases. The odds ratios (OR) and 95% confidence intervals (CI) were calculated for *p53*+ versus *p53*- tumors, as compared to the controls, in relation to known and suspected risk factors for breast cancer including age at first birth, age at menarche, parity, lactation, family history of breast cancer, oral contraceptives, induced abortion, previous breast biopsy, body size, usual alcohol use, race, education, smoking, electric blanket use, physical activity, and caloric intake. The prevalence of *p53* protein overexpression was 44.3% (166/375). In a multivariate polytomous model, the ratio of the ORs for *p53*+ vs. *p53*- (an indicator of heterogeneity) was substantially elevated among women with a greater than high school education (2.35, 95% = 1.40, 3.93), current cigarette smokers (2.00, 95% CI = 1.11, 3.59), and users of electric blankets, water beds, or mattresses (1.82, 95% CI = 1.14, 2.92). There was no marked heterogeneity by *p53* status for other known and suspected risk factors for breast cancer. These data suggest that further focus on environmental exposures in relation to breast cancer risk stratified by *p53* status is warranted.

6

Cancer Susceptibility in South Florida's Diverse Populations Trapido E, Obeso J, Krishan A, Ramachandran C, Hamilton K.

Purpose

The study was designed to see if the prevalence of GSTM1 and/or GSTT1 polymorphisms among three race/ethnic groups partially explain observed variation in incidence rates of specific cancers.

Methods

White non-Hispanics [WNH], African Americans [AA], Cuban Americans [CA] were interviewed in a cross-sectional study, and 10ccs of blood were drawn. DNA was PCR amplified, using GSTM1 and GSTT1 sense and antisense primers to distinguish between GSTT1 and GSTM1 active/deficient individuals. PCR products were separated on a 2% agarose gel, and GST polymorphisms were analyzed. Gender, age, ethnicity and race specific cancer rates were taken from the Florida Cancer Data System.

Results

53% of CAs had neither polymorphism, compared to 42% of AAs and 33% of WNHs. AAs were substantially less likely to have M1 polymorphisms than WNHs, and somewhat more likely to have T1 polymorphisms. Persons with a family history of breast cancer were 4.8 times as likely to have both deletions as those who did not [95% CI = 1.16-10.33]. Persons with a family history of head and neck cancers were 7.2 times more likely to have a T1 deletion than those who did not. Rates of breast, cervix, ovary and corpus cancer were significantly associated with having M1 deletions. Significant associations were also found between T1 polymorphisms and prostate cancer.

Conclusions

Differences in the prevalence of M1 and T1 polymorphisms were observed by race, and by ethnicity. Variations in incidence rates by race and ethnicity may be a reflection of differences in the prevalence of these polymorphisms.

Taq I VDR genotype may modify the breast cancer risk associated with low levels of 1,25(OH)₂D. Janowsky E, Lester G, Hulka B, Taylor J, Bell D.

The purpose of this study was to investigate the breast cancer risk associated with *Taq I* VDR polymorphism. In addition, we studied *Taq I* VDR genotype as a possible modifier of the effect of low 1,25(OH)₂D levels on female breast cancer risk. We compared 138 women (18 black, 120 white) with incident breast cancer and 163 controls (24 black, 139 white) frequency matched to cases on age (within 3 years), race, clinic, and month of blood drawing in a clinic-based case-control study. We included a second group of 163 women (23 black, 140 white), frequency matched to cases on age (within 3 years) and race, in the genetic, but not the blood level, analyses.

There were significant differences between the races in distribution of *Taq I* VDR genotypes ($\chi^2_{2df}=10.39$, $p=0.006$); blacks had a higher frequency of TT and lower frequency of tt genotypes than whites. There were no differences in breast cancer risk by *Taq I* genotype in either race. Among white women, the estimated ORs (95% CI) of breast cancer risk for a comparison of 1,25(OH)₂D levels below to 1,25(OH)₂D levels above the median were 3.0 (1.3, 6.9) and 5.0 (1.9, 13.1) for the TT and Tt genotypes, respectively. The corresponding OR estimate for women with the tt genotype was 0.8 (0.3, 2.5). Among cases, white women with tt were more likely than TT and Tt to have *in situ* disease, 2.3 (0.9, 6.0), and were less likely to have lymph node metastases 0.5 (0.1, 1.7).

These findings need verification in other observational studies. If confirmed, awareness of this source of heterogeneity in breast cancer may improve our ability to develop and evaluate appropriate preventive strategies and interventions.

Polybrominated Biphenyls (PBBs) and Risk of Digestive System Cancer: A 20 Year Follow-up Study

Hoque A, Sigurdson AJ, Burau KD, Humphrey HEB, Hess KR, Sweeney AM. The University Of Texas M. D. Anderson Cancer Center and School of Public Health, Michigan Department of Public Health (MDPH)

Human health effects of PBBs are not known, but increased risk of stomach cancer mortality and PBBs has been reported. We evaluated serum PBB level and cancer risk at multiple sites, particularly focusing on digestive system. We used a case-control design nested within a Michigan cohort accidentally exposed to PBBs in 1973. The MDPH followed 3899 people through 1993, among whom 187 cancers were identified, 12 of which were digestive system neoplasms (liver, stomach, esophagus and pancreas). Controls were 696 cohort members without a diagnosis of cancer and were frequency matched by sex and age (in 5 year strata). Baseline serum PBB levels were measured in parts per billion (ppb) using standard methods. An increasing dose-response relationship for digestive system cancer and higher serum PBB category (4-20 ppb, 21-50 ppb and >50 ppb) was observed after adjustment for age, family cancer history, cigarette smoking, alcohol drinking and baseline serum polychlorinated biphenyls level. Adjusted odds ratios and confidence intervals (CI) for each PBB category were 8.23 (95% CI 1.27-53.3), 12.3 (95% CI 0.80-191) and 22.9 (95% CI 1.34-392), respectively. The results suggest that serum PBB levels were associated with digestive system cancer. Studies should continue to evaluate the health effects of PBB exposure in this Michigan cohort over time.

Occupation and Pancreatic Cancer Risk

BT Ji, D Silverman, Q Dai, M Dosemeci, YT Gao, A Blair

An examination of occupational risks of pancreatic cancer was undertaken in a population-based case-control study in Shanghai, China. The study included 451 pancreatic cancer patients (age 30-74) newly diagnosed in 1990-1993 and 1,552 controls randomly selected from Shanghai residents. Information on a lifetime job history and other factors was obtained in a face-to-face interview. Odds ratios (OR) and 95% confidence intervals (CI) were estimated using logistic regression models with adjustment for age, education, income and cigarette smoking. Among men, an increased risk of pancreatic cancer was associated with employment as an electrician (OR=6.7, CI=2.4-18.4), and a positive trend in risk with increasing duration of employment was apparent (P for trend =0.001). Exposure to electric magnetic fields (EMF) as measured by a job exposure matrix also was associated with an increased risk among electricians. Threefold risks were observed for men with the highest level of intensity and for those with the highest probability of EMF exposure, although women with heavy EMF exposure did not have increased risk. Elevated risks among men were also found for metal workers (OR=2.0, CI=0.9-4.2), toolmakers (OR=2.7, CI=1.3-5.6), plumbers and welders (OR=2.8, CI=1.2-6.6), glass formers, potters, painters, and construction workers (OR=2.4, CI=1.1-5.5), and cooks (OR=2.2, CI=0.7-7.7). Among women, textile workers experienced an increased risk (OR=1.6, CI=0.9-2.9). Our results suggest that occupations associated with exposures to metal and textile dusts or certain chemicals may increase the risk of pancreatic cancer. The elevated risk among electricians may warrant further studies to evaluate the possible role of EMF exposures.

10

Parity and mammographic breast density in relation to breast cancer risk: evidence for interaction

Van Gils C, Hendriks J, Holland R, Otten J, Verbeek A

We examined whether mammographic density has an explanatory role in the harmful influence of nulliparity on breast cancer risk. Another possibility is that mammographic density and nulliparity act independently or perhaps synergistically on breast cancer risk. Our study populations consisted of 129 cases and 517 controls who had been participants of the long-standing Nijmegen breast cancer screening programme for approximately 10 years. The amount of breast density was classified by a fully-computerized method on digitized mammograms from the screening examination 10 years earlier. Data on parity and potential confounders were obtained from a questionnaire, administered at the same examination.

We found that nulliparae with low breast density (<5%) were not at increased risk compared to parous women with low density (odds ratio (OR)=1.1; 95% confidence interval (CI)=0.2-5.9). Parous women with low mammographic density formed the reference category throughout further analyses. The risk for parous women with high density ($\geq 5\%$) was 3.1 (95%CI=1.5-6.1). When both factors were present (nulliparity with high density) the risk was 7.1 (95%CI=3.2-15.9). This indicates that the 2 risk factors work synergistically and that breast density is not just an explanatory factor in the influence of nulliparity on breast cancer risk. It is hypothesized that high breast density (reflecting excessive epithelial cell proliferation and/or large proportions of connective stromal tissue) will be more carcinogenic in the susceptible, undifferentiated epithelial breast tissue of nulliparae, than in the differentiated tissue of parous women.

Risk of esophageal and gastric adenocarcinoma and use of calcium antagonists and other medications that promote gastroesophageal reflux.
 T. Vaughan, D. Farrow, W-H. Chow, M. Gammon, H. Risch, P. Hansten, J. Schoenberg, S. Mayne, J. Fraumeni Jr. Adenocarcinomas of the esophagus (EA) and gastric cardia (GCA) have risen dramatically in incidence over the past two decades in the U.S., for reasons that are not yet clear. A number of common medications (e.g., calcium channel blockers, tricyclic antidepressants, and certain asthma medications) promote gastroesophageal reflux by relaxing the lower esophageal sphincter (LES). Reflux is thought to increase cancer risk by promoting cellular proliferation, and by exposing the esophageal epithelium to potentially genotoxic gastric contents. Recent studies have suggested that calcium channel blockers may also increase cancer risk by inhibiting apoptosis. Using personal interview data from a multi-center, population-based case-control study conducted between 1993 and 1995 at three registries in the U.S., we evaluated whether use of LES-relaxing drugs was associated with increased risk of EA or GCA. Cases (n=554) were compared to general population controls (n=695). Overall 27.4% of controls had used one or more of these drugs for at least six months, compared to 30.2% of EA and 23.8% of GCA cases. The adjusted odds ratios (ORs) for ever use were 1.0 (95% confidence interval (CI)=0.7-1.5) and 0.8 (95% CI=0.5-1.1) respectively. There was little evidence of increasing risk with increasing duration of use of all LES-relaxing drugs together. We found increased risk of EA among persons reporting use of asthma drugs containing theophylline (OR=2.5; 95% CI=1.1-5.6) and beta-agonists (OR=1.7; 95% CI=0.8-3.8). Risks were higher among long-term users (>5 yrs.) of these drugs (OR=3.1; 95% CI=0.9-10.3 and OR=2.3; 95% CI=0.8-7.0, respectively). In contrast, there was no evidence that use of calcium channel blockers or other specific groups of drugs altered risk of these cancers. These results provide reassuring evidence that the increases in EA and GCA incidence are not likely to be related to use of LES-relaxing drugs as a group, or calcium channel blockers in particular, but they do suggest that persons with long-standing asthma may be at increased risk of esophageal adenocarcinoma.

Changes in mammographic breast density and the concomitant changes in breast cancer risk

Van Gils C, Hendriks J, Holland R, Karssemeijer N, Otten J, Straatman H, Verbeek A

We examined whether diminution of mammographic breast density lowered breast cancer risk. Our study population consisted of participants of the long-standing Nijmegen breast cancer screening programme. Postmenopausal breast cancer cases (N=108), who had to have participated in all the 5 screening rounds prior to their diagnosis, were matched to 400 controls on year of birth and screening history. Changes in breast density were measured over a 10-year period by a fully-computerized method. Women with high breast density ($\geq 5\%$ of the breast composed of fibroglandular density) showed a 3-fold increased 10-year risk compared to women with low breast density ($< 5\%$).

Women who showed $< 5\%$ density during the whole study period formed the reference category throughout further analyses. In women with 5-25% density initially, we observed a trend of decreasing risk with diminishing density; the odds ratio (OR) for those who decreased to $< 5\%$ density was 1.6 (95% confidence interval (CI)=0.5-5.3) in contrast to the OR of 5.5 (95% CI=2.1-14.6) for those with persisting 5-25% density. In women who increased from 5-25% density to $> 25\%$ density OR was 6.5 (95% CI=2.0-21.4). In women with $> 25\%$ density initially, diminishing density was not clearly associated with lowering risk, which may be partly explained by the low number of women who decreased to $< 5\%$ (N=12). Our main observation was a decreased risk with diminishing breast density.

Rural Breast Cancer Care: Evidence from the REACH Project. Tropman S., Ricketts T., Cooper R., Paskett E. and Hatzell T.

Purpose: The aim of this study was to assess the type of cancer treatment received by rural breast cancer patients, and the degree to which treatment received was in concordance with the National Cancer Institute's (NCI) recommendations.

Methods: Data came from the Reaching Communities for Cancer Care (REACH) project; a 5-year, NCI-funded intervention designed to improve rural cancer care in rural. Medical record data from 366 stage I or II breast cancer cases treated in two rural regions (NC and SC) at two times (1991 and 1996) were analyzed. The proportion of women who received the appropriate primary and adjuvant care was determined by comparing care received to an algorithm developed using NCI's Physician Data Query (PDQ) database. Logistic regression controlled for the possible influence of year, location and other characteristics.

Results: The majority of women received the appropriate primary therapy (74%-92%), however significantly more women received a mastectomy than a lumpectomy for both stages. Few women received the appropriate adjuvant therapy; between 34% and 50% for stage I cases, and between 54% and 61% for stage II cases. Logistic regression indicated that the receipt of appropriate therapy could not be explained by other factors.

Conclusions: This results provide needed information about patterns of breast cancer care in rural communities, however further research is needed to better understand the source of treatment variation and deviation from guidelines found in this study.

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Phytochemical Intake and Prostate Cancer Progression: A Case-Case Study. S. Hursting, C. Duphorne, P. Pillow, S. Strom, S. Chang, R. Babaian, P. Scardino, and M. Spitz. U.T.-M.D. Anderson Cancer Center and Baylor College of Medicine, Houston, TX 77030.

The rates of latent prostate cancer (PC) are remarkably similar across the world, while the rates of highly aggressive, lethal PC are much higher in developed countries than in developing countries. Previous studies have suggested possible relationships between the intake of certain dietary factors (particularly fat, fruits and vegetables, and carotenoids) and PC risk. Recent findings have also indicated that numerous plant constituents with phytoestrogenic properties may account for at least some of the cancer preventive effects of fruits and vegetables. This case-case study was designed to determine if these dietary factors are associated with PC progression. Preliminary analyses are presented on 53 clinically insignificant PC cases (tumor volume ≤ 0.5 cc) compared with 99 clinically significant (extracapsular but non-metastatic) PC cases. All subjects successfully completed the NCI's Health Habits and History Questionnaire (modified to include the major foods contributing phytoestrogenic compounds) as part of their participation in our molecular epidemiologic study of PC. We found that the two PC groups did not significantly differ in their total fat, fruit or vegetable intakes. However, men with clinically insignificant PC, relative to men with clinically significant PC, had higher mean daily intakes of total carotenoids (8524 v 7316 μg ; $p=0.12$), lycopene (2672 v 1804 μg , $p=0.05$), coumestrol (134 v 77 μg , $p=0.06$), enterodiol (155 v 136 μg , $p=0.05$), apigenin (265 v 152 μg , $p=0.03$), luteolin (56 v 36 μg , $p=0.05$), formononetin (1.1 v 0.4 μg , $p=0.04$), genistein (332 v 156 μg , $p=0.2$) and daidzein (187 v 103 μg , $p=0.3$). No differences were observed in the intakes of quercetin, kaempferol, biochanin A, enterolactone or the phytosterols. These preliminary results suggest that diet, particularly low consumption of phytochemicals such as certain carotenoids and phytoestrogens, may play a role in PC progression. This work was supported by NCI RO1 CA68578 and NCI SPORE CA58204.

Geographic Distribution and clustering of Ovarian and Breast Cancer

Zuozhe Zhang, S. Harlap, J. Mower,
P. Bloniarz, T. J. Galvin, Z.F. Zhang

The purpose of this study is to describe geographic distributions and the clustering patterns of breast and ovarian cancers in order to shed a light on the potential shared common etiological factors. Data included the mortality rates of ovarian and breast cancers in 48 states in the U.S., latitude and longitude of geographic centers of 48 states and 3,105 counties, and median household income at the county level. Regression and correlation analyses were employed to assess the similarities in geographic distributions of these two cancers at the state and the county levels. Results showed that geographic variations of the ovarian cancer mortality were significantly associated with latitude at both the county and the state level and with longitude at the county level, but not at the state level. The mortality rates of breast cancer were significantly correlated with latitude and longitude at both county and state levels. There was a strong correlation between ovarian and breast cancer mortalities at the county and the state level. The median household incomes were associated with both of cancers. The results indicate that breast and ovarian cancers share the common risk factors and that both cancers are not only associated with certain genetic mutations, but also related to social economic factors and environmental exposures.

Glutathione S-Transferase T1 (*GSTT1*) Genotype and Human Colon Cancer Risk. Satyajit Ray¹, George C. Roush², Marianne Berwick³, Abhik Das⁴, and Jennifer J. Hu¹, ¹Lombardi Cancer Center, Georgetown U. Med. Ctr., Washington, DC 20007; ²New York University, New York, NY 10010; Medical Center; ³Memorial Sloan-Kettering Cancer Center, New York, New York 10021; ⁴Johns Hopkins University School of Hygiene & Public Health, Baltimore, MD 21205

Glutathione S-transferases (GSTs) play important roles in the detoxification of active oxygen species in humans. Genetic deletion of *GSTM1* and/or *GSTT1* has been associated with human cancers. To test the hypothesis that subjects with genetic deletion of *GSTT1* may have increased risk for colon cancer, we conducted a case-control study with 49 colon cancer cases and 329 controls. There was a significant association between age and case-control status ($p < 0.0001$). The prevalence of *GSTT1* null genotype was higher in colon cancer cases (35%) than that in controls (26%) with an age-adjusted odds ratio (OR) of 1.47 and a 95% confidence interval (CI) of 0.76-2.88. The most interesting finding is that there seems to be a gender-related difference in the association between *GSTT1* null genotype and colon cancer risk. In males, the prevalence of the *GSTT1* null genotype was 2.14-fold higher (95% CI: 0.96-4.76) in cases (46%) than that in controls (29%) with marginal statistical significance ($p = 0.06$). However, there is no difference in the prevalence of *GSTT1* null genotype in females ($p = 0.74$). The mean age of onset of colon cancer was not different in cases with or without the expression of *GSTT1* gene (67.88 and 67.78, respectively). In summary, our findings suggest an association between *GSTT1* null genotype and human colon cancer risk in males. Larger studies are needed to further evaluate the association.

Case-case study of prostate cancer: role of body composition and baldness. S. S. Strom*, Y. Yamamura, R. J. Babaian, P. T. Scardino, M. R. Spitz. (University of Texas M. D. Anderson Cancer Center, Houston, TX. 77030)

Prostate cancer (PC) shows a considerable heterogeneity in presentation and outcome. Conventional prognostic factors alone are unable to predict which men have clinically insignificant tumors that will not progress and which men will develop aggressive PC. To identify risk factors associated with PC progression, the authors analyzed data from a case-case study being conducted in Houston, Texas. Physical characteristics, specifically BMI, body fat percentage, body circumferences, and hair loss, were evaluated in 81 cases with nonsignificant PC (NS) (tumor volume ≤ 0.5 cc) and 151 age-race matched men with clinical significant disease (SD). Men with SD showed higher mean BMIs at ages 25, 40, and at study entry compared to men with NS cancer (23.9 vs 23.2, $p=0.09$; 25.9 vs 24.9, $p=0.01$; 27.6 vs 26.5, $p=0.01$, respectively). Increased body fat percentage, calculated from skin fold measurements, was associated with a greater relative risk of having SD (relative risk = 1.05; $p=0.03$). Body circumferences measured at the waist, abdomen, and hips were significantly higher among men with SD (98.8 vs 96.0, $p=0.04$; 102.6 vs 100.0, $p=0.07$; 104.5 vs 101.6, $p=0.005$, respectively). Higher BMIs at all ages, higher body fat percentage, and larger girth measurements in men with SD suggest that differences in skeletal structure, musculature, and/or diet could be associated with PC aggressiveness. Relative to men with NS PC, SD cases reported hair loss less often (64% vs 72%) and starting at a later age (40.4 vs 38.2). No differences were found in balding patterns and reporting of family history of baldness between the two groups. These preliminary data suggest that body composition and baldness could provide some clues about PC progression.

Supported by grants RO1CA68578 and SPORE CA58204.

The Impact of MQSA on Decisions to Either Cease or Continue Mammography Services. G. Li, C. Chvala, F. Houn

Purpose: A pilot project was conducted with 36 mammography facilities to determine if compliance with MQSA contributed to cessation of mammography services.

Methods: From June to August 1997, a brief telephone interview was conducted with 18 facilities that had recently closed and 18 facilities that were continuing mammography services. Respondents were asked to indicate the degree to which MQSA-related factors such as cost of accreditation and burden of patient follow-up compared to a set of non-MQSA related factors (loss of patient volume and loss of insurance contracts) contributed to decisions to cease or continue mammography services.

Results: Overall survey response rate was 97.3%. Open and closed facilities did not differ significantly in influence by MQSA-related and non-MQSA-related factors. Significant correlations however, were found between MQSA certification and inspection variables with closed facilities more likely to submit multiple applications for ACR accreditation; more likely to have a higher number of deficiencies on their ACR applications; and have significantly poorer ratings at annual inspections.

Conclusions: These results suggest that MQSA continuing requirements for personnel, equipment, certification, follow-up, etc., do not impose undue burden on facilities. Rather, the process to ensure high quality services is effective from the point of initial application and supports the importance of annual inspections to identify deficiencies in facilities that are not offering quality services.

Reactions of Puerto Rican Women to Notification of Facility Non-Compliance with MQSA. M. Kyser, C. Chrvala, C. Sierka, F. Houn

Purpose: A pilot study was conducted to assess women's reactions and changes in knowledge and screening behaviors following notification by letter that their mammography center had not been certified to perform mammography.

Methods: One hundred women who received the notification letter from 3/97 to 4/97 were randomly selected to participate in a telephone survey conducted by bi-lingual, trained interviewers from the Regional FDA Office in Puerto Rico from 7/97 to 9/97. Total response rate was 96%.

Results: Women rated the letters as somewhat or very clear (82%), comprehensible (85%), containing important information (91%), confusing (51%), frightening (61%), and causing anger (33%). A family history of breast cancer was associated with significantly higher ratings of fear, worry, and anger. The letters prompted positive behavioral changes, with 68% continuing to have annual mammograms, 8% planning to increase frequency of screening and only 5% decreasing. These findings suggest that notification letters can positively affect women's confidence in mammography and even improve their understanding of mammography, breast cancer and quality assurance (36%).

Conclusions: Study results suggest that women are responsive to messages that inform them about the status of their mammography facility and overall positive behavioral and knowledge gains will be achieved.

MEASURING COMORBIDITY IN THE PROSTATE CANCER OUTCOMES STUDY. CN Klabunde, JM Legler, AL Potosky. Division of Cancer Control and Population Sciences, Applied Research Branch, National Cancer Institute (NCI), Bethesda, MD.

Purpose: To describe the development of comorbidity measures for use in the analysis of treatment patterns and quality of life in the NCI-sponsored Prostate Cancer Outcomes Study (PCOS).

Methods: Over 3300 men diagnosed with prostate cancer during 1994-95 are participating in PCOS. Following diagnosis, these men completed a mailed questionnaire asking about comorbid conditions, type of treatment received for prostate cancer, and quality of life (urinary, bowel, and sexual functioning; general health status). In addition, their medical records were reviewed for comorbid conditions, treatment received, and complications resulting from treatment. After assessing the match rate between survey and abstract data, we developed two separate comorbidity measures for use in treatment patterns and quality of life analyses. Abstract data were used in the comorbidity measure for treatment, while survey data were used in the comorbidity measure for quality of life. Regression analysis and index construction were used to develop the measures. Comparisons of the new measures were made to the Charlson index.

Results: For most comorbid conditions, prevalence was higher according to survey than abstract data. The match rate between the two data sources ranged from 67% for arthritis to 97% for liver disease. Comorbidity measures differed not only in the conditions included, but also in the weights assigned to each condition.

Conclusions: Comorbidity is an important consideration in the assessment of treatment patterns and outcomes for prostate cancer patients. Comorbidity measures must be tailored to the endpoint of interest.

Mammography Facilities' Satisfaction with MQSA Inspection.

C. Sierka, C. Chrvala, F. Houn

Purpose: To conduct a national survey of mammography facilities to evaluate components of the MQSA inspection program.

Methods: One page surveys were mailed to an unweighted, random, national sample of 1,000 mammography facilities. The surveys were accompanied by a cover letter explaining the purposes of the study and an addressed, postage-paid return envelope. Overall response rate was 65%.

Results: There were no significant differences between responders and non-responders attributable to type of mammography center, daily volume of exams, and inspection compliance scores. Average number of hours preparing for the inspection was 8.7 hours; mean time spent on-site for the actual inspection was 5.7 hours. There was a significant improvement in overall satisfaction ratings between the first and most recent MQSA inspection (means = 5.1; 5.9, respectively). Ratings of inspector performance on factors such as politeness, helpfulness, and knowledge levels about mammography and the inspection process were consistently positive with scores ranging from 6.2 to 6.5 on a 7 point Likert scale. Overall perception of the inspection as beneficial and educational was positive with mean scores of 5.6 and 5.5, respectively. Inspection results were viewed as valid and useful to prompt operational improvements.

Conclusions: The annual MQSA inspection program is generally viewed as a positive experience for facilities and staff. Even more striking is the fact that facilities noted a significant improvement when asked to compare their first and most recent on-site evaluation. The annual inspection of mammography centers is an essential element of MQSA and facilities receive demonstrable benefits from their participation.

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Folate Status May Predict Survival in Early-stage Non-small Cell Lung Cancer. Jatoi A, Daly BDT, Kramer G, Mason JB.

Purpose: Folate has been shown to reverse bronchial squamous metaplasia and may thereby protect against lung cancer recurrence. As part of a larger study, we undertook a cross-sectional analysis of folate status in patients with resected non-small cell lung cancer.

Methods: Lung cancer resection was performed >3 months prior to enrollment (range 4-120 months). Exclusion criteria included 1) age <60 years; 2) >2 alcoholic drinks/day; 3) cancer treatment, use of folate antagonists, or smoking in the preceding 3 months; 4) evidence of cancer on history, physical examination, or chest radiograph. RBC and serum folate were measured by radioimmunoassay and folate intake by the Willet Food Frequency Questionnaire.

Results: 36 patients were evaluated; 29 completed the questionnaire. With cancer stage the covariate, the association between RBC folate and censored survival and between serum folate and censored survival approached statistical significance ($r=0.35$; $p=0.055$ and $r=0.32$; $p=0.083$, respectively). No association was found between folate intake and censored survival with the same covariate ($r=0.003$; $p=0.77$).

Conclusions: Our cross-sectional data suggest folate status may predict survival in patients with a highly fatal malignancy. Longitudinal studies should explore the possible prognostic and chemopreventive role of folate in early-stage non-small cell lung cancer.

WORKSITE BREAST CANCER SCREENING PROGRAMS: A REVIEW OF REPORTED STUDIES
LS Caplan, SS Coughlin, Division of Cancer Prevention and Control, NCCDPHP, CDC, Atlanta, GA

The workplace is increasingly recognized as an important site for disseminating health information and implementing health promotion activities. About 54% of American women over 18 work outside the home, making the workplace especially appropriate for programs for women. This presentation reviews and critically evaluates studies of worksite breast cancer screening programs. Many women are not screened for breast cancer due to barriers of distance, time, and cost. The workplace, as a venue for health promotion programs, can overcome such barriers and reach many female employees. Incentives for employers include reducing costs of medical treatment and lost productivity. However, most studies of breast cancer programs have consisted of cross-sectional surveys with an observational study design, carried out as part of program evaluation. These surveys have often been limited by the lack of suitable comparison groups, the use of a non-randomized design, and the lack of a clearly defined theoretical framework for the intervention. Despite these limitations, several studies have suggested benefits. Additional scientifically rigorous evaluation studies of worksite health programs for the early detection and prevention of breast cancer are needed, as well as continued development and evaluation of innovative workplace programs aimed at combating breast cancer in the U.S.

PERCEIVED VULNERABILITY AND MAMMOGRAPHY SCREENING: DEMOGRAPHIC AND PSYCHOSOCIAL CORRELATES

W.Haddad, M. Costanza, A. Stoddard, and L. Clemow,
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2,399 women members from two HMO's identified as underutilizers of mammography screening, were interviewed to explore the relationship between perceived vulnerability to getting breast cancer and selected variables: sociodemographic factors, actual risk of developing breast cancer (Gail Model), worry about getting breast cancer, knowledge of mammography, and psychological constructs (anxiety, self-esteem, depression, optimism). Bi-variate analysis showed that women who perceived their vulnerability as too high, in comparison to their actual risk, had greater knowledge of mammography screening when compared to women who perceived their vulnerability as too low. The psychological constructs of optimism and self-esteem were greater in women whose perceived vulnerability was too low, while depression and anxiety were greatest in women whose perceived vulnerability was too high. In polytomous regression analysis, women who perceived their vulnerability as too high had greater fear of mammography results and were more likely to worry a lot about breast cancer. These findings suggest focused interventions which address the specific concerns of these "committed" underutilizers.

Communicating Breast Cancer Risk: Impact of Provider Discussions with Patients. B Cheuvront*, R Royak-Schaler, C Klabunde *School of Public Health, University of North Carolina at Chapel Hill.

Purpose: To examine the influence of communication with health care providers about risk and family history on the risk perceptions, worry, knowledge, and screening practices of women with a family history of breast cancer.

Methods: 151 women (76 black/75 white) with family histories of breast cancer completed a telephone survey covering their perceived risk for developing breast cancer, worry about getting breast cancer, knowledge of prevention options, and screening practices. They were also asked whether they had discussed their risk with their health care provider.

Results: Women who had spoken with their health care provider were more likely to have more recent mammograms and clinical breast exams, were more knowledgeable about prevention options, and were more likely to believe they were at higher risk of getting breast cancer than other women their age. However, black women were less aware of prevention options. Breast cancer worry among these women, however, was not related to screening practice.

Conclusions: Risk conversations with providers appear to benefit women with family histories by promoting risk perceptions and regular screening. Providers should make an effort to discuss individual risk with women who have family histories, along with appropriate prevention and screening options with them.

Title: The Influence of Health Care, Culture, and Cost on Breast Cancer Screening: Issues Facing an At-Risk Special Population *Co-Authors:* Risendal, B.; Giuliano, A.; Short, B.; DeZapian, J.; Papenfuss, M. Arizona Cancer Center, Tucson, AZ 85716 **Purpose:** Breast cancer survival rates among Southwest American Indian (AI) women are poor in comparison to other racial groups. Breast cancer screening results in an earlier stage at diagnosis, which improves survival. Few studies have closely examined the health practices of AI women in an urban setting, a group which accounts for half this special population. **Methods:** A cross-sectional face-to-face survey administered by trained interviewers to 519 randomly selected households in Phoenix, Arizona. Women 40 years of age and older are included (n=168) in this analysis. **Results:** Nearly half the women (47.0%) were in the 40-49 year category; the remainder being split between the 50-59 and 60+ year age groups. Half the women self-reported lack of employment (47.6%) and less than a high school degree (45.8%). Many women (72.0%) reported receiving a routine check-up within the last year. Over 1/3 of women surveyed (35.7%) had received a mammogram (MAM) in the last 2 years; 52.8% had received a clinical breast exam (CBE) in the last year, and 27.4% had received both a CBE & MAM within the last 2 years. These results did not differ by age group. Annual routine check-up and Pap Test were strongly associated with breast cancer screening. Knowledge of CBE and MAM procedures and cost/insurance were also positively associated with screening frequency. **Conclusions:** These findings indicate that breast cancer screening rates among urban AI women are far below Year 2000 Goals. Our data suggests that improving health care access, the availability of no or low cost breast cancer screening, and knowledge of CBE & MAM exam procedures can increase screening frequency and potentially reduce mortality in this at-risk special population.

Lung cancer and body mass index: leanness at diagnosis and increased risk. Chang S¹, Spitz MR, de Andrade M, Honn S, Dave A, Hursting SD. Leanness has generally been associated with increased risk of lung cancer; however, whether this association is independent of smoking has not been resolved. We examined the relationship of lung cancer risk and usual body size in a case-control study among 248 African-American and 218 Mexican-American men and women. Newly-diagnosed, previously untreated lung cancer cases recruited from hospitals in Houston and San Antonio, Texas were matched by ethnicity and age within 5 years to community controls. In general, cases and controls differed little in height by ethnicity and sex. Usual weight of cases was generally less than controls and they had lower body mass index [(BMI)=kg/m²] than controls for both ethnic groups and sexes. The difference in BMI was greatest among African-American men (8.5 kg/m²) and least among Mexican-American women (3.9 kg/m²), paralleling relative incidence rates for these groups. In multivariable analysis comparing the lowest tertile of BMI to the highest and adjusting for age, ethnicity, and smoking factors, low BMI was associated with increased risk for both men and women, although the number of women was small [odds ratio (OR)= 9.48, 95% confidence interval (CI)= 3.80, 23.61; OR=15.06, 95% CI=3.34, 67.95, respectively]. Among men, lean former smokers had higher lung cancer risk than lean current smokers after adjusting for age, ethnicity, and smoking factors (OR=18.47, 95% CI=2.84, 120.13; OR=11.43, 95% CI=3.13, 41.73, respectively). The relationship between BMI and lung cancer risk among women was only slightly affected by whether women had smoked (OR=10.23, 95% CI=2.65, 39.56) or never smoked (OR=9.83, 95% CI=0.98, 98.42). However, among female smokers, adjusting for other factors strengthened the association between BMI and lung cancer risk (OR=21.53, 95% CI=2.79, 165.96). Our findings provide further evidence that leanness increases risk of lung cancer independent of smoking, particularly among men who are former smokers and women who have ever smoked. Future studies should focus on differences between ethnic groups and use larger numbers of women. The research was supported by CA 55769 and Dr. Chang by a postdoctoral fellowship from the M D Anderson Education Program in Cancer Prevention Grant R25-CA57730

Assessing Rural Physicians' Agreement with Cancer

Screening Guidelines. Hatzell TA, Tropman SE, Ricketts TC

Purpose: This study's purpose was to assess the influence of the REACH Project's cancer control educational intervention on rural primary care physicians' views on cancer screening services.

Methods: A pre- and post-intervention survey was mailed to primary care physicians in the intervention region in rural NC and the comparison region in SC. Physicians were asked their views on appropriate intervals for several cancer screenings: CBE, mammography, FOBT, sigmoidoscopy, DRE, pap smears, and chest x-rays; and their perceptions of the efficacy of early detection of several cancers in promoting survival. Response frequencies determined the proportion corresponding to the 1989 US Preventive Services Task Force guidelines. Chi square tests assessed the significance of changes in responses over time within the intervention and comparison regions.

Results: Concordance between physicians' views and USPSTF guidelines increased significantly over time in both regions for only one recommendation: chest x-rays should *not* be used as a lung cancer screening test. For some tests, level of agreement between physicians' views and screening frequency guidelines was consistently low over time and across the two regions: about 40% of respondents agreed with the recommendation for CBE, and 45% for mammography among women over age 50. More favorably, about 75% of respondents agreed with the FOBT recommendation and over 80% for sigmoidoscopy. Perceived efficacy of early detection of prostate cancer and melanoma increased significantly in both regions over time.

Conclusions: The educational intervention had no apparent influence on physicians' views on cancer screening. Research is required to understand why USPSTF cancer screening guidelines have not been fully embraced by rural primary care physicians.

Perceptions about Cervical Cancer Chemoprevention Trials Among Hispanic, African-American, and White Women

K. Basen-Engquist, G. Tortolero-Luna, K. Phillips, I. Torres, M. Follen Mitchell.

Purpose: To explore the perceptions about cervical cancer chemoprevention trials (CCCT) among African-American (AA), Hispanic (H), and non-Hispanic white (NHW) women. This data is part of a larger study on factors affecting recruitment of minority women to CCCT. **Method:** 31 women who were attending a colposcopy clinic (10 AA, 11 H, and 10 NHW) completed semi-structured interviews about their perception of the negative and positive outcomes of participating in a CCCT, barriers to participating, and who they consult for health advice. The average age of the women was 30, and their average years of education was 12. **Results:** When asked about positive outcomes of participating in a CCCT, 16 mentioned helping future patients, 15 said preventing cancer, 10 said improving their condition, 7 said avoiding surgery, and 7 mentioned learning more about their condition. Side effects was the negative outcome mentioned by the most women (21), followed by three related outcomes: the drug might not work (9), condition gets worse (6), and developing cancer (4). The barriers to participation described most often were inconvenient transportation (11), interference with family responsibilities (7), taking the medication (6), and interference with work (6). When asked who they would go to for advice about health matters or participating in a CCCT, 29 said a doctor, 16 said their mother, 12 said their friends, and 11 said their husband or partner. **Conclusions:** These preliminary results suggest that women perceive both altruistic and personal health benefits to participating in a CCCT. Recruitment efforts should take into account the significant concerns women report about side effects, transportation, and disruption of family and work schedules.

CHRONIC DOSING OF OLTIPRAZ IN PEOPLE AT INCREASED RISK FOR COLORECTAL CANCER. Szarka CE, Clapper ML, Raskay BJ, Pfeiffer GR, Balshem AM, Litwin S, Frucht H, Goosenberg EB, Engstrom PF, O'Dwyer PJ.

The dithiolthione oltipraz is being developed as a chemopreventive agent for many malignancies including colorectal cancer based upon its induction of detoxification enzymes and its *in vivo* protective activity against chemically induced tumors in animal models. This clinical study evaluated the biochemical effects and tolerability of oltipraz when given over three months. Fourteen individuals with increased risk for colorectal cancer were randomized to take 125 or 250 mg/m² of oltipraz twice weekly for 12 weeks. One subject withdrew from the study for non-study related reasons. Two subjects at the 250 mg/m² dosage required dose reductions due to significant fatigue. Pretreatment, week 6, 12 and 16, blood and/or colon tissue were obtained for evaluation of glutathione, glutathione S-transferase and DT-diaphorase activity. No significant modulation of Phase II detoxification enzymes was seen at either dose. A nontoxic dose and schedule of oltipraz that is suitable for further evaluation of this agent in chemoprevention studies is identified. However, future studies should include multiple timepoints for tissue acquisition for biomarker analysis, a placebo control arm and should focus on a panel of biomarkers rather than one probable area of effect. (Supported by NO1-CN-15345-01 and the Hamilton Family Foundation.)

Determinants of preventive efficacies of NSAIDs against lung tumorigenesis. Castonguay, A., Rioux, N. and Duperron, C. Faculty of Pharmacy, Laval University, Quebec City, Canada, G1K 7P4.

The aim of this study was to determine the mechanism of prevention of lung tumorigenesis by NSAIDs and to improve their efficacies. Lung tumorigenesis was induced in A/J mice by seven-week administration of the tobacco-specific nitrosamine 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). NSAIDs were given in the diet from two weeks before and until 16 weeks after NNK administration. The inhibition of lung tumor multiplicity was higher with nonbuffered acetylsalicylic acid (ASA) (62%) than with buffered ASA (18%). The preventive efficacy of ASA increased with the dose. NNK increased plasma prostaglandin E₂ (PGE₂) four fold. PGE₂ levels in ASA+NNK treated mice correlate with the logarithm of the number of tumors ($r^2=0.99$). The cyclooxygenase 2 specific inhibitor, NS-398, totally abolished NNK-induced PGE₂ synthesis and reduced lung tumor multiplicity by 34%. The NK cytotoxicity of spleenocytes of NNK+NSAIDs-treated mice reflected the preventive efficacy of NSAIDs. These results demonstrate that NSAIDs prevent lung tumorigenesis by attenuating immunotoxicity of the lung carcinogens. (Supported by CRS (Canada) grant).

PRESENCE OF CAROTENOID, AN ANTI-CARCINOGENIC MARKER, IN NIPPLE ASPIRATES POST-LACTATION. Chandice Covington, A Mitchell-Gieleghem, D Lawson, I Eto, C Grubbs.

Lactation is a known carcinogenic protective factor. Little is known about the nature of this protective factor. The purpose of this study was to examine post-weaned, nipple aspirate fluid (NAF) from women (N=17), ages 18-45, for carotenoid, a known antioxidant and anticarcinogenic marker, and compare carotenoid availability in NAF to that reported in colostrum. Total carotenoid ranged from 0.40 - 4.0 µg/ml, with a mean level of 1.94 (SD=1.21), with women who had weaned less time (<12 month) and those who were less than 35 years old having significantly greater carotenoid availability. NAF carotenoid did not differ significantly from the mean of 1.90 reported for colostrum from a previous study. This research elucidates possible mechanisms of the protective effect of lactation on the micro-environment of the breast.

**Evaluation of a Cancer Screening Promotion Program
Reaching Medically Underserved Women.**

Fernandez, M.

DeBor, M.

Stewart, K.

Purpose: To determine the effectiveness of ENCORE^{plus}, a health promotion program providing outreach, education, enabling, and referral for breast and cervical cancer screening to medically underserved women through a network of community-based non-profit organizations not traditionally providing public health services.

Methods: Initial data was collected from women enrolling in the program via questionnaires recording demographics and prior screenings. Followed-up occurred within six months of enrollment to assess whether or not enrollees received recommended screenings.

Results: Data from the program's second implementation year show that 27,494 women enrolled in ENCORE^{plus} resulting in 15,396 mammograms and 10,791 Pap tests. Over half the enrollees were racial/ethnic minorities, over 75% reported annual incomes under \$15,000 and 49% reported no insurance. 50% were previously non-adherent to Pap test screening guidelines and 60% of those 40 and over were previously non-adherent to mammography screening guidelines. Of non-adherent enrollees, 57.8% received mammograms and 36.5% received Pap tests. These results are compared with other programs.

Conclusion: A program implemented through community-based organizations can be successful in reaching its target population and bringing medically underserved women to breast and cervical cancer screening.

EFFECTIVENESS OF COMMUNITY PHYSICIAN EDUCATION FOR CANCER PREVENTION, SCREENING AND TREATMENT

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Urban minority groups, such as those living in Upper Manhattan, are generally under-served with regard to cancer prevention and screening practices. Primary care physicians are critical to counseling and recommending screening to these patients.

The NCI- and ACS-funded Upper Manhattan Physicians Against Cancer project, 1992-4, delivered a strong educational program to primary care physicians working in this community, including; academic detailing, customized materials on cancer prevention, screening and treatment, a series of formal and informal dinner lectures, as well as a quarterly newsletter.

An evaluation of the program was conducted, comparing 84 physicians in the two intervention communities with 38 in a control community. With pre- and posttest interviews over an 18 month period, intervention physicians were asked about their attitudes toward, knowledge of (relative to ACS guidelines), and likelihood of counseling and screening for breast, cervical, lung, colorectal and prostate cancers.

We found that both groups revealed a significant change in recommending mammography, BSE, digital rectal exams, PSA and dietary changes from pre- to posttest, with one significant difference, use of the acid phosphatase test for detecting prostate cancer ($p < .01$). No dramatic differences were observed between groups, though a pretest effect and small numbers may have ~~masked a significant effect.~~

The Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial: The First Five Years
CC Johnson, Henry Ford Health System, Detroit MI 48202

The objective of the NCI PLCO trial, designed to enroll 148,000 individuals, is to determine whether certain screening tests reduce mortality from prostate, lung, colorectal, and ovarian cancer. Subjects include men and women aged 55-74 who are at risk for the four cancers, and have not undergone screening for these cancers in the three years previous to recruitment. As of October 1997, there are over 90,000 persons enrolled at ten different sites nationwide. Participants are randomized to a screening or observational arm.

Recruitment strategies and processes have varied by site and over time. Men randomized to screening receive a digital rectal examination and a prostate-specific antigen determination annually for four consecutive years. Women receive a pelvic examination of the ovaries, a CA-125 determination, and a transvaginal ultrasound. Men and women receive an annual chest x-ray and, for the first and fourth visit only, a flexible sigmoidoscopy. Trial participants are followed for 10-14 years for incidence of all cancers and survival.

Persons in the intervention arm complete a food frequency questionnaire and donate blood for a centralized biorepository. The latest data on enrollment and numbers of ascertained benign conditions and cancers will be presented.

Patient Satisfaction with Screening Flexible Sigmoidoscopy. Schoen RE, Weissfeld JL, Bowen NJ. University of Pittsburgh, Pittsburgh, PA.

Flexible sigmoidoscopy (FS) is an underutilized cancer screening procedure. Physicians often cite patient discomfort as a reason for not requesting FS, but patient experiences and attitudes to FS have not been well studied. **Aim:** To measure patient satisfaction with FS. **Methods:** A reproducible 18 question instrument with face validity, internal validity, and criterion validity to assess satisfaction with FS was developed and employed. **Results:** 1221 patients, 666 men, 555 women, mean age 61.8 years, were surveyed after screening FS. The depth of insertion was ≥ 50 cm in 70.7%. 27.4% of exams included a trainee examiner and in 17.8% a polyp was found. 97.7% strongly agree/agree (SA/A) they were very satisfied with their care and 68.5% SA/A that the exam was more comfortable than expected. Satisfaction was not associated with gender or presence of a polyp, though more satisfied individuals reported less overall discomfort ($p < .001$) and greater likelihood to recommend the procedure to others and to undergo a repeat exam ($p < .001$). Pre test anxiety had a "U" shaped relationship to satisfaction, with the least anxious and most anxious having less pain and more satisfaction than those with intermediate anxiety. Training exams resulted in more discomfort ($p < .05$) and less satisfaction ($p < .001$). **Conclusions:** Individuals who undergo FS are satisfied and find the procedure more comfortable than expected. Even the most anxious patients are satisfied with a skilled exam. Training exams with less skilled practitioners do not achieve the same level of satisfaction.

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Treatment Options, Selection and Satisfaction Among Black and White Men with Prostate Cancer in North Carolina (NC)

Demark-Wahnefried W, Schildkraut JM, Iselin CE, Conlisk E, Kavee A, Aldrich TE, Lengerich EJ, Walther PJ and Paulson DF Duke Univ Med Ctr, Durham, NC/ N.C. Div of Health & Human Services, Raleigh, NC.

Prostate cancer (CaP) mortality is greatest among African Americans. In NC, which has the fourth largest population of blacks in the country, CaP mortality is 2.5 times greater among blacks than whites, and represents the highest reported CaP mortality rate of any state in the nation. To explore potential reasons for the racial differential in mortality, we undertook a study to determine if differences related to treatment existed between black and white men who were diagnosed with CaP during 1994-1995.

231 Cases were ascertained from 16 institutions within a 63-contiguous county region where the overall population was $>20\%$ black. A stratified design was employed to evenly accrue subjects into groups according to race and stage. A telephone survey was administered to ascertain treatment options discussed, treatment(s) received, factors influencing treatment, satisfaction with treatments discussed and options given, and socio-demographic information.

Measures relating to treatment were consistently associated with stage at diagnosis ($p < 0.001$), rather than other variables measured (i.e. race, age, income, co-morbidity, education/residential status). Also, most subjects reported that their physician presented several treatment options ($>65\%$) and that the physician was the most important factor influencing their treatment decision (57%).

These data suggest that black and white men in NC receive comparable treatment for CaP. Therefore, efforts to reduce the racial disparity in mortality should be directed toward reducing the high incidence of later stage disease at diagnosis, and to explore potential biological differences which may confer risk of more aggressive disease among African Americans.

Crane LA, Leakey TA, Warnecke R, Ehram G. University of Colorado Health Sciences Center, AMC Cancer Research Center, and University of Illinois, Chicago.

The Stages of Change Model predicts that for behavior change to occur, individuals must progress through stages of precontemplation, contemplation, action, and into maintenance. This model may be useful for encouraging screening mammography among underserved populations. In a quasi-experimental, non-equivalent control group design, a multiple outcall approach based on the Stages of Change Model was used to encourage mammography behavior among low income women in the state of Colorado. Women receiving the multiple outcall intervention were compared to women assigned to: (1) health survey only (control); (2) single outcall; and (3) advance letter plus single outcall. Behavior change was assessed through a telephone interview conducted six-months after initiation of the protocol. After controlling for differences between groups in age, education, income and previous mammography behavior, compared to the control condition, the multiple outcall intervention was related to increased rates of screening among women who were nonadherent at baseline (odds ratio=2.44; 95% CI = 2.2-2.7). The multiple outcall intervention did not increase screening among women adherent at baseline. In addition, there is evidence that the intervention promoted advancement through the stages of change for mammography. These results support the use of a relatively intensive, stage-based telephone intervention to improve screening mammography rates among underserved women.

Ethnic Differences in Cancer Knowledge and Beliefs Among Mexican Americans and African Americans.

Hernández-Valero MA, Strom SS, Chamberlain RM, Jiang H, Honn S, Spitz MR. Department of Epidemiology, MD Anderson Cancer Center (MDACC) Houston, Texas 77030.

Cancer knowledge and beliefs (CKB) and sociodemographic characteristics (age, education, income) must be evaluated to develop culturally-sensitive cancer prevention interventions for individual minority populations. We examined the association between CKB and sociodemographic characteristics in a lung cancer case-control study among 282 Mexican Americans (MA) and 316 African Americans (AA) conducted at MDACC between 1991-1995. As part of the study, 10 statements adapted from the Health Belief Model were used to assess CKB. A cancer knowledge scale was developed based on the number of correct responses: very low (1-2), low (3-4), medium (5-6), medium-high (7-8), high (9-10). When comparing overall correct responses, MA and AA obtained identical mean correct responses (5.4). However, statistically significant ethnic-differences were observed on individual statements such as: "everything causes cancer" (MA 62.2%, AA 44.1%, $p<.05$), "once cured it won't come back" (MA 15.6%, AA 44.1%, $p<.001$), and "people who have been healthy all their lives probably won't get cancer" (MA 27.6%, AA 11.2%, $p<.001$). There were no overall ethnic differences in CKB between the two groups given correct answers were not associated by gender, age, education or income. Our results show MA and AA have their own unique misconceptions about cancer that need to be addressed when developing culturally-sensitive cancer prevention interventions among these minority populations.

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Breast & Cervical Cancer Screening in Filipino American Women

Pasick RJ and Stewart SL

Filipino American women have significantly higher rates of late stage breast and cervical cancer compared with White women, yet there have been no population-based surveys of breast and cervical screening in this large population. This study is a modified random-digit-dialing telephone survey of 875 Filipinas from Northern California census tracts with at least 8% Filipinos, administered in English, Tagalog, Ilocano, and Cebuano. In this largely foreign-born population (90%), mammography and Pap smear utilization were significantly associated with age, marital status, education, employment, insurance, income, length of US residency, English use, religious practices, and health beliefs. Multiple logistic regression was used to model receipt of screening given these factors. Among women 20+, 12% had never had a Pap smear. Significant predictors in this group were being unmarried, less than a college diploma, 10 years or less in US, low English use, and more traditional health beliefs. Among women 50-75, despite being well educated (50% college grads), insured (90%), and not low income (65% > \$20,000), 19% had never had a mammogram and 62% were not in the maintenance stage for mammography (3 in the past 5 years, with 1 less than 2 years ago). Predictors of maintenance were insurance, more than 10 years in the US, and high religious affiliation. Interventions for Filipinas should be tailored to the characteristics of recent immigrants.

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COMPLIANCE WITH COLON CANCER SCREENING IN SIBLINGS OF COLORECTAL CANCER PATIENTS USING THE TRANSTHEORETICAL MODEL (TTM)

Manne, S., Breite, I., Galleli, K., Vickberg, S., and Winawer, S.

Little is known about the knowledge of and attitudes towards colon cancer screening in first degree relatives (FDR) of patients diagnosed with early onset colorectal cancer (CRC). Current guidelines recommend colon cancer screening starting at age 40 in FDR's of patients diagnosed with CRC at or before the age of 55. The TTM, used to describe patients' health prevention practices, states that people progress through a series of stages ranging from not contemplating to continuing the practice over time. The stage that the patient is in depends upon the perceived "pros" and "cons" about the practice. Using the TTM, educational efforts are aimed at increasing pros and decreasing cons in an effort to move people towards adoption. Sixty siblings of patients diagnosed with early onset CRC were interviewed. CRC and colon cancer screening knowledge, pros and cons of colon cancer screening, and stage of change were measured. The majority (93%) heard of the FOBT, flexible sigmoidoscopy, or colonoscopy. With regard to colonoscopy results indicate that 25% of participants were in the Action (had prior procedure) or Maintenance stage (planning another), 12% were contemplating the procedure, 2% were in Relapse (not planning another) and 47% were in the Precontemplation stage (not thinking about having one). Patients' endorsement of pros and cons differed significantly across the stages of change in the predicted direction. Physician recommendation to have the procedure also differed significantly across the stages of change. Results suggest that the TTM may be applicable in the development of educational materials to encourage screening in patients who have these procedures recommended.

TELEPHONE CALLS TO THE CANCER INFORMATION SERVICE (CIS) IN RESPONSE TO A DAYTIME TELEVISION STORYLINE ON BREAST CANCER. Marcus PM. Division of Cancer Prevention, National Cancer Institute. Bethesda, MD 20892.

In 1994, a middle-aged female character on "General Hospital," a daytime television program, was diagnosed with breast cancer. A public service announcement that displayed the toll-free CIS telephone number (1-800-4-CANCER) was aired after episodes in which the story-line was included. The purpose of the present study was to assess the number of calls to the CIS in response to the breast cancer story-line.

From October to December 1994, the CIS record-of-call forms included a check-off box to identify callers who, when asked how they learned of the CIS, reported General Hospital as their source. During those months, 207 of the 92,000 callers with questions regarding breast cancer stated that they learned of the CIS in that manner. Nearly all callers were female (97%). Additional demographic data was collected on roughly 40% of these callers, indicating that they came from a variety of ethnic and educational backgrounds. Interestingly, a large proportion (80%) were younger than 40, even though breast cancer more often strikes older women. The total number of calls in reaction to General Hospital is, in reality, greater than 207, as such calls made during the first three months of the story-line (7/94-9/94) could not be included.

As measured, the response to the General Hospital story-line was quite modest. Regardless, daytime television may provide an opportunity to inform people about breast cancer issues and available resources.

Outcome Expectations and Stage of Readiness to Change Health Behaviors Among Blue-Collar Women in Rural North Carolina Heisler JA, Campbell MK

Purpose: This study examines the relationship between outcome expectations for health behavior change, including dietary change and smoking cessation, and stage of readiness to change among blue-collar women in rural North Carolina. **Methods:** Nine worksites were randomized to intervention or delayed intervention groups. Interventions included tailored health magazines and lay health advisor trainings. Baseline, 6-month, and 1-year follow-up surveys were conducted with approximately 900 women. Participants' expectations of what would happen if they made changes to improve their health were examined in relationship to their stage of readiness to change that behavior. Relationships were also examined across time to determine whether advances in stage of readiness to change related to changes in outcome expectations. **Results:** Preliminary results indicate that there were significant relationships between participants' outcome expectations and their stage of readiness to change several health behaviors. Participants also advanced in stage of readiness to change dietary behaviors. **Conclusions:** Outcome expectations may help predict whether people will advance in their readiness to adopt healthier behaviors. These results could assist practitioners in: targeting interventions to people most ready to make changes; tailoring interventions to promote outcome expectations likely to lead to increased readiness to adopt health promoting behaviors.

**PREDICTORS OF LOW-FAT DIETARY CHANGE:
THE WOMEN'S HEALTH TRIAL: FEASIBILITY
STUDY IN MINORITY POPULATIONS**

D. Bowen, T. Cheung, & T. Hoida

The purpose of this study was to assess the extent to which non-White women and lower income postmenopausal women could be recruited and could participate in intensive dietary change. We conducted a randomized dietary intervention trial, with the daily goal of 20% of energy from fat. Intervention women from all ethnic and economic groups made substantial progress in meeting their dietary goals. Extent of participation in intervention activities predicted dietary change at 6 and 12 month follow-up points. Several psychosocial variables independently predicted dietary change, such as perceptions of one's dietary habits, social support, and beliefs in one's ability to make dietary changes. These data can guide the design of better interventions and can help identify women who need extra assistance.

AUTOMATED TELEPHONE COUNSELING TO IMPROVE

MAMMOGRAPHY SCREENING RATES. R Friedman, W Rakowski, B Ehrich. Medical Information Systems Unit, Boston University, Boston, MA and Department of Community Health, Brown University, Providence, RI.

For women who have lapsed from annual screening mammography, telephone counselors have been shown to increase subsequent screening mammography rates by 28%. Since telephone counselors are not widely available, we used an inexpensive, totally automated, computer-based, telephone counseling system, effective for changing other health behaviors, to promote mammography screening.

The Telephone-Linked Care system for Mammography (TLC-M) is a computer-controlled voice system, that educates, advises and motivates women to have regular screening mammograms. TLC-M uses real human voice to speak to women over the telephone. The conversation content is based on the Transtheoretical Model of behavior change in which a woman's readiness to have a routine screening mammogram is assessed and depending upon her intention, barriers for having mammography are identified and addressed.

TLC-M proactively calls women age 50+ who have not had their annual screening mammogram. If a woman would like to set up an appointment for a mammogram, TLC-M will transfer the call to the Radiology Department. For women who would consider making an appointment in the future, it will provide the department telephone number and hours. Next, TLC-M will determine whether a woman has any of the barriers for mammography that have been identified in the literature, and if so, it will provide information, emotional support, and advice to overcome the identified barriers. Depending upon the results of the first conversation, the women will receive up to 2 weekly TLC-M follow-up calls. Women who set up an appointment for a mammogram will receive a TLC-M reminder call prior to the appointment.

TLC-M has the potential of being a practical intervention for increasing the rate of annual screening mammography.

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Differences in Providers' Beliefs about the Benefits and Risks of Hormone Replacement Therapy

Exline JL, Siegler IC, and Bastian LA

Objective: To determine if physician beliefs about the benefits and risks of HRT differ by physician gender and/or specialty.

Design: Cross-sectional survey of providers.

Setting: Health Maintenance Organization in North Carolina.

Participants: 105 gynecologists, internists and family physicians and physician assistants were surveyed and 74 providers completed and returned the survey (70.5% response rate).

Measurements and main results: All providers prescribe HRT, yet their beliefs about the benefits and risks of HRT differed by specialty and gender of physician. Gynecologists are significantly less concerned about the potential risks of HRT on breast cancer ($p=.004$) and thromboembolic events ($p=.005$) compared to family physicians and internists. Female providers across the three specialty categories were significantly different than their male colleagues in their beliefs about the benefits of HRT with regards to the reduction in risk of heart disease (79% versus 64%, $p=.001$), osteoporosis (83% versus 75%, $p=.045$) and Alzheimer's disease (45% versus 26%, $p=.026$). There was a trend towards female physicians being more convinced about the risks of breast cancer than their male colleagues ($p=.08$).

Providers' perceived breast cancer risk and continuing menses to be why some patients chose not to use HRT. Gynecologists were significantly more likely to prescribe estrogens other than the standard conjugated estrogen ($p=.014$).

Conclusions: Differences in rates of prescribing HRT by gender and/or specialty may be partially explained by providers' beliefs about the benefits and risks of HRT and their familiarity with HRT regimens.

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Using The Theory Of Reasoned Action To Analyze The Decision To Participate In A Colon Chemoprevention Trial

C.B. Rubenstein, D.E. Brenner, M.T. Ruffin
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Purpose: To study the decision to participate in a chemoprevention trial utilizing the Theory of Reasoned Action. **Methods:** Beliefs about outcomes, importance of those outcomes, and subjective norms were targeted in a self-administered, mailed questionnaire regarding a colon cancer chemoprevention trial. The outcomes included altruism, money, desire to prevent cancer, inconveniences (such as child care, parking, time off work), embarrassing and uncomfortable procedure, and side effects as contributing factors for deciding whether to participate in a chemoprevention clinical trial that involved aspirin, flexible sigmoidoscopies, blood draws, and colon biopsies. **Results:** The 299 trial eligible subjects were identified using colonoscopy records. 165 were control subjects, who had recently had a normal colonoscopy, ranging in age from 19 to 86. 134 were at high risk for developing colon cancer, with ages ranging from 24 to 86. To date, 142 questionnaires (47.5%) have been completed and returned with 121 responding to whether they would or would not participate in the study. Respondents agreeing to participate had significantly lower household incomes ($p=.002$) with no other demographic features significantly different. The financial incentive reported necessary by those agreeing to participate was mean \$119.23 (range 0-\$1000). Factor analysis on 16 outcomes revealed two orthogonal, psychologically meaningful factors; Side Effects and Benefits. Side effects scale included discomfort of procedures (blood draw and sigmoidoscopy), embarrassment, time involved, and diet. Benefits scale included helping others, free examination, free blood tests, and financial incentive. Factor analysis on the 5 social influence items revealed 2 orthogonal, psychological meaningful factors: Adult Family Members and Others. Multiple logistic regression analysis with participation decision as the dependent variable produced a model of household income, Side Effects scale, and Adult Family Members Scale. **Conclusions:** Subjects eligible for a colon cancer chemoprevention trial consider a number of issues in making the decision to participate.

Psychological Profiles of Men With and Without a Family History of Prostate Cancer

Michael A. Diefenbach, Ph.D., Suzanne M. Miller, Ph.D., Mark O'Donnell, M.A., Debra Bruner-Watkins, R.N., Linda Kruus, M.S., Gerald E. Hanks, M.D., Fox Chase Cancer Center, Philadelphia, PA

The goal of the study was to explore the psychological and screening profiles of men with ($n=56$), and without ($n=100$), a family history of prostate cancer, in a sample that was predominantly middle-aged, Caucasian, married, employed, and well-educated. Participants completed a mailed survey that assessed cancer and screening history, as well as prostate cancer related beliefs, attitudes, and affects.

Results indicated that first-degree relatives (FDRs), compared to non-FDRs reported having a higher mean lifetime risk for developing disease ($p<.04$), were more likely to feel at risk than other men their age ($p<.001$), and were more likely to see themselves as being the type of person to get the disease ($p<.04$). FDRs believed that prostate cancer is inherited ($p<.02$), and that a person has little control over the development of the disease. Affectively, FDRs were more anxious ($p<.05$) than non-FDRs, however, higher anxiety did not translate into more frequent screening behavior. FDRs also reported that they read fewer prostate cancer-related news stories and watched fewer programs on TV than non-FDRs ($p<.003$). Finally, the coping style monitoring (a tendency to attend to and to exaggerate cancer related cues) interacted with cancer worry: High monitoring FDRs were significantly more worried about their disease risk than low monitoring FDRs.

The findings suggest that FDRs may benefit from personalized counseling interventions targeted to their cognitive-affective profiles and designed to address psychological barriers to adherence.

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Follow-up Adherence After Abnormal Mammogram

Kaplan C., Juarez-Reyes M., Bastani R., Ganz, P., & Crane L.

The purpose of this study was to determine adherence rates and factors affecting follow-up in low income women with either an abnormal breast examination or recommendation for diagnostic mammogram in public health facilities. Retrospective chart reviews were conducted 12 months after initial referrals. Outcome measures were any breast-related care over a 12-month period following index visit. Adherence was rated as either all, some, or none of recommended procedures being received or referred to another facility. A subsample of patients had telephone interviews asking about health attitudes and beliefs, barriers to follow-up, and reactions to breast abnormality. A subsample of physicians were also interviewed about similar issues.

951 subjects met study eligibility criteria. Patients were overwhelmingly Latino and foreign-born. Almost 67% of subjects received all of their recommended care and treatments, while 11.4% followed no recommendations. African-American and non-Latino White women were less likely to receive any follow-up care than other ethnic/racial groups. Patients reported inability to pay for services, uncertainty about where to receive services and distance to clinics as major barriers to follow-up. Physicians reported many perceived barriers for patients including denial, fear, incorrect address information, and lack of transportation. Almost 90% of women interviewed recognized the severity of breast abnormalities and benefits of proper follow-up, but about one third stated the likelihood of receiving screening procedures such as Pap smear, clinical breast exam or mammogram in the next 12 months was only somewhat or not very likely. In conclusion, lack of follow-up is a significant problem with women in public health facilities, and interventions to increase adherence should address identified barriers such as financial assistance and facility location.

Skills-Based Learning for Primary Care Community Physicians Using a Modified MammaCare Method of Clinical Breast Examination

Costanza, M.E., White, M.J., Stoddard, A., Luckmann, R., and L. Clemow

A continuing medical education (CME) course to improve primary care physicians' clinical breast examination (CBE) skills provided rehearsal of the MammaCare CBE Method with standardized patients (trained instructors who play the role of patients). Eighty-five attendees had an opportunity to perform a complete CBE on one breast and observe and evaluate at least two other physicians' exams.

Standardized patients visited 78 physicians in their offices pre/post course attendance to assess changes in CBE performance using checklists for thoroughness and completeness. In addition, time spent palpating one breast was measured. Post-course assessments were conducted from one to four months after course attendance (mean 8.9 weeks; median 10.1 weeks). Course physicians increased their ability to perform the MammaCare Method of CBE ($p=0.0001$), and average search time for one breast palpation increased from 66.7 sec. to 120.6 sec. ($p<0.0001$).

This skills-based CME model holds promise for teaching or improving clinical and physical examination. Attendees readily accepted working with standardized patients as pre/post course evaluators and course instructors.

Future Mammography Compliance by Underserved Urban Women After a Mobile Mammography and Educational Intervention

Klemp J, Fabian CJ, Johnson C, Simon C, Barnes J, Chang, J:
University of Kansas Medical Center, Kansas City, Kansas

The purpose of this prospective study is determine if a one time mobile intervention with free mammography, clinical breast exam, risk assessment, and breast health education will improve future compliance with recommended screening guidelines.

The mobile mammography and risk assessment program was initiated in 1995 with funds largely provided by the Susan G. Komen Foundation. Services are performed on a mobile medical unit transported to an area church or civic center. Our goal is to compare the proportion of women who had undergone a screening mammogram 2 years prior to the intervention to those undergoing screening within 2 years following the mobile intervention. 846 women have been screened in the past 27 months. The median age is 49, median household income is <\$25,000 annually, 40% are minority, 28% had never had a previous mammogram and 72% had some form of insurance. A two year follow-up was conducted on women screened in the first four months of the mobile screening program and 74% (92/124) of the women were contacted. Of these 92 women, 25% of the women had never had a mammogram before the mobile intervention, 46% of the women had obtained a mammogram 2 years prior to the intervention, and 40% had received a mammogram 2 years subsequent the intervention. Subsequent compliance was no different between those who had previously demonstrated compliance with recommended screening practices. Our preliminary data does not support our hypothesis that a free mobile intervention, including mammogram, clinical breast exam, risk assessment and breast health education, will increase future compliance with recommended screening guidelines.

Differences between Attendees and Non-Attendees of a Skills-Based Breast Cancer Screening

Continuing Medical Education (CME) Course

White, M.J., Luckmann, R., Stoddard, A., Clemow, L., and
M.E. Costanza

Community primary care physicians from two IPA model HMOs in Massachusetts were randomized to the physician intervention arm of a five year mammography utilization study and asked to complete a self-administered survey assessing their breast cancer screening knowledge and attitudes. A year latter, these physicians were invited to attend a five hour skills-based breast cancer screening CME course.

Stepped recruiting efforts through invitations, follow-up calls and faxes, and finally personal contacts from peer opinion leaders were made in maximize course attendance. Attendees were categorized into low and high recruiting groups depending on the extent of recruiting efforts. Detailed cost analysis was kept to monitor the feasibility of the recruitment process.

Percent of female physicians ($P=0.06$) and mean number of patients seen per hour ($P=0.03$) significantly differed between attendees and non-attendees. Course attendees were more likely to have completed the initial breast cancer screening knowledge and attitude survey (84% attendees vs. 48% non-attendees). While attendees requiring higher recruitment efforts cost twice that of the low recruitment group, there was no difference in course performance outcome.

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Racial and Ethnic Influences on Mammographic Breast Density (Fishman J, Hamilton K, Trapido E, Schwartz D, and McCoy C, Sylvester Comprehensive Cancer Center, University of Miami, FL)

Purpose: The mammographically dense breast is associated with increased breast cancer risk. We investigated the relationship between breast density and race/ethnicity among women in a large breast cancer surveillance program.

Methods: For 15,120 women screened over a ten-year period, the frequency of a mammographically dense breast was calculated and adjusted for age, quetelet index ($\text{weight}/\text{height}^2$), parity, and menopausal status. Women were classified by race (white, black) and ethnicity (Hispanic [including Puerto Rico and Cuba], non-Hispanic, and other Caribbean).

Results: The unadjusted frequency of dense breast varied from 14.1% (white Hispanic) to 8.8% (black Caribbean). For women under age 50, multivariate analysis showed a higher risk of dense breast among all whites compared to all blacks (adjusted odds ratio [OR] = 1.22, 95% confidence interval [CI] = 1.05-1.42). Black Caribbean women showed a distinctly lower frequency of dense breast than black non-Hispanics regardless of age (adjusted OR = 0.625, CI = .515-.759).

Conclusions: There are significant differences in the adjusted frequency of dense breast among women of different racial and ethnic groups. The extent to which these differences may contribute to racial and ethnic differences in the incidence and presenting stage of breast cancer remains to be investigated.

Results of a Media/Outreach Effort to Increase Awareness about Breast Cancer Among African American Women. Fleisher, L., James, D., Daly, M., Torres, S.

Purpose. African American women are underrepresented in breast cancer prevention, screening and treatment trials and the reasons for low participation are complex and long-standing, including availability and accessibility to healthcare resources, the additional costs of participation, language barriers, issues of acceptability, and distrust of the healthcare system. The purpose was to increase awareness about breast cancer, information resources, and issues about clinical trials.

Methods. This two-year pilot project, funded by the National Action Plan on Breast Cancer, included a formative evaluation to develop, implement and evaluate paid radio advertisements on local black radio, a target direct mail advertisement to African American households in Philadelphia, and community outreach strategies to encourage women to call the Cancer Information Service to learn about breast cancer and discuss issues around clinical trials. The project was based on an extensive formative evaluation and involvement of the community through a Community Advisory Board and cultural-sensitivity training of CIS staff. A follow-up interview was conducted to assess women's concerns about breast cancer, satisfaction with the information and self-reported behavior.

Summary of Results. During the two-month implementation, the CIS office received 113 calls from African American women about breast cancer which was a dramatic increase from this population. Callers found out about the CIS from direct mail (17%), radio (19%), outreach (9%) and a wide variety of other sources (NCI publications other organizations, and television). Fifty-three percent of the callers completed the follow-up interview; however, only 3% refused to participate.

Conclusions. Here, we present the impact of the targeted media on call volume and qualitative results from follow-up interviews.

COMMUNITY BASED CANCER EDUCATION INTERVENTION IN MEXICAN AMERICAN

COMMUNITIES. M. Abrahamsen, A. Giuliano, M. Papenfuss, J. de Zapien, S. Saltzman, J. Stephan, J. Meister. Arizona Cancer Center, University of Arizona, Tucson, AZ 86716.

The aim of this project was to increase the knowledge of risk factors, risk behaviors, the importance of early detection and the availability of screening and treatment for cancer in Mexican American communities in Nogales, Arizona. A total of 601 randomly selected households were administered a health questionnaire by a trained group of bilingual, female health promoters. 294 households were randomly selected to an intervention group. This group was given brochures about cancer, specifically designed for this community. 307 households made up the control group which was given cancer brochures produced by the NCI and ACS. To assess whether there was an increased knowledge among the participants, a second visit was made at 2 months in which the same health questionnaire was administered (post-test). The mean age of participants was 46.5 yrs with 83.4% of participants being female and 39.1% having completed a minimum of a high school education. Among the intervention group, a significant improvement in knowledge of cancer causes and cancer screening was observed. For example, at baseline 40% and 29% of intervention and control groups respectively responded that they did not know what causes cancer. This decreased to 1% and 18% of intervention and control groups respectively at the post-test. Our data indicate that a one-on-one intervention, using Spanish language brochures, is an effective tool to increase the knowledge of cancer screening and cancer risk factors among Mexican American communities.

DOPAMINE D4 RECEPTORS AND THE RISK OF CIGARETTE SMOKING IN AFRICAN AMERICANS AND CAUCASIANS. Lerman C., Caporaso N.E., Audrain J., Boyd N.R., Main D., Bowman E.D., Shields P.

Purpose: Nicotine has been implicated in the stimulation of brain reward mechanisms via central neuronal dopaminergic pathways. We evaluated the association of smoking and smoking cessation with a functionally active dopamine D4 receptor 48 base pair variable nucleotide tandem repeat (VNTR) polymorphism. **Methods:** Smokers (n=283) and nonsmokers (n=192) were recruited through local media for a case-control study of smoking. Smokers underwent a single minimal contact session of smoking cessation counseling, and then were followed for up to one year. **Results:** African Americans (n=72) who were heterozygous or homozygous for the long-repeat allele (i.e., S/L or L/L) had a higher risk of smoking (O.R.=7.7, 95% C.I.=1.5, 39.9; p=0.006), shorter time to the first cigarette in the morning (p=0.03) and earlier age at smoking initiation (p=0.09), compared with those with homozygote S/S genotypes. Following smoking cessation counseling, none of the African American smokers with the S/L or L/L genotypes were abstinent at two months, compared with 35% of the smokers who were homozygous S/S (p=0.02). The analysis of Caucasians (n=403) did not suggest a similar smoking risk for the D4 genotypes (O.R.=1.0, 95% C.I.=0.6, 1.6; p=0.90), or an association with smoking cessation (p=0.75). **Conclusions:** While the number of African Americans is small, this study is consistent with the hypothesis that the L alleles of the dopamine D4 receptor gene increase the risk of smoking and smoking relapse. These individuals may be prone to use nicotine to stimulate synaptic dopamine transmission, and therefore, may be less responsive to minimal contact smoking cessation treatment.

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Educational Intervention and Prostate Cancer Early Detection Barriers Among African-American Men. Burgh D., McGrory G., Diehl J., Wolf T., Marcus S., Hyslop T., Myers R., Thomas Jefferson University; Chodak G., Williams M., University of Chicago; Leventhal H., Rutgers University; Robinson R., Centers for Disease Control.

Purpose: Determine the impact of a prostate cancer screening educational intervention on barriers to appointment-making for a prostate cancer early detection. **Methods:** Thomas Jefferson University and the University of Chicago identified 548 African American male patients at the University of Chicago University Health Service (UHS) for a study of prostate cancer education and early detection. The men were 40 to 70 years of age, had no record of prostate cancer, had visited the UHS within two years prior to the study, and had no record of digital rectal examination (DRE) or prostate specific antigen (PSA) testing in the past year. A total of 413 (75%) men completed a baseline telephone survey. Respondents were randomly assigned to either a control group (mailed clinic invitation and reminder letter) or treatment group (mailed appointment invitation and reminder letter, educational booklet, and counseling telephone call). Barriers to appointment-making were identified via follow-up telephone interview with appointment nonadherers. **Results:** A total of 229 (55%) men reported a barrier to making an office visit for prostate cancer education and early detection. Univariate analyses of appointment-making barriers indicate that control group men were less likely to understand the appointment-making process (p<.05) and more likely to believe that early detection was appropriate only in the presence of symptoms (p<.05). These findings suggest that the educational intervention provided to the treatment group served to minimize confusion about appointment-making procedures and clarify that early detection is directed towards asymptomatic men.

Carbone ET, Campbell MK, and Honess-Morreale L.
University of North Carolina at Chapel Hill.

Public health professionals are often called upon to develop surveys and educational materials for cancer prevention and control. The effectiveness of these surveys and materials are dependent on their understandability and appropriateness to the target audience. However, problems with wording and language are often not revealed even by pilot testing. Cognitive response techniques can be invaluable tools to assist researchers. With this method, respondents are led through a survey or informational message, and asked to paraphrase items, discuss thoughts, feelings, and ideas that come to mind, and suggest alternative wording.

As part of the *FoodSmart* study, a multimedia nutrition education project, cognitive response interviews were conducted among technical college and public library attendees. Feedback from these interviews helped inform the development of a Learning Style survey, and responses were used to design tailored computer messages and a nutrition newsletter.

Results indicate that words such as "low fat" and "healthy" are often misunderstood, and dietary messages in the Food Guide Pyramid are subject to a wide range of interpretations. Interviews also provided insight into the meaning of stages-of-change, self-efficacy, and other psychosocial measures. Gaining a better understanding of respondents' cognitive processes significantly improved the language and approach used in this cancer control intervention.

Body Fat Distribution and Risk of Breast Cancer. Huang
Hankinson SE, Colditz GA, Hunter DJ and Willett WC. Harvard
University, Boston, MA 02115

Purpose: To examine prospectively the associations of waist circumference and waist/hip ratio (WHR) with risk of breast cancer.

Methods: A cohort of 47,382 nurses reported their waist and hip circumference along with other risk factors in 1986 and were followed every 2 years up to 1994. The validity of self-reported waist circumference and WHR was assessed against technician measurement among a subsample of 140 women ($r=0.89$ and 0.70).

Results: During 333,097 person-years of follow-up, 197 premenopausal and 840 postmenopausal breast cancer were diagnosed. After adjusting for known risk factors, waist circumference was not associated with risk of premenopausal breast cancer, but positively associated with postmenopausal breast cancer (p trend <0.05 , relative risk [RR]=1.34 for waist circumference of ≥ 36 inch versus <28 , 95% confidence interval [CI], 1.05 to 1.72). After further controlling for body mass index, waist circumference tended to be positively related to premenopausal breast cancer; and the positive association with postmenopausal cancer remained significant. When the analysis was limited to postmenopausal women who never used hormone therapy, a stronger positive association was found (RR=2.01 for waist of ≥ 36 inch versus <28 , 95% CI, 1.32 to 3.06). Among past and current postmenopausal hormone users, no significant associations were found. Waist/hip ratio presented similar and slightly weaker associations with breast cancer in general. **Conclusions:** Central obesity is associated with increased risk of breast cancer, especially among postmenopausal women who never used hormones, which is independent of the effect of overall obesity.

IMPLICATIONS OF PHYSICIAN COUNSELING OF WOMEN AT HIGH RISK FOR BREAST CANCER

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Women at high familial risk for breast cancer (i.e., those with a first-degree relative with the neoplasm^{1,2}) often do not engage in effective surveillance behaviors, such as regular clinical and breast self exams and mammograms³. Barriers to screening include; increased anxiety or fear^{4,5,6}, cognitive deficits and breast cancer misbeliefs⁴. Considerable evidence supports the importance of the physician⁵ in reducing anxiety, increasing the likelihood that she will regularly engage in these preventive behaviors⁷.

The presentation describes an intensive study of 26 women at "high risk" for breast cancer. The study method relies upon the "grounded theory"^{8,9} approach to the collection of data, with its explicit approach to theory development. Using psychometrically sound measures, multiple outcomes in surveillance behaviors and quality of life, among women who engaged in frequent BSE, CBE & Mammograms, elevated familial risk was seen as "normal". Rarely were symptoms-part of their identity, and concern about the cancer rarely intruded upon their thoughts. The role of the physician, as both the symbolic reminder of her status, and the concrete influence on her continued surveillance behaviors, is critical. Mechanisms for enriching this role are explored.

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36 = 62 in 1980 Post-Survey
38 = 61a in Post-Survey*

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Intention of African American Men to Undergo Follow-up
Should an Abnormal Prostate Cancer Early Detection
Exam Result Occur.

Myers R, McGrory G, Hyslop T, Wolf T, Burgh D, Diehl J,
Marcus S, Thomas Jefferson University; Chodak G,
Williams M, University of Chicago; Leventhal H, Rutgers
University; Robinson R, Centers for Disease Control.

Purpose: Identify factors associated with intention to
have follow-up in the event of an abnormal prostate can-
cer early detection result.

Methods: Thomas Jefferson University and the University
of Chicago identified 548 African American male patients
at the University of Chicago University Health Service
(UHS) for a study of prostate cancer education and early
detection. The men were 40 to 70 years of age, had no
record of prostate cancer, had visited the UHS within
two years prior to the study, and had no record of dig-
ital rectal examination (DRE) or prostate specific anti-
gen (PSA) testing in the past year. A total of 413(75%)
men completed a baseline telephone survey. Respondents
were randomly assigned to either a control group (mailed
education and early detection exam appointment invita-
tion and reminder) or treatment group (mailed appoint-
ment invitation, reminder, educational booklet, counsel-
ing telephone call).

Results: Only 314 (77%) baseline survey responders indi-
cated that it was certain that they would undergo diag-
nostic evaluation in the event of an abnormal early de-
tection exam result. Multivariate logistic analyses
show that perceived self-efficacy ($p < .009$) and belief in
primary care physician support for screening ($p < .003$)
were positively associated with intention to have diag-
nostic follow-up; while belief in the finality of being
diagnosed with prostate cancer ($p < .003$) was negatively
associated with follow-up intention.

Conclusions: Findings indicate that patient adherence to
physician direction for follow-up of abnormal early
detection results may be problematic. Specifically,
adherence to follow-up by African American men may be
influenced by self-efficacy, fatalism and social support

PSYCHOSOCIAL PROBLEMS OF CANCER SURVIVORS

Baker, F., Denniston, M. & Hann, D.

It is estimated that close to 10 million people are surviving cancer, yet relatively little information is available about their psychosocial needs or problems. In this questionnaire survey, we examined the responses of 301 cancer survivors to a list of 29 problems that they might have experienced. The most common problem experienced by this group was fatigue (71%). Half to two-thirds were fearful about the future, and the possible return of illness. Other problems mentioned by at least two-fifths included sleeping difficulties, changes in appearance, continued health problems, sexual dysfunction, and feelings of vulnerability. As compared to older survivors, younger respondents felt more angry, guilt-ridden, isolated, helpless and vulnerable. They felt they were being treated differently from others and they were more concerned about the future, return of illness, sterility, their jobs, finances and appearance. They had more problems with family and children and returning to former roles. While there were few significant differences by race, significant differences were found by gender, time since diagnosis, income and level of educational attainment. Knowledge regarding the problems of survivors can be helpful in designing appropriate support and educational programs and in targeting interventions for those who need them the most.

FATIGUE AND QUALITY OF LIFE IN CHEMOTHERAPY RECIPIENTS

Hann, D., Denniston, M., & Baker, F.

Clinical reports suggest that fatigue is one of the most common and disruptive side effects of chemotherapy. However, yet there has been little systematic investigation of this topic. In this study, we compared fatigue and quality of life in 62 cancer patients currently receiving chemotherapy to fatigue in 84 patients who had completed chemotherapy (average time since treatment=2.5 years). The two groups were similar in age and other demographic characteristics. Patients who had completed chemotherapy reported significantly less frequent fatigue ($p<.01$) and less severe fatigue ($p<.01$) than patients in current treatment. Also, patients who had completed chemotherapy reported that fatigue produced significantly less interference with their daily activity, and with their physical, social, and emotional functioning (all $p<.05$). Finally, the physical, functional, and emotional well-being reported by patients who had completed treatment was significantly better than was reported by patients still in treatment (all $p<.01$). These results suggest that following completion of chemotherapy, cancer patients may experience significant improvements in fatigue, daily functioning, and quality of life. If these findings are supported by longitudinal research, they will be helpful in educating patients as to what to expect with regard to the side effects of cancer treatment and the impact of those side effects on quality of life.

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PSYCHOSOCIAL ASPECTS OF GENETIC TESTING AND
COUNSELING FOR HEREDITARY BREAST/OVARIAN
CANCER: PRELIMINARY FINDINGS

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G. Mills¹, L. C. Strong¹, P. T. Rieger¹, ¹UT M.D. Anderson
Cancer Center, ²UT School of Public Health

Few published studies have focused on the psychosocial experience of individuals undergoing cancer genetic counseling and testing in the clinical setting. This report describes preliminary data from a study of the psychosocial aspects of genetic testing and counseling for hereditary breast/ovarian cancer (HBOC). Thirty women (60% of whom had a current or prior diagnosis of breast and/or ovarian cancer) who consented to a genetic testing and counseling protocol completed psychosocial measures prior to undergoing pre-test counseling and genetic testing (baseline), and at two weeks and three months following counseling for test results disclosure. Participants who received positive test results (37%) showed a decreasing trend in mean depression scores within 2 weeks, but scores were elevated at the 3-month follow up period. Mean state anxiety scores showed an increasing trend following positive results disclosure as did mean scores of perceived risk of developing HBOC among non-cancer patients. Among those who received a negative test result, there were no differences in mean state anxiety, cancer-specific distress and perceived risk (among non-cancer patients) between psychosocial assessments at baseline and at post-results disclosure. Mean depression scores showed a decreasing trend immediately after disclosure followed by a return to baseline levels. These preliminary findings suggest that additional counseling and support may be helpful for individuals receiving positive genetic test results in order to mitigate potential negative psychological impact.

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The Influence of Research Participant Motivation on Compliance to Low-Fat (LF) and Calorie-Restricted (CR) Diets. Brooks, K., Depper, J., Heilbrun, L., Lababidi, S., Uhley, V. and Djuric, Z. Karmanos Cancer Institute, Detroit, MI, 48201

A 12-week dietary intervention trial was recently completed in Detroit, MI to examine the relative biochemical effects of LF and CR diets. Some women were able to meet their diet goals by 4 weeks. We therefore examined some possible reasons that contributed to their success. Premenopausal women (n=88) were randomized to either a control, low-fat (15% of calories from fat), low-calorie (25% restriction), or low-fat/low-calorie diet for 12 weeks. Four day food records were collected at baseline, 4, 8 & 12 weeks. Bi-weekly visits and daily food diaries were employed to monitor compliance. ADA exchanges were used to assist participants in meeting their dietary goals. As a follow-up to the study, the participants were asked what their primary reason for participating was and if they had had prior experience with formal diet instruction. Of the women who had a calorie-reduction goal, those whose reasons for participation were altruistic had a significantly better ($p = 0.026$) calorie reduction success rate (83.3%) than did those with a self-serving primary reason to participate (48.0%). Here, success was defined as having a caloric intake $\leq 75.0\%$ of baseline level at 4 weeks. Altruistic reasons included having a relative or friend with cancer and/or having a desire to contribute to science. Other reasons such as a desire to lose weight, to learn about nutrition, or receiving payment for participation were classified as self-serving. Education, body weight and previous diet experience were not statistically significant factors for success. No significant influence of any of these factors on ability to meet the 15% of calories from fat goal by 4 weeks was found. Supported by NIH grants CA 60812 and CA 22453.

Cytochrome P450 (CYP) 2C9 Genetic Polymorphism and Lung Cancer Risk Among Caucasians, Mexican Americans, and African Americans. Wu XF, Wen Y, Hong WK, and Spitz MR. The University of Texas M. D. Anderson Cancer Center and School of Public Health, Houston, TX 77030 (Supported by CA55769 and CA68437).

Purpose: CYP2C9 is known to metabolize a number of clinically important drugs and may also play a role in the metabolism of benzo[α]pyrene, a carcinogen in tobacco smoke. CYP2C9*2, also termed Cys144, is a relatively common allelic variant of CYP2C9 that may reduce this enzyme activity. This study was conducted to estimate the prevalence of CYP2C9*2 among various ethnic populations and to examine the associations between CYP2C9 polymorphism and susceptibility to lung cancer. **Methods:** Genotyping of CYP2C9 was performed using the polymerase chain reaction on peripheral white blood cell DNA from 368 patients with previously untreated lung cancer (192 Caucasians, 72 Mexican Americans (MA), and 104 African American (AA)) and 361 controls (175 Caucasians, 98 MA, and 88 AA). Benzo[α]pyrene diol epoxide (BPDE)-induced chromatid breaks were quantified by an *in vitro* assay in peripheral blood lymphocyte cultures. **Results:** Among controls, the prevalence of CYP2C9*2 variant allele was significantly different among Caucasians (0.171), MA (0.082), and AA (0.034) ($P < 0.0001$). The presence of the CYP2C9*2 variant allele was not associated with decreased lung cancer risk for MA and AA. However, a significantly decreased lung cancer risk was observed in Caucasian males with OR of 0.51 (0.27, 0.97) after adjustment by age and smoking status. A trend of decreased BPDE-induced chromatid breaks was observed with increasing copy number of CYP2C9*2 variant allele in lung cancer patients. The mean breaks per cell for patients with CYP2C9 homozygous wild allele, heterozygotes, and homozygous CYP2C9*2 variant allele were 0.76, 0.64, and 0.57, respectively. **Conclusion:** CYP2C9*2 variant allele may decrease the risk of lung cancer and may modify BPDE induced mutagen sensitivity. However, this association is linked to ethnicity and gender.

A Pilot Study Investigating the Association between High-Density Lipoprotein Cholesterol and Mammographic Densities

G Maskarinec¹, L-C Lyu², L Meng L¹, A Theriault³, G Ursin⁴

¹Cancer Research Center, University of Hawaii ²Taipei Medical College ³Div. of Medical Technology, University of Hawaii ⁴Norris Comprehensive Cancer Center, University of Southern California.

Purpose: To explore the relation between mammographic densities (MD) and high-density lipoprotein cholesterol (HDL-C), which may be a marker of long-term dietary patterns and associated with breast cancer risk, among Asian, Caucasian, and Hawaiian women.

Methods: In this cross-sectional study, postmenopausal women who had received a screening mammogram completed a survey on their medical and reproductive history and usual diet. Using computerized assessment, the total and the dense area of the breast were measured in pixels. The proportion of the breast with densities was calculated as the ratio of the dense area to the total area of the breast. HDL-C measurement was performed on a Kodak Ektachem Analyzer following precipitation of low- and very-low-density lipoproteins.

Results: Mean HDL-C levels were 64 mg/dl in 20 Asian vs. 56 mg/dl in 19 Caucasian/Hawaiian women. Among women who did not take estrogen (N=26), HDL-C was inversely associated with the area of MD (partial $R^2=0.15$, $p=0.03$). In the same regression model, daily intake of tofu (partial $R^2=0.2$, $p=0.014$), body mass index (partial $R^2=0.17$, $p=0.001$), age at menarche (partial $R^2=0.06$, $p=0.06$), years of school (partial $R^2=0.06$, $p=0.01$), and Asian ethnicity (partial $R^2=0.03$, $p=0.9$) were negatively related to densities. Physical activity, dietary fat and alcohol intake were not associated with MD. Substituting the area of MD with the proportion of densities as the dependent variable did not change the variance explained by HDL-C. In women who used estrogen replacement therapy (N=13), HDL-C was not related to MD.

Conclusion: We observed an association between HDL-C and MD in women not taking estrogen replacement, but not in estrogen-users.

BIOMARKERS FOR EXPOSURE TO TOBACCO TOXINS

C.D. Malvestutto, J. E. Henningfield; Pinney Associates Inc., Bethesda, MD; D. M. Burns, UCSD School of Medicine, San Diego, CA

The 1997 National Cancer Institute Monograph, titled "Changes in Cigarette-Related Disease Risks and Their Implication for Prevention and Control" reconfirmed that the risk of premature smoking-caused mortality is directly related to the number of cigarettes smoked per day. Also in 1997, a United Nations expert panel advised that, to reduce tobacco-caused death and disease, reduction of exposure to tobacco toxins be added as a third leg of current prevention and cessation-focused efforts. One of the many practical problems raised by consideration of exposure reduction approaches is how to quantify their potential benefit and thereby assess their validity. This presentation will highlight the results of a review of more than 50 potential biomarkers of tobacco exposure. Markers were evaluated through a review of the literature and through direct consultation with experts. The utility of each measure for use in ERT clinical trials was assessed based on the following criteria: linearity of dose-response relationship between the measure and the tobacco toxin exposure level, relatedness of the marker to tobacco-caused disease, sensitivity and specificity in differentiating smokers and non-smokers, ability to specifically reflect cigarette smoke consumption without interference from sources of exogenous nicotine or other non-tobacco substances, ability to reflect changes within a few weeks of exposure reduction, ability to demonstrate a distinction between current/recent exposure and past exposure, ease and expense of use and measurement. The results of this analysis should be useful in evaluations of putative exposure reduction products and strategies from tobacco companies, as well as from pharmaceutical companies and public health advocates. Perhaps not surprisingly, some of the measures advocated by tobacco companies have fundamental flaws which could readily lead to invalid conclusions.

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Effect of Supplemental Vitamin Use and Smoking on Gamma-Ray Induced Mutagen Sensitivity Wang L, Bondy ML, Wang XZ, Gu J, Strom SS, Spitz MR, Wei Q. The U.T. M.D. Anderson Cancer Center, Houston, TX 77030

Ionizing radiation induces free radicals that cause single- and double-strand DNA breaks. We have reported that gamma-ray-induced mutagen sensitivity was associated with increased risk of gliomas. We now describe the effects of supplemental vitamin (SV) use and smoking on radiosensitivity in a healthy population. We measured gamma-ray (1.5 Gy) induced chromatid breaks in cultured lymphocytes in 437 healthy subjects (18 to 95 yrs old) from 5 ongoing case-control studies, who completed questionnaires which included information on use of tobacco, alcohol and SV in the past 10 years. The overall mean numbers of spontaneous and induced chromatid breaks were 0.02 and 0.44 per cell (b/c), respectively. The mean induced b/c were higher in men than in women ($P=0.074$) but did not differ by age and ethnicity. Smokers ($n=227$) had higher b/c (mean=0.47) than nonsmokers ($n=210$; mean =0.41) ($P=0.003$), but no difference of b/c in alcohol use was found. In addition, SV users ($n=218$) had lower b/c (mean=0.41) than nonusers ($n=129$; mean =0.47) ($P=0.036$). Interestingly, there was an interactive effect between SV use and smoking:

Interactive effect of supplemental vitamin use and smoking on radiosensitivity

SV use	Smoking	No. of Subjects	B/C ^a Mean±SD	Percentage Difference	P value ^b
Yes	No	113	0.38±0.18	Baseline	Reference
Yes	Yes	105	0.44±0.23	+18%	0.029
No	No	51	0.41±0.21	+7.9%	0.321
No	Yes	78	0.51±0.38	+34%	0.002

^a B/C=break per cell of those irradiated by 1.5 Gy. ^b Two-sided t test.

Thus, the protective effect from SV use was not evident in smokers. (Supported by NIH grants CA70334, CA68233, CA7017 and CA55769)

TGF- α Expression in Epithelial Hyperplasia/Dysplasia - and Invasive Squamous Cell Carcinoma (SCC) in the Human Lung. Piyathilake CJ¹, Manne U², Heimbürger DC¹, Weiss H³, Frost AR² and Grizzle WE². Departments of Nutrition Sciences¹ and Pathology² and Comprehensive Cancer Center³, University of Alabama at Birmingham, AL 35294.

TGF- α plays an important role in regulating tumorigenicity through an autocrine growth mechanism. Although the expression of TGF- α is shown to be elevated in SCC, the degree of expression in normal bronchial epithelium and intraepithelial bronchial lesions (hyperplasia/dysplasia) is largely unknown. We used immunohistochemical techniques to determine the expression of TGF- α in normal bronchial epithelium, intraepithelial lesions and invasive carcinomas in 20 archival lung specimens resected for SCC. Immunostaining was graded as negative (< 0.5), low (> 0.5 - 1.0) and moderate (> 1.0 - 2.5). Wilcoxon signed-rank test was used to perform pairwise comparison of TGF- α scores among different tissue types. Moderate expression of TGF- α was more frequent in invasive carcinomas (72%) compared to either normal (26%) or intraepithelial bronchial lesions (36%). The average TGF- α expression was 0.79 (SEM=0.11), 0.90 (SEM=0.11) and 1.35 (SEM=0.12) in normal, intraepithelial bronchial lesions, and SCC, respectively. There was a significant difference in TGF- α scores between SCC and normal ($p=0.002$) and between SCC and intraepithelial lesions ($p=0.01$). However, TGF- α was not differentially expressed between normal and intraepithelial bronchial lesions ($p=0.64$). These findings suggest that although TGF- α is expressed in normal as well as intraepithelial lesions it may be involved in the progression of intraepithelial lesions to invasive cancer.

Prevalence of HBV and HCV Infection in Egyptian patients with Hepatocellular Carcinoma

El-Shazly H, El-Sobkey M, Raouf A, Shehata L, Farahat T, Hakim I, and Ritenbaugh C.

The aim of this study was to define the roles of hepatitis B (HBV) and hepatitis C (HCV) in the etiology of hepatocellular carcinoma (HCC) in Egypt. In this case-control study, we assessed 97 cases of pathologically confirmed HCC and 99 community control subjects for the presence in serum of hepatitis B surface antigen (HBsAg) and antibodies to the hepatitis C virus (anti-HCV). Anti-HCV was detected in 68% of HCC cases and in 36.4% of controls ($P < 0.001$). The corresponding prevalence of HBsAg were 40.2% and 11.1% ($P < 0.001$). Among our HCC patients 22.7% were positive for both HBV and HCV compared to none of the controls. However, no hepatitis viruses were detected in 14.4% of the HCC cases and in 52.5% of the controls ($P < 0.001$). No correlation was found between anti-HCV and HBsAg. It is even, notable that anti-HCV was much less prevalent among HBsAg positive patients. Stepwise logistic regression analysis indicated that both HBsAg (odds ratio [OR] 8.83; 95% confidence intervals [CI] 3.77-20.69) and anti-HCV (OR 5.8; CI 2.90-11.73) were independent risk factors for HCC. We conclude that HBV plays a predominant role in HCC in Egyptian patients, while HCV is secondarily but independently related to HCC.

Spatial Statistics for Analyzing Genetic Instability in Tumorigenesis
 Lee J.J., Yu R., Hong, W.K., Hittelman, W.N.
 University of Texas M.D. Anderson Cancer Center, Houston, Texas

Genetic instability and the accumulation of genetic changes are driving forces in tumor development. To visualize this process and to quantify the degree of genetic instability, we utilized chromosome in-situ hybridization with centromere markers for chromosomes 7, 9, and 17 to detect the spatial array of chromosome copy numbers in tissues at risk for cancer development. Our goal was to detect both infrequent events (i.e., three or more chromosome copies per cell) as a measure of generalized genomic instability and to detect the outgrowth of clones with either over- or under- representation of chromosome copies. Specifically, we will present methods and findings in the following areas. (1) Averaged chromosome copies were computed by nonparametric smoothing. Random coefficient regression models showed that generalized instability increased during multistep tumorigenesis. (2) Patterns of the hotspot regions were analyzed to determine whether they were distributed in complete spatial randomness or as a result of clonal outgrowth. Tissues from premalignant lung lesions presented patterns of clonal outgrowth. On the other hand, normal lung tissues from non-lung cancer individuals treated with chemo- and/or radiotherapy were more likely to exhibit patterns of complete spatial randomness. (3) Clonal outgrowth of chromosomes 7, 9, and 17 occurred in different regions suggesting genetic mosaicism in premalignant tissues. This quantitative approach is useful in showing the spatial distribution of genetic instability and may be useful in individual tumor risk assessment. (Support by NCI CA68437 and NIDR DE11906)

Genetic Counseling and Testing for Breast-Ovarian Cancer Susceptibility: What Do Women Want? Janet Audrain, Barbara Rimer, David Cella, Judy Garber, Beth N. Peshkin, Judith Ellis, Joellen Schildkraut, Michael Stefanek, Victor Vogel, & Caryn Lerman

Purpose: To assess preferences for the content and process of genetic counseling and testing for breast-ovarian cancer susceptibility among women at high risk for breast cancer.

Methods: Ninety-eight healthy women who had a family history of breast cancer in at least two first-degree relatives participated in a structured telephone survey that evaluated preferences for type of provider, and the content and process of pre-test education and post-test genetic counseling. **Results:** Forty-two percent of women preferred that pre-test education be delivered by a genetic counselor, while 22% preferred an oncologist. This preference was positively associated with a desire to discuss psychosocial issues during the session ($p = .001$). For post-test counseling, 38% of women preferred an oncologist, while 20% preferred a genetic counselor (20%). However, women who desired supportive counseling during this session were significantly more likely to prefer a genetic counselor to an oncologist ($p = .02$). Fewer women wished to see a primary care physician or gynecologist for pre-test education (11%) or post-test counseling (22%). With regard to counseling process, 82% of women wished to self-refer for genetic counseling, but 63% desired advice and recommendations about whether or not to be tested. **Conclusion:** When feasible, the optimal approach may be for oncologists to work with genetic counselors to provide pre-test education and medical recommendations. Elicitation of patients' preferences may be useful to determine the level of counseling services needed.

Epidemiologic studies have identified lower risks of lung, breast, colon, and prostate cancers associated with high fruit and vegetable consumption. Numerous plant constituents with phytoestrogenic properties have been shown to be anticarcinogenic in experimental models and may account for at least part of the cancer preventive effects of fruit and vegetable consumption. These phytoestrogenic constituents include the flavonoids apigenin, luteolin, quercetin, kaempferol, and myricetin; the isoflavonoids genistein, daidzein, biochanin A, and formononetin; the lignans enterolactone and enterodiol; and the coumarin coumestrol. Values for these phytoestrogens are not included in nationally-available nutrient analysis databases such as DIETSYS, the nutrient analysis program associated with the NCI's Health Habits and History Questionnaire (HHHQ). We therefore modified DIETSYS to include these components in foods based on values published in the scientific literature and from phytochemical databases available on the Internet. In addition, we have modified the food frequency component of the HHHQ to contain the major foods contributing phytoestrogenic compounds and have used it in a case-case study of prostate cancer (PC). Preliminary analyses from this study indicate that caucasian men with clinically insignificant PC (n=50), relative to caucasian men with clinically significant PC (n=93), have higher mean daily intakes of apigenin (245 v 156 µg, p=0.09), luteolin (52 v 37 µg, p=0.16), genistein (294 v 141 µg, p=0.3), daidzein (168 v 90 µg, p=0.3), formononetin (1.0 v 0.4 µg, p=0.04), enterodiol (155 v 139 µg, p=0.11) and coumestrol (140 v 74 µg, p=0.04). No differences were observed in the intakes of quercetin, kaempferol, biochanin A or enterolactone. These findings demonstrate the potential utility of our modified questionnaire and database for studying the associations between phytoestrogens and cancer risk. This work was supported by RO1 CA68578 and SPORC CA58204.

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IMPROVEMENT IN GENETIC KNOWLEDGE FOLLOWING GROUP EDUCATION AND INDIVIDUAL COUNSELING (Harrop-Stein, C., Montgomery, S., Daly, M., Gillespie, D.) Fox Chase Cancer Center, Philadelphia, PA

With the recent discovery of the BRCA1 and BRCA2 genes, a growing number of women are seeking genetic testing for cancer predisposition. Preliminary research conducted with 64 at-risk women at Fox Chase Cancer Center as part of the Human Genome Project study, Coping with Genetic Risk for Breast and Ovarian Cancer, found that this group had a poor understanding of genetics, yet 92% expressed an interest in testing. This research was conducted as an adjunct to the above findings to assess whether baseline knowledge of genetics improved following group genetic education and individual cancer risk counseling. Sixty-four participants completed a 6-item genetic knowledge survey prior to attendance at a group informational session on cancer risk and genetics and at twelve months following the group meeting. Mean number of correct responses significantly increased from 1.8 to 4.1 between baseline and 12 months (p<.0001). For example, at baseline, only 25% of respondents knew that a woman with an altered BRCA1 gene had an increased risk of ovarian cancer but 78% answered this item correctly at 12 months. However, some respondents remained uncertain on more technical knowledge items dealing with genetic inheritance. 55% of those questioned at 12 months did not know that a woman who has a sister with an altered BRCA1 gene has a 50% chance of inheriting the same alteration. Almost 25% of those initially intending to have genetic testing declined to provide a blood sample during the year following the intervention. Group genetics education coupled with individualized cancer risk counseling significantly improves general genetic knowledge and underscores the realistic benefits and limitations of genetic testing. However, more comprehensive instruction may be necessary to impart the technical knowledge necessary to fully understand the mechanisms of genetic inheritance and the genetic testing process.

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Validation of the case-control study design assessing the relationship between diet and colorectal cancer.

Malila N, Virtanen M, Pietinen P, Virtamo J, Albanes D, Hartman A, Heinonen O. National Public Health Institute, Helsinki, Finland and National Cancer Institute, Bethesda, MD.

1. Purpose of study. To evaluate the case-control study design for assessing the relationship between dietary factors and risk of colorectal cancer.
2. Methods. The study was part of the Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study including subjects who had colorectal cancer diagnosed after the first year in the trial, and a random control group. Dietary data were collected at baseline (prior to diagnosis) and after diagnosis for cases, and at baseline and evenly during the trial for controls.
3. Results. In the two dietary assessments, the cases, compared to controls, reported a considerable increase in their consumption of fruits and berries, fruit juices, low-fat milk, cheese, and cream, and decrease in their consumption of potatoes. In the case-control setting, total energy and calcium intake were directly, and starch, total fiber, water-soluble fiber, and iron intake inversely associated with the risk of colorectal cancer. In the case-cohort design, only cholesterol intake was significantly (inversely) associated with the risk.
4. Conclusions. The dietary risk factors for colorectal cancer are markedly different in case-control and case-cohort settings due to the strong effect of current diet on the recall of diet prior to diagnosis among cancer cases. This source of bias should be taken into consideration when interpreting associations between diet and colorectal cancer in case-control design.

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Validity of a Fruit and Vegetable Food Frequency Questionnaire among 18-20 Year Old Adults. Cullen KW, Baranowski T, Hebert D, deMoor C. UT M.D. Anderson Cancer Center, Houston, TX.

This study validated the use of a Fruit and Vegetable Food Frequency Questionnaire (F&V FFQ) among 18-20 year old adults. High school (HS) seniors (57) and recent HS grads (19) were recruited and agreed to 5 phone interviews during a 2-week period. Each participant completed the F&V FFQ at calls 1 and 5, and 3 24-hour recalls administered by trained staff using the computerized Nutrient Data Systems at calls 2-4. The F&V FFQ asked how often 9 fruit and juices and 15 vegetables were consumed during the past week, with space available to write in F&V not listed. Responses ranged from 0 to 15 or more servings per week. Servings of F&V were hand coded for the 24-hour recalls, summed for each day, and averaged across days. Daily servings of F&V were computed from the F&V FFQ. 79% of the HS grads (15) and 77% of the HS seniors (44) completed the 5 phone interviews. Mean F&V intake (SD) from the 3 24-hour recalls was 2.79 (2.05) servings, while that from the FFQ #1 & #2 were 5.53 (3.35) and 3.30 (1.74) servings, respectively. Significant correlations were found between the recall means and FFQ#1 for fruit ($r=.41$, $p<.002$), juice ($r=.27$, $p<.05$), vegetable ($r=.36$, $p<.006$) and total F&V ($r=.36$, $p<.007$). The correlations between the recall means and FFQ#2 were higher: .52 for fruit ($p<.0001$), .63 for juice ($p<.0001$), .42 for vegetables ($p<.002$), and .48 for total F&V ($p<.002$). Higher correlations with the second FFQ may be the result of a learning effect since the students had just completed three 24-hour recalls, or the recalls coincided with the same time as the FFQ#2. Although this F&V FFQ did not provide valid estimates of individual F&V intakes, it adequately ranked individuals in a group. Further research on FFQ among older adolescents and young adults is warranted.

Comparison of Two Methods of Classification of Alcohol Intake among Head and Neck Cancer Patients. McPherson, RS, Steffen-Batey, L, Spitz, M, Hong, WK.

Alcohol consumption and a history of smoking are the primary risk factors for upper aerodigestive tract cancer. It has been hypothesized that high alcohol intake is associated with several immunologic alterations including granulocytopenia, lymphopenia, T-cell depression, delayed hypersensitivity and decreased cytotoxicity of natural killer cells. Alcohol consumption is typically underreported, thus this can lead to a dilution of the true effect of alcohol on disease status. Since no measure of alcohol consumption is entirely valid, most researchers recommend the use of multi-methods to establish drinking status or measure drinking behavior. 606 patients from an ongoing clinical trial of the effect of 13-cis retinoic acid for the prevention of second primary head and neck tumors completed a food frequency questionnaire (FFQ) and a risk factor questionnaire (RFQ) to collect alcohol consumption data. Correlation of the consumption of beer, wine and liquor from these two methods were between 0.55 and 0.76. When stratified by gender and by site of primary cancer the highest correlations were for beer consumption, ranging from 0.73 to 0.84. Time lapse between last treatment and enrollment in the trial (16-36 months) did not effect agreement of alcohol intake as measured by the FFQ or RFQ. Overall percent agreement for classification of alcohol consumption was 73%, kappa 0.61. These two methods were compared to demonstrate the level of agreement between a self-administered and an interview approach for assessing alcohol intake and to discuss their use in future analyses of disease associations in this trial.

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Validity of a Fat Behavior Scale among 18-20 Year Old Adults.
Cullen KW, Baranowski T, Hebert D, deMoor C. UT M.D.
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This study validated the use of a fat behavior scale (FBS) as a surrogate measure of fat intake among 18-20 year old adults. Previous research established the validity of a FBS with middle aged, middle income women. High school (HS) seniors (57) and recent HS grads (19) were recruited and agreed to 5 phone interviews during a 2-week period. Each participant completed a Fat Behavior Questionnaire (FBQ) at calls 1 and 5. The FBQ asked how often fat-related eating behaviors occurred during the past week (0 to 8-14 times). In between, they completed three 24-hour recalls administered by trained staff using the computerized Nutrient Data Systems. Percent of kilocalories (kcal) from fat was calculated for the 24-hour recalls and averaged across days. The following subscales were created from the FBS: Substitution (SUB) ($\alpha=.43$), Avoid fat (AF) ($\alpha=.25$), Modify meat (MM) ($\alpha=.51$), Fried foods (FF) ($\alpha= -.03$), Teen foods (TF) ($\alpha=.41$), Replace high fat foods with fruit & vegetables (RF&V) ($\alpha=.56$), and Replace high fat meats with low fat alternatives (RLFA) ($\alpha=.24$). 79% of the HS grads (15) and 77% of the HS seniors (44) completed the 5 phone interviews. Significant correlations were found between % fat kcal and the following subscales: SUB ($r= -.029$, $p<.03$), AF ($r= -.37$, $p<.004$), RLFA ($r= -.035$, $p<.008$), and FF ($r=0.35$, $p<.005$). Inspection of items revealed a low frequency of many of the fat-related eating behaviors, which may contribute to low correlations with % fat kcal. A valid FBS is less expensive and provides information on the actual dietary behaviors that contribute to high fat intakes. Such information guides both intervention development and evaluation. Further research to determine fat-related behaviors correlated with fat intake among older adolescents and young adults is warranted.

DOES PERCEPTION OF HIGH RISK FOR HEREDITARY COLON CANCER AFFECT DIETARY BEHAVIOR?

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Purpose: To compare dietary behavior related to cancer prevention among: 1) persons who are at high genetic risk for colon cancer, 2) persons who have been diagnosed with hereditary colon cancer, and 3) intrafamily controls at general population risk.

Methods: 279 adults (aged 19-66, 43% male) in 82 familial adenomatous polyposis (FAP) families completed food frequency and behavior surveys from 1990-97 during a genetic testing study. Dietary data were analyzed on 104 persons at 50% risk for FAP, 77 patients diagnosed with FAP (most had prophylactic surgery), and 98 intrafamily controls (non-blood relatives). Cancer beliefs and risk perception were assessed in the at-risk group.

Results: Daily dietary fiber, energy, and fat intakes (without alcohol) [11.7 ± 6.6 gm, 1702 ± 937 kcal, and 70 ± 47 gm, respectively, $N=279$] did not differ among groups. However, when we compared the genetic at-risk group (who were aware of their increased genetic risk for developing colon cancer) to the controls, the percent of calories from fat was significantly lower [34.9% vs. 37.5%, respectively; $P<.04$], and the percent of calories from carbohydrates were correspondingly higher [48.9% vs. 45.9%, $P<.02$]. The patients with FAP did not differ from controls in these two measures.

Conclusions: In general, the dietary patterns in these families show better adherence to cancer prevention dietary guidelines than seen in the general U.S. population. Even when persons are at high genetic risk for colon cancer, there is a perception, reflected in their dietary behavior, that the risk is modifiable.

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RELATIONSHIP BETWEEN CARRAGEENAN USE AND INCIDENCE OF MAMMARY CANCER

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This investigation was performed to determine if there is a relationship between the global use of carrageenan and the occurrence of mammary cancer. Lambda-carrageenan in low concentration has been associated with destruction of human mammary myoepithelial cells in tissue culture. Since these cells are absent in invasive malignancies, this effect may have biological significance. Lambda-carrageenan is used extensively, in order to improve the consistency of foods, in particular dairy foods. It serves as emulsifier and stabilizer, effects achieved by its ability to bind with milk proteins and improve the texture of foods, including ice cream, puddings, whipped cream, and increasingly low fat processed meats. Available data indicate that the per capita human food use of carrageenan in 1995 in the U.S. was .041 lbs/person, in Germany .037 lbs/person, and in Japan .031 lbs/person. A decade earlier use was estimated at about 5% less. This is consistent with the reported age-adjusted incidence of breast cancer in 1985 for Japan of 23.5 cases/100,000 population, for Germany of 57 cases/100,000 population, and for the United States of 84.8 cases/100,000. The increasing incidence of about one percent per year in the United States between 1940 and 1980 is consistent with the increasing commercial use of carrageenan since 1937. Hence, although it is difficult to obtain precise data about worldwide human consumption of carrageenan and to separate this by type of carrageenan, the available evidence is consistent with a role for carrageenan in the development of breast cancer.

We report on the use of hand-held computers for implementing several variations on the method of scheduled, gradual reduction for tobacco cessation. The programs are administered by a credit-card sized computer (LifeSign) that operates in two stages: baseline and gradual withdrawal. Separate versions of the program are available for gradual smoking cessation, gradual smokeless tobacco cessation, and using nicotine gum for smoking cessation. Each version incorporates two stages: baseline and withdrawal. During the seven-day baseline period, users record their normal tobacco use by pressing a data input button. During the withdrawal phase (lasting up to 5 weeks) users are prompted when to use tobacco or nicotine gum. The pace of the withdrawal program adjusts on the basis of user compliance.

Each program has been validated in one or more self-help outcome studies. For gradual smoking cessation, long-term quit rates ranged from 19% to 24% in three studies. Results from two uncontrolled studies with the smokeless tobacco showed quit rates of 15% and 19% at six-month follow-up. A controlled evaluation of the nicotine gum program comparing nicotine gum plus LifeSign to nicotine gum alone showed end of treatment quit rates among 85 subjects significantly favored the gum plus LifeSign condition (29% vs. 11%, $p < .05$).

Results of these studies suggest that the LifeSign technology provides a flexible methodology for delivering effective tobacco cessation programs across a range of contexts. The presentation will focus on the conceptual bases, operation, and application of the LifeSign technology, and provide an overview of the research conducted to date.

Childhood Cigarette Smoking Prevention: Evaluation of the Don't Choke on Smoke (DCOS) Program. Miller-Schlyer M, Brecheisen M, and Beisecker AE.

This study examined the efficacy of DCOS, a smoking prevention program for 4-6th grade students. Experiments and role-playing are used to encourage smoking abstinence, educate on negative sequelae and teach peer refusal skills. Two-tailed *t*-tests determined immediate changes in attitudes, intended behaviors, and knowledge using pre- and post-program data. Baseline attitudes toward smoking were negative overall and did not change following the presentation. Overall, 7.2% reported previous smoking; 9.7% of boys and 5.1% of girls reported previous smoking. There was no significant overall change in intention to smoke. Smoking initiation occurs between 5th-6th grades while susceptibility to smoking (inability to rule out possible future smoking) increases greatly between 4th-5th grades. Having family or friends who smoke increases susceptibility to smoking. General smoking knowledge increased by 21%. Role-playing was students' favorite part of the presentation, perhaps leading to improved peer refusal skills. This evaluation suggests DCOS is presented to the appropriate age group, positively affects overall attitudes, and increases knowledge and peer refusal skills; however, the program's efficacy can only be established with long term follow-up with control and experimental groups.

GREAT AMERICAN SMOKEOUT 1997: IMPACT OF OVER-THE-COUNTER NICOTINE MEDICATIONS

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The 1996 Great American Smokeout (GASO), sponsored by the American Cancer Society, had greatly expanded media promotional efforts due to its partnership with one of the marketers of over-the-counter (OTC) nicotine medications. This was the first GASO promotional campaign that included paid advertising through television, magazines and newspapers, as well as educational activities about GASO in retail stores that sold the medications. This effort did not promote any specific brand of medications: the main focus was on the importance of quitting smoking on the day of the GASO (November 21). Awareness and participation in the GASO was estimated by a random digit dial telephone survey to obtain a nationally representative sample. Changes in retail sales of nicotine medications from a baseline period without this promotion were estimated by A.C. Nielsen's InFact Service which tracks sales in a sample of retail outlets with Universal Product Code scanners. Quitting efforts aided by proven effective nicotine medications increased by 30% in the week of GASO compared to the weekly average during the baseline period. As reported in the September 19, 1997, Morbidity and Mortality Weekly Report, from the Centers for Disease Control and Prevention, "Marketing and promotional efforts designed to promote attempts to quit, along with OTC availability of nicotine medications, are a useful part of a national strategy to decrease the prevalence of smoking." This promotional effort was continued into the 1997 GASO campaign. This presentation will include a summary of findings from the second year of augmented ACS promotion of GASO with an analysis of which efforts appear to maximize the effectiveness of such nationwide campaigns. This experience should be particularly useful in light of ongoing discussions of how the U.S. Federal Government should expand its efforts to promote the prevention and cessation of tobacco use.

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Smoking Expectations and Cancer Risk Among High School Youth

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Purpose. In contrast to reductions in smoking rates among US adults, the prevalence of smoking among adolescents has increased in recent years. The present study investigated positive and negative outcomes expected from smoking among 9th-12th grade students.

Methods. Students were asked to write down as many positive outcomes from smoking as possible in 60 seconds. This procedure was repeated for negative outcomes, and data from 314 boys and 353 girls were obtained.

Results. Responses were coded into categories representing positive outcomes (e.g., buzz/high, tension reduction, weight control, image enhancement, social facilitation) and negative outcomes (e.g., causes disease, endangers others, discolors teeth/hands, negative social implications). Categories were based on prior research and the obtained responses. Category frequencies were obtained for the first through tenth responses as well as across all responses. The most frequent positive outcome responses were buzz/high, tension reduction, social facilitation and weight control. The most frequent negative responses were disease development (e.g., cancer), negative health symptoms (e.g., cough), and negative aesthetics (e.g. discolors teeth/hands/nails, smelly breath/hands/hair). Gender and ethnic differences on category frequencies were explored.

Conclusions. These results support previous research indicating that high school youth are very knowledgeable about the positive and negative effects of smoking, even in the absence of any or regular use.

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Heightened perceptions of illness risk are seen as important motivators of health behavior change, but few studies have separately examined whether risk perceptions reflect *accurate* judgements of current risk status, in addition to whether they act as *motivators* to change behavior. Among 101 asymptomatic dental clinic smokers, age 18-74, 57% male, and racially and economically diverse, we assessed level of relative accuracy in their cancer risk perceptions, as well as whether their risk perceptions influenced intentions to quit smoking. Participants were moderate (.75 ppd), longstanding ($m=19$ yrs.) cigarette smokers, 71% of whom were contemplating quitting. We assessed smokers' perceived risk for cancer in comparison to same age and sex nonsmokers. Participants who smoked more cigarettes per day felt more at risk in comparison with nonsmokers ($t=.23$, $p<.05$), but those who had smoked longer, had a history of personal or familial tobacco-related illness, or had received doctor or dentist advice to quit were no more likely to feel at risk for developing cancer ($ps>.05$). Those contemplating a quit attempt felt more at risk than either those not contemplating quitting, or those who had already quit ($F(2,95)=3.13$, $p<.05$). Those interested in attending a clinic-run smoking cessation clinic felt more at risk than those who expressed no interest ($t(96)=2.75$, $p<.01$). Results confirm the importance of heightened risk perceptions in motivating intentions to quit, but further work must clarify on what bases at-risk individuals evaluate their level of risk.

COMPUTER-GENERATED SMOKING CESSATION FOR OLDER SMOKERS

Orleans, C.T., Boyd, N.R., Noll, E.L., Crossette, L., Glassman, B.

This paper reports 6-month outcomes of a randomized controlled trial that evaluated the efficacy of a series of personalized, computer-generated smoking cessation messages to promote successful transdermal nicotine (TN) use among low income, older smokers who receive pharmaceuticals through a state prescription plan. Smokers, age 65 and older, filling a TN prescription were identified within 10 days of purchase, interviewed by telephone and offered the program. Those who accepted were randomly assigned to receive either the Control condition (C) (a patch use tip sheet) or the Treatment condition (T) (patch use tip sheet, a self-help guide, and a series of 7 mailings tailored to the individuals' stage of change, patch dose/brand, quitting motives and barriers). Subjects were mostly female (76%) long-term smokers (mean years smoked=55). Mean age was 72, mean annual income \$10,252, mean smoking rate 22 cigarettes/day, and 78% smoked within 30 minutes of waking. C and T subjects were similar on most baseline measures.

Six month follow-up with 376 subjects (86%) showed that T subjects were more likely than C subjects to make at least one quit attempt ($p=0.01$). Counting nonrespondents as continuing smokers, the quit rate was marginally higher for T subjects (40%) than C (33%) subjects ($p=0.055$). Quit rates for respondents only were 48% T and 37% C ($p=0.023$). Respondents who reported initiating TN by the baseline call had higher quit rates than those who had not ($p=0.001$). Those reporting daily TN use had higher quit rates than those who did not ($p=0.04$). Quit rates were also higher among respondents who did not smoke while on the patch ($p=0.023$). Results show promise for computer-based tailored messages to promote smoking cessation among older smokers.

