

**PROGRAM
and
ABSTRACTS**

20th Annual Meeting

**AMERICAN SOCIETY
of
PREVENTIVE ONCOLOGY**

March 20 - 23, 1996

Hyatt-Regency
Bethesda, Maryland

Program Chair: John D. Potter, MD, PhD
Fred Hutchinson Cancer Research Center

Sponsored by:

American Society of Preventive Oncology, Bristol-Myers Squibb, Marion Merrell Dow, Inc., Pharmacia & Upjohn Co., Kellogg Foundation, and a conference grant from the National Institutes of Health/National Cancer Institute.

- A S P O -

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 **20th Annual Meeting** of the American Society of Preventive Oncology, participants should be better able to:

- * evaluate new methods and programs for the prevention and early detection of cancer;
- * review and monitor programs designed to reduce cancer incidence, mortality and morbidity;
- * evaluate the effectiveness of clinical trials in cancer prevention and control;
- * advise health professionals regarding appropriateness of screening procedures in specific areas; and
- * evaluate the effects of global ecological change on public health policy related to cancer prevention and control.

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.

- A S P O -

The Executive Committee members listed below are interested in hearing from you regarding the organization.

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The two following Study Groups have been organized on an *ad hoc* basis for the past two years. Chairs for the 1996 meeting are:

- A S P O -

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Marcy A. List, PhD

University of Chicago

Alfred I. Neugut, MD, PhD

Columbia University

Polly A. Newcomb, PhD

Fred Hutchinson Cancer Research Center

Martha L. Slattery, PhD, MPH

University of Utah

— ANNOUNCEMENTS —

MESSAGES

Contact Judy Bowser at the ASPO registration desk if you are expecting a message or wish to leave one for someone.

CATERED MEALS

We have attempted to include a variety of items at each meal function so those of you preferring vegetarian fare may be easily accommodated.

SPECIAL ACKNOWLEDGEMENTS

The ASPO Executive Committee offers special thanks to Program Chair, Dr. John Potter for his extraordinary commitment in directing the arrangement of the program for this meeting.

The ASPO Executive Committee wishes to thank all the co-sponsors of this 20th Annual Meeting. The corporate sponsors have given the Program Committee complete latitude in choosing the speakers and program content which are underwritten by their contributions.

FOR THE FUTURE. . .

Please take a few minutes at the close of the meeting to complete the questionnaire at the back of the printed program. This will help future Program Committees and conference staff to better meet your professional and logistical needs. If 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 1997 Meeting.

Chair: Marcy List, PhD; University of Chicago
Roberd Bostick, MD; The Bowman Gray School of Medicine
Bernard Levin, MD; The UT M. D. Anderson Cancer Center
John Pierce, PhD; UC-San Diego Cancer Center
Jean Richardson, DrPH; USC School of Medicine

- NOTES -

— Thursday, March 21, 1996 —

7:15 am - 5:00 pm

REGISTRATION

7:30 - 8:45 am

STUDY GROUP BREAKFAST MEETINGS

GENETIC MARKERS

OLD GEORGETOWN

Organizer: **Melissa Bondy, PhD**
The University of Texas
M. D. Anderson Cancer Center

CANCER SCREENING

EMBASSY

Organizer: **Nicole Urban, ScD**
Fred Hutchinson Cancer Research Center

CHEMOPREVENTION

**POTOMAC/
PATUXENT**

Organizers: **Mary Daly, MD**
Fox Chase Cancer Center

Gary Goodman, MD
Swedish Hospital Tumor Institute

9:00 - 9:15 am
**HAVERFORD/
BACCARAT**

WELCOME

Richard R. Love, MD
ASPO President; University of Wisconsin Medical School

9:15 - 10:15 AM

**DISTINGUISHED ACHIEVEMENT AWARD
PRESENTATION and ADDRESS**

Walter C. Willett, MD, DrPH
Harvard University School of Public Health

*"Dietary Fat, Body Fat and Cancer: Where Are We on
the Learning Curve"*

- NOTES -

— Thursday, 3/21, cont'd. —

10:15 am

Break

10:30 am - 12:00

SYMPOSIUM

Update on Cancer Screening: Science, Technology, Ethics

Chair: **Martha Slattery, PhD**
University of Utah
Dept. of Family & Preventive Medicine

*"Cancer Screening in Children:
The Quebec Neuroblastoma Screening Trial"*
William G. Woods, MD
Director, Pediatric Hematology-Oncology
University of Minnesota Medical School

"Molecular Screening for Colorectal Cancer"
Stanley Hamilton, MD
Johns Hopkins University

"Molecular Screening for Breast Cancer"
Beth Newman, PhD
University of North Carolina at Chapel Hill

12:00 - 1:30 pm

Lunch on your own

Those with posters to set up for this evening's session may do so at this time. The Poster Session will be in the **POTOMAC/PATUXENT/EMBASSY** set of rooms.

- NOTES -

— Thursday, 3/21, cont.d. —

1:30 - 3:00 pm

SYMPOSIUM

Socioeconomic Status and Cancer – Differences in Health Risk

Chair: **Polly Newcomb, PhD**
Fred Hutchinson Cancer Research Center

*"Social Class and Cancer: Overview and Application to
the U.S."*

Nancy Breen, PhD
National Cancer Institute
Division of Cancer Prevention and Control

*"Evidence of Socio-economic Differences in Cancer
Incidence & Survival"*

Paolo Boffetta, MD, MPh
Chief, Unit of Environmental Cancer Epidemiology
International Agency for Research on Cancer
Lyon, France

"Explanations for Socio-economic Differences in Cancer"

Manolis Kogevinas, MD, PhD
Institut Municipal d'Investigacio Medica
Dept. of Epidemiology & Public Health
Barcelona, Spain

3:00 - 3:15 pm

Break

3:15 - 4:15 pm

PRESENTED PAPERS (2 Concurrent Sessions)
see following pages

- NOTES -

— Thursday, 3/21, cont'd. —

Session A — Cancer Screening

**HAVERFORD/
BACCARAT**

**Chair: Victor Vogel, MD, The University of Texas
M. D. Anderson Cancer Center**

3:15 pm

**Rena J. Pasick, DrPH
Northern California Cancer Center**

Cancer Screening Outreach Tailored by Adoption Stage for Multi-Ethnic Women

R. J. Pasick, P. S. Gardiner, R. A. Hiatt

Breast and Cervical Cancer Intervention Study (BACCIS) is a community-based study to increase cancer screening among underserved, multi-ethnic women. This paper reports on measurement of adoption stage as a means of tracking the impact of an outreach intervention. Over a period of 3 years, 2444 women (African American, Chinese, Hispanic, and White) were recruited by lay outreach workers who ascertained each woman's adoption stage for mammography and Pap smear screening (adapted from the Transtheoretic Model for Behavior Change). Strategies and messages were tailored for each individual by stage, and a protocol aimed at stage advancement was followed for subsequent contacts. Stage information was updated with each contact. Statistically significant improvements in stage have been achieved for all ethnic groups. For mammography screening, 661 women have been followed. Of those 156 (24%) were initially not at the action stage. 61% of this group were advanced to action stage for mammography through an average of 2.3 outreach contacts. These data will be presented by ethnicity and by initial stage for all participants (mammography and Pap) at the end of the study. Stage data were validated by random sample telephone interviews ($\kappa = .65$). Both benefits and obstacles to collection of stage data by lay health workers and the implications for cost-efficient community outreach will be discussed.

- Thursday, 3/21, cont'd. -

3:30 pm Florence Houn, MD, MPH
Food and Drug Administration

The Quality of Mammography Facilities in the U.S.
Houn F, McCrohan, Jr. JL. Elliott, ML

Purpose: To evaluate the quality of mammography facilities in the U.S. under the Mammography Quality Standards Act (MQSA), a federal mandate which began on October 1, 1994.

Methods: To analyze data from 10,200 annual inspections of U.S. mammography facilities collected by the Food and Drug Administration's implementation program of the Mammography Quality Standards Act.

Results: Preliminary data of the first 4,000 inspections is compared to previous FDA studies of mammography quality (1992 Nationwide Evaluation of X-ray Trends). In 1995, over 98 percent of facilities have acceptable phantom image scores compared to 89 percent in 1992. Acceptable dark room fog levels have also increased from 38 percent in 1992 to 92 percent in 1995. All facilities now perform daily processor quality control, whereas in 1992 10 percent self-reported they did not do daily sensitometry. Radiation dose average is 140 mrad.

Conclusions: Federal mandated standards for quality assurance and quality control have improved mammography quality. Inspection data should reassure U.S. women as to the safety and effectiveness of mammography.

— Thursday, 3/21, cont'd. —

3:45 pm

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

Screening for Breast Cancer: the Positive Predictive Value of First Screen Results. M.T. Mandelson and S.H. Taplin.

Screening mammography frequently fails to differentiate between benign and malignant lesions and may result in high rates of false positive findings and a low positive predictive value (PPV). Purpose: to evaluate screening performance in a population of women age 50 and older and to determine if risk factors for breast cancer identified women more likely to have "true positive" mammography results.

Women were eligible if they were screened through the Breast Cancer Screening Program (BCSP) at Group Health Cooperative (GHC) between 1986 and 1993, were age 50+ at the time of screening, and reported no history of prior mammography or symptoms at BCSP visit. Of the 47,361 women screened (1986-1993), 15,331 women were eligible for analysis. The PPV of mammography increased with age from 6.9% in women 50-64 to 19.8% in women 75+ ($p < .001$) and resulted in detection of 133 cases of ductal carcinoma in-situ (DCIS) and invasive breast cancer. Logistic regression analysis showed that older age (p for trend $< .01$), abnormal clinical breast exam results ($RR=9.8$), and nulliparity ($RR=1.9$) were significantly associated with increased likelihood of being "true positive" by mammography. No association between family history of breast cancer, age at menopause, or use of hormone replacement therapy was observed.

Prior estimates of PPV from clinical trials and from academic and private practice settings may not be generalizable to community practice of mammography. Further, studies often fail to distinguish between an initial exam that will detect prevalent cancer and subsequent exams that detect incident tumors. Our results show high PPV at first screen in a population-based practice and that risk factor information may be used in conjunction with mammography results to identify women most likely to have breast cancer.

– Thursday, 3/21, cont'd. –

4:00 pm

Marc Schwartz, PhD

Lombardi Cancer Research Center

The Impact of Individualized Breast Cancer Risk Counseling on Mammography Utilization.

M. Schwartz, C. Lerman, M. Daly, B. Rimer, C. Sands, and A. Balschem.

We have previously reported on the results from a randomized trial demonstrating beneficial effects of individualized breast cancer risk counseling (BCRC) on psychological distress and breast cancer risk comprehension. In the present analysis we evaluated the impact of BCRC on mammography utilization. Participants, 363 women with a family history of breast cancer, were randomized to receive BCRC or General Health Education (GHE). Women who consented to be interviewed, but not to be randomized to an intervention (Decliners) were also followed. At baseline, 74% of Decliners, 69% of GHE subjects, and 69% of BCRC subjects had obtained a mammogram in the prior 12-months ($p > .20$). Logistic regression was used to evaluate the impact of BCRC on mammography utilization in the 12-months post-intervention, controlling for potential confounders (e.g., demographics, baseline mammography adherence). Age ($OR=1.5$, $p < .01$) and baseline mammography adherence ($OR=2.0$, $p < .01$) positively predicted mammography utilization. Group also predicted mammography utilization; compared to Decliners, BCRC participants were most likely to have obtained a mammogram ($OR=2.6$, $p < .01$), followed by GHE participants ($OR=2.2$, $p < .01$). The difference between the BCRC and GHE groups was not significant ($p > .10$). Finally, we examined the impact of BCRC among the least adherent participants (those who indicated at baseline that they had *never* had a mammogram). Within this subgroup, 89% of the BCRC group subsequently obtained a mammogram, compared to 60% of the GHE group and 9% of Decliners (Fisher exact test $< .01$). These results suggest that BCRC may be most effective among the least adherent women. Further, women who decline breast cancer risk information may be least likely to obtain annual mammography.

— Thursday, 3/21, cont'd. —

OLD GEORGETOWN

Session B — Chemoprevention/Nutrition

Chair: Mack Ruffin, MD, MPH
University of Michigan
Department of Family Practice

3:15 pm

Omer Kucuk, MD, Wayne State University

BETA-CAROTENE AND ALPHA-TOCOPHEROL SUPPLEMENTATION DECREASES MUTAGEN SENSITIVITY IN HEALTHY ADULTS.

Kucuk O, Pung A, Franke A, Custer L, Wilkens LR,
Goodman MT. Cancer Research Center of Hawaii, University
of Hawaii, Honolulu, Hawaii 96813.

Mutagen sensitivity, a biological marker of cancer susceptibility (T.C. Hsu, M.R. Spitz, and S.P. Schantz, Cancer Epidemiol, Biomarkers and Prev., 1:83-89, 1991), was studied in seven healthy adults over a period of 24 weeks. As part of this cross-over intervention study, three subjects took β -carotene and α -tocopherol supplements during the first 12 weeks of follow-up and four subjects took the supplements during the second 12 weeks. Mutagen sensitivity and plasma micronutrients were measured at baseline and every four weeks.

Plasma levels of β -carotene and α -tocopherol rose sharply during supplementation with an associated decrease in mutagen sensitivity ($p=0.0003$). Supplementation with β -carotene and α -tocopherol was associated with an average reduction of 35% in the number of bleomycin-induced chromosome breaks per cell. Unfortunately, plasma β -carotene and α -tocopherol returned quickly to initial levels once supplementation was stopped, with a concomitant increase in mutagen sensitivity back to the baseline level. These results suggest that β -carotene and α -tocopherol reduce mutagen sensitivity. However, in order to maintain reduced mutagen sensitivity, continuous intake of the supplements may be necessary.

— Thursday, 3/21, cont'd. —

3:30 pm

Robert E. Schoen, MD, MPH
University of Pittsburgh

Measurement of Visceral Adipose Tissue: Is CT Scanning Needed? Schoen RE, Thaete FL, Weissfeld JL, Sankey SS, Kuller LH. University of Pittsburgh, Pittsburgh, PA.

Visceral adipose tissue (VAT) has an important biologic and epidemiologic relationship to breast, prostate, colorectal, and endometrial cancers. The gold standard for measurement of VAT is assessment with a single slice CT scan through the L4-L5 interspace (L45CT), but because of simplicity, radiation, and cost anthropometric variables (AV) are often used to estimate VAT. **Aim:** To determine the necessity of CT measurement of VAT, we compared the estimation of total VAT by AV to L45CT. **Methods:** Total VAT was measured in 40 subjects undergoing complete diagnostic abdominal and pelvic CT scanning who met pre-defined eligibility criteria. Correlation and regression analysis were used to compare the relationship between AV and L45CT to total VAT. **Results:** The CT determined L4-L5 adipose tissue area was highly correlated to total VAT ($\rho = .89$, $p < .001$), more so than any anthropometric variable, including BMI, abdominal sagittal diameter, and age. L45CT explained a large proportion of the variance in total VAT ($R^2 = .87$, $p < .001$), with other variables contributing little. Anthropometric variables were inaccurate in estimating VAT in individuals with a BMI ≥ 27 . **Conclusions:** Anthropometric data such as BMI and sagittal diameter do not reflect total VAT, especially for men and women with a BMI ≥ 27 . Single slice CT scanning estimates VAT across gender, age and a wide range of BMI and is needed to accurately measure VAT.

— Thursday, 3/21, cont'd. —

3:45 pm

Robert M. Bostick, MD, MPH
The Bowman Gray School of Medicine

Calcium and Colorectal Epithelial Cell Proliferation in Ulcerative Colitis

Bostick RM, Boldt M, Darif M, Fosdick L, Wood JR, Overn P,
Lillemoe T

In persons at higher risk for colon cancer (eg, those with sporadic adenoma or ulcerative colitis), compared to those at lower risk, colonic epithelial cell proliferation (CECP) kinetics are altered. We have previously shown that calcium supplementation appears to normalize the distribution of proliferating cells without affecting the proliferation rate in the colorectal mucosa of sporadic adenoma patients. In a randomized, double-blind, placebo-controlled, clinical trial conducted concurrently with our previously published sporadic adenoma trial, we tested whether calcium supplementation can also modulate cell proliferation kinetics in patients with ulcerative colitis. Ulcerative colitis patients ($n = 31$) were randomized to placebo or 2.0 g of supplemental calcium daily. CECP was determined by immunohistochemical detection of proliferating cell nuclear antigen (PCNA) labeling of cells in "non-prep" rectal biopsies taken at randomization and after eight weeks treatment. All biopsies were scored by one reviewer. Differences in mean follow-up minus baseline labeling index (LI, or the percentage of colon crypt epithelial cells that were labeled) and in the ϕ_h (proportion of labeled cells that were in the upper 40% of the crypts) were compared with Student's t tests. Pill taking adherence was over 96%. Biopsy scoring reliability was high ($r = 0.91$). The pooled baseline LI and ϕ_h were 6.3% and 5.6%, respectively. The LI in the calcium group decreased by 0.34% more than in the placebo group ($p = 0.91$). Similarly, the ϕ_h in the calcium group decreased by 0.55% more than in the placebo group ($p = 0.85$). This study provides no evidence that calcium can normalize either the rate or distribution of proliferating cells in the colon crypts of patients with ulcerative colitis.

- Thursday, 3/21, cont'd. -

4:00 pm

Mark Kestin, PhD, MPH
Fred Hutchinson
Cancer Research Center

FATTY ACIDS AS BIOMARKERS OF DIETARY FAT INTAKE. Mark Kestin Ph.D., MPH, Irena King Ph.D., Maureen Henderson, MD. Cancer Prevention Research Program, Fred Hutchinson Cancer Research Center, Seattle, USA.

There are no sensitive and accepted biological markers of total fat intake. As many of fatty acids measured in the body derive from *de novo* synthesis, they do not correlate well with measures of dietary fatty acids. Newer methods of analysis allow for reliable measurement of more minor fatty acids, which may be useful biomarkers. To test this hypothesis, post-menopausal women are being recruited and randomized to consume follow one of two controlled diets: (i) low-fat (18% of Kcal) or (ii) moderate fat (36% of Kcal). The diets are consumed for seven weeks and fasting blood samples are taken twice at baseline and twice at end-of-study. Red blood cell, plasma phospholipid and plasma cholesterol esters are analyzed for fatty acids. To date, 52 women have been randomized and data is available on 30 women (14 low-fat, 16 moderate-fat)

The two groups had similar baseline age, dietary fat intake, and Body Mass Indexes. In the low-fat group, there were very significant increases in red blood cell proportions of C16:0 (0.61%, $p < 0.001$), C16:1(n-7) (0.07%, $p < 0.001$), C18:1(n-7) (0.07%, $p < 0.001$), and C20:4(n-6) (0.24%, $p < 0.001$); there were decreases in *trans*C18:1 (-0.31%, $p < 0.001$) and C18:2(n-6) (-1.33%, $p < 0.001$). Similar changes were seen in plasma phospholipid fatty acids but were less apparent in cholesterol esters. In summary, changes in blood fatty acid proportions seem to be promising potential biomarkers of fat intake.

4:15 pm

Break

— Thursday, 3/21, cont'd. —

4:30 - 5:30 pm **Late-Breaking Session on Prevention and Screening Trials**

**HAVERFORD/
BACCARAT** Chair: **Richard R. Love, MD**

4:30 pm

David B. Thomas, MD, DrPH
Fred Hutchinson
Cancer Research Center

A Randomized Trial of Breast Self Examination in Shanghai. Thomas DB, Gao D, Self S, Allison C, Tao Y, Presley R, Ray R, Qin Q.

The purpose of this study is to determine whether breast self examination (BSE) can reduce mortality from breast cancer. In 1989-1991 approximately 287,000 current and retired female employees of the Shanghai Textile Industry Bureau in 520 factories were randomized by factory into a BSE instruction or control group; and women in the instruction group were given intensive training in BSE, plus subsequent reinforcement training and reminders to practice BSE. All women have been actively followed for breast disease and mortality, and compliance has been monitored in the instruction group.

After a mean follow up period of approximately six years, more benign breast lesions were detected in the instruction group and about equal numbers of breast cancers have been reported in the two groups. Compared to the breast cancers in control women, those in women who received BSE instruction were not smaller or at a less advanced stage at diagnosis. These results do not provide support for the contention that large scale public health programs to teach women BSE will reduce size and stage of tumor at diagnosis, and therefore mortality from breast cancer.

- NOTES -

- Thursday, 3/21, cont'd. -

5:00 pm

Larry C. Clark, PhD, MPH
University of Arizona Cancer Center
Department of Epidemiology

The Nutritional Prevention of Cancer with Selenium 1983-1993: A Randomized Clinical Trial

Clark, LC, Combs, Jr., GF, Turnbull, BW, Slate, EH, Alberts, DS

Purpose. The present study is the first to test the specific hypothesis that a supplement of the essential nutrient selenium (Se) can reduce the risk of cancer in a randomized, double-blind prevention trial.

Methods. The trial randomized a total of 1,312 patients with histories of basal cell (BCC) or squamous cell carcinomas (SCC) of the skin to either a daily oral supplement of 200 µg Se, or a placebo. They were followed with regular semi-annual dermatologic examinations for a total of 8,269 person-years of observation.

Results. Selenium treatment did not affect the primary endpoints -- incidence of new BCC or SCC of the skin. No cases of selenium toxicity occurred. Selenium-treatment was, however, associated with statistically significant reductions in several secondary endpoints: total cancer mortality, total cancer incidence, lung cancer, colorectal cancer and prostate cancer. The consistencies of these associations over time, between study clinics and for the leading cancer sites, strongly suggest that, for this cohort of patients, Se-supplementation had substantial health benefits. In light of these results the blinded phase of this trial has been stopped.

Conclusions. These results support the hypothesis that supplemental Se can reduce the incidence of, and mortality from, certain cancers. Although selenium does not show protective effects against non-melanoma skin cancers, in major cancers the selenium-treatment group had substantial reductions in incidence and mortality that demand further evaluation in well controlled prevention trials.

- NOTES -

— Thursday, 3/21, cont'd. —

6:00 - 8:00 pm
CHESAPEAKE SUITES

POSTER SESSION AND RECEPTION
see abstracts for posters at back of booklet

8:00 pm

BEST POSTER AWARD PRESENTATION

Dinner on your own

— Friday, March 22, 1996 —

There will be no study group breakfasts this morning. Coffee and juice will be available at the beginning of this morning's session.

7:30 am - 5:00 pm

REGISTRATION

8:30 - 10:00 am
HAVERFORD/
BACCARAT

SYMPOSIUM

*Behavioral Models in Cancer Prevention: Tyrants or
Servants?*

Chair: David B. Abrams, PhD
Professor & Director, Brown University
School of Medicine
Division of Behavioral Science and
Preventive Medicine, Miriam Hospital

"Self Regulation Models in Smoking & Dietary Change"
John P. Pierce, PhD
UC-San Diego Cancer Center
Head, Cancer Prevention and Control
Sam M. Walton Professor for Cancer Research
Department of Family and Preventive Medicine

- NOTES -

- Friday, 3/22, cont'd. -

*"Social Learning Models for Preventing Alcohol Use
Among Adolescents"*

Cheryl L. Perry, PhD
University of Minnesota
School of Public Health
Professor, Division of Epidemiology

*"Theoretical Approaches to Increasing Compliance with
Breast Cancer Screening"*

Karen Emmons, PhD
Harvard School of Public Health
Dana Farber Cancer Institute
(Work is co-authored by **Susan J. Curry, PhD**,
Group Health Cooperative of Puget Sound)

David B. Abrams, PhD, Discussant

10:00

Break

10:15 - 11:00 am

ASPO BUSINESS MEETING

11:30 am - 1:00 pm
**CABINET/
JUDICIARY**

**LUNCHEON and
JOSEPH W. CULLEN MEMORIAL AWARD LECTURE**

Michael C. Fiore, MD, MPH
Director, University of Wisconsin Center for Tobacco
Research and Intervention

*"Treating Tobacco Dependence: Guidelines for the
New Millennium"*

The Joseph W. Cullen Award is underwritten by Marion Merrell Dow,
Inc.

- NOTES -

— Friday, 3/22, cont'd. —

1:00 - 4:00 pm
HAVERFORD/
BACCARAT

SYMPOSIUM

Critical Perspectives on Cancer in Developing Countries

Chair: John D. Potter, MD, PhD
Fred Hutchinson Cancer Research Center

"Worldwide Cancer Incidence and Trends"

D. M. Parkin, MD

Chief, Unit of Descriptive Epidemiology
Centre International de Recherche Sur le Cancer
World Health Organization, Lyon, France

"Perspectives on Screening for Cancer in Developing Countries"

Indraneel Mitra, MBBS, PhD, FCRS

Surgeon and Scientist
TATA Memorial Hospital, Bombay, India

"Cancer and Environmental Change"

Ian T. Magrath, MBBS, FRCP

Chief, Lymphoma Biology
National Cancer Institute

4:15 - 5:55 pm

PRESENTED PAPERS (2 Concurrent Sessions)
see following pages

- NOTES -

— Friday, 3/22, cont'd. —

Session C — Epidemiology

HAVERFORD/
BACCARAT

Chair:

Gad Rennert, MD, PhD
Carmel Medical Center
Haifa, Israel

4:15 pm

Gail McKeown-Eyssen
University of Toronto

Insulin Resistance and the Risk of Colorectal Neoplasia
McKeown-Eyssen GE and the Toronto Polyp Prevention Group.

Purpose: This paper presents preliminary results of a case-control study of the relationship between colorectal neoplasia and biologic factors found in insulin resistance. Insulin resistance is a syndrome with increased VLDL-triglycerides, glucose, insulin, C-peptide, and central adiposity, and decreased HDL-cholesterol, which is related to diabetes, cardiovascular disease and hypertension.

Methods: Patients of endoscopists and colorectal surgeons at three Toronto hospitals are invited to provide fasting blood samples. Based on the results of colonoscopy and/or medical history, patients are classified as having previous colorectal cancer, or current adenomatous polyps without previous cancer. These patients are compared by logistic regression analysis with controls free of polyps on colonoscopy and without a history of neoplasia.

Results: Preliminary results of logistic regression analyses indicate associations of previous colorectal cancer with serum triglycerides (Odds Ratio, OR=4.1, $p<0.01$), insulin (OR=3.2, $p<0.01$), C-peptide (OR= 2.3, $p<0.05$), glucose (OR=1.8, $p<0.10$), waist/hip ratio (OR=3.8, $p<0.01$) and HDL-cholesterol (OR=0.37, $p<0.05$). For patients with current adenomatous polyps and no history of cancer associations are also seen with serum triglycerides (OR=2.9, $p<0.01$), insulin (OR=2.2, $p<0.05$), C-peptide (OR= 2.9, $p<0.01$), glucose (OR=1.4, $p>0.10$), waist/hip ratio (OR=4.4, $p<0.01$) and HDL-cholesterol (OR=0.36, $p<0.01$). Odds ratios vary with gender and are somewhat reduced by age adjustment.

Conclusions: These findings suggest that colorectal neoplasia may be related to biologic factors associated with insulin resistance, either separately or in combination.

— Friday, 3/22, cont'd. —

4:35 pm

Peter Gann, MD, ScD
Northwestern University
Medical School

A Prospective Study of Plasma Sex Hormones and Prostate Cancer. Gann P, Hennekens C, Ma J, Longcope C, Stampfer M. Northwestern Univ. Medical School, Chicago, IL; Harvard Medical School, Boston, MA.

Sex steroids, particularly androgens, are strongly implicated in the pathogenesis of prostate cancer, but studies of circulating hormone levels have been inconsistent. Using archived plasma, we conducted a nested case-control study of 222 men who developed prostate cancer and 390 controls matched on age, smoking status and length of follow-up. We measured testosterone (T), dihydrotestosterone (DHT), 3 α -androstenediol glucuronide (AAG), estradiol (E2), SHBG and prolactin (PL). Odds ratios (ORs) for hormone quartiles were estimated using conditional logistic regression models. We found weak or nonexistent associations when hormones were considered individually. However, T levels were correlated with SHBG ($r = 0.55$) and E2 ($r = 0.28$) among the controls. When hormone levels were adjusted simultaneously, we observed a strong trend for increasing risk across higher quartiles of plasma T (ORs = 1.00, 1.41, 1.98, 2.60; P trend = 0.004), an inverse trend for SHBG (ORs = 1.00, 0.93, 0.61, 0.46; P trend = 0.01), and a nonlinear inverse association for E2 (ORs = 1.00, 0.53, 0.40, 0.56; P trend = 0.03). There were no associations with DHT and PL, and for AAG - a marker of 5 α -reductase activity - a weak independent association. The results were unchanged by excluding cases diagnosed within 4 years of blood sampling, localized cases, and controls with elevated PSA. The results suggest that circulating T and SHBG levels are independent and opposing risk factors for prostate cancer, and that low circulating E2 could be an additional independent risk factor.

- Friday, 3/22, cont'd. -

4:55 pm

Maria Elena Martinez
Harvard School of Public Health

Age at menarche and use of oral contraceptives and the risk of colorectal cancer. M.E. Martinez, F. Grodstein, E. Giovannucci, G.A. Colditz, F.E. Speizer, W.C. Willett, and M.J. Stampfer. Harvard University, Boston, MA

To explore the roles of reproductive factors and oral contraceptive use in the etiology of colorectal cancer, we prospectively examined 501 incident cases of colorectal cancer which occurred during 1,012,280 person-years of follow-up between 1980 and 1992 in the Nurses' Health Study. The women completed mailed, self-administered questionnaires every two years to update information on the risk factors and major medical events. After adjustment for age, body mass index, physical activity, family history of colorectal cancer, aspirin use, cigarette smoking, alcohol consumption, and intake of red meat and total vitamin D, the relative risk (RR) for women whose age at menarche was 14 years or greater was 0.69 (95% confidence interval (CI)=0.52-0.90) as compared to those with an age at menarche of less than 12 years. The risk of colorectal cancer was significantly decreased among women with a history of oral contraceptive use (RR=0.81, 95% CI=0.66-0.98) as compared with never users. No important associations were seen for age at menopause, parity, or age at first birth and risk of colorectal cancer. These prospective data suggest a protective role for a later age at menarche and the use of oral contraceptives in the etiology of colorectal cancer.

— Friday, 3/22, cont'd. —

5:15 pm

Anna Giuliano, PhD
Arizona Cancer Center

Relationship of Traditionalism to Disease Risk and Disease Protective Behaviors Among a Southwestern American Indian Tribe. A. Giuliano, M. Papenfuss, J. de Zapien, V. Davis, S. Katowski, B. Risendal, L. Nuvayestewa. Arizona Cancer Center, University of Arizona, Tucson, AZ 85716

It is important to ascertain the impact of traditional values in health beliefs and behaviors in order to improve the ability of western bio-medicine to meet the changing needs of American Indians (AI). We conducted a population based survey of knowledge, attitudes, beliefs, and behaviors focusing on chronic diseases among a Southwestern AI tribe living on-reservation. A total of 559 randomly selected women ≥ 18 yr. age were surveyed face-to-face by trained AI interviewers. To construct a traditionalism score, a multi-dimensional approach was adopted by assessing three sub-dimensions of native culture: language usage, cultural participation, and percent of life-time off reservation. A mean score of the 3 dimensions was computed for each respondent. Categories of low, medium, or high traditionalism were calculated according to tertile scores. Using multi-variate logistic regression to adjust for SES variables high levels of traditionalism were sig. positively associated with disease protective behaviors such as practicing traditional AI activities to keep healthy (OR=3.07), and sig. inversely associated with disease risk factors, such as smoking (OR=0.26) and obesity (OR=0.60). Our data indicate that traditionalism is strongly inversely associated with disease risk behaviors, and strongly positively associated with disease protective behaviors independent of age, marital status, and education. These data provide strong rationale for the promotion of traditional cultural values in public health programs aimed at decreasing chronic disease rates among AI populations.

– Friday, 3/22, cont'd. –

5:35 pm

Ann Zauber, PhD
Memorial Sloan-Kettering
Cancer Center

INCREASED FAMILIAL RISK FOR COLORECTAL CANCER ASSOCIATED WITH YOUNGER AGE AT DIAGNOSIS (<55) OF ADENOMAS OR COLORECTAL CANCER A Zauber, S Winawer, and T Bishop, *Memorial Sloan-Kettering Cancer Center, Imperial Cancer Research Fund*

Purpose: An increased risk for colorectal cancer has been established for family members of colorectal cancer probands and of adenomatous polyp probands. This study was designed to assess whether the risk for colorectal cancer was the same for family members of probands with the precursor lesion, the adenoma, as for family members of probands with colorectal cancer.

Methods: Colorectal cancer status and age at diagnosis were obtained for family members of newly diagnosed colorectal cancer probands and adenomatous polyp probands from 7 participating centers of the National Polyp Study. The Cox proportional hazards model was used to assess the risk of colorectal cancer in family members with control for year of birth and sex.

Results: There were 69 colorectal cancers in 1414 parents and siblings of 351 colorectal cancer probands, 201 colorectal cancers in 4246 parents and siblings of 1032 adenoma probands, and 29 colorectal cancers in 1411 spouse controls. The hazard ratio for colorectal cancer was 1.7 (95% CI 1.2, 2.6) for family members of colorectal cancer probands and 1.7 (95% CI 1.2, 2.6) for family members of adenoma probands relative to spouse controls. The hazard ratio was 2.5 ($P < 0.03$) for family members of colorectal cancer probands diagnosed <age 55 and 2.8 ($P < 0.001$) for family members of adenoma probands diagnosed <age 55 relative to spouse controls.

Conclusion: The risk of colorectal cancer in families of adenoma and of colorectal cancer probands is the same, with younger age of diagnosis indicating the highest risk. The screening recommendations for family members of colorectal cancer probands should also be applied to family members of adenoma probands.

— Friday, 3/22, cont'd. —

CABINET/
JUDICIARY

Session D — Behavioral Science/Quality of Life

Chair: Jon Kerner, PhD
Georgetown University Med. Center
Lombardi Cancer Research Center

4:15 pm

Caryn Lerman, PhD
Georgetown University
Lombardi Cancer
Research Center

PREDICTORS OF UTILIZATION OF BRCA1 TESTING

Caryn Lerman, PhD, Henry T. Lynch, MD, Kevin Schulman, MD, Steven Narod, MD, George Bonney, PhD, Chanita Hughes, MS, Andres Gomez-Camintero, MPH, David Main, MS, Cecil Fulmore, MS

Objective. To identify factors associated with utilization of BRCA1 testing in high risk families. Design. Prospective cohort study with baseline assessment of sociodemographics, knowledge, and perceptions of the benefits, limitations, and risks of BRCA1 testing. The primary outcome measure was actual utilization of BRCA1 testing following a pre-test education session. Setting-Participants. 231 adult male and female members of ten consecutively enrolled BRCA1-linked hereditary breast-ovarian cancer (HBOC) families. Results. 56% of individuals requested BRCA1 testing when offered. Utilization increased to 71% among those who agreed to complete the baseline interview (n=176, response rate=76%). Utilization rates were significantly higher in females (OR=3.19, C.I.=1.48-6.87) and persons with health insurance (OR=5.60, C.I.=1.58-19.83) and lower in persons ages 50 and older (OR=0.39, C.I.=0.16-0.87). The odds of utilizing BRCA1 testing were also greater for persons with higher levels of knowledge (OR=1.94, C.I.=1.41-2.59) and perceptions of the benefits of testing (OR=1.77, C.I.=1.32-2.28). Perceived limitations and risks of testing did not influence utilization. Conclusions. Males and persons of a lower socioeconomic status may be under-represented among those who utilize BRCA1 testing. Lack of health insurance may hinder use of this new technology. Decisions about BRCA1 testing may be influenced disproportionately by the perceived benefits of testing, relative to the limitations and risks. To facilitate informed patient choices about BRCA1 testing, providers must emphasize the limitations and risks of BRCA1 testing, as well as the potential benefits.

— Friday, 3/22, cont'd. —

4:35 pm

Rosalind A. Breslow, PhD, MPH, RD
National Cancer Institute

What Americans know and don't know about cancer risk and survival.

Breslow RA,¹ Sorkin JD,² Frey CM, ¹ Kessler LG.¹

1. National Cancer Institute, Bethesda, MD. 2. National Institute on Aging, Bethesda, MD.

Purpose: To assess Americans' knowledge about risk factors for breast, cervical, colon, and prostate cancers and about prospects of surviving these cancers following early detection.

Methods: Nationally representative data were obtained from 12,035 subjects who completed the 1992 National Health Interview Survey Cancer Control Supplement which includes questions about cancer risk factors and survival.

Results: The majority of subjects were unable to identify major cancer risk factors. Approximately two-thirds did not know that age increased the risk for breast and colon cancer, that diet increased the risk for colon cancer, or that multiple sex partners increased the risk for cervical cancer. Knowledge about survival was poor. Only about half thought they had a good chance of survival following early detection of cervical and colon cancers.

Conclusions: Americans lack knowledge about major risk factors for common cancers. Knowledge was poor at all ages, in all races, at all income levels and at all educational levels. Americans need education about cancer risk factors and survival.

- Friday, 3/22, cont'd. -

4:55 pm

Lori A. Crane, PhD, MPH
University of Colorado
Health Sciences Center

EVALUATION OF A SKIN CANCER PREVENTION PROGRAM FOR PRESCHOOLS AND DAY CARE CENTERS

Crane, LA; Schneider, LS; Yohn, J; Morelli, J; and Plomer, KD.

Sun exposure in childhood is a major risk factor for melanoma as an adult. This paper reports the evaluation of a skin cancer prevention program aimed at increasing the use of sun protective practices among caregivers and parents of preschool-age children. Twenty-seven preschools and day care centers in the Denver, Colorado area were first matched by enrollment size and race/ethnicity of children and then randomly assigned either to intervention or wait-list control group. In Spring, 1994, staff at centers assigned to the intervention attended workshops on sun protection and received posters for their centers. The families attending these centers received totebags with free sunscreen samples, brochures on sun protection, activities to complete with their young children, and a kitchen magnet with the project's slogan, "Block the Sun, Not the Fun." Evaluation components included pre- and post-test surveys of center directors, pre- and post-test observations of practices at centers, and a post-test survey of parents. Pre-testing was completed in Summer, 1993, while post-testing was completed by Fall, 1994. The control group received the intervention in Spring, 1995. Results indicated: (1) increases in "pro-sun protection" knowledge and attitudes among directors in the intervention group, and to a lesser extent among parents in the intervention group; (2) greater use of sun protection practices at intervention centers, including use of sunscreen; (3) no difference between sun protection practices of parents by intervention group; (4) fewer sunburns during the 1994 summer among children attending centers assigned to the intervention group. Path analysis provides evidence that greater use of sunscreen at centers may explain the lower incidence of sunburns in the intervention group. We conclude that this program was effective in promoting sun protection knowledge, attitudes and practices.

— Friday, 3/22, cont'd. —

5:15 pm

Suzanne M. Miller, PhD
Fox Chase Cancer Center

Enhancing Adherence to an Initial Colposcopy by Telephone Counseling of Low-Income Minority Women: A Preventive Strategy

Presenter: Suzanne M. Miller, Ph.D., Kimberly K. Siejak, M.S., Caryn Lerman, Ph.D., Christine M. Schroeder, Ph.D., Tina Bales, B.A., Enrique Hernandez, M.D., William Helm, M.D.

We investigated the efficacy of a brief telephone counseling intervention on adherence to diagnostic follow-up (colposcopy) in low income minority women ($N = 781$) with an initial abnormal Pap smear result. Three main types of barriers were assessed and addressed: encoding (e.g., perceived risk), affective (e.g., worry about the consequences), and self-regulatory (e.g., forgetting). Comparison groups received an appointment confirmation call or standard care (no contact). Logistic regression showed that telephone confirmation significantly increased adherence over standard care ($p < .001$) and telephone counseling significantly increased adherence over telephone confirmation ($p < .05$). The most common barrier type reported during the counseling call was affective ($p < .001$), with 42% indicating more than two affective barriers; corresponding percentages for encoding and self-regulatory barriers were 14% and 6 %. Even after counseling, women adhered less if they were less worried about their child-bearing ability ($p < .05$), often forgot medical appointments ($p < .001$) or had scheduling conflicts ($p < .001$), and did not understand the purpose of a biopsy ($p < .05$), indicating a need to address these factors more extensively. Targeting cognitive-affective barriers appears to be a cost- and time-effective strategy to enhance adherence to cancer-screening regimens in traditionally underserved populations.

– Friday, 3/22, cont'd. –

5:35 pm

Kathryn M. Kash, PhD
Strang Cancer Prevention Center

GENETIC TESTING AMONG WOMEN AT RISK FOR BREAST
CANCER: KNOWLEDGE, INTEREST, AND DECISION MAKING.
Kash KM, Holland JC, Osborne MP, Miller DG.

Women at a low (15-20%), moderate (20-35%), or high (35-50%) risk for developing breast cancer (due to family histories) are at greater risk than women at average risk (11%). With the cloning of the BRCA1 gene, these women are the most likely candidates to request genetic testing. We queried women as to their knowledge of breast cancer and genetic testing as well as their interest in and potential decision making about testing. Four hundred and eighty women from rural and urban areas of the U.S. completed a questionnaire regarding genetic testing, psychological distress, and health beliefs. Mean age is 46 with a range from 21 to 75, primarily white (97%), married (80%), less than a college education (52%), and from cities with populations less than 150,000 (69%). Thirty-six percent thought their chances of being BRCA1 gene carriers were very to extremely likely. Women at the highest risk level (35-50%) reported significantly more breast cancer anxiety ($p < .009$) than women at the lowest risk level (15-20%). While knowledge of breast cancer is quite good (mean = 8, scale of 0 to 10), knowledge of genetic testing is less than optimal (mean = 7, scale of 0 to 15). Despite this low knowledge level and that only 65% of women had heard about the BRCA1 research, 72% stated that, if the test were available now, they would have their blood taken and get the results immediately. The two most meaningful pros for genetic testing were: to plan on doing breast self-examination regularly and to have certainty about their gene carrier status. The two important cons against genetic testing were: knowing would not predict if or when breast cancer occurs and knowing would cause them concern for their children. The decisional balance summary of pros and cons significantly predicted willingness to undergo genetic testing ($p < .0001$), with women having more cons than pros stating they would not have their blood taken now or in the future. Using this model we can determine whether women will have genetic testing when it becomes available on a clinical level. Of greatest concern is that knowledge is poor and perception of being a gene carrier is higher than expected. Improved education and access to genetic counselling are essential in order to help women make appropriate decisions about genetic testing.

— Friday, 3/22, cont'd. —

7:30 pm
CABINET/
JUDICIARY

BANQUET

Speaker: Jonathan Patz, MD, MPH
Johns Hopkins University
Departments of Occupational & Environ. Medicine
and Microbiology & Immunology

*"Global Ecological Change & Public Health: Implications for
Long-Term Preventive Medicine"*

— Saturday, March 23, 1996 —

7:15 - 11:00 am REGISTRATION

7:30 - 8:45 am STUDY GROUP BREAKFAST MEETINGS

WOMEN'S HEALTH

OLD GEORGETOWN

Organizer: Kathy Helzlsouer, MD, PhD
Johns Hopkins University

DIET & NUTRITION

WATERFORD

Organizer: Larry Kushi, DSc
University of Minnesota

TOBACCO RELATED CANCERS

LALIQUE

Organizers: Paul Cinciripini, PhD
The University of Texas
M. D. Anderson Cancer Center

Susan J. Curry, PhD
Group Health Cooperative of Puget Sound

- NOTES -

— Saturday, 3/23, cont'd. —

9:00 - 10:40 am PRESENTED PAPERS

Session E — Biomarkers & Genetics

HAVERFORD/
BACCARAT

Chair:

Nathaniel Rothman, PhD
National Cancer Institute

9:00 am

Epidemiologic evaluation of cytogenetic markers in Hodgkin's disease. Strom SS, Hess KR, Rodriguez MA, Spitz MR, Liang JC

Sara S. Strom
The University of Texas
M.D. Anderson Cancer Center

The usefulness of a biomarker in cancer prevention is dependent upon sources and extent of their variability. Therefore, it is necessary to determine the relationships of biomarkers to patient characteristics, exposures, disease outcomes, and to each other. We studied baseline biomarker data in a cohort of 105 newly diagnosed Hodgkin's disease patients enrolled at The University of Texas M. D. Anderson Cancer Center. Cytogenetic biomarkers of DNA damage in lymphocytes (chromosomal breaks (CB), both spontaneous (SB) and bleomycin-induced (BIB), and sister chromatid exchange (SCE) frequencies) were integrated with epidemiologic data (collected from telephone interviews) using univariate and multiple regression analysis. Age, sex, race, education, histology, previous history of infectious mononucleosis, and family history of cancer showed no association with any biomarker. There was a strong univariate relationship between SCE with alcohol intake ($p < .0001$) and SB with both alcohol ($p = .04$) and smoking ($p = .05$). Advanced stage of disease was related to high SB ($p = .01$). BIB was not associated with any of the variables studied. Adjusting for all variables in multivariate modeling, current alcohol intake was associated with high SCE ($p < .001$) and SB with current smoking ($p = .04$). Positive correlations were found for each pair of markers. As expected, SB and BIB showed the strongest correlation ($p < .0009$). Higher SCE and SB in current alcohol and cigarette users indicate the need for evaluating these exposures when interpreting these biomarkers. These data showed little interindividual variations for BIB and support its stability as a useful constitutional biomarker.

— Saturday, 3/23, cont'd. —

9:20 am

Xifeng Wu

The University of Texas

M. D. Anderson Cancer Center

Association of Family History of Cancer and Primary Chromosome 9 Aberrations in Lung Cancer Cases and Controls, XF Wu, MR Spitz, H Jiang, TM King, S Pathak, and B Dave; The University of Texas M.D. Anderson Cancer Center, Houston, TX (Supported by NCI grant CA55769, MR. Spitz, M.D., P.I.).

We have demonstrated that spontaneous chromosome aberrations on chromosome 9 in peripheral blood lymphocytes (PBL) are significant risk predictor for lung cancer. This study evaluates the relationship between self-reported family history of cancer and spontaneous chromosome aberrations in PBL of 94 lung cancer patients and 74 healthy controls. The hypothesis is that individuals exhibiting specific chromosome aberrations might have inherited genetic instability and would be more likely to exhibit a family history of cancer. For each individual, a personal interview was conducted including a detailed family history and 100 metaphases were analyzed for spontaneous aberrations. The patients reported having 838 first-degree relatives, including 77 members (9.2%) with cancers. The controls reported having 679 first-degree relatives, including 53 members (7.8%) with cancers. Of 94 cases, 42 (43.8%) had chromosome 9 aberrations compared with 17 (23%) of 74 controls. In the controls, we found the odds ratio (OR) associated with chromosome 9 aberrations was significant elevated for family history of tobacco-related cancers (OR=5.1, 95% confidence intervals of 1.3, 19.5), after adjusting by age, sex, ethnicity, packyears and number of first degree relative. In the cases, a borderline significantly elevated OR of 5.0 was also noted for chromosome 9 aberrations by family history of lung cancer. We found no associations between age, sex, ethnicity, smoking status and chromosome 9 aberrations in either group. The findings suggest that chromosome 9 aberrations may be a marker of cancer susceptibility and associated with familial aggregation of cancer.

— Saturday, 3/23, cont'd. —

9:40 am

Zuo-Feng Zhang, MD, PhD
Memorial Sloan-Kettering
Cancer Center

Tobacco Smoking and Chromosome 9 Alterations in Bladder Cancer. Zhang Z, Shu X, Cordon-Cardo C, Orloff I, Lianes P, Lacombe L, Cao P, Sarkis A, Dalbagni G, Reuter V, Scher H, Begg C. Memorial Sloan-Kettering Cancer Center, New York, NY 10021

Purpose. Bladder cancer has been associated with tobacco and certain occupational exposures. Molecular studies showed that p53 mutations and chromosome 9 alteration are the most frequent events in bladder cancer. Chromosome 9 alterations are considered an early event in the bladder carcinogenesis. In this study, we assessed 73 patients with bladder cancer to inquire if chromosome 9 alterations are related to smoking.

Methods. This study employed a case-series design to examine the correlation between cigarette smoking and chromosome 9 alterations. Information on smoking was abstracted from medical charts. Tumor tissues were analyzed using restriction fragment length polymorphism (RFLP) and microsatellite polymorphism assays for chromosome 9 alterations. Logistic regression method was used to analyze the data.

Results. We observed an increased risk of chromosome 9 alterations in smokers (Odds Ratio (OR)=3.99, 95% confidence interval (CI)=1.08-14.83) controlling for age, sex, and race. A dose-response relationship was also identified between years of smoking and chromosome 9 alterations ($P=0.05$).

Conclusions. The study supports the view that cigarette smoking affect the biomarkers and enhance the risk for bladder carcinogenesis. The results help explain the etiology and pathogenesis of bladder cancer and may contribute to more effective cancer prevention, detection and treatment strategies. The results suggest that potential tumor suppressor genes on chromosome 9 may be involved in the smoking-related bladder carcinogenesis.

— Saturday, 3/23, cont'd. —

10:00 am Qingyi Wei, PhD
The University of Texas
M. D. Anderson Cancer Center

A new DNA repair assay of genetic susceptibility for application in epidemiologic studies. Qingyi Wei, Lie Cheng, Dongjing Geng. The University of Texas M. D. Anderson Cancer Center, Houston, TX 77030

Mutations in mismatch DNA repair genes are responsible for microsatellite instability in hereditary non-polyposis colon cancer. Microsatellite instability has been shown one of the most common genetic alterations in various types of cancer. Genotypic and phenotypic defects in DNA repair genes vary from individual to individual and are reflected in their expression. Purpose: To simultaneously measure and evaluate the relative levels of transcripts of five mismatch DNA repair genes in cultured lymphocytes using quantitative reverse-transcriptase (RT) polymerase chain reaction (PCR). Methods: RT-PCR was used to measure the relative levels of transcripts of five mismatch DNA repair genes: *hMLH1*, *hMSH2*, *hPMS1*, *hPMS2*, and *GTBP* in lymphoblastoid cell lines. Random primers were used for the RT reaction. PCR was performed using pairs of primers unique for each gene and chosen for optimal PCR in terms of the required annealing temperatures and minimum dimer formation. The PCR product of each gene was confirmed by direct sequencing. β -actin gene was used as an internal control for RNA degradation, DNA contamination, as well as a reference for quantitating the levels of transcripts. Results: The conditions chosen for PCR reactions generated distinguishable and measurable levels of the transcripts of each of the five target genes in a single reaction tube. Cell lines with known mutations in the target genes and deficient in mismatch DNA repair had either undetectable or lower levels of the relevant gene transcripts than repair proficient cell lines. Conclusions: We developed an RT-PCR assay that allows simultaneous quantitation of the expression of five mismatch DNA repair genes in peripheral blood lymphocytes. This approach may facilitate the screening for germline alterations or defects in target genes. It has the potential to become a biomarker for identifying individuals at increased risk of cancer.

— Saturday, 3/23, cont'd. —

10:20 am

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

IDENTIFICATION OF THE 185delAG *BRCA1* GENE ALTERATION AND CHARACTERISTICS OF A SUBSET OF CANCER PRONE FAMILIES (Daly, MB, Godwin, AK, Berman, DB, Costalas, JW, Masny, A, Gillespie, D) Fox Chase Cancer Center, Philadelphia, PA

Women with a strong family history of breast and/or ovarian cancer who have inherited an alteration in the *BRCA1* gene have as much as an 85% risk of developing breast cancer and an up to 60% risk of developing ovarian cancer. A recent study reported that 1% of DNA samples from Eastern European Ashkenazi Jews showed a specific alteration on nucleotide 185 of exon 2 of the *BRCA1* gene. Using this new information, close to 200 DNA samples from 699 participants presently enrolled in the Family Risk Assessment Program (FRAP) for women with one or more first degree relatives with breast or ovarian cancer were screened for the 185delAG alteration. Eleven (5.5%) women (from 9 unrelated families) out of 200 samples tested were carriers of the 185delAG *BRCA1* alteration. Characteristics of these 11 probands were compared to those of the 699 participants of FRAP to identify potential epidemiologic markers of risk for this particular mutation. All but one (91%) of those testing positive for 185delAG are Ashkenazi Jews of Russian and Polish descent, compared to 28% in the FRAP population ($p > .001$). The number of first and second degree relatives with breast and ovarian cancer are significantly higher in the 185delAG families than in the FRAP families as a whole (breast 3.2 vs. 1.2 cases/family, $p = .01$; ovarian 2.4 vs. 0.5 cases/family, $p = .001$). No significant differences in age, age at first live birth, parity or oral contraceptive use was found. Ethnicity and multiple breast/ovarian cancers characterize families with *BRCA1* mutations in 185delAG. Other standard epidemiologic risk factors do not appear to discriminate. Areas for further research will be discussed.

10:40 am

Break

- NOTES -

— Saturday, 3/23, cont'd. —

11:00 - 12:30 pm SYMPOSIUM

How Useful Are Clinical Trials for Cancer Prevention?

Chair: **E. Robert Greenberg, MD**
Director, Norris Cotton Cancer Center
Professor of Community & Family Medicine and
Medicine, Dartmouth College

"The Role of Randomized Trials for Testing Primary Prevention Strategies"

Julie E. Buring, ScD
Brigham & Women's Hospital
Associate Professor, Dept. of Ambulatory Care & Prevention
Harvard Medical School

"Limitations of Clinical Trials in Guiding Primary Prevention Efforts"

Graham A. Colditz, MD
Harvard School of Public Health

"The Role of Observational and Experimental Studies in Cancer Prevention"

E. Robert Greenberg, MD

Conclusion of Annual Meeting Program

- NOTES -

— POSTER ABSTRACTS —

2

Genetic Testing for Colon Cancer Susceptibility: Anticipated Reactions of Patients and Challenges to Providers. Audrain J., Lerman C., Marshall J., & Gomez-Caminero A. Georgetown University Medical Center, Lombardi Cancer Center.

The commercial availability of genetic tests for colon cancer susceptibility is creating new opportunities and challenges for both patients and providers. **PURPOSE & METHODS:** To provide information useful in the education and counseling of individuals considering genetic testing, we conducted structured interviews with 45 male and female first-degree relatives of colorectal cancer patients. **RESULTS:** 51% of respondents indicated that they definitely would want to obtain a genetic test for colon cancer susceptibility when it is available and 31% said that they probably would want to be tested. Interest in genetic testing was significantly higher among persons with less formal education and those with a Catholic religious preference. Motivations for genetic testing included to know if more screening tests are needed, to learn if one's children are at risk, and to be reassured. Barriers to testing included concerns about insurance, test accuracy, and about how one's family would react emotionally. Most participants anticipated that they would become depressed and anxious if they tested positive for a mutation, while many would feel guilty and still worry if they tested negative. Of note, about one-half of respondents expected that they would decrease their use of screening tests and make fewer attempts to reduce dietary fat if they tested negative. **CONCLUSIONS:** These preliminary results underscore the importance of educating patients about the potential risks, benefits and limitations of genetic testing, with particular emphasis on the possibility of adverse psychological effects and implications for health insurance. The potential for false reassurance following a negative test result should be addressed by emphasizing the residual risks of cancer among noncarriers of predisposing mutations.

RECRUITING FOR A CANCER CONTROL PROGRAM USING A GEODEMOGRAPHIC DATABASE AND THE TELEPHONE Crane, L.A., Leakey, T.A., Warnecke, R., Rimer, B., Woodworth, M., Heller, D., Ruelle, A., Taylor, M.K., and Dusenbury, K.

This paper evaluates the use of a geodemographic database for a telephone mammography promotion program targeting low-income women in Colorado. The research was conducted through the Cancer Information Service (CIS), a nationwide program of the National Cancer Institute that provides free, up-to-date information on cancer via a toll-free telephone number. The geodemographic database that was used was designed by Inforum, Inc., and allows selection of census *blockgroups* according to demographic and consumer characteristics. The neighborhoods (blockgroups) that were selected met these criteria: low-income, minority, and/or primarily over age 50. Following selection of blockgroups, residential lists with householder's name, address and telephone number were purchased through a direct marketing company. Households were contacted by Information Specialists at the CIS to: 1) determine the presence of a woman over the age of 50; and 2) implement the educational intervention. The recruitment strategy resulted in greater participation in the program by low income, low education, and African American women compared to that which would be expected based on data at the state level. On weekdays, calling was most likely to result in an eligible enrolled woman during the period 5 p.m. - 9 p.m. and least likely during the period 1 p.m. - 5 p.m. (8.5% versus 5.1% success rate per attempt). Saturday was the most productive day to call, with the highest success rate between 1 p.m. and 5 p.m. (14.4%). Women with no history of mammography, lower income, older, and lower education were more likely to be contacted in the first attempt to reach the household, while women with a history of mammography, higher income, younger, and higher education were more likely to require four or more attempts to be reached. This recruitment method is successful for increasing participation of underserved women in a mammography education program.

FAMILIAL CANCER RISK COUNSELING: DEVELOPMENT AND EVALUATION OF A TRAINING PROGRAM FOR NURSES (Daly, M., Masny, A., Preston, F.) Fox Chase Cancer Center, Phila., PA

Oncology practice is being revolutionized by molecular genetic tools to assess cancer risk. The dissemination of genetic information to community practice presents an opportunity for education in cancer control. The purpose of this project was to develop and test the impact of a training program for nurses in Familial Cancer Risk Counseling (FCRC). During the development phase, 14 key informant interviews with nurses working in cancer risk assessment and four focus groups with 29 community-based nurses were conducted. Findings identified key concepts for the curriculum such as, principles of basic genetics, inherited patterns of cancer, obtaining and interpreting a cancer family history, communication and implications of cancer risk information. Based on this information, a three-day training was developed and conducted with 36 oncology nurses. Of these, 61% were masters prepared, 16% currently worked in risk assessment, 33% planned to initiate cancer risk programs, and only 8% had taken a formal course in genetics. To evaluate the course objectives, pre/posttest measures of knowledge were used. There was a statistically significant improvement in pre and posttest knowledge scores ($p = .0001$) using the Wilcoxon signed rank statistic, with a mean pretest score of 58% and mean posttest score of 76%. To test the impact of the course, survey data at baseline and at 6 month post-training will analyze individual and group change over time in providing FCRC. At baseline, 56% were routinely taking a cancer family history. Of these, 50% obtained information on first degree relatives only, 35% failed to record age at diagnosis, and 60% failed to inquire about bilaterality of disease. Research articles were cited as the primary source of information in cancer genetics (51%); and 64% listed continuing education as the greatest need to providing FCRC. This study provides information on core concepts for training community-based providers in cancer genetics and suggests that education in familial cancer risk counseling is an essential step towards integrating principles of cancer genetics into cancer control practice.

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A Psychometric Evaluation of the Temptations to Try Smoking Inventory for Adolescents

K Suchanek Hudmon, AV Prokhorov, CW Schacherer, M Quinones, ER Gritz; The University of Texas M. D. Anderson Cancer Center, Houston, TX

To assess temptations to try smoking in a study of factors associated with smoking initiation in youth, modifications were made to the University of Rhode Island Temptations Inventory (a component of the Transtheoretical Model of Change). The modifications were made to tailor the scale to a younger target population. In the spring of 1995, the inventory was tested in a vanguard cohort of 234 nonsmokers (60% female) in the 5th (53%), 8th (33%), or 12th (14%) grade. Of the respondents, 40% were White, 27% were African-American and 28% were of Hispanic origin.

The Temptations to Try Smoking Inventory includes 15 items that assess potential sources of temptation to try smoking, such as stress, peer pressure, and curiosity. Items were measured on 5-point Likert scales ranging from "really don't want to" to "really want to" [try smoking] in 15 situations.

An item analysis revealed that all items had ample variability (mean item variance, 0.61), high inter-item correlations (mean correlation, 0.59), and high item-total correlations (range, 0.61-0.84). The reliability analysis suggested that the inventory is a consistent measure with a Cronbach alpha estimate of internal consistency of 0.96.

These results suggest that the temptation to smoke inventory scale is sufficiently reliable to warrant its use in future research efforts.

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

Using Tailored Messages to Promote 5-a-Day among Black Church Members: A Comparison of Church Oriented vs. Personal Health Oriented Bulletins. Waldmiller, J. Campbell, MK, Bernhardt, J. Jackson, B. Weathers, B. Bennett, K. Potenzi, D. Department of Nutrition and the Health Communications Research Laboratory, University of North Carolina at Chapel Hill.

The Black Churches United for Better Health project, a 4 year NCI-funded 5-a-Day community study, is promoting fruit and vegetable consumption for cancer prevention among rural black church members in eastern North Carolina with computer tailored health bulletins. Focus group interviews indicated that many participants held a holistic and spiritual health perspective rather than a personal health, biomedical model. From this, we randomly assigned the 25 intervention churches into two groups so that congregants received either church-based or personal health-based nutrition bulletins. The church-based bulletins contained nutrition information interwoven with scriptural quotations about health, and a message and grace from the pastor. The personal health-based bulletins used doctors and nutrition experts as information sources. Both bulletins provided individual dietary feedback and tailored messages regarding risk perceptions, stage of change, and barriers to change. Source credibility and message recall are being evaluated with a telephone survey of a random subsample of the study population (550 out of 3737 baseline participants), and in-depth interviews with approximately 75 study participants. The baseline sample is 98% African American, 70% female, 54% married, one-third have education beyond high school, and the mean age is 51.4 years. Quantitative and qualitative results will be presented.

Results of an Interim Analysis of Adherence Data from a Head and Neck Cancer Chemoprevention Trial

K Suchanek Hudmon and RM Chamberlain: The University of Texas M. D. Anderson Cancer Center, Houston, TX

An interim analysis of adherence data in clinical trials can help investigators to identify and remedy problems associated with adherence. We conducted an interim analysis of 478 subjects randomized during the first 5 years of a cooperative group chemoprevention trial testing the effects of 13-CRA in the prevention of second primary tumors of the head and neck.

In examining pill count data over the first 5 follow-up visits for the subset of subjects who were at least 16 months post-randomization (n=323), the average percentage of subjects taking at least 85% of their prescribed pills ranged from 93.7% (at the 3-month visit) to 88.3% (at the 6-month visit). Of the 478 randomized subjects, 57 requested drug termination for personal reasons not related to toxicity; 40 made their request during the first 9 months post-randomization. There were no significant differences between the subjects who remained on the drug and the subjects who requested drug termination when stratified by sex, age, race, education, employment, and alcohol or tobacco use.

These results suggest high levels of adherence among subjects on-drug. More indepth studies are needed to explore the reasons underlying subject requests for drug termination during the first nine months post-randomization.

Supported by grant 52051 from the National Cancer Institute.
 "Chemoprevention Trial to Prevent Second Primary Tumors with low-dose 13-cis retinoic acid in Head and Neck Cancer," Waun Ki Hong, M.D., P.I.

Diagnostic Conditions for the Effects of Monitoring on Intrusive Ideation in Women at Risk for Cervical Cancer

Presenter: Suzanne M. Miller, Ph.D., Walter Mischel, Ph.D., Joanne Schwartz-Buzaglo, M.A., Christine M. Schroeder, Ph.D., Robert Sipps, B.A.

According to the Monitoring Process Model (MPM), the tendency to monitor for threatening information is expected to lead to elevated levels of intrusive ideation, but only under certain diagnostic conditions that heighten the threat level or "heat" of the situation. We explored this prediction in the context of the framing of information relevant to diagnostic follow-up (colposcopy) for an abnormal Pap smear. Prior to colposcopy, patients ($N = 79$) were randomly assigned to one of three preparatory conditions:

1) *Negative framing*, which emphasized the negative consequences of non-adherence to recommended screening and health-protective regimens; 2) *Positive framing*, which emphasized the positive consequences of adherence; and 3) *Neutral framing*. Multiple regression analyses showed that there was an interaction between monitoring coping style and message framing on post-appointment intrusive ideation, controlling for depression ($p < .15$) and pre-appointment intrusive ideation ($p < .01$). Specifically, *high monitors* (who scan for and exaggerate health threats), in comparison with *low monitors* (who avoid and ignore such threats), experienced greater intrusive ideation when the message was presented in a negative, threat-oriented frame. The results suggest that high monitors fare worse than low monitors in response to cancer-related threats and regimens, but only when the aversive aspects of the situation are explicitly primed.

Taking Account of Monitoring-Blunting Styles to Reduce Intrusive Ideation in Low-Income Minority Women Following an Initial Abnormal Pap Smear

Presenter: Suzanne M. Miller, Ph.D., Kimberly K. Siejak, M.S., Walter Mischel, Ph.D., Christine M. Schroeder, Ph.D., Tina Bales, B.A.

Low-income minority women ($N=231$) scheduled for diagnostic colposcopy/biopsy following an initial abnormal Pap smear result received either an appointment reminder call or the reminder call plus a brief structured counseling intervention, which assessed and addressed barriers to adherence. On arrival at the colposcopy appointment, intrusive ideation -- which has been found to play a central role in the stress response to medical threats -- was assessed with the Revised Impact of Events Scale (RIES). We tested the hypothesis that *high monitors* (who seek, amplify, and are most vulnerable to health threats) would have less intrusive ideation after undergoing counseling, whereas *low monitors* (who avoid such threats) would have more. As predicted, in a hierarchical multiple regression, the interaction between monitoring and intervention type was significant ($p < .05$). High monitors who had received the telephone counseling had less intrusive ideation than those in the reminder-only condition, whereas low monitors who had received the counseling intervention had more intrusive ideation than those who had received a simple reminder call. Thus, brief pre-appointment interventions tailored to the individual's coping style appear to more effectively reduce anxious preoccupation with cancer-related threats and should therefore best facilitate subsequent adherence to recommended health-protective regimens.

Psychosocial Issues of Breast Cancer Patients. Liu T, Cosby LG, Harris MG. Comprehensive Cancer Center, University of Alabama at Birmingham, Birmingham, AL 35294-3300.

To assess the quality of life of breast cancer patients, a questionnaire was administered to new patients at their first appointment. Questionnaires completed between 1989 and 1991 were analyzed. One hundred and two breast cancer patients completed the questionnaire. The patients' age ranged from 27 to 78 with a mean of 49 years old. 84.3% of women were white. 68.6% women were married. The average length of disease was 0.9 months. At the time of assessment, 84.3% of patients had not yet received treatment for their disease. Issues of most concern to the patients were health, family, finance/work, future, and self-esteem. 90.2% and 93.1% of patients expressed concerns about their health and family, respectively. Concerns about finance/work, future, and self-esteem were present in 40.2%, 62.7%, and 22.5% of women, respectively. 73.5% of patients requested counseling and support for themselves and 42.2% of patients requested counseling and support for their family. Interpreting information and referrals for additional services were requested by 30.4% and 10.8% of the patients respectively. Concerns and needs were related to age, race, and marital status through multivariate logistic regression analysis. Women younger than 50 years old and those married were more likely to have concerns about their family. More young women and non-whites, but fewer married women, had concerns about finance/work with odds ratios (OR) of 1.05, 6.58, and 0.34, respectively. The psychosocial issues identified in this study will be used for further comprehensive evaluations of breast cancer patients' quality of life and for different intervention programs targeted to specific demographic groups.

Perceived Social Support Predicts Disease-Specific Distress among Low-Income Patients Referred for Colposcopy

Presenter: Suzanne M. Miller, Ph.D., Megan Mills, M.A., Ann O'Leary, Ph.D., Tina Bales, B.A., Abbey Fromkin, B.A., and Samantha Simms, B.A.

We examined the relationship between subjective and objective social support status and disease-specific distress in 56 low-income minority women referred for colposcopy following an initial positive Pap smear. Subjective support was measured with the UCLA-R loneliness scale. Objective measures of social support included marital status, number of support persons available, and number of persons living with the patient. Consistent with recent theorizing, we hypothesized that the psychological impact of the abnormal Pap smear on intrusive ideation (as measured by the RIES) -- which is a key factor in the stress response to medical threats -- would be a function of the individual's perceived lack of social support. As predicted, subjective feelings of loneliness significantly predicted intrusive ideation ($p < .03$), controlling for objective support resources, age, and education. These findings underscore the importance of assessing subjectively-experienced support as a predictor of disease-specific intrusive ideation and related psychological dysfunction, in response to positive cytologic screening and follow-up.

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Relationships Between Socioeconomic Status And Race-Specific Cervical Cancer Incidence And Survival. T. Liu, J. W. Waterbor, H. Weiss, S. J. Soong. University of Alabama at Birmingham, Comprehensive Cancer Center, Birmingham, AL 35294-3300.

Cervical cancer is a major threat to women's lives worldwide. There is a higher incidence and mortality in minority groups and in developing countries. Lower socioeconomic status (SES) is assumed to account for this overburden. To further examine the relationships in the U.S., the authors conducted analyses using two large databases. Reported cases from 1973 to 1991 from all Surveillance, Epidemiology, and End Results registries (except Hawaii) were used to calculate county-year-race-age-specific incidence rates. Per capita personal income, per capita net earnings, average earnings per job, and percent of population employed were derived from the Regional Economic Information System, Department of Commerce. They were merged with incidence data at the county and year level and used to categorize counties into three SES groups. Multivariate analyses were performed with adjustment for calendar year and age, marital status or diagnostic stage of cases. Poisson regression analysis of both in situ and invasive cervical cancer showed higher rate ratios for black and other groups compared to white women among counties of low and medium SES levels. Through logistic regression, relative risks (RRs) of being diagnosed with invasive vs. in situ cancer were calculated. Black women had higher RRs (1.10 to 1.39) and other women had lower RRs (0.73 to 0.89) compared to white women in all three SES levels. Cox regression analyses showed improved survival in white and other groups of women. The exploratory analyses may be subject to the ecological fallacy, but suggest that the SES of a population is limited in explaining racial differences of cervical cancer. Specific interventions or individual based cancer control approaches are necessary.

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Comparison of Breast and Cervical Cancer Screening Practices among Salvadorans in DC and a Southwestern Native American Tribe. S. Shankar, A. Giuliano, M. Papenfuss. Washington Cancer Institute at Washington Hospital Center, Washington DC. Arizona Cancer Center, University of Arizona, Tucson, AZ.

The purpose of this investigation is to compare the breast and cervical cancer screening behaviors and practices among immigrant Salvadoran Women (ISW), and Southwestern Native American Women (SNAW). The incidence of cervical cancer among Hispanic women and Native American Women is nearly 2-3 fold higher than rates among white women and five-year relative survival rate for breast cancer is lower than for white women. Only 29% of the ISW have health insurance, while on the other hand, SNAW have free access to Indian Health Service insurance which does not include screening mammograms. The data were collected in two independent population based surveys to assess the knowledge attitudes and behaviors among the two groups. A total of 843 Salvadoran women living in DC area, and 559 Native American women living in Arizona were interviewed face to face by Salvadoran and Native American interviewers respectively. Seventy one percent of ISW and 67% of SNAW of all ages reported ever hearing of a mammogram; above the age of 40 years old, 63% of ISW and 45% of SNAW reported ever having a mammogram; 84% of ISW and 96% of SNAW reported ever hearing, and 70% of ISW and 79% SNAW having a Pap with in last year. These data indicate inadequate knowledge and screening frequencies among these minority women. In addition to cultural barriers, others included not knowing where to go, lack of transportation, and lack of or insufficient insurance.

Participation in Clinical Treatment Trials: Factors Affecting Participation for Women with Breast Cancer

Paskett E, Muss H, Case L

A retrospective descriptive study was conducted to investigate reasons for participation or non-participation in clinical treatment trials among women with breast cancer. Subjects were breast cancer patients from a university-based medical center (n = 30) and a rural community hospital (n = 41). Thirty-four (43%) were eligible for trial participation. Face-to-face interviews were conducted to identify reasons for participation or non-participation in clinical treatment trials.

Only 59 percent (n = 20) of eligible women were invited to participate in a treatment trial by their physician. Of those asked, 14 (70%) agreed to participate. Reasons for participation included: 1) personal benefit; 2) altruism; 3) doctor's recommendation; 4) desire to foster the progress of medical research; and 5) previous experience with cancer and/or medical research. Reasons women gave for not wanting to participate included: 1) negative beliefs about clinical trial research; 2) lack of knowledge about clinical trial research; 3) personal issues; and 4) requirements of the protocol. Among eligible women, those who were not offered trial participation were older than those offered participation (average age 63 years vs. 54 years; $p = .025$). Logistic regression analyses found two areas that predicted participation: 1) attitudes about research studies (OR = 3.98; $p < 0.05$); and 2) knowledge/beliefs about research studies (OR = 3.6; $p = 0.03$).

Areas of intervention to improve clinical trial participation for women with breast cancer include protocol design, physician reminders, and patient-directed efforts.

Employment, Medical Coverage, and Pap Smears Among Salvadorean Women in the District of Columbia. S. Shankar, E. E. Huerta, K. A. Jablonski, R. Hur. Washington Cancer Institute at Washington Hospital Center, Washington, DC 20010.

Immigrants from El Salvador comprise one of the fourth largest group of Hispanics in the U.S., and one of the largest Hispanic groups in the Washington Metropolitan Statistical Area. To assess their knowledge, attitudes and practices (KAP) towards cancer and access to health care and its utilization, a cross-sectional survey was conducted during 1994. A total of 843 Salvadoran immigrant women over the age of 20 were interviewed face to face. One specific objective of the survey was to determine whether employment status and insurance coverage had an impact on women's KAP with regard to Pap smears. Of the women surveyed, 63% reported either full- or part-time employment status, only 29% receive medical coverage through their employer. Of those with insurance, 37% attend public health clinics and 35% attend private doctor's offices, while 81% of those without insurance seek care in public health clinics. Of the women surveyed 93% had heard of Pap smears, 68% of uninsured and 73% of insured women underwent a Pap smear within the past year. These results indicate that although employment/health insurance status had a small effect on KAP with regard to this component of cancer control, there is a need for educational activities to increase the numbers of both insured and uninsured Salvadoran women receiving Pap smears.

EARLY BREAST CANCER DETECTION BEHAVIORS IN RURAL AFRICAN AMERICAN WOMEN

Kruus, L.K., Auerbach, S.A., & McCreary, M.L.

There is little research demonstrating the effectiveness of cancer prevention interventions tailored to meet the specific needs of rural African American women. The present study compared the effectiveness of two workshops (Culturally Adapted and Standard Education) developed to promote early breast cancer detection behaviors. Content was identical in both groups. However, the culturally adapted format included specific references to African-American, religious, and rural cultures. Workshops were presented by lay health educators. Subjects were 48 African-American women (mean age = 60.5) with no previous history of breast cancer. Measures assessed breast cancer knowledge and self-report of frequency and intent to engage in early detection behaviors.

Analysis revealed no significant changes in intent to perform BSE and CBE, regardless of workshop type. However, analysis of pre-intervention data indicated that the majority of participants reported regular BSE practice (91%) and regular CBEs (87%) suggesting ceiling effects may have precluded obtaining significant pre/post differences. Interestingly, these pre-treatment estimates of behavior were informally recanted by many participants either during the workshops or in subsequent focus groups. In addition, years of education is positively related to an increase in breast cancer knowledge ($p < .05$) across both types of workshops.

These findings suggest that high risk populations such as rural African American women benefit from both standard and culturally adapted interventions, particularly more educated participants. The unique benefits of better presenting information in a familiar manner may be better detected by enhancing the validity of self-report measures.

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Cancer Prevention in Rural Virginia: Smoking and Diet in Rural Manufacturing Employees

Fries, E., Ripley, J., Figueredo, M., McCoy, J.
Virginia Commonwealth University

Among Virginia's rural areas, some cancer rates are increasing faster than they are in rest of country. Primary prevention in rural areas is often lacking. Rural southern Virginia is no exception, in fact large-scale prevention efforts in this area, particularly pertaining to smoking, are almost non-existent. This may be due in large part to the presence of tobacco industry and farming. Our project assesses the feasibility of a worksite based behavior change project that uses community strategies to motivate change in smoking and diet. Baseline survey data is described below.

Two hundred thirty seven employees of two major rural manufacturing employers in Mecklenburg County, southern Virginia were surveyed (response rate 90%). The respondents had a mean age of 42 years, 50% were female, and 53% African American. Seventy-one percent of those surveyed had a high school education or less. Among these employees, 50% report eating red meat more than three times per month, about 30% use a thick coating of butter on their bread, only 2% reported eating 5 five servings of fruits or vegetables per day, and 40% are current smokers. Cancer related beliefs and attitudes are very revealing in this rural population. More than 65% of employees reported that they are not at risk for any cancer, and 46% reported that smoking did not cause cancer or that they were unsure if smoking caused cancer. These data underscore the need for cancer prevention activities in these areas. Further data will provide implications for smoking and diet interventions in this area.

Smoking Cessation Following Diagnosis of Head and Neck Cancer

Ostroff, J., Moadel, A., Jacobsen, P., Schantz, S., Abate, M., McKiernan, J.

Continued smoking after diagnosis of cancer is associated with greater morbidity, and increased risk of disease recurrence, second primary cancers, and mortality. This longitudinal study examined the prevalence, patterns and predictors of smoking cessation among patients recently diagnosed with head and neck cancer. Eligible patients ($n=74$, 62% male), all smokers in the year prior to diagnosis, smoked an average of 24 cigarettes per day. Patients were assessed at two times: a) just prior to hospital discharge (T_1), and b) 6 months following diagnosis (T_2). Patients completed self-report questionnaires assessing tobacco use and key factors hypothesized to be related to post-diagnosis smoking status (e.g. health beliefs, medical history, prior tobacco use). Patients' self-reported tobacco use was verified at follow-up via urinary cotinine assays. 37% of patients reported continued tobacco use at T_2 . In terms of smoking cessation, most patients had made multiple attempts to quit. Compared to patients who successfully quit smoking ($n=47$), patients who continued to use tobacco ($n=27$) were significantly less knowledgeable at T_1 about the health benefits of smoking cessation and risks of continued tobacco use ($p<.01$). These data highlight the importance of developing smoking cessation interventions that focus on patient education.

Factors Associated with Perceived Susceptibility to Colorectal Cancer. Vernon SW, Myers R, Lu M, Tilley BC.

Although a person's perception of the risk of or susceptibility to disease is believed to be an important determinant of health-related behavior, little is known about the correlates of perceived susceptibility (PS). This information is important because it may identify subgroups to target for educational interventions and also may inform the content of messages. We examined correlates of PS among a group of automobile workers identified as being at increased risk of colorectal cancer (CRC).

We analyzed data from the baseline survey of The Next Step Trial, a worksite-based health promotion trial of screening and nutrition interventions. The study population was composed of 2459 active and retired male employees from 28 worksites who returned a self-administered mail questionnaire (58% of those eligible). The questionnaire measured constructs from behavior change theories and models relevant to CRC screening. Data on demographic, risk factor, and medical history characteristics were collected from employee records or from the questionnaire.

We used logistic regression to assess the independent contribution of all variables that were statistically significant at $p < 0.15$ in univariate analyses. Factors most strongly associated with high PS included a personal history of polyps (OR=3.4, 95% CI = 2.7, 4.2); worry about being diagnosed with CRC (OR= 2.8, CI = 2.3, 3.4); and family history of CRC or polyps (OR= 1.8, CI = 1.4, 2.2). Other variables significantly associated with high PS were high salience and coherence of screening; being a current smoker; high social influence; belief that screening is effective; intention to be screened; and younger age.

These data show that workers with a personal or family history of polyps or CRC appear to recognize their increased risk and that workers who are more worried about developing CRC report higher PS than workers who are less worried. We hypothesize that these employees will be more receptive to our worksite CRC screening intervention.

Predictors of Smoking Status in an African-American Population
Taylor, K.L., Gold, K.F., & Kerner, J.F.

We present data from a survey of cancer-control needs of U.S. born, Caribbean-born, and Haitian-born blacks, and four subsamples of Hispanics living in New York City ($N = 2462$). The current abstract concerns predictors of smoking status (former smoker vs. current smoker) among the U.S. born black sample ($N = 408$, 209 women, 199 men; stratified by age). Subjects were selected via random-digit-dial methodology and were interviewed via telephone. Ninety-eight subjects (53% women) were former smokers, and 94 subjects (46% women) were current smokers. Univariate analyses revealed significant group differences (former/current) on the following smoking-related variables: number of years smoked ($M = 19.4$ (12.9); $M = 25.3$ (14.7), $t = -2.5$, $p = .01$), and number of quit attempts ($M = 4.6$ (5.7); $M = 10.9$ (21.6), $t = -2.36$, $p = .03$), with current smokers higher on both variables. Current smokers were more likely to have used other strategies for quitting, such as switching to lower nicotine-brand cigarettes ($\chi^2 = 5.48$, $p = .02$), and cutting down the amount smoked ($\chi^2 = 8.32$, $p = .003$), relative to former smokers. However, both groups reported a predominant use of the strategy of quitting all at once ("cold turkey"), without nicotine replacement or other professional assistance ($\chi^2 = .40$, *ns*). Among the former smokers, the primary reason for quitting was for health reasons, whereas for current smokers, social pressure and "lack of desire to smoke" were more common reasons for wanting to quit ($\chi^2 = 3.93$, $p = .05$). The results suggest that current smokers have smoked for longer, have had more difficulty quitting, and, importantly, wish to quit for reasons different than reported by former smokers (i.e., non-health-related reasons). Logistic regression analyses predicting smoking status utilizing the above variables will be reported. Additional analyses will include comparisons on smoking status and smoking behaviors between the foreign-born samples and the US-born sample.

Psychometric Properties of the Decisional Balance Scale for Smoking Initiation in Youth

AV Prokhorov, CW Schacherer, K Suchanek Hudmon,
M Quinones, ER Gritz: The University of Texas M. D.
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Using the Transtheoretical Model of Change as a framework for studying factors associated with smoking initiation in youth, a modified version of the University of Rhode Island Decisional Balance Index was tested in a vanguard cohort of 357 students in the 5th, 8th or 12th grade (61% female). Modifications were made to the original version of the scale to make it appropriate for young students. Of the respondents, 42% were White, 26% were African-American, and 27% were Hispanic. The largest proportion of respondents were in the 5th grade (45%).

The decisional balance scale consisted of six items highlighting positive aspects of smoking (Pros subscale) and six items reflecting negative aspects of smoking (Cons subscale). The item-total correlations for items in both subscales ranged from 0.42 to 0.78. The Cronbach alpha estimates of internal consistency were $\alpha = 0.77$ for the Pros subscale and $\alpha = 0.86$ for the Cons subscale. The estimate of reliability for the difference score (Pro-Con), which is used to define decisional balance, was 0.86.

Our results suggest that both the subscales and the overall Decisional Balance Index are consistent measures that can be used to test future theoretical hypotheses.

SMOKING CESSATION IN A LUNG CANCER PREVENTION TRIAL FOR HEAVY SMOKERS.

Bowen D, Thornquist M, Shaffer S, Anderson K.

This abstract presents rates and prediction of smoking cessation in CARET (the Carotene and Retinol Efficacy Trial), a randomized controlled trial testing the effects of beta-carotene and retinol on lung cancer rates in heavy smokers ($n=14,254$) and asbestos-exposed individuals ($n=4060$).

Eligibility requirements for heavy smokers included a smoking history of at least 20 pack-years and no more than six years since smoking cessation; 66% of the heavy smokers were current smokers at baseline. Current smoking at baseline was defined as having smoked any cigarettes in the past month.

CARET staff provided cessation assistance (e.g., pamphlets, advice, encouragement) for interested smokers at every visit; no direct attempts were made to encourage all smokers to quit. These opportunities were recorded as part of the main trial database. Ten percent of the opportunities involved the provision of direct personal counseling. Other, less frequently used, opportunities included printed material and outside referral. Of the current smokers at baseline, 18% had quit smoking as of October 1995. Of baseline former smokers, 4% had returned to smoking by that date. An annual total of 9%, 5%, 4%, and 5% of the baseline current smokers had quit smoking at the 1, 2, 3, and 4 year post-baseline follow-up points, respectively.

Baseline predictors of cessation at the one year follow-up among current smokers include demographic variables, health variables, quality of life, and trial-related variables. These data support the provision of low intensity cessation opportunities for smokers in large clinical trials. These data also indicate that many participants do not consider CARET to be an "alternative" to quitting, but actively engage in cessation activities.

Smoking patterns in long-term survivors of Hodgkin's disease.

Sigurdson AJ, Tee PG, Spitz MR, Strom SS

Continued smoking (CS) in long-term survivors of non-smoking-related cancers increases risk of acute health problems and second malignancy. We studied smoking patterns after diagnosis (dx) among a Hodgkin's disease (HD) cohort to identify factors influencing CS vs. cessation which could be useful for intervention strategies. Demographic and social data were collected by telephone interview from 180 HD patients treated at The University of Texas M. D. Anderson Cancer Center between 1986-93. The average age at dx was 32 yrs (range 16-70) and the mean follow-up time was 4.6 yrs (range 1.2-9.4). There were 102 men and 78 women, of whom 84% were White, 10% Hispanic and 4% Black. At dx, 42 men (41%) and 22 women (28%) were currently smoking. At interview, 14 had quit and 50 were still smoking; 3 previous quitters resumed and 4 initiated after dx. In bivariate analysis, CS was significantly associated with age, years smoked, and recreational drug use; gender, education, race, marital status, income, histology, disease severity, alcohol use, number of cigarettes smoked/day, follow-up time and type of treatment were unrelated. Multivariate logistic modeling was used to assess CS indicators with simultaneous adjustment for age, gender and education. Younger patients tended to continue smoking (odds ratio (OR)=0.9 for age, 95% confidence interval (CI): 0.8-1.0, $p<0.05$) and those who had previously used recreational drugs were 7 times more likely to continue smoking (OR=7.1, 95% CI: 1.2-41). In a separate model comparing the 7 who began/resumed (vs. never smokers), chemotherapy without radiation and initiating recreational drug use were significant. Targeting younger patients with a history of recreational drug use for smoking cessation programs would appear to be an effective intervention strategy.

Predictors of mammographic discomfort

Lightfoot N.,^{1,2} Steggle S.,¹ Conlon M.,¹ Darlington G.,^{1,2}
Bakker D.,¹ and C. Jackson¹

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Previous or anticipated mammographic discomfort could affect future breast screening attendance. A study was conducted to identify predictors of mammographic discomfort in women who attend organized breast screening. After undergoing a clinical breast exam and mammogram at the Northeastern Ontario Centre of the Ontario Breast Screening Program, 292 women completed a questionnaire about the psychological impact of screening and visit satisfaction. Logistic regression analysis was used to consider the following potential predictors of mammographic discomfort: age group, ethnic group, educational level, marital status, family history of breast cancer, previous mammogram, present abnormal clinical examination, use of hormone replacement therapy, reported intense fear or anxiety related to present screening, reported health-related occupation as main job, reported radiation concern, and some potential interactions. Only indication of intense fear or anxiety related to the present screening experience (OR=2.2, 95% CI=1.7-2.7) and concern about mammographic radiation (OR=2.2, 95% CI=1.5-2.9) were significantly related to reported mammographic discomfort. Future studies should include administration of a validated pain scale, coupled with prospective follow-up of screening participants. These results suggest that education in advance of screening about potential mammographic discomfort requires evaluation.

Reducing the Black-White Gap In Mammography Screening Among Older, Rural Women: The North Carolina Breast Cancer Screening Program, An Eight-Year, Five County, Multi-level Intervention Research Project

Earp, J.A., O'Malley, M.S., Harris, R.P., Altpeter, M., Eng, E., Mayne, L., UNC-Chapel Hill, NC 27599-7400

The North Carolina Breast Cancer Screening Program goal is to increase the proportion of Black women over 50 from five rural eastern North Carolina counties who received screening mammography in the past year. NC-BCSP uses 3 interventions to stimulate community networks and reduce organizational barriers. In a quasi-experimental, pre/post test design, repeated surveys of a cohort of 2,000 Black and White women randomly sampled from five intervention and five comparison counties will be used to evaluate screening behaviors, screening barriers, and attitudes about breast cancer. Preliminary 1994 baseline survey data confirm that, as compared to Black women, Whites more often report: ever having heard of mammography (98% vs. 88%); ever having had a mammogram (78% vs. 57%) and having had a mammogram in the last year (51% vs. 35%). Only 42% of Black women report more than one mammogram during their lifetime (vs. 65% of White women). Other factors potentially related to receipt of mammograms also differ by race. These data not only verify that the Black/White gap in mammography screening still exists in some parts of the country, but underscore the need for interventions specifically targeted to underserved, at risk, older Black women.

ROBUST ESTIMATES OF THE PREDICTIVE VALUE OF PROSTATE-SPECIFIC ANTIGEN (PSA) IN A NATIONAL COMMUNITY-BASED PROGRAM FOR THE DETECTION OF PROSTATE CANCER USING PSA AND DIGITAL RECTAL EXAMINATION (DRE). Ross CA, DeAntoni EP, Crawford ED, Gross M, Zheng D, Schaefer V, Etzioni R.

PURPOSE: To evaluate the ability of PSA to detect prostate cancer (CaP) in clinical trials where cancer status is not confirmed in most of the test population

METHODS: A nation-wide community-based clinical trial for detection of CaP with PSA and DRE was conducted in 167 clinical centers. There were 6,139 subjects positive by PSA and/or DRE and 1,307 biopsies. We determined the robustness of statistical estimates of the positive predictive value (PPV) and the cancer detection rate (CDR) for DRE, PSA, and DRE/PSA based on biopsied subjects. Estimates of PPV and CDR were compared across subsets of centers that had differing biopsy rates: 20%, 30%, 40%. Logistic regression analyses were performed for estimating the relative risk of CaP if DRE and PSA were performed under worst-case assumptions: (a) lower CaP rates in non-biopsied men than in biopsied test-positive men; (b) a majority of cancers in non-biopsied test-positive men detected by DRE rather than PSA; and (c) non-zero cancer rates in the test-negative populations.

RESULTS: Statistical estimates of PPV and CDR were comparable across centers with differing biopsy rates. PSA was statistically significant in the prediction of CaP when: (1) cancer rates in the test-negative population approached 25%; (2) cancer rates in the non-biopsied test-positive men were as low as 5% that of biopsied men; (3) 90% of cancers in the test-positive non-biopsied population were allocated to the DRE+/PSA- category.

CONCLUSIONS: In a typical PSA study where there is selective biopsy of screen-positive men, valid estimates of the value of PSA in predicting CaP can still be obtained. Valid estimates based on these data show that PSA is indeed a useful predictor of CaP.

The Impact of Mammography Use on Breast Cancer Incidence

G. Maskarinec, L. Meng. Cancer Research Center of Hawaii.

Purpose: This ecologic study estimates the increase in breast cancer incidence rates due to mammography utilization in small geographic areas, illustrating the use of health care data for breast cancer prevention.

Methods: Insurance claims for mammograms performed during 1992/93 were combined with breast cancer incidence data from the statewide Hawaii Tumor Registry and the 1990 Census ZIP File. Claims data were obtained from private and public payors and covered close to 85% of the state's female population. Age-adjusted breast cancer incidence rates for each of the 79 ZIP code areas were regressed on mammography utilization rates and selected demographic variables. Age and stage specific analyses were also performed.

Results: At least 42% of women, 40 years and older, had received at least one mammogram during the two-year study period, with the highest rate (45%) in women 50 to 64 years old. Overall, 21% of the variation in age-adjusted breast cancer incidence was explained by mammography utilization and 14% by educational attainment. The effect of mammography utilization was strongest for women 65 years and older, whereas the effect of education was strongest for women 50 to 64 years. Less than 10% of the variance among women 40 to 49 years could be explained in any model. Contrary to expectation, the distribution of disease stage at diagnosis was not related to the level of mammography utilization.

Conclusion: Geographic areas with high mammography utilization experience higher breast cancer incidence rates than areas with low utilization. The size of this effect is comparable to the increase in rates observed since the mid-eighties, supporting the hypothesis that this increase is attributable to screening and early detection.

Genetic Screening for Breast and Colon Cancers: An Analysis of Risk Communication and Potential in the Popular Press

L. Fintor, MA, MPH, K. Crosson, MPH, C. May, MPH, C. Hunter, MD, MPH, and J. Whitted, Ph.D.

Advances in cancer genetics and the potential for screening and early detection are communicated to the public largely through dissemination in the popular press. To evaluate and summarize the nature of this information, we have conducted a content analysis of the mass circulation print media with respect to articles on genetic factors associated with colon and breast cancers.

Among the quantitative variables evaluated were estimated prevalence attributable to genetic causation (sole and/or partial), time to widespread screening availability, demand and costs, and potential relative risk for random mutation.

Qualitative variables included portrayal of causation (single gene, phenotype, environment), potential efficacy of interventions, recognition of legal, economic, and ethical implications of genetic testing, and public reaction.

We found widely varying estimates of cancer incidence, prevalence, and mortality associated with family history or genetic mutation and a growing expectation that genetic testing will soon become standard screening protocol. These public perceptions have serious implications for cancer screening policy and attitudes toward research priorities.

FACTORS RELATED TO DIAGNOSIS WITH EARLY COLORECTAL CANCER IN AN HMO POPULATION.
R. Myers, PhD, J. Murray, Ph.D., D. Weinberg, M.D.,
G. McGrory, M.A. T. Wolf, MA, J. Caveny, M.S.,
N. Hanchak, M.D., N. Schlackman, M.D., R. Comis, M.D.

In 1995, over 138,200 new cases of colon and rectum cancer will be detected and there will be approximately 55,300 deaths from colorectal cancer. It is widely accepted that identification and treatment of early stage disease increases the likelihood of cure. Randomized trials have demonstrated that having an abnormal screening FOBT result is associated with a diagnosis of early disease. However, the literature on other factors that are useful in predicting disease stage is contradictory and not well-developed.

The study reported here is a retrospective analysis of factors associated with stage of disease among 222 men and women 50 or more years of age who were diagnosed with colorectal cancer between 1987 and 1990. Study subjects were members of U.S. Healthcare, Inc., an independent practice association (IPA)-type HMO. Prior to diagnosis study subjects were eligible for free annual FOBT screening through the HMO's colorectal cancer screening program known as US HEALTHCARE CHECK. Data from this ongoing screening program and computerized HMO claims and encounters records were used in the analysis.

Factors considered in the analysis include age, gender, medical history during enrollment in the HMO, length of enrollment in the HMO, and participation in the screening program. Multivariable analysis shows that detection of colorectal cancer as a result of screening was significantly and positively related ($p=0.0318$) to diagnosis with early disease ($OR=2.5$). These findings lend support for annual FOBT screening among older adults.

Screening Mammography Effectiveness in a Rural Community.
Wu Y, MPH, Weissfeld J, MD, MPH, Weinberg G, DrPH.
University of Pittsburgh, Pittsburgh Cancer Institute.

PURPOSE: Many studies prove efficacy of screening mammography in reducing breast cancer mortality among women aged 50 to 69 years. Few studies specifically examine effectiveness in community settings. This study characterizes prior screening mammography use among women with incident breast cancer in rural northwestern Pennsylvania. **METHODS:** Subjects include 488 50+ year-old women with late (regional, distant) and early stage breast cancer, incident in 1993 and reported to the Pennsylvania Cancer Registry. A telephone interviewer obtains self-reported histories of screening mammography during the five-year period before breast cancer diagnosis. **RESULTS:** Preliminary analyses from the first 129 completed interviews show mean age 67.3 years and 98.4 percent white race. Ten of 27 (37%) women with late stage breast cancer report no screening mammograms in the five years before breast cancer diagnosis. Preliminary analyses show a 1.34 odds ratio (95% confidence interval 0.54-3.29), representing the odds of no screening mammography among women with late stage relative to women with early stage breast cancer. Preliminary analyses do not show a dose-response relationship between the number of screening mammograms and late stage breast cancer. **CONCLUSIONS:** Early results from this community survey show that a substantial proportion of women with incident late stage breast cancer report a prior history of mammography screening. Subsequent community research on breast cancer control through screening mammography must consider not only the quantity, but also the quality of screening mammography in the community.

Factors Associated with Employee Intention to Engage
in Worksite Colorectal Cancer Screening
Myers RM, Vernon SW, Lu M, Tilley BC.

Little is known about receptivity to cancer screening among employees at increased risk. This report identifies correlates of intention to engage in colorectal cancer screening among pattern and model makers in an American automobile manufacturing company. This study analyzed data from The Next Step trial, a randomized trial of interventions aimed at increasing screening compliance and improving diet.

There were 5,092 individuals at 28 worksites who were to be targeted for screening with rectal examination, fecal occult blood testing, and flexible sigmoidoscopy. Medical and screening history data were obtained from a computerized employee data base. Prior to exposure to trial interventions, a baseline survey was mailed to these employees to collect sociodemographic measures, cognitive representations related to cancer and screening, and social influence. Fifty-eight percent returned a completed survey. Responses to two survey items were used to compute a dichotomous measure of intention to screen (i.e., High vs Low). Intention to screen was high among 57% of survey respondents.

Logistic regression analyses were done to model intention. Covariates found to be strongly and significantly associated with high intention included high perceived salience and coherence of screening (OR=11.0, 95% C.I.=7.7,16.1), high screening effectiveness (OR=3.6 95% C.I.=3.6,5.5), and high self-efficacy (OR=3.3 95% C.I.=2.3,4.8). Intention was negatively associated with age; and positively associated with perceived susceptibility and social support. It is hypothesized that factors identified here will influence screening in this population. At the conclusion of the trial, we will determine the importance of these factors in relation to observed compliance.

Effects of risk notification among women at high risk for breast cancer: ethnic differences

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UCLA, School of Public Health and Jonsson Comprehensive Cancer Center

Using the statewide California Cancer Registry, we identified 901 White, 426 Hispanic, 307 Black and 253 Asian first degree relatives of cancer cases, ≥ 30 years. Women in the randomly assigned intervention group received personalized risk notification based on the algorithm developed at NCI, as well as a brochure specifically targeting high risk women and encouraging screening mammography. In Whites, 69.8% of the intervention group and only 61.2% of the control group had obtained a mammogram between the baseline and the 12 month follow-up ($p < .02$). Screening rates were substantially lower among Hispanics, Blacks and Asians. Only small proportions recognized important risk factors such as age, early menarche, late menopause and nulliparity. Instead, subjects named high-fat diet, smoking, use of birth control pills, stress and lumpy breasts. Ethnic differences in the above will be discussed. Over 80% of women in all groups stated that it was very important to receive information on their personal risk for breast cancer and that this information encouraged them to obtain regular mammograms. We will describe the differential effects of the intervention on knowledge of risk factors, attitudes, beliefs and behaviors related to breast cancer screening in the four ethnic groups.

Screening compliance among first degree relatives of colon cancer patients in New South Wales.

Co-authors: Dr JE Byles and Dr MJ Schofield.

This study will estimate the proportion of first degree relatives of people diagnosed with colon cancer in NSW who are complying with the screening recommendations of the Australian Cancer Society and will investigate factors associated with screening compliance. With the permission of individuals' medical practitioners, 700 patients from the NSW Central Cancer Registry were mailed a questionnaire to pass on to an appropriate first degree relative. It is hypothesised that less than 50% of first degree relatives are complying to screening recommendations and that predictors of compliance include certain sociodemographics, a high knowledge score and positive colon cancer related attitudes based on the Health Belief Model. This is the first known study looking at screening compliance for first degree relatives of colon cancer patients in Australia.

Risk Perceptions for Colorectal Cancer among Low-income African-Americans from a Community Health Center

Lipkus, I.M., Rimer, B., Lyna, P., and Woods-Powell C.T.

Very little is known about African-Americans' risk perceptions for colorectal cancer (CRC). We examined this issue, and predictors of risk for CRC among low-income African-American (N=433) and white (N=109) men and women age 50 and over who used a community health center.

Overall, 37%, 21% and 4% perceived their risk for CRC as below average, average, and above average respectively. 37% did not know their risk for CRC. Predictors of increased risk were: being male, being a smoker, poorer perceptions of health, and having a family history of CRC. When asked why they rated their risk as they did, subjects who provided personal actions (e.g., exercise, diet) and psychological reasons (e.g., don't feel I'll get it) perceived less risk while those who provided physiological explanations (e.g., stomach problems) felt at greater risk. Contrary to several preventive health models, risk did not predict self-reported screening rates for ever having had a: digital rectal exam (90.1%), fecal occult blood test (75.6%), and sigmoidoscopy (33.1%).

These results suggest that: 1) African-Americans are unaware or underestimate their risk for CRC, 2) more education is needed to inform African-Americans of their risk for CRC, and 3) attributions of risk should be looked at further to better understand how risk may predict screening.

FOBT screening for colorectal cancer: Assessment of two modes attempting to achieve compliance

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Colorectal cancer is the leading cause of cancer incidence and death in Israel (age adjusted incidence rates per 100,000 among Jewish men and women of 40 and 32 respectively). **Objectives:** The investigation of compliance with FOBT screening, aimed at the assessment of the most cost-effective approach to achieve a maximal response. **Methods:** A two-step vs. one-step compliance with FOBT screening was investigated. A random sample of 2000 subjects (1000 men, 1000 women) who met the following criteria was chosen: a. ages 50-74 years at entry, b. insured within the frame of the general health fund (K.H.), c. residents of Haifa. In September 1995 subjects were mailed letters re the project. They were randomly assigned to receive one of the following: a. a postcard to be returned if subject was interested in the kit, b. the kit itself. In each group, half of the subjects also randomly received brochures about colorectal cancer, the value of early detection and FOBT. Several weeks thereafter a telephone survey was conducted to determine reasons for compliance/non compliance and their relation to demographic and health-behavior characteristics.

Results: The overall initial response (returning postcards or completed tests) within a month was 9% (173 subjects). The compliance of 1000 subjects who were mailed the kit was 4.9%. Of 1,000 subjects who were mailed a postcard, 124 (12.4%) requested the FOBT kit. Only 14 (1.4% of the group, 11.3% of the subjects requesting the kit) complied with the test. No difference in compliance as related to receiving the brochure was exhibited. Test performance of men was different from that of women: a M/W ratio of 1.4 and 0.8 among those mailed a postcard and a kit respectively. **Conclusions:** Considerable efforts are required for improving the generally low compliance of the Israeli population (3.2%). Special attention is required with regard to individuals interested in the test (responding by postcard) who nevertheless do not comply. In this context of low compliance, health education and cost-effectiveness issues are intertwined.

EVALUATION OF A BLADDER CANCER SCREENING PROGRAM FOR AN OCCUPATIONALLY-EXPOSED COHORT. Thomas J. Mason, Ph.D., Alicia B. Anderson, B.A., Kathleen Lee, R.N.

This screening study has evaluated a home self-testing protocol for microscopic hematuria as a method of early detection of bladder cancer among chemical workers exposed to a known bladder carcinogen. The study also serves as a medical monitoring program to these workers who were exposed through the manufacture, packaging, or formulation of a pesticide used on cotton crops. A total of 1200 workers from manufacturing and formulation sites have enrolled in the program. Compliance with annual screening has been high as evidenced by a 95% completion rate in the first year of the program. Three hundred and eighty-three persons have been found to have hematuria and/or abnormal cytology in Year 1; 149 in Year 2. Three new cases and one recurrent case of transitional cell carcinoma of the bladder have been detected by this screening program. Other serious urologic conditions that have been diagnosed include BPH, calculi, renal cyst, urethral stricture, cystitis, prostatitis, and bladder outlet obstruction. Several unique features of the program have contributed to its success and transportability: 1) a special urine collection system, 2) a 24-hour informational hotline, 3) high compliance [89% in Year 1] with dipstick self-testing. The program serves as a model for the American workforce whose employers do not have medical personnel on site and for those whose retired/former employees are scattered nationwide and are in need of medical monitoring, a potential target population of 100,000 persons.

Anthropometric and Hormonal Differences Between Men With and Without Prostate Cancer. Demark-Wahnefried W, Robertson CN, Conaway MR, Anderson EE, Drezner MK, Mathias BA, Lobaugh BL, Clark RV and Paulson DF, Sarah Stedman Center for Nutritional Studies and the Comprehensive Cancer Center at Duke University Medical Center, Durham, N C

Anthropometry has been proposed as a promising technique for uncovering potential risk factors for prostate cancer, since fat distribution, skeletal structure and musculature may be affected by the hormonal milieu and may differ between men with disease vs those without. A case-control study was undertaken to determine whether anthropometric measures [weight, height (sitting/standing), skinfold measurements (triceps, biceps, subscapular, suprailiac and thigh), circumferences (midarm (MAC), midarm muscle, waist, hip and thigh), breadths (elbow, biacromial and biiliac) and hormonal levels [total and free testosterone (T), dihydrotestosterone (DHT) and sex hormone binding globulin] differ between cases and controls. Subject accrual was stratified with regard to race (20% black/80% white), age (50-60 years/61-70 years) and case/control status (clinically confirmed, localized disease cases versus PSA/DRE normal controls)(n=317). Dual energy x-ray absorptiometry to determine differences in body composition was conducted on a subset of 75 men. Analyses suggest a significant three way interaction for age, race and case status confirming the need for stratification. Although anthropometric differences were apparent in subgroup analyses (i.e. for black males ≤ 60 years old biacromial breadth, MAC and MAMC was significantly greater in controls), there were no anthropometric differences that remained significant for the total sample. Hormonal analyses suggest a trend toward higher free and total T among cases ($p=0.12$), but significantly lower levels of DHT ($p=0.05$) when compared to controls. Since hormonal determinations preceded surgical and/or hormonal intervention, this finding was unexpected and suggests that the conversion of testosterone to DHT may be inhibited by the disease itself.

THE ROLE OF COMMUNICATION IN QUALITY ASSURANCE IN A LARGE MULTICENTER CHEMOPREVENTION TRIAL: THE CARET EXPERIENCE. Cartmel B, Anderson K, Howells J.

One of the challenges in multicenter chemoprevention trials is ensuring quality assurance among all sites. Excellent communication between the Coordinating Center and CARET's six study centers nationwide has been achieved by: channeling all communication through the Coordinating Center, formalizing communication, and providing specific mechanisms for two-way communication.

Within CARET, many types of information (including policies, procedures, and data) require different methods of communication. Policy decisions made by the Steering Committee are communicated by meeting minutes including action items and assignment of responsibilities. Procedures are documented in detailed manuals, and bulletins communicate new or revised procedures. Study sites use Study Center Inquiry forms (SCIs) to communicate procedural questions or problems to the Coordinating Center. The average number of SCIs has been 510 per year. Request for Information forms (RFIs) communicate inconsistencies in data collection identified at the Coordinating Center. There has been a yearly average of 460 RFIs. Feedback reports generated monthly by the Coordinating Center communicate the timeliness and completeness of data collection at each study center.

When developing communication systems for large multicenter chemoprevention trials, important considerations include organization of the trial, number and location of sites, and cultural and language differences.

Correlates of Serum Organochlorine Levels in Women Undergoing Weight Loss Demark-Wahnefried W, Schildkraut J, Hamilton M, Laseter JL and Hughes C. Stedman Ctr for Nutritional Studies & Program of Cancer Prevention, Detection and Control Research at Duke University Med Ctr. Durham NC 27710.

Potential associations between serum organochlorine levels and factors associated with lipid turnover and storage were explored in 10 normal overweight women enrolled in a structured weight reduction program. A survey eliciting responses regarding weight history, childbearing/lactation and contaminant exposure was administered. Anthropometric measures and phlebotomy were conducted at baseline and after 4 weeks on the weight reduction program. Serum was analyzed for 19 common polychlorinated pesticides and their metabolites and 10 PCB congeners. Weight reduction over the 1 mth period and BMI were unassociated with organochlorine levels. Strong positive correlations, however, were noted between levels of DDE/DDT and age ($\beta=0.6994$; $p=0.0244$; $\beta=0.6938$ / $p=0.0261$) and waist/hip ratio ($\beta=0.6228$ / $p=0.0544$; $\beta=0.7510$ / $p=0.0123$). Trends were noted for decreased levels of DDT in women who had reported breast feeding ($p=0.1082$) and more episodes of weight cycling ($p=0.0616$). Findings suggest that organochlorine levels in the sera are affected by factors that govern their excretion, i.e. breast feeding, as well as factors related to lipid turnover, i.e. weight cycling and waist/hip ratio. In addition to age, which may serve as an index of cumulative exposure, factors associated with lipid mobilization may modify the exposure of specific target tissues to these compounds in vivo. Although further study is needed to clarify the association between factors associated with lipid turnover and levels of organochlorines, findings suggest a need to account for the potential interaction between waist/hip ratio and exposure to organochlorines in further efforts aimed at exploring the impact of these compounds on cancer risk.

PARTICIPANT ADVISORY COMMITTEES IN CARET: A NOVEL APPROACH TO RETAINING PARTICIPANTS. Powell C, Lands D, Bowen D, Carmel B, Gehling A, Waterhouse T, Gucer P.

A major challenge of a long-term chemoprevention trial is the retention of participants. CARET is a multi-site trial of 18,314 randomized participants designed to assess the effect of vitamin A and beta-carotene on lung cancer risk in two high-risk populations: asbestos-exposed workers and heavy smokers. To meet the challenge of retention, CARET pioneered the formation of a Participant Advisory Committee (PAC) at each of the six study centers. Each PAC, comprised of an ongoing group of participants, meets periodically to advise study center staff on current and future retention activities.

Five of the six study centers have recruited participants to form PACs. PAC recruitment was a multistep process to attain membership representing the diversity of the CARET populations. Characteristics of members are 78% male 22% female, 48 to 80 years old, 88% Caucasian, 3% African-American, 3% Hispanic, 3% Asian, 2% American-Indian, on study 1 to 9 years, and 25% current and 75% former smokers. These characteristics differ only slightly from the CARET cohort. PACs have met from 1 to 7 times, depending on the study center. PAC issues include selecting retention items, developing additional forms, and deciding on newsletter content. PACs advocate the perspective of participants with the goal of increasing participant retention.

THE IMPORTANCE OF THE RELATIONSHIP BETWEEN THE PARTICIPANT AND INTERVIEWER IN MAINTAINING LONG TERM PARTICIPATION IN A CHEMOPREVENTION TRIAL - THE CARET EXPERIENCE. Sinatra J, Huget K, Fred Hutchinson Cancer Research Center.

The Carotene and Retinol Efficacy Trial (CARET) is testing the effect of vitamin A and beta-carotene supplements on the incidence of lung cancer in high risk populations. Randomization of 6,795 participants at the Seattle Study Center took place between 1985 and 1993. Participants take one capsule a day and visit the study center once or twice a year. Study vitamins will be administered until 1997 and analysis is planned for 1998.

Retention of participants is a key to the success of long term prevention trials because in part it assures the reliability of study results. One of our retention methods has focused on the development of a strong bond between study participants and individual interviewers. This bond is established in a number of ways, beginning with interviewers who are well trained in study procedures and maintain a professional and courteous demeanor. We have provided a comfortable and friendly environment for the participant to ask questions and discuss sensitive issues (e.g. health problems, family issues and loss of loved ones) with the understanding that the information disclosed is confidential. We attempt to consistently schedule participants with the same interviewer. Participants are seen in individual interviewers' offices that have been personalized to give less of a clinical atmosphere. Other factors include a pleasant study center environment and minimal waiting time at the study center before the visit. Although there is a significant age difference between study participants and interviewer, this does not appear to be a barrier to developing this bond.

Currently 81% of living randomized participants are active. Pilot study participants, 72% active with median follow-up of 8.7 years; Efficacy participants, 82% with median follow-up of 3.3 years.

FEMALE INFERTILITY AND RISK OF BREAST CANCER

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To examine the association of infertility and breast cancer, we analyzed data from a population-based case-control study of women residing in Wisconsin, Massachusetts, New Hampshire, and Maine. Women less than 75 years old with a new diagnosis of breast cancer were identified via statewide tumor registries (n=6888). Population-based controls were randomly selected from lists of licensed drivers and Medicare beneficiary files (n=9529). A woman was considered infertile if she reported that conception did not occur after a year of trying to become pregnant. Age-adjusted percentages of infertility were similar for controls (12%) and cases (10%). After controlling for confounders (including parity and age at first full term pregnancy) in logistic regression models, women who had trouble conceiving were at slightly elevated risk of breast cancer (odds ratio (OR) 1.12, 95% confidence interval (CI) 1.03-1.22). Among women who reported that a physician diagnosed their infertility, risk of breast cancer was similar to women without infertility (odds ratio (OR) 1.07, 95% confidence interval (CI) 0.91-1.26). However, that association was significantly modified by menopausal status (pre-menopausal OR: 1.82, CI: 1.29-2.58, post-menopausal OR: 0.94, CI: 0.77-1.16, likelihood ratio test $p < .001$). These results suggest that menopausal status may modify the relationship of infertility and breast cancer risk.

IDENTIFYING PARTICIPANT CATEGORIES OF HIGH RISK FOR INACTIVATION: THE CARET EXPERIENCE. Bradley J. McIntyre O. Shanabarger S. Anderson K. Powell C. Bowen D.

CARET is a long-term randomized controlled multi-center trial designed to determine the efficacy of beta-carotene and retinyl palmitate in preventing lung cancer in 18,314 participants. The Study-Wide Participant Retention Package includes newsletters, birthday cards, calendars, reminder calls, certificates, vitamin dispensers, pins, and Participant Advisory Committees. At three years post-randomization, our mean capsule consumption rate is 81%, as compared with a projected rate of 70%. Inactive participants contribute zero consumption to the rates. To improve retention further, we began to identify specific categories of risk for inactivation.

CARET identified general demographic predictors of risk for inactivation, including being divorced/separated and being a current smoker. In addition, we reviewed the reasons participants gave when they inactivated and developed risk categories for inactivation. For example, 63% of participants who inactivated gave personal health concerns as a reason, 12% cited location/transportation issues, and 5% noted a desire to take supplemental vitamin A or beta-carotene.

We created specific retention strategies targeting the individual participants who fall into these high risk categories. These strategies focus on the differences in reasons for inactivation. For example, an interviewer evaluates health concerns given by a participant as a reason for wanting to inactivate. If these health concerns are considered temporary, the interviewer implements a retention strategy (e.g., substituting a phone call for the next visit) designed for a temporary problem. In this way, CARET and its participants benefit from adding individualized retention strategies to its retention program.

ALCOHOL CONSUMPTION IN RELATION TO ENDOMETRIAL CANCER RISK. Newcomb, P.A., Storer, B., and Trentham-Dietz, A.

We analyzed data from a population based case-control study to evaluate the relation of moderate alcohol consumption to endometrial cancer risk. Cases (n=812) under age 79 with a new diagnosis of endometrial cancer were identified from Wisconsin's cancer incidence reporting program. Controls (n=3442) were randomly selected from drivers license lists and Medicare beneficiary files. Age and beverage specific alcohol consumption was ascertained by telephone interview. After adjustment for postmenopausal hormone use, relative weight, and other factors, the relative risk for endometrial cancer was 0.95 (95% confidence interval 0.71-1.24) among women who recently consumed alcohol (> 1 drink/week) compared to abstainers. However, the effect of alcohol appeared to depend upon age: among younger women (< 55 years, as in the CASH study) alcohol was inversely associated with risk; in older women the effect was not seen (P interaction = .06). There was also a suggestion that this association was further modified by body mass. Among heavier women of all ages there was a positive association with risk (RR=1.52 for > 1 drink/week, 95% confidence interval 1.07-2.16), whereas among younger heavier women there was not (RR=0.52, 95% confidence interval 0.11-2.36). There was no evidence of beverage specific associations. These preliminary results suggest that alcohol may be associated with endometrial cancer risk, although its effect may differ markedly - as others have observed - among certain subgroups of women.

LACK OF COMPLIANCE WITH MAMMOGRAPHY IN AFRICAN-AMERICAN AND WHITE WOMEN: A NEED FOR BARRIER-SPECIFIC RATHER THAN RACE-SPECIFIC INTERVENTION STRATEGIES

DM Daniel, DT Lackland, LF Baron, DW Nixon,
DR Garr, AJ Gross, PH O'Brien, and DG Hoel

A significant proportion of African-American and white women do not adhere to guidelines for mammography. Strategies for increasing breast cancer screening practices are dependent on the reasons for noncompliance. A cross-sectional, random digit dialing telephone survey of asymptomatic, African-American and white women in 520 households was conducted to assess breast cancer screening practices, as well as barriers to mammography. Significant racial differences were detected with white women reporting higher rates of clinical breast examination and mammography. In contrast, African-American women reported practicing more monthly self breast examination than white women. After adjusting for medical care, age, education, health insurance, income, marital status, and family history of breast cancer, race did not remain a significant predictor in the logistic regression model for mammography use. Likewise, no racial differences were detected in reasons given for lack of compliance. Insufficient knowledge of mammography recommendations was the most frequent response for not receiving a mammogram in the past year. These results indicate a need for barrier-specific intervention strategies rather than race-specific intervention strategies.

DIFFERING RISK FACTORS FOR TYPES OF SKIN CANCER

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A population based case-control study was conducted in Arizona, a region of very high skin cancer incidence, to evaluate and contrast environmental and phenotypic factors associated with skin cancer types, including 541 squamous cell cancer (SCC), 352 basal cell cancer (BCC), 278 melanoma (MEL) and 1011 control subjects. Multivariate logistic regression analyses revealed a different profile of risk factors between SCC, MEL and BCC. Past sunscreen use was associated with a significant decreased risk; SCC (adjusted odds ratio [OR]=0.4; 95% confidence interval [CI] = 0.3 to 0.6), MEL (OR=0.6; 95% CI = 0.4 to 0.9), BCC (OR=0.6; 95% CI = 0.4 to 0.8) for highest compared to lowest usage. Current sunscreen use was positively associated with risk, SCC (OR=4.4; 95% CI = 2.6 to 7.1), MEL (OR=2.5; 95% CI = 1.3 to 4.6), BCC (OR=2.4; 95% CI = 1.5 to 3.8). Number of freckles/moles was positively associated with risk; SCC (OR=4.9; 95% CI = 2.6 to 9.6), MEL (OR=4.4; 95% CI = 1.9 to 9.5), BCC (OR=2.2; 95% CI = 1.1 to 3.6). Ability to tan was associated with decreased risk for SCC (OR=0.4) and MEL (OR=0.3) but not BCC. Past intense UV exposure was positively associated with SCC (OR=1.9) and BCC (OR=1.4) but not MEL. Sunburns before age 18 were positively associated with SCC and MEL (both OR=1.7) but not BCC. We conclude that differing risk factors between skin cancer types require different cancer control interventions.

Race, occupation, and deaths from multiple myeloma, leukemia, and lymphoma. Safaeian M, Weissfeld JL, Kuller LH. University of Pittsburgh Cancer Institute, University of Pittsburgh.

Blacks exhibit striking and unexplained multiple myeloma risks. Using 19 year mortality follow-up of 361,662 35-57 year-old men screened for the Multiple Risk Factor Intervention Trial (MRFIT), we examined the relationship, among blacks and whites, between occupation and cause of death. Cases consisted of men dying from hematopoietic cancer, 231 from multiple myeloma (ICD-9 203), 585 from lymphoma (ICD-9 200-202), and 470 from leukemia (ICD-9 204-208). Matching on race, age, and MRFIT clinical center, we randomly selected two controls per case, one dying from cardiovascular disease (ICD-9 410-483) and the second from non-hematopoietic neoplasm (ICD-9 140-199, 209-239). We used the 1980 Bureau of Census Alphabetical Index of Industries and Occupations to code occupations and industries appearing on death certificates. We used the National Institute of Occupational Safety and Health (NIOSH) Job Exposure Matrix (JEM) to quantify 12 chemical exposures (benzene, coke oven fumes, asbestos, processed styrene / butadiene, ethyl oxide, formaldehyde, petroleum, steel making dust, rubber butadiene, rubber butadiene / styrene, toluene, styrene, and phthalic acid). Overall, 17.7% of cases and controls worked in a chemical industry. However, chemical industry occupation was unassociated with multiple myeloma, leukemia, or lymphoma. Likewise, we were unable to confirm previously described associations involving employment in public utilities or transportation. Among blacks, we observed statistically non-significant association between JEM-determined petroleum exposure and multiple myeloma (2.0-risk relative to other neoplasms, $p=0.57$, and 3.0-risk relative to cardiovascular disease, $p=0.34$). With the JEM, we could easily and rapidly screen many specific chemical agents for association with multiple myeloma.

A PLAGUE OF LIVER CANCER IN HAIMEN CITY, CHINA WT London¹, AA Evans¹, G-C Chen², L Shen², W-Y Lin², P An¹, KA McGlynn¹, L-L Gao¹, E Ross¹, AM Balshem¹, F-M Shen³. Fox Chase Cancer Center¹, Philadelphia, PA; Haimen City Anti-Epidemic Station², Haimen, China; School of Public Health³, Shanghai Medical University, Shanghai, China.

To identify specific environmental, viral, and genetic risk factors for hepatocellular carcinoma (HCC), we are conducting a prospective study in Haimen City, China. Questionnaires were completed and biosamples collected from 60,984 men ages 30 to 64 years at study entry (2/92 to 10/93). To identify chronic infection with hepatitis B virus (HBV), all serum samples were tested by radioimmunoassay, at entry, for hepatitis B surface antigen (HBsAg). By 4/1/95, the cohort had been followed for 133,704 person-years (py). Examination of death certificates revealed that 717 men had died, 301 from HCC, 71 from chronic liver disease (CLD). Among 9630 HBsAg(+) men, 336 (3.5%) had died, 212 from HCC, 53 from CLD. Among 51,352 HBsAg(-) men, 381 (0.7%) had died, 88 from HCC, 18 from CLD. The age-standardized total, HCC, and CLD mortality rates/10⁵ py were: 1451, 886, and 251 for HBsAg(+) men; 286, 59, and 16 for HBsAg(-) men. Although HCC and CLD accounted for most of the difference in mortality between the HBV infected and uninfected groups, there was also an excess of non-neoplastic, non-hepatic causes of death that was responsible for 121 deaths/10⁵ py among HBsAg(+) men and 59 deaths/10⁵ py among HBsAg(-) men. Chronic HBV infection is the major risk factor for HCC and death among adult men in Haimen City. Other factors that contribute significantly to HCC and mortality in this population are being identified.

Adult weight gain and risk of colon cancer in men.

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Purpose: To investigate the hypothesis that increase in body mass index (BMI) during young adulthood increases risk of colon cancer in later life, and that this association is stronger in nonsmokers than in smokers. The latter hypothesis is based on the idea that weight gain during young adulthood indicates a chronic energy imbalance in nonsmokers but not in smokers because of the effect of smoking on resting metabolic rate.

Methods: The cohort comprised 2,059 middle-aged men who were employed by the Western Electric Company in Chicago and were free of clinically diagnosed cancer at the initial examination in 1958. BMI in middle age was calculated from measured weight and height. BMI at age 20 was estimated from self-reports.

Results: 49 incident cases of colon cancer were detected during 43,326 person-years of follow-up. When stratified by level of change in BMI from age 20 to middle age (≤ 1.9 , 2.0-3.9, 4.0-5.9, and ≥ 6.0 kg/m²), age-adjusted relative hazards of colon cancer in never-smokers were 1.00, 1.22, 2.31, and 5.01, respectively (p for trend = 0.008); corresponding results in ever-smokers were 1.00, 0.95, 0.77, and 0.87. Further adjustments did not appreciably change these results.

Conclusion: These results support the idea that a life-style characterized by chronic energy imbalance during young adulthood increases risk of colon cancer.

Risk of adenocarcinoma of the stomach and esophagus with intake of well-done and barbecued meats. Ward MH, Sinha R, Heineman EF, Markin RS, Rothman N, Weisenburger DD, Zahm SH.

Meats cooked to high temperature contain polycyclic aromatic hydrocarbons (PAHs) and heterocyclic amines (HCAs), compounds which are mutagens and animal carcinogens. Epidemiologic studies of various cancers have shown an association with high intakes of well-done, browned, fried, and barbecued meats. We have conducted a population-based case-control study of adenocarcinoma of the stomach and esophagus in Nebraska. A 61-item food frequency questionnaire with additional questions on meat cooking method and doneness was completed by 176 stomach and 143 esophagus cases and 503 controls. A two-fold increased risk of stomach cancer (odds ratio (OR)=2.1, 95% confidence interval (CI) 1.01-4.5) was observed for consumption of beef cooked well-done/medium well-done (a crude surrogate for HCA exposure) compared to rare/medium rare. There was no association for esophagus cancer. ORs for stomach and esophagus cancer were nonsignificantly elevated among those who usually ate hamburgers and steaks barbecued (a surrogate for both HCAs and PAHs) compared to all other cooking methods (stomach OR=1.5, 95% CI 0.6-4.0; esophagus OR=1.8, 95% CI 0.7-4.5). These novel findings deserve further investigation with a more detailed questionnaire targeted for these compounds.

Incidence of Colorectal Cancer by Anatomic Subsite: Time Trends and Racial Differences

Demers, RY., Severson, RK., Schottenfeld, D.

Colorectal cancer may represent more than one disease process. Numerous epidemiologic studies suggest that anatomic subsites of colorectal cancer (eg. right-colon, left-colon, and rectum) show different geographic, demographic and risk factor profiles. This study explores time-trends of incidence over a 21-year period for anatomic subsites of adenocarcinoma of the colon and rectum by race, gender, and stage of disease. Results reveal a major rise in right-colon disease for African-American men and women in the late 1970s and early 1980s. The rise was greatest in African-American men, and is accounted for in large part by increased incidence in late stage disease. Corresponding drops in survival among African-American men are noted. These findings indicate widely differing disease patterns, based on anatomic subsite, and indicate a need for targeted efforts at early detection of right-colon disease among African-Americans.

Predictors of PAH-DNA Adduct Levels in Smokers: Baseline Data from a Chemoprevention Trial. J. S. Jacobson, L. W. Wang, Q. Wang, R. M. Santella, Columbia U. School of Public Health, New York, NY

Smokers are known to have higher polycyclic aromatic hydrocarbon (PAH) DNA adduct levels than non-smokers, and adduct levels are known to vary inversely with serum vitamin levels. We initiated a randomized double-blind trial of tablets containing beta carotene, vitamin C, and vitamin E vs. placebo among smokers. Blood, urine, and oral cell specimens were obtained at baseline, and a questionnaire covering demographic data and behavioral risk factors was administered. PAH-DNA adduct levels in blood mononuclear cells were assayed by competitive ELISA with color endpoint detection in the baseline samples. The first 50 study participants with complete baseline data included 24 males and 26 females with a mean age of 42 years. Data on ethnicity, smoking history, and PAH-DNA adduct levels were as follows:

Group	N	Mean age	Mean Pack-yr	Mean PAH-DNA Adduct levels
<i>Males</i>				
Non-African-American	8	42+/-9.5	40+/-16.2	56.5+/-50.0
African-American	16	42+/-8.4	34+/-16.7	72.4+/-91.5
		ns	ns	ns
<i>Females</i>				
Hispanic	6	43+/-4.9	26+/-12.1	34.0+/-15.4
Caucasian	9	42+/-14.9	45+/-40.0	24.6+/-18.6
African-American	11	38+/-6.7	34+/-19.9	74.9+/-62.5
		ns	ns	P < 0.005

PAH DNA adduct levels were higher overall in this study than in previous studies using immunofluorescence assays. The very high adduct levels in African-American study participants at baseline call for careful assessment of exposures other than smoking in this study population.

Poly(ADP-Ribose) Polymerase In Human Breast Cancer: A Case-Control Analysis Hu JJ, Dubin N, Berwick M, Miesner J, Roses DF, Harris MN and Roush GC, Lombardi Cancer Center, Georgetown U. Med. Center, Washington, DC 20007; Dept. of Environmental Medicine and Dept. of Surgery, New York U. Med. Center, New York, NY 10010

Poly(ADP-ribose) polymerase (PADPRP) is a DNA-binding protein which actively participates in important biological functions, such as cell proliferation, differentiation, DNA repair and replication, as well as in cell transformation. A cancer case-control study was conducted to evaluate the involvement of genetic polymorphism of PADPRP gene on chromosome 13 and PADPRP enzyme activity in breast cancer. A PCR method was used for genotyping and a radiometric method was used for enzyme activity measurement. The frequency of the PADPRP B allele was similar in breast cancer cases (0.14, n=70) and in controls (0.13, n=128). In a subset of 20 cancer cases and 38 controls, the mean PADPRP enzyme activities (induced by H₂O₂ or oligonucleotide) were observed to be lower in cancer cases (12%-18% decrease, respectively); an odds ratio of 2.79 for the below-median oligonucleotide-induced PADPRP in cases vs. controls was suggestive of a possible association between decreased PADPRP activities and breast cancer. In subjects with the PADPRP B allele, the mean H₂O₂-induced PADPRP enzyme activity was significantly higher (p = 0.019 after adjustment for case-control status); a functional link between B allele and PADPRP enzyme inducibility was suggested; the mechanisms involved in the differential cellular response to H₂O₂ and oligonucleotide in the presence of B allele require future exploration.

Weaver V, Davoli C, Heller P, Sunyer J, Murphy S. and Groopman J

Many diseases, including cancer, are more common in underserved populations. Exposure to environmental toxicants may be an important contributing factor. We recently completed a pilot study which provides data on the extent of exposure to several environmental hazards in inner-city children. We obtained questionnaire information on sources of benzene and environmental tobacco smoke (ETS) in 79 children who were patients in a lead poisoning prevention clinic. Urinary cotinine and *trans,trans*-muconic acid (ttMA), metabolites of nicotine and benzene, respectively, were measured as was blood lead. As expected, the mean blood lead level was elevated at 23.6 µg/dL. Cotinine was present in 98.7% of samples assayed with a mean of 79.2 ng/mg creatinine. Eighty percent of children had cotinine values ≥ 30 ng/mg creatinine which is consistent with household ETS exposure. ttMA was present in 72% of samples assayed; a wide range of values was found (< limit of detection to 2579.2 ng/mg creatinine) with a mean of 176.6 ng/mg creatinine. As many as 10.1% of the values, depending on the comparison study, were above the highest level reported in non-occupationally exposed adults. We conclude that these children had substantial exposure to both ETS and lead. Based on questionnaire information, they were exposed to benzene as well and the ttMA results may indicate excessive exposure. However, this biomarker requires further validation in the environmental setting for full interpretation of these findings.

Glutathione S-transferase μ (GST μ) Expression and Pancreatic Adenocarcinoma Susceptibility. Szarka CE, Pfeiffer GR, Everley LC, Ruggeri BA, Clapper ML. Fox Chase Cancer Center, Philadelphia, PA

This study characterizes the genotypic and phenotypic expression of GST μ in individuals with pancreatic adenocarcinoma. The human glutathione S-transferases are classified into the α , μ , π and θ classes. The μ isoenzyme is of distinct interest due to its ability to conjugate with highly reactive epoxides. Since only 40-60% of individuals in the general population express the μ subclass, subjects who are unable to express GST μ may be at increased risk of developing cancer. Several studies investigating the association between GST μ expression and cancer susceptibility indicate that cigarette smokers deficient in the expression of GST μ are at increased risk for lung, larynx and bladder cancer. The contribution of GST μ expression to risk for pancreatic adenocarcinoma, another tobacco-related malignancy, is unknown. An aliquot of whole blood from 22 individuals with pancreatic adenocarcinoma was stored at -70°C for phenotypic analysis. The lymphocytes were separated from the remaining sample using Lymphocyte Separation Medium (Organon Teknika Corp., Durham, NC). The isolated lymphocytes were washed, pelleted and frozen at -80°C. The GST μ genotype was determined in DNA extracted from the lymphocytes by the salting-out method. PCR was performed with primers to exon 4 and 5 of GST μ and primers to the β globin gene as internal positive controls. PCR products were electrophoresed in 2% w/v agarose gels, stained with ethidium bromide and photographed under UV light. The GST μ phenotype was determined in whole blood using an enzyme-linked immunoadsorbent kit (Biotrin International, Dublin, Ireland). 43% of the individuals did not have the GST μ genotype, while 57% of the individuals did not express the GST μ phenotype. Tobacco products were currently or previously used by 64% of the individuals. No association between GST μ expression and tobacco use was demonstrated. The expression of GST μ in individuals with pancreatic adenocarcinoma is comparable to the general population suggesting that individuals unable to express GST μ are not at higher risk for pancreatic cancer. More subjects are being enrolled to confirm this observation. (Supported by the Hamilton Family Foundation)

