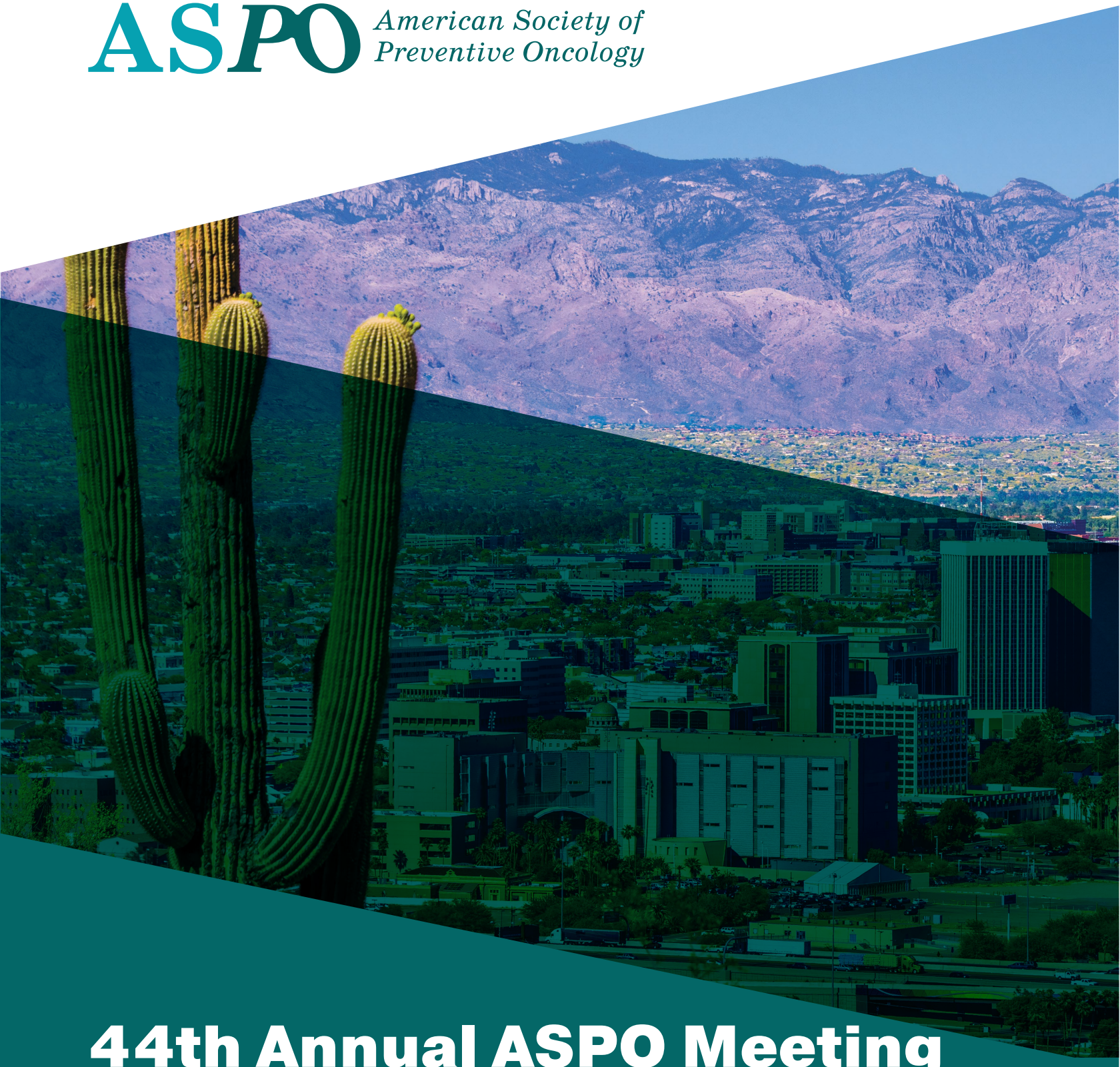
ASPO American Society of Preventive Oncology



44th Annual ASPO Meeting

Program & Abstracts

Virtual Program

Welcome

Welcome to the American Society of Preventive Oncology Annual Meeting

The American Society of Preventive Oncology strives to promote the exchange and dissemination of information and ideas relevant to cancer prevention and control; to identify and stimulate research areas in cancer prevention and control; and to foster the implementation of programs in cancer prevention and control.

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44th Annual Meeting to be held virtually due to COVID-19 restrictions

In response to the rapidly changing circumstances associated with the Novel Coronavirus (COVID-19), the ASPO Board of Directors has made the decision to convert the Annual Meeting in Tucson to a virtual meeting. The Board of Directors and Planning Committee carefully weighed the risks to attendees and their communities and determined that the canceling the live meeting was the best course of action. The health and safety of attendees is our top priority.

Please know, this was a difficult decision – the ASPO team and University of Arizona host committee were looking forward to welcoming all of you in Tucson in a few weeks. Our leadership has met daily for the past week to determine the best and safest course of action. ASPO is a non-profit organization and as such we have had to balance all decisions to ensure that we protect the health of meeting attendees and their communities and workplaces, as well as remain stable as an organization and fulfill our vision to accelerate progress towards cancer prevention and control.

Registration

We will be holding the 45th Annual ASPO Meeting in 2021 at the same location in Tucson, Arizona and will provide all 2020 registrants with a 30% discount code for their 2021 registration. The remainder of your registration will be applied toward to cost of the virtual meeting. Those registered for the meeting will have exclusive access to the 2020 virtual meeting webinars.

Social Media

Keep the conversation going! Get the latest meeting updates by following ASPO and join the conversation using #ASPO2020.

@ASPrevOnc

General Information

Poster Session

As ASPO moves forward with a virtual meeting for 2020 due to COVID-19 restrictions, we are excited to present the first ever ASPO Twitter Conference! All posters will be presented as part of a live Twitter conference starting March 25. Posters will also be available on the ASPO website for your colleagues to review.

How it works:

- All posters will be uploaded to the ASPO website
- Presenters will select a time slot for their Twitter presentation (signup link will be shared with participants on 3/16)
- @ASPrevOnc will tweet an introduction to each poster, you will then have 10 minutes and 5 tweets to present your research as a reply to the intro from your own Twitter account
- Each tweet cannot be more than 280 characters.
- Each Tweet should be numbered and use the official Twitter Conference hashtag #ASPOPosters2020
- You are encouraged to include images with your tweets. We suggest pulling charts, graphs, images etc. from your poster to highlight, rather than re-sharing the full poster
- Pre-plan your tweets, so you have as much time as possible for questions
- Check back in through the week – more questions may be asked, and you are free to continue to interact past your scheduled time block
- Discussions on a presentation should be posted as a reply to the specific tweet in order to maintain a cohesive thread

Questions?

We're happy to answers any questions you might have. Please contact the ASPO National Office at info@aspo.org.

Conference Evaluation

Please respond to the online survey that will be sent soon after the meeting. This will help future Program Committees and conference staff to better meet your professional and logistical needs.

Hotel Reservations

If you have already booked a hotel room, you will need to cancel your reservation with the hotel directly. Reservations must be cancelled at least two days prior to the scheduled arrival.

Special Acknowledgements

The ASPO Executive Committee offers special thanks to program co-chairs, **Dr. Timothy Rebbeck** and **Dr. Kathryn Weaver,** for their extraordinary commitment in facilitating the development of the program for this meeting, and to the entire 2020 ASPO Program Committee for sharing their expertise and their valuable contributions to the program.

Program Co-Chairs:

Timothy Rebbeck, PhD
Dana Farber Cancer Institute and Harvard TH Chan School of Public Health

Kathryn Weaver, PhD
Wake Forest School of Medicine

2020 Program Committee Members:

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Duke University

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University of Arizona

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Stephanie Schmit, PhD, MPH
Moffitt Cancer Center

Amy Trentham-Dietz, PhD
University of Wisconsin-Madison

Alexandra White, PhD, MSPH
National Institute of Environmental
Health Sciences

ASPO Leadership

ASPO Executive Committee Members
(parentheses indicates term expiration)

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Cheryl Thompson (2021)

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Li Li (2022)
Shine Chang (2020)

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Special Interest Groups

Behavioral Science & Health Communication
Chair: Carmina Valle (2021)
Vice-Chair: Linda Ko

Molecular Epidemiology & The Environment
Chair: Katherine Reeves (2020)
Vice-Chair: Elizabeth Hibler

Lifestyle Behaviors, Energy Balance & Chemoprevention
Chair: Marji McCullough (2021)
Vice-Chair: Cynthia Thomson

Survivorship & Health Outcomes/ Comparative Effectiveness Research
Chair: Erin Kent (2020)
Vice-Chair: Kathryn Weaver

Cancer Health Disparities
Chair: Yamilé Molina (2020)
Vice-Chair: Theresa Hastert

Early Detection & Risk Prediction of Cancer
Chair: Jasmin Tiro (2020)
Vice-Chair: Kate Rendle

Early Career Development
Chair: Allison Burton-Chase (2020)
Vice-Chair: Tracy Crane

International Issues in Cancer
Chair: Ramzi Salloum (2021)
Vice-Chair: Irene Tami-Maury

ASPO Award History

Year	Joseph F. Fraumeni, Jr., Distinguished Achievement Award	Distinguished Service Award	Joseph Cullen Award in Tobacco Research
1983	Michael Shimkin		
1984	Ernst Wynder		
1985	Sam Shapiro		
1986	William Haenszel		
1987	Lester Breslow		
1988	Nicholas Petrakis		
1989	Alfred Knudson		
1990	Saxon Graham	John Weisburger	
1991	Barbara Hulka		
1992	David Schottenfeld		Ellen Gritz
1993	Joseph Fraumeni		Thomas Glynn
1994	Anthony Miller	Richard Love	Tracy Orleans
1995	Pelayo Correa		Donald Shopland
1996	Walter Willett	Al Neugut	Michael Fiore
1997	Barbara Rimer		Edward Lichtenstein
1998	Peter Greenwald		Jack Henningfield
1999	J. Potter/W.Ki Hong		John Pierce
2000	Margaret Spitz		Susan Curry
2001	I.B. Weinstein/Ellen Gritz		David Burns
2002	Robert Hoover		Jonathan Samet
2003	Leslie Bernstein		K. Michael Cummings
2004	Dave Alberts		Caryn Lerman
2005	Graham Colditz		Stanton Glantz
2006	Frank Meyskens	Carolyn Aldige	Gary Giovino
2007	Bernard Levin		Michael Thun
2008	Malcolm C. Pike		David Abrams
2009	Mitchell Gail		Ronald Davis *(posthumously)*
2010	Paul Engstrom		Jasjit Ahluwalia
2011	Patricia Ganz		Alex Prokhorov
2012	Electra Paskett		Stephen Hecht
2013	Polly Newcomb		Dave Wetter
2014	Bob Croyle		Vish Vishwanath
2015	Richard R. Love	Amy Trentham-Dietz	Cheryl L. Perry
2016	Alfred I. Neugut		Peter Shields
2017	Timothy Rebbeck		Kurt Ribisl
2018	Beti Thompson		Thomas Brandon
2019	Anna Giuliano	Heidi Sahel	James Sargent
2020	Jeanne Mandelblatt		Paul Cinciripini

Volunteer Committees

LOCAL HOST COMMITTEE

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Sherry Chow
Elizabeth Jacobs
Cyndi Thomson

Student Volunteers:
Ana Florea
Magdiel Habila
Yvette Houston
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Andrew Seidenberg
Parisa Tehranifar
Erika Trapl
Shaneda Warren Andersen
Erika Waters
Karen Wernli
Jennifer Young Pierce
Charnita Zeigler-Johnson

2020 Awards

2020 ASPO Joseph F. Fraumeni, Jr., Distinguished Achievement Award

Jeanne Mandelblatt, MD, MPH, Georgetown University, Lombardi Cancer Center

2020 Joseph Cullen Award in Tobacco Research

Paul Cinciripini, PhD, The University of Texas MD Anderson Cancer Center

ACS Travel Awards

Pre- or Postdoctoral Fellow Eighth Annual Calle/Rodriguez Minority Travel Awards for a Top-Ranked Abstract

Travel Funded by The American Cancer Society

Sachelly Julián-Serrano, MHSN, RDN, National Cancer Institute, National Institutes of Health
Hepcidin-regulating iron-metabolism genes and pancreatic ductal adenocarcinoma: a pathway analysis of genome-wide association studies

Humberto Parada, MPH, PhD, San Diego State University
Accelerometer-measured physical activity and breast cancer incidence in the WHI OPACH Study

ASPO Travel Awards

Eighth Annual Electra Paskett Scholarship Travel Award for the Top-Ranked Pre- or Post-doctoral fellow

Julia Butt, PhD, Duke Cancer Institute
Auto-antibodies to p53 and the subsequent development of colorectal cancer in a United States prospective cohort consortium

Other ASPO Travel Awards chosen from top-ranked abstracts

Xinwe Hua, MPH, PhDc, Fred Hutchinson Cancer Research Center
Associations between post-treatment inflammatory biomarkers and survival among stage II-III colorectal cancer patients

Anne Julian, PhD, National Cancer Institute
Do-It-Yourself Sunscreen Tutorials on YouTube

Kevin Kensler, ScD, Dana-Farber Cancer Institute
PSA Testing and Prostate Cancer Incidence Following the 2012 Update to the U.S. Preventive Services Task Force Prostate Cancer Screening Recommendation: Implications for Racial/Ethnic Disparities

Brigid Grabert, PhD, JD, MPH, University of North Carolina at Chapel Hill
Implementation strategies for improving HPV vaccination in large healthcare systems

Yazmin San Miguel, MPH, University of California San Diego
Abnormal Stool Blood Tests and Colorectal Cancer Mortality in a Large United States Cohort

Support Acknowledgements

The Program Committee wishes to express appreciation to the following organizations for their commitment to supporting ASPO.

The Newcomb Family Foundation

The Ohio State University Comprehensive Cancer Center

The University of Texas MD Anderson Cancer Center

The University of Wisconsin Carbone Cancer Center

University of Arizona Cancer Center

American Cancer Society

In 2012, the American Cancer Society and American Society of Preventive Oncology announced the first annual "Calle/Rodriguez Minority Travel Award for a Top-Ranked Abstract" funded by the American Cancer Society. Drs. Jeanne Calle and Carmen Rodriguez were highly-respected epidemiologists, beloved colleagues and friends to many in the cancer research community. As Vice President of Epidemiology at the American Cancer Society, Dr. Calle was Principal Investigator of the Cancer Prevention Study (CPS)-II, a prospective study of more than one million men and women designed to identify risk factors for cancer. In particular, Dr. Calle was the lead author on widely-cited landmark studies establishing the link between obesity and cancer risk. She also guided the development and initiation of CPS-III, a study that will further our understanding of the causes of cancer and ways to prevent it for the next generation. A physician from Spain, Dr. Rodriguez was the Strategic Director of the CPS-II biospecimen repository. She published more than 100 scientific articles, with a special interest in studying ovarian and prostate cancers. Her work on the associations between hormone replacement therapy and cancer risk earned widespread media attention. Dr. Rodriguez also served as a Spanish-speaking spokesperson for the American Cancer Society. Professionally, Jeanne and Carmen were more than scientists; they were valued colleagues and committed mentors to many. Carmen and Jeanne passed away within months of each other in 2008-2009. While their deaths have been a tremendous loss, their spirits will live on in part due to the generosity of others whose donations allow the American Cancer Society to create this memorial award.

National Institutes of Health

Funding for this conference was made possible in part by (1R13CA250330) from the National Cancer Institute. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention of trade names, commercial practices, or organization imply endorsement by the U.S. Government.

Exhibitors

University of Arizona Cancer Center

Student Transformative Experiences to Progress Underrepresented Professionals (STEP-UP) Summer Research Program
An NCI funded R25 training grant. The program is seeking junior and senior undergraduates and master's level students who are underrepresented in their communities to come to the University of Arizona for a 12-week educational experience in cancer prevention and control.

Behavioral Measurement and Interventions Shared Resource (BMISR)
BMISR has over 25 years of experience providing support to local and national researchers studying lifestyle behaviors, quality of life and patient-reported outcomes related to cancer prevention and control. BMISR provides investigators with one access point to several research services ranging from study design consultation to instrument selection to questionnaire delivery.

Moffitt Cancer Center

Moffitt Cancer Center is recruiting scholars who have a profound interest in preventing, treating and curing cancer. As a Comprehensive Cancer Center, our research enterprise offers training and education in numerous areas in the fight against cancer, including at the PhD and postdoctoral level

Centers for Disease Control and Prevention

The CDC is a leader in efforts to reduce preventable cancers and improve the health of cancer survivors. CDC collects data on all cancer cases in the United States and works with national organizations and state and local health agencies to help Americans lower their cancer risk by increasing the use of effective cancer prevention programs and screening tests.

Colorectal Cancer Alliance

The Colorectal Cancer Alliance was founded in 1999 as the Colon Cancer Alliance, by a group of 40+ survivors, caregivers, and friends who saw the need to educate the public about colorectal cancer and provide support to those affected by the disease. In January 2016, the Colon Cancer Alliance merged with The Chris4Life Colon Cancer Foundation which was founded in 2010 and became the Colorectal Cancer Alliance, the largest colorectal cancer-specific non-profit in the United States. The Colorectal Cancer Alliance is focused on empowering a nation of allies who work with us to provide support for patients and families, caregivers, and survivors; to raise awareness of preventive measures, and inspire efforts to fund critical research.

MEDSOL

Agenda

ASPO.ORG
March 23 – 27 | #ASPOweek

Visit https://aspo.org/annual-meeting/ for the 44th Annual Virtual ASPO Conference agenda.

Abstracts Selected for Oral Presentation

Session 1: Risk Factors and Mechanisms of Breast & Colorectal Cancer Incidence & Survival
Monday, March 23, 1:00-2:30 p.m.

Auto-antibodies to p53 and the subsequent development of colorectal cancer in a United States prospective cohort consortium

Butt J, Blot WJ, Visvanathan K, Le Marchand L, Chen Y, Sesso HD, Wassertheil-Smoller S, Ho GYF, Tinker LE, Potter JD, Song M, Berndt S, Waterboer T, Pawlita M, Epplein M
Presenter: **Julia Butt, PhD**, Duke Cancer Institute

Auto-antibodies to tumor suppressor p53 are found in a subset of colorectal cancer (CRC) patients. A prospective cohort study in the US (Cancer Prevention Study II) has recently reported a statistically significant 1.8-fold increased odds for the development of CRC based on pre-diagnostic sero-positivity for p53; the magnitude of this association decreased with longer time-span between blood sampling and diagnosis. In the present study, we sought to examine this association in a large US CRC cohort consortium to evaluate the potential utility of p53 auto-antibodies as an early CRC detection biomarker. Methods: Antibody responses to p53 were measured in pre-diagnostic blood samples of 3,702 incident CRC cases (median [range] follow-up: 7.3 years [0-40 years]) and an equal number of controls, matched by age, race, and sex, from 9 US prospective cohorts. The association of sero-positivity to p53 with CRC risk, overall and by time between blood draw and diagnosis, was determined by conditional logistic regression. Results: Overall, 5% of controls and 7% of cases were sero-positive to p53, resulting in a statistically significant 33% increased CRC risk (OR: 1.33; 95% CI: 1.09, 1.61). The association was strongest for CRC diagnoses within 2 years after blood draw (OR: 2.73; 95% CI: 1.67, 4.45), with 15% sero-positive cases compared to 6% sero-positive controls. The number of sero-positive cases decreased with longer follow-up time (2- <5 years: 9%; 5- <10 years: 6%; ⩾10 years: 3%) down to a proportion similar to that in controls resulting in the absence of an association of p53 sero-positivity with CRC risk after more than 5 years between blood draw and CRC diagnosis. Conclusion: In this large consortium of prospective cohorts, we found that pre-diagnostic sero-positivity to the tumor suppressor p53 was statistically significantly associated with a 2.7-fold increased risk of a subsequent CRC diagnosis within 2 years after blood draw, replicating the findings of the one previous cohort study examining this association. The findings suggest that while p53 sero-positivity may not be a useful predictor of long-term CRC risk, p53 auto-antibodies might be considered as part of a marker panel for early detection of this cancer.

Accelerometer-measured physical activity and breast cancer incidence in the WHI OPACH Study

Parada H, Bellettiere J, Evenson KR, LaMonte MJ, LaCroix AZ
Presenter: **Humberto Parada, PhD, MPH**, San Diego State University

To examine the associations between accelerometer-measured physical activity (PA) and breast cancer incidence among a cohort of postmenopausal women. Methods: This longitudinal study included 6,382 women (mean age 79±6 years; 49.4% non-Hispanic white, 33.7% non-Hispanic Black, 16.9% Hispanic) without a history of breast cancer who participated in the Women's Health Initiative (WHI) Objective Physical Activity and Cardiovascular Health (OPACH) Study. During 2012-2013, participants wore an ActiGraph GT3X+ accelerometer at the hip for up to 7 days. Accelerometer intensity counts were specially calibrated to PA in older women. The resulting data were used to compute minutes per day spent in total PA, light intensity PA (e.g., usual walking), and moderate-to-vigorous PA (MVPA; e.g., brisk walking). Physician-adjudicated first diagnosis of in situ (n=18) or invasive (n=103) breast cancer was ascertained over a median follow-up of 5.6 years. We used multivariable Cox regression to estimate covariate-adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for tertiles and one-standard deviation (SD) unit increments of PA exposures in association with breast cancer incidence. We examined effect measure modification by age, race/ethnicity, body mass index (BMI), and smoking history. Results: The highest (vs. lowest) tertile of total PA was associated with a breast cancer incidence HR of 0.67 (95% CI = 0.43-1.05) and this association was more pronounced for MVPA (HR=0.61, 95% CI=0.38-1.00) than for light PA (HR=0.81, 95% CI=0.53-1.26). In BMI-stratified analyses, HRs for total (PInteraction=0.04) and light PA (PInteraction=0.01), but not MVPA (PInteraction=0.79), were stronger among women with BMI ⩾ 30 kg/m2 (n cancer events=48; total PA HRper one-SD=0.69, 95% CI=0.50-0.96; light PA HR=0.69, 95% CI=0.50-0.95) than among women with BMI < 30 kg/m2 (n cancer events=73; total PA HRper one-SD=1.07, 95% CI=0.84-1.38; light PA HR=1.13, 95% CI=0.89-1.44). Age, race/ethnicity, and cigarette smoking history did not strongly modify these associations (PInteraction's ⩾ 0.16). Conclusions: Engaging in high levels of PA may play a beneficial role in the prevention of breast cancer in older women, and in particular among postmenopausal women with BMI ⩾ 30 kg/m2

Abstracts Selected for Oral Presentation

Session 1: Risk Factors and Mechanisms of Breast & Colorectal Cancer Incidence & Survival
Monday, March 23, 1:00-2:30 p.m.

Associations between post-treatment inflammatory biomarkers and survival among stage II-III colorectal cancer patients

Hua X, Kratz M, Newcomb PA
Presenter: **Xinwei Hua, MPH, PhD**, Fred Hutchinson Cancer Research Center

Purpose: We aimed to evaluate post-treatment inflammatory biomarkers, namely C-reactive protein (CRP), interleukin-6 (IL6), monocytes chemoattractant protein-1 (MCP1), leptin and adiponectin, in relation to overall survival (OS) in stage II-III colorectal cancer (CRC) patients. Methods: Participants were incident, invasive CRC cases who were 22-74 years of age, diagnosed between 1997- 2008 from the population-based Seattle Colon Cancer Family Registry. We included stage II-III cases who were at the greatest risk for disease progression. Further restriction to 308 participants with a blood draw 1-3 years after diagnosis was made to preclude acute treatment effects. We measured concentrations of all five markers in EDTA-plasma samples using the Meso Scale Discovery immunoassays. Biomarker levels were log-transformed to ensure normality. We also divided patients into sex-specific quartiles for each marker to test for a dose-effect of a biomarker on disease progression. Mortality and cause of death were assessed through linkage to the National Death Index. We used Cox proportional hazard regression to estimate hazard ratios (HR) and 95% confidence intervals (CI) for associations of post-treatment inflammatory markers with OS. HRs were adjusted for potential confounders selected a priori, including age at blood draw, sex, body mass index, plasma storage time, the time between diagnosis and blood draw, and stage at diagnosis. Results: Elevated CRP levels were associated with poorer OS (HR=1.32 per unit increase of log-CRP, 95% CI=1.13-1.55). For circulating IL6, a dose-response relationship with survival was evident: compared with the lowest quartile of IL6, the 2nd, 3rd and 4th quartiles were significantly associated with OS, with HRs (95% CIs) of 2.72 (1.42-5.21), 4.23 (2.24-7.99), and 6.80 (3.56-12.96) respectively (p for trend<0.0001). For MCP1, we observed a 2-fold increase in the risk of overall mortality per unit increase in log-MCP1 (HR=2.17, 95% CI=1.39- 3.39). Circulating levels of leptin and adiponectin were not significantly associated with OS. Conclusions: Circulating inflammatory markers, specifically CRP, IL6, and MCP1, are prognostic markers in stage II/III CRC patients and should be considered for incorporation into studies of CRC outcomes.

Postmenopausal hormone therapy is primarily associated with reduced risk of colorectal cancer arising through the adenoma-carcinoma pathway

Labadie JD, Harrison T, Buchanan D, Campbell P, Chan A, Gallinger S, Giles GG, Gunter M, Hoffmeister M, Jenkins M, Ogino S, Slattery ML, Van Guelpen B, Peters U, Newcomb PA
Presenter: **Julia Labadie, PhD, DVM, MSPH**, Fred Hutchinson Cancer Research Center

PURPOSE: Our goal was to evaluate whether the inverse association of postmenopausal hormone therapy (PMH) and colorectal cancer (CRC) differs by molecularly defined CRC tumor subtypes. METHODS: We pooled data on tumor markers and PMH use among 8,220 post-menopausal women (3,898 CRC cases and 4,322 controls) from eight observational studies in the Genetics of Epidemiology of Colorectal Cancer Consortium and the Colon Cancer Family Registry. We used multinomial logistic regression to estimate odds ratios (OR) and 95% confidence intervals (CI) for the association of ever versus never PMH use and each tumor subtype compared with controls. We defined subtypes according to microsatellite instability (MSI-high or -low/stable), CpG island methylator phenotype (CIMP positive or negative), oncogenic mutations in BRAF and KRAS, and combinations of these markers that have been linked to specific pathways (adenoma-carcinoma, serrated, alternate). Additionally, we investigated whether associations varied by tumor anatomic location (proximal colon, distal colon, rectum). All models were adjusted for study, age, body mass index, smoking status, and family history of CRC. Wald chi-square tests were used to evaluate whether the association differed by tumor-specific subtypes. RESULTS: Ever use of PMH was associated with a 38% reduction in overall CRC risk (OR 0.62, 95%CI 0.56–0.69). In general, this association was observed regardless of individual markers for MSI, CIMP, BRAF, or KRAS status. However, when taken altogether and grouping cases by pathway, the association was attenuated for tumors arising through the serrated pathway compared with the adenoma-carcinoma pathway (OR 0.81, 95%CI 0.65–1.01; p for difference 0.046). We also observed a weaker association for tumors of the proximal colon compared with the distal colon and rectum (OR 0.71, 95%CI 0.62–0.80; p for difference 0.010). CONCLUSIONS: In this large consortium analysis, we observed a strong inverse association between PMH use and overall CRC risk. The association may predominantly reflect a benefit of PMH use for tumors arising through the adenoma-carcinoma pathway and tumors of the distal colon and rectum, as the association was weaker for tumors arising through the serrated pathway and proximal colon tumors.

Abstracts Selected for Oral Presentation

Session 1: Risk Factors and Mechanisms of Breast & Colorectal Cancer Incidence & Survival
Monday, March 23, 1:00-2:30 p.m.

Adolescent use of hair dyes, chemical straighteners and perms in relation to breast cancer risk in the Sister Study

White AJ, Taylor KW, Eberle CE, Gaston SA, O'Brien KM, Jackson CL, Sandler DP
Presenter: **Alexandra White, PhD, MSPH**, National Institute of Environmental Health Sciences

Purpose: Hair products may contain hormonally active and carcinogenic compounds. We evaluated the risk of breast cancer associated with adolescent use of hair dyes, chemical straighteners and perms in a large prospective U.S. cohort. Methods: Sister Study participants (n=47,833) were ages 35-74 years and had a sister who had been diagnosed with breast cancer at the time of enrollment (2003-2009). Enrollment questionnaires obtained information on demographics and lifestyle factors as well as frequency of use of hair dyes, chemical straighteners, and perms at ages 10-13 years. Cox proportional hazards models were used to estimate adjusted hazard ratios (HRs) and 95% confidence intervals (95% CIs) for the association between adolescent hair product use and breast cancer risk (invasive cancer and ductal carcinoma in situ). We considered whether associations varied by invasiveness, estrogen receptor (ER) status of the tumor, menopause status and race. Results: Over an average of 8.3 years of follow-up, 2,829 cases were diagnosed. Hair dye use at ages 10-13 years was uncommon and not associated with breast cancer risk (e.g. permanent hair dye, <3%; HR=0.96, 95% CI: 0.76-1.22). Use of perms (34% non-Hispanic white vs. 8% black women) and straighteners (10% non-Hispanic white vs 75% black women) at ages 10-13 years varied by race. An elevated HR for breast cancer was observed for frequent use of chemical straighteners (HR=1.27, 95% CI: 0.98-1.65). Though based on small numbers, this association was most pronounced for ER- invasive (HR=2.04, 95% CI: 0.98-4.24) and premenopausal breast cancer (HR=2.18, 95% CI 1.27-3.74). Frequent use of perms was also associated with a higher risk of invasive breast cancer and ER- tumors (HR=1.25, 95% CI: 1.00-1.57 and HR=1.69, 95%CI: 0.96-2.98, respectively). Although product use varied by race, associations with breast cancer did not. Conclusions: Frequent use of chemical straighteners or perms during the ages of 10-13 years was associated with a higher risk of breast cancer. These results suggest that exposure to the chemicals in these hair products, especially during adolescence which may be an important biological window of susceptibility, may play a role in breast carcinogenesis.

Oxylipins Correlate with Quality of Life in Women Taking Aromatase Inhibitors for Breast Cancer

Martinez JA, Stopeck AT, Chow HHS, Wertheim BC, Chew W, Roe DJ, Chalasani P, Thompson PA
Presenter: **Jessica Martinez, PhD**, University of Arizona

The purpose of this study was to determine if oxylipins – oxygenated bioactive lipid metabolites of ω-3 and ω-6 fatty acids with varying roles in inflammation and pain – correlate with aromatase inhibitor-associated arthralgia (AIA) and quality of life (QOL) in early stage breast cancer (ESBC) patients. Methods: ESBC patients on AI therapy were enrolled to an open-label study of sulindac, a non-steroidal anti-inflammatory drug (NSAID), for 12 months (n = 47). Pre-intervention arthralgia and physical function were assessed using the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) questionnaire, where higher scores indicate worse symptoms. The Functional Assessment of Cancer Therapy – General (FACT-G) questionnaire was used to assess QOL, where higher scores indicate better QOL. A total of 53 plasma oxylipins in plasma were quantified by mass spectrometry. Pearson's correlation was used to measure the association between pre-intervention oxylipin concentrations, arthralgias and QOL. Results: Prior to initiating sulindac, baseline levels of 17 oxylipins were found to be significantly correlated with QOL scales. This included inverse associations between QOL and seven pro-inflammatory products of ω-6 fatty acid metabolism. Notably, prostaglandin E2, the primary target of NSAIDs, was negatively correlated with Social Well-Being (rho = -0.30; P = 0.04). Conversely, resolvin D1, a potent anti-inflammatory lipid, was positively associated with Total FACT-G (rho = 0.31; P = 0.03) and Emotional Well-Being (rho = 0.37; P = 0.01). Two ω-3 metabolites with unknown mechanisms were correlated with both QOL and WOMAC; 19,20-DiHDPE was positively correlated with Total (rho = 0.34; P = 0.02) and Social FACT-G (rho = 0.32; P = 0.03), and inversely with Total WOMAC (rho = -0.303; P = 0.04) and Stiffness (rho = -0.32; P = 0.03); and 5(6)-DiHETE was inversely correlated with Social FACT-G (rho = -0.33; P = 0.02) and positively with Total WOMAC (rho = 0.31; P = 0.04). Conclusions: This is the first evidence that plasma oxylipin metabolites of ω-3/ω-6 fatty acids correlate with QOL and arthralgia symptoms in patients on AIs and suggests oxylipins as a potential novel target for improving QOL and adherence to AI therapy in patients with ESBC.

Abstracts Selected for Oral Presentation

Session 2: Enhancing Cancer Prevention Efforts at Multiple Levels
Monday, March 23, 1:00-2:30 p.m.

Do-It-Yourself Sunscreen Tutorials on YouTube

Julian AK, Farley ZS, Beach A, Perna FM
Presenter: **Anne Julian, PhD**, National Cancer Institute

Sunscreen is a common but complex sun safety product regulated in the US as a non-prescription drug. Recently, contributors on social media such as YouTube and Pinterest have advocated for making your own sunscreen at home. Such online tutorials likely represent misinformation in that they present an untested product as a safe replacement for a regulated drug. Purpose of the Study: To describe Do-It-Yourself sunscreen tutorials on YouTube, to determine whether viewers are making sunscreen, and whether specific misinformation is crowd- corrected in the online environment. This study demonstrates the use of online comments to identify behavioral outcomes of misinformation on social media. Method: We searched YouTube (March 2019) using search terms DIY sunscreen and Do-It-yourself sunscreen and selected the top 15 English-language videos sorted by relevance and views (N = 30). We double-coded the recipes for inclusion of FDA-approved photofilters, ingredient measurements and product claims (e.g., SPF level). We collected and coded all viewer comments (N = 2,477) for valence, presence of comments suggesting use on children is safe, crowd-correction by the online community, and indication of past or planned behavior change. Results: Most videos (67%) included SPF claims that were not accompanied by testing. Zinc oxide was the only photofilter used (present in 83%) and 17% of recipes contained no FDA-approved photofilters. Ingredient quantity was imprecise or absent in 23% of recipes. A notable fraction of videos (33%) had all supportive and no critical comments. Many videos (47%) had comments indicating a plan to use the recipe on babies, toddlers or children. Response to comments about use on children did not correct this misinformation. Comments indicated viewers had made or planned to make the recipe in 63% of videos. Discussion: Sunscreen is a drug intended to prevent sunburn and cancer, yet recipes for DIY sunscreen mischaracterize resulting product properties, thus misinforming the public. Further, viewers of DIY sunscreen videos frequently post positive comments regarding homemade sunscreen and do not correct false statements regarding their safety for use on infants and children. Making sunscreen, especially for use on children, may lead to skin damage.

Implementation strategies for improving HPV vaccination in large healthcare systems

Grabert BK, Liu A, Heisler-MacKinnon J, Schlusser CL, Gilkey MB
Presenter: **Brigid Grabert, PhD, JD, MPH**
University of North Carolina Gillings School of Global Public Health and Lineberger Comprehensive Cancer Center

HPV vaccination could prevent most of the 34,000 HPV-attributable cancers diagnosed in the U.S. each year, but uptake remains suboptimal. Given the increasing consolidating of pediatric primary care, large healthcare systems are key partners in implementing interventions to improve HPV vaccination. To inform future partnerships, we sought to explore implementation strategies systems currently use to improve HPV vaccination. Methods: We conducted in-depth telephone interviews with a multi-state sample of QI leaders in 15 large healthcare systems. Guided by Powell et al.'s typology of implementation strategies, we analyzed data qualitatively via content analysis. Results: QI leaders reported using a wide range of implementation strategies for improving vaccination services generally, but described barriers to improving HPV vaccination specifically. Many prioritized assessment and feedback, or giving providers data on their vaccination rates, to inform practice improvements. However, several leaders noted that their electronic medical records did not offer HPV vaccine-specific quality metrics, but rather reported on adolescent vaccines in combination, limiting their ability to focus on HPV vaccination. QI leaders also generally favored provider financial incentives, but none were using this strategy to improve HPV vaccination, either due to the lack of an HPV vaccine-specific metric or low prioritization of the metric compared to others. QI leaders perceived provider training as an effective strategy for improving prescribing practices; however, many noted that time with providers for HPV vaccine-specific training was extremely limited. Conclusions: The emergence of large healthcare systems provides an opportunity to leverage existing QI infrastructure for addressing underuse of evidence-based preventive services. Large healthcare systems are motivated to improve vaccination services and use diverse implementation strategies to do so. However, in the case of HPV vaccination, our findings suggest that limitations in existing quality metrics, along with payment structures that constrain time for provider training, are two key barriers to practice improvements.

Session 2: Enhancing Cancer Prevention Efforts at Multiple Levels
Monday, March 23, 1:00-2:30 p.m.

Correlates of support for a nicotine reduction policy among smokers enrolled in a 20-week trial of very low nicotine content cigarettes

Denlinger-Apte RL, Koopmeiners JS, Tidey JW, Luo X, Smith TT, Pacek LR, McClernon FJ, Jenson J,Colby SM, Severson H, Donny EC, Hatsukami DK
Presenter: **Rachel Denlinger-Apte, PhD, MPH**, Wake Forest School of Medicine

Study Purpose: The Food and Drug Administration (FDA) recently announced a policy proposal to limit the amount of nicotine in cigarettes to a minimally-addictive level. Within the first year of implementation, an estimated 5 million smokers may quit smoking. In surveys, smokers are generally supportive of such a policy, although most likely have minimal exposure to very low nicotine content (VLNC) cigarettes. Little is known about the extent of support for a nicotine reduction policy among smokers with prolonged exposure to VLNC cigarettes and if the nicotine reduction approach influences support. Methods: Daily smokers (N=1250) were randomly assigned to an immediate nicotine reduction condition (0.4 mg/g nicotine cigarettes; VLNC), a gradual nicotine reduction condition (15.5 to 0.4 mg/g nicotine cigarettes; monthly nicotine dose changes), or a control condition (15.5 mg/g nicotine cigarettes) for 20 weeks. Participants were asked if they would "support or oppose a law that reduced the amount of nicotine in cigarettes, to make cigarettes less addictive." Logistic regression analyses assessed if policy support was affected by study condition, gender, race, age, education level, menthol status, and interest in quitting as well as cigarette dependence, satisfaction, perceived risk, withdrawal, and craving scores. Results: At week 20 (N=957 completers), 578 participants supported the policy (60.4%), 167 opposed (17.4%), and 212 responded "Don't know" (22.2%). Across conditions, support was greater among those interested in quitting (OR=3.3, 95% CI=2.4, 4.4), older participants (OR= 1.01, 95% CI=1, 1.03) and those with increased cigarette risk perceptions (OR=1.05, 95% CI=1, 1.1). Support was lower among males (OR=0.51, 95% CI=0.38, 0.69) and those with greater dependence scores (OR=0.92, 95% CI=0.86, 0.98). Study condition was not associated with support. Conclusions: The majority of participants supported the policy and prolonged exposure to VLNC cigarettes did not affect support. Notably, smokers interested in quitting were more likely to support the policy. Health communication campaigns highlighting the potential health benefits of cigarette nicotine reduction (i.e. increased quitting) could be advantageous if the FDA moves forward with policy implementation.

Reaching Cancer Center Patients Who Smoke with Tobacco Treatment Integrated into Clinical Cancer Care: Examining the Reach and Effectiveness of Tobacco Treatment Programs Implemented in the NCI Cancer Center Cessation Initiative

D'Angelo H, Rolland B, Adsit R, Pauk D, Rosenblum M, Baker TB, Fiore MC
Presenter: **Heather D'Angelo, MHS, PhD**, University of Wisconsin-Madison

Purpose: Tobacco cessation among cancer patients results in improved cancer outcomes, yet cessation services are often unavailable in clinical oncology settings. Utilizing common metrics, we report on the reach and effectiveness of the tobacco treatment programs implemented in NCI-Designated Cancer Centers as part of the National Cancer Institute Cancer Center Cessation Initiative (C3I). Methods: Cancer Centers (n=34 Cancer Centers/affiliated settings) reported on tobacco use screening rates and current smoking prevalence over a 6-month period. Reach (percent of adult smokers receiving cessation counseling, medications, or connections to a quitline) was calculated for 29 Centers/affiliated settings overall and by type of tobacco treatment services delivered over a 6-month period. Thirty-day point prevalence smoking abstinence at 6-months post-engagement was measured among program participants at 12 Centers/affiliated settings. Results: Between 35.0%-100.0% (median 95.5%) of adult patients were screened for tobacco use over six months. Average current smoking prevalence was 12.5% (range 5.0% to 35.0%). All but one Center connected smokers with treatment using an optional or automatic eReferral via the electronic health record (EHR). The EHR revealed that over 6-months, a total of 7,557 smokers were reached with at least one type of evidence-based tobacco treatment out of 38,586 smokers identified, with reach ranging from 3.4%-83.7% (median=20.1%) across settings. In-person counseling was delivered to 12.4% of smokers on average, and an average of 14.4% of smokers received counseling via telephone. On average, 12.1% of smokers received/were prescribed cessation medications, while 4.9% of smokers were connected to state quitlines. Average 30-day abstinence rates were 11.6% (median=7.6%). Conclusions: Screening rates were high, and eReferrals were used at nearly all Centers to facilitate treatment delivery. Smokers were reached most often by internal counseling programs, both in person and telephone based; fewer were connected to state quitlines. Implementing population-based tobacco dependence treatment programs in oncology settings can reach large numbers of cancer patients who smoke, and may lead to improved cessation and treatment outcomes.

Session 2: Enhancing Cancer Prevention Efforts at Multiple Levels
Monday, March 23, 1:00-2:30 p.m.

Implementation of Shared Decision Making for Lung Cancer Screening

Alishahi Tabriz A, Neslund-Dudas C, Turner K, Rivera MP, Reuland DS, Elston Lafata J
Presenter: **Jennifer Elston Lafata, PhD**, University of North Carolina at Chapel Hill

Purpose. The Centers for Medicare and Medicaid Services has stipulated shared decision making (SDM) as a prerequisite to lung cancer screening (LCS) reimbursement. Given SDM has proven challenging to implement in practice, it remains unclear how organizations have approached its implementation for LCS. We describe how health care organizations implemented SDM for LCS, including factors considered as these programs were developed and implemented, and the challenges faced. Methods. We used in-depth, semi-structured interviews with key informants (N=30) directly involved with implementing and/or managing SDM for LCS in 23 organizations representing 12 states and the 4 US Census regions. Key informants were identified via snowball sampling. We used template analysis to identify key constructs from the Consolidated Framework for Implementation Research that organizations considered when implementing LCS-SDM programs. Results. Resultant programs were centralized models in which frontend practitioners (e.g., primary care providers) referred patients to a LCS clinic in which trained staff (e.g. advanced practice nurses) delivered SDM at the time of screening or decentralized models in which frontend practitioners delivered SDM prior to referring patients for screening. Some organizations used both models. Participants discussed tradeoffs between SDM quality and access, as they perceived centralized models as enhancing SDM quality, but limiting patient LCS-SDM access and vice versa. Regardless of model implemented, participants reported ongoing challenges with limited resources and budgetary constraints, ambiguity regarding what constitutes SDM, and an absence of benchmarks for evaluating LCS-SDM quality. Conclusions. Those responsible for developing and managing SDM-LCS programs voice concerns regarding both patient access and SDM quality, regardless of organizational context or LCS-SDM model. The challenge facing these organizations, and thus those wanting to help patients and clinicians balance the tradeoffs inherent with LCS, is how to move beyond a “check box” documentation requirement to a process that enables LCS to be offered to all high risk patients, but used only by those who are informed and for whom screening represents a value concordant service.

Mammography's Blind Spot: Getting a grip on the 30% of all breast cancers that are missed by routine screening

Zhang Z, Irvin VL, Simon MS, Chlebowski RT, Luoh SW, Shadyab AH, Krok-Schoen JL, Tabung FK, Qi L, Edwards BJ, Stefanick ML, Schedin P, Jindal S
Presenter: **Zhenzhen Zhang, PhD, MPH, MMed**, Oregon Health & Science University

Purpose of the study: Interval breast cancers (IBC) present symptomatically after a non-suspicious mammographic screen and before the next scheduled mammographic screen. The objective of this study was to investigate the aggressive attributes of IBC by length of inter-screening period compared to screen-detected breast cancers (SBC). Methods: This study utilized data from the Women's Health Initiative (WHI). WHI enrolled 68,132 postmenopausal women (50-79 years) in randomized controlled clinical trials where mammographic screening was protocol mandated. Using a novel algorithm to accurately identify IBC and SBC cases, T-test, Ï‡2 test and Fine-Gray competing risk models were conducted to compare the demographics, tumor characteristics and the breast cancer-specific mortality of IBC vs. SBC.Results: Of 5,455 breast cancer incidences, 3,019 (55.3%) were compliant to protocol screening and comprise our study population. Among these 3,019 patients, 1,050 were IBC cases including 324 diagnosed within 1 year IBC1yr) and 726 diagnosed between 1-2.5 years (IBC1-2.5yr) following recent mammogram, as well as 1,969 SBC cases. Compared to SBC, IBC had significantly larger tumor size, higher clinical stage and more lymph node involvement but no significant difference in molecular subtypes. For breast cancer-specific mortality, IBC1yr had a higher risk compared to SBC (HR=1.69; 95% CI=1.20-2.37) after controlling for molecular subtype, histology, waist-to-hip ratio, menopausal hormone clinical trial arm and dietary modification trial arm. This significance persisted after further controlling for other confounding factors such as age, race/ethnicity etc. (HR=1.64; 95%CI=1.14-2.34). In fact, the elevated risk of death for IBC1yr was associated with increased tumor size and lymph node involvement, as differences were no longer statistically significant after further controlling for these tumor phenotypes (HR=1.24; 95% CI=0.87-1.77) (IBC1-2.5yr: HR=1.09; 95% CI=0.79-1.51).Conclusions: IBC diagnosed within 1 year after the last mammogram compared to SBC have worse survival, possibly due to a more aggressive tumor phenotype comprising larger tumor size and lymph node involvement. Further studies are warranted to confirm these findings and identify improved screening measures.

Session 3: Financial Toxicity and Related Outcomes in Cancer Survivors
Tuesday, March 24, 1:15-2:45 p.m.

Reducing Cancer-related Financial Toxicity through Financial Navigation: Results from a Pilot Intervention

Wheeler SB, Rodriguez-O'Donnell J, Rogers C, Fulcher J, Deal, A. Manning ML, Gellin M, Padilla N, Rosenstein DL
Presenter: **Stephanie Wheeler, PhD, MPH**, University of North Carolina at Chapel Hill, Gillings School of Global Public Health, Lineberger Comprehensive Cancer Center

Our purpose was to pilot a novel patient-centered financial navigation (FN) intervention to decrease the burden of financial toxicity (FT) among uninsured and underinsured patients with cancer treated at the North Carolina Cancer Hospital (NCCH). Methods: Participants were recruited by cancer clinic nurses and social workers at the NCCH. Eligible patients scored less than 22 points (indicating significant FT) on the COmprehensive Score for financial Toxicity (COST) instrument. Fifty patients were enrolled in the intervention, which included an intake assessment of financial needs and vulnerability, initial one-on-one consultation with a trained financial navigator (i.e., financial counselor or social worker), triage to financial support services matching patients' needs, and multiple follow-up appointments. Navigator recommendations were based upon a detailed review of patients' financial status, billing information, insurance, and other indicators used to refer patients to appropriate financial and social services resources offered by the hospital, government, nonprofits and private corporations. Following the initial appointment, patients were given a checklist of resources they were eligible for and the required paperwork to complete applications. During follow-up appointments, application status was reviewed, and practical assistance was provided. Patients were re-contacted at 2-week intervals to assess progress toward financial assistance goals. Outcome data collection included pre/post-intervention COST scores, patient satisfaction with the intervention, and intervention fidelity and retention. Results: The first fifty patients approached all screened positive for FT (COST < 22). Baseline COST scores ranged from 0-19. Results indicated a significant improvement in COST scores following the FN intervention (average increase=6.86, 95% CI = 4.30-9.42), p<0.0001). Post-intervention questionnaires indicated excellent patient satisfaction and retention with the FN intervention, and navigator logs indicated high fidelity to the intervention protocol. Conclusions: A novel FN intervention was feasible, acceptable, and effective in reducing FT among uninsured and underinsured oncology patients.

Financial Distress and its Associated Burden in Couples Coping with an Incurable Cancer

Milbury K, Lopez G, Contreras J, Weather S-P, Bruera E
Presenter: **Kathrin Milbury, PhD**,The University of Texas MD Anderson Cancer Center

Although financial toxicity has been linked to poor disease outcomes in cancer patients, the associations between subjective financial distress (FD) and symptom burden and quality of life (QOL) are rarely examined from a patient-partner dyadic perspective. Thus, this cross-sectional study seeks to examine dyadic associations in couples coping with an incurable cancer. Method: Patients undergoing systemic and/or radiotherapy for advanced lung cancer (n=50) or high grade glioma (n=50) and their spouses/romantic partners completed measures of psychological distress (BSI-18), symptom severity including FD (ESAS, 0-10 scale), QOL (PROMIS-10), relationship wellbeing (SRI), and avoidance (AAQ-2). Results: Patients were mainly female (60%), and patients and partners were all in a heterosexual relationship (mean length: 30.12 +/- 15.1 yrs), mainly non-Hispanic White (80%), married to each other (93%) and well educated with a mean age of 57.9 years (range: 28.5-79.0 years). FD was interrelated in couples (ICC=.53, P<.0001), and mean score did not significantly differ by role (patient=2.32 vs partner=2.81). Controlling for medical and demographic factors, based on dyadic level analyses, FD was significantly associated with physical QOL (P=.01) so that those with higher FD reported lower QOL. Interestingly, FD was significantly associated with psychological distress (P=.001), mental QOL (P<.001), avoidance (P=.01), and relationship wellbeing (P=.03) for partners but not for patients so that partners reporting higher FD had worse health and wellbeing. Moreover, in terms of relative burden, FD was the 7th (out of 12) most severe symptom for patients, and the 2nd most severe symptom for partners (after sleep disturbances). Based on concordance analyses, patients significantly underestimated their partners' FD (P=.007), which was further associated with increased partner psychological distress (P=.04). Conclusion: Although FD is interdependent in couples coping with an incurable cancer, FD appears to be a greater relative burden for partners than patients. In the palliative care setting, reducing FD may be an important target for caregiver interventions seeking to improve their health and wellbeing and reduce the overall cancer burden.

Session 3: Financial Toxicity and Related Outcomes in Cancer Survivors
Tuesday, March 24, 1:15-2:45 p.m.

Examining the Costs of Surviving Cancer

Adler Jaffe S, Anderson A, Guest DD, Sussman AL, Wiggins CL, McDougall JA
Presenter: **Shoshana Adler Jaffe, MPH**, University of New Mexico Comprehensive Cancer Center

Purpose: Financial challenges among cancer patients and their informal caregivers have been quantified, but less is known about the lived experience of financial hardship as a result of a cancer diagnosis. We documented experiences of financial hardship, choices made, and knowledge gained among sociodemographically diverse cancer survivors and their informal caregivers. Methods: This qualitative study was part of the Comprehensive History of Individuals' Cancer Experience (CHOICE) Project. CHOICE used a sequential explanatory design. The first phase consisted of a quantitative survey with 394 population-based breast, colorectal, and prostate cancer survivors, while the next phase, detailed here, included 19 semi- structured, qualitative interviews with a subset of survivors and informal caregivers. Interview transcripts were coded using grounded theory and analyzed to assess common themes and areas of unmet need. Results: Four key themes were identified: difficulty paying bills, coping mechanisms, support systems, and issues with resources. Survivors and caregivers both noted experiences of financial-induced stress, but the specific stressors were varied. Similarly, a wide variety of coping mechanisms were used to address financial challenges. Survivors and caregivers reported having to decide between paying for recommended medical care and being able to afford basic necessities. The long-term financial impact of a cancer diagnosis was repeatedly described by survivors. Conclusion: Financial hardship often resulted in material and psychological distress among both survivors and informal caregivers. Interventions to prevent or minimize the financial challenges experienced by both survivors and their informal caregivers are urgently needed to improve social and clinical outcomes.

Employment disruption after breast cancer diagnosis and financial burden in the Sister and Two Sister Studies

Meernik C, Sandler DP, Peipins LA, Hodgson ME, Wheeler SB, Weinberg CR, Nichols HB
Presenter: **Clare Meernik, MPH**, University of North Carolina, Gillings School of Global Public Health

Purpose: High costs of cancer care in the U.S. contribute to financial hardship and poor outcomes for cancer patients. We estimated the effect of cancer-related employment disruption on financial burden in a national sample of women diagnosed with breast cancer who were relatively financially stable and had health insurance at diagnosis. Methods: Women with breast cancer who were enrolled in the Sister Study or the Two Sister Study completed a survivorship survey in 2012. Employment disruption was defined as stopping work or working fewer hours after cancer treatment. Financial burden was defined as experiencing financial problems paying for cancer care, borrowing money or going into debt because of cancer, or filing for bankruptcy because of cancer. Prevalence ratios (PRs) and 95% confidence intervals (CIs) for financial burden related to employment disruption were estimated using Poisson regression with robust error variance, adjusted for demographic and clinical characteristics. Results: We analyzed data from women who were ⩾1 year from breast cancer diagnosis who reported being employed at diagnosis (n=1605 total, n=1425 non-Hispanic White (NHW), n=79 non-Hispanic Black (NHB)). On average, women were age 50 at diagnosis (range=28-77 years) and 5 years from diagnosis at survey (range=1- 8.5 years). Most women had health insurance at diagnosis (99% NHW, 97% NHB) and an annual household income of at least $50,000/year (84% NHW, 75% NHB). Overall, 27% of women reported employment disruption after diagnosis and 21% experienced financial burden, including 16% experiencing difficulty paying for cancer care, 13% borrowing money or going into debt, and 2% filing for bankruptcy. In adjusted analyses, employment disruption was associated with a higher prevalence of financial burden (NHW PR=2.00, 95% CI: 1.62, 2.47; NHB PR=3.81, 95% CI: 1.89, 7.67). Conclusions: Women experiencing disruptions to employment after cancer diagnosis are vulnerable to financial distress related to cancer and its treatment. Our results indicate financial burden is prevalent even among women who have insurance coverage and financial resources at breast cancer diagnosis. These findings could inform sick leave and work policies which may help to limit employment disruption after cancer.

Abstracts Selected for Oral Presentation

Session 3: Financial Toxicity and Related Outcomes in Cancer Survivors
Tuesday, March 24, 1:15-2:45 p.m.

Costs of Caregiving and Financial Burden among Informal Caregivers of African American Cancer Patients

Hastert TA, Ruterbusch JJ, Beebe-Dimmer JL, Pandolfi S, Schwartz K, Thompson H, Schwartz AG
Presenter: **Theresa Hastert, PhD, MPP**, Wayne State University/Karmanos Cancer Institute

Background: Cancer patients commonly rely on loved ones to act as informal caregivers during and after treatment. The financial costs that caregivers experience related to caregiving and their association with caregiver financial hardship are not well understood, especially among caregivers of African American cancer survivors. Methods: Results include survey data from 346 caregivers of participants in the Detroit Research on Cancer Survivors (ROCS) cohort, a population-based study of African American survivors of breast, colorectal, lung, or prostate cancer in Metropolitan Detroit. Costs related to caregiving include medication (prescription or over the counter), logistical (transportation, groceries, home modifications), and medical bills (doctor, hospital, or clinic bills; medical supplies). Financial hardship was measured on a scale from 3-15 based on questions related to caregiver financial resources, strain, and difficulty paying caregiving costs and analyzed in tertiles (3-5, 6-8, 9+). The association between costs and financial hardship was assessed using modified Poisson regression models controlling for caregiver age, sex, income, and relationship to the survivor. Results: Caregivers were mostly women (78%), African American (91%), and 28% reported household incomes <$20,000/year. Caregivers included spouses (35%), non-married partners (8%), family members (47%) and friends (10%). Two-thirds (68%) of caregivers reported costs related to caregiving. Logistical costs were most common (62%), followed by medication costs (39%) and medical bills (13%). Medication and medical bill costs were more common among spouses (54% and 32%, respectively) compared to other relationships; while logistical costs were more common among non-married partners (71%) and family members (67%). Prevalence of high financial hardship was 30% higher among caregivers who reported any versus no caregiver costs [prevalence ratio (PR): 1.30, 95% CI: 1.12, 1.51], and these findings were similar for medication (PR: 1.23, 95% CI: 1.08, 1.39), logistic (PR: 1.32, 95% CI: 1.14, 1.53), and medical bill costs (PR: 1.28, 95% CI: 1.07, 1.53). Conclusions: Most caregivers experienced costs related to caregiving, and those costs were associated with caregiver-reported financial burden.

Food Insecurity as a Barrier to Medical Care Among Cancer Survivors

McDougall JA, Anderson J, Pankratz VS, Adler Jaffe S, Guest DD, Sussman AL, Meisner AL, Wiggins CL, Jimenez EY
Presenter: **Jean McDougall, PhD, MPH**, University of New Mexico

Purpose: As cancer patients face financial challenges they may be forced to make a trade-off between food and medical care. We characterized food insecurity and its relationship to treatment adherence in a population-based sample of cancer survivors. Methods: Individuals age 21-64 years, diagnosed between 2008 and 2016 with stage I-III breast, colorectal, or prostate cancer were identified from the New Mexico Tumor Registry and invited to complete a survey, recalling their financial experience in the year before and the year after cancer diagnosis. We estimated the prevalence and cumulative incidence of food insecurity, sociodemographic factors associated with food insecurity, and the relationship between food insecurity and forgoing, delaying or making changes to various types of medical care. Multivariable logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI). Results: Among 394 cancer survivors, the prevalence of food insecurity in the year after a cancer diagnosis was 33% and the cumulative incidence of food insecurity was 13%. Food insecure cancer survivors tended to have more comorbidities, lower levels of education, lower income, and were more likely to be Hispanic or unmarried. In addition, those with very low food security were nearly 3-times as likely to forgo, delay, or make changes to prescription medication (OR 2.77; 95% CI 1.06-7.25) and nearly 6-times as likely to forgo, delay, or make changes to treatment other than prescription medication (OR 5.69; 95% CI 1.86- 17.40), than cancer survivors with high food security. Conclusions: Efforts to screen for and address food insecurity among individuals undergoing cancer treatment should be investigated as a strategy to reduce socioeconomic disparities in cancer outcomes.

Session 4: Cancer Health Disparities across the Cancer Care Continuum
Tuesday, March 24, 1:15-2:45 p.m.

Longitudinal Dyadic Interdependence in Psychological Distress Among Latinas With Breast Cancer and Their Informal Caregivers

Segrin C, Badger TA, Sikorskii A, Pasvogel A, Weihs K, Lopez AM, Chalasani P
Presenter: **Chris Segrin, PhD**, University of Arizona

Purpose: Cancer diagnosis and treatment can generate substantial distress for both survivors and their informal caregivers, defined as family members or friends who provide care and assistance to the cancer survivor. The primary aim of this investigation is to test a model of dyadic interdependence in distress experienced by Latina breast cancer survivors and their informal caregivers to determine if each influences the other. Methods: To test this prediction, 209 Latinas with breast cancer and their informal caregivers (dyads) were followed for 4 waves of assessment over the course of 6 months. Both psychological (depression, anxiety, perceived stress) and physical (number of symptoms, symptom distress) indicators of distress were assessed. Longitudinal analyses of dyadic data were performed in accordance with the actor-partner interdependence model using linear mixed effects modeling. Results: Findings indicated that psychological distress was interdependent between cancer survivors and their informal caregivers over the 6 months of observation. Caregivers experienced greater depression, anxiety, and stress to the extent that the survivors reported such distress, and vice versa. These effects held, even when controlling for nature of the survivor-caregiver relationship (married to each other or not), education, and the dyads' baseline similarity on distress. However, there was no such evidence of interdependence on indicators of physical distress. Conclusions: These findings are consistent with emotional contagion processes by which psychological distress is transmitted over time between cancer survivors and their informal caregivers. Latina cancer survivors are a particularly vulnerable population due to health disparities, linguistic barriers, and socioeconomic challenges. Management of psychological distress is of particular concern in this population. These findings point to the potential importance of caregiver well-being for the welfare of Latina breast cancer survivors.

A retrospective study of administrative data to identify factors associated with future disability status among older colorectal cancer survivors

Swartz MC, Chou LN, Swartz MD, Lyons EJ, Mehta H, Karmarkar A, Middleton A, Basen-Engquist K, Giordano SH, Goodwin J
Presenter: **Maria Swartz, PHD, MPH**,
The University of Texas MD Anderson Cancer Center

Disability is associated with loss of independence and early mortality. Currently, only 1-2% of cancer survivors who reported physical limitations received rehabilitation services. It is critical to identify factors associated with the development of disability to guide clinical practice given treatment changes. We aimed to 1) identify demographic and cancer-related characteristics associated with future disability status among older colorectal cancer survivors, and 2) compared the future disability status among cancer and matched non-cancer cohorts. Methods: We conducted a retrospective cohort study using the Texas Cancer Registry-national Medicare linked database. The cancer cohort included Medicare beneficiaries with a primary colorectal cancer diagnosis between 2005 and 2013 (n=13,229). The non-cancer cohort was identified from a 5% sample of Medicare beneficiaries (n=11,416). Diagnosis dates from the cancer cohort were used as the index date for the non-cancer cohort. Cohorts were matched 1:1 based on index date, age, and gender. Cox regression models were used to estimate hazard ratios (HRs) and 95% confidence intervals. Disability status was defined according to Davidoff et al. using inpatient, outpatient and durable medical equipment claims files, and assessed monthly, beginning 1 month after cancer diagnosis (or index date), continuing until disability, death, end of Medicare continuous enrollment, or end of study. Results: Factors that were significantly associated with disability status in the cancer cohort were age (HR=3.50 for >80 years old), female gender (HR=1.50), race/ethnicity (HR=1.34 for Hispanic and 1.21 for Black), stage (HR=2.26 for distant stage), comorbidity (HR=2.18 for >1), and radiation (HR=1.21). When compared to the non-cancer cohort, having a cancer diagnosis (HR=1.07) and comorbidity (HR=2.09 for >1) were associated with developing disability. Conclusions: Colorectal diagnosis is an independent risk for disability status. Beyond well-known risk factors "age and mortality" subsets of survivors (Hispanic and Black survivors and those with comorbidity) are found to be at higher risk for developing disability. This warrants further investigation and may indicate targeted intervention to prevent future disability.

Session 4: Cancer Health Disparities across the Cancer Care Continuum
Tuesday, March 24, 1:15-2:45 p.m.

Race, Neighborhood Socioeconomic Status, and Gut Microbiome

Sun X, Chen Z, Yuan F, Chan R, Cooper G, Li L
Presenter: **Li Li, MD, PhD**, University of Virginia

Purpose of the study: Gut microbiome plays an increasingly recognized important role in human health. This study aims to evaluate the association among race, neighborhood disadvantage index (NDI), and gut microbiome in patients undergoing screening colonoscopy. Methods: The study includes 689 patients aged 50-80 years undergoing screening colonoscopy at University Hospitals Cleveland Medical Center. Each patient donated a stool sample 1-4 weeks prior to their colonoscopy examination. 16S ribosomal RNA genes in stools were sequenced and classified into 236 Operational Taxonomic Units (OTUs) to species level. Neighborhood Disadvantage Index (NDI) was derived from 17 variables reflecting neighborhood contextual environment. We first examined the association of race with microbiota, and race with NDI. We then examined further the association between NDI and each microbiota by linear mixed effect model to account for the correlation within census tract, with adjustment of age, sex, BMI, smoking, and sequencing batch. The significance of associations between microbiota and NDI are evaluated by likelihood ratio tests. Q-value was estimated for False Discovery Rate (FDR)-based multiple testing correction. For the microbiota associated with NDI with Q-value <= 0.05, we additionally adjusted for genetic ancestry in the model in a subset of 222 patients who have available genome-wide ancestry informative SNP genotype data. Results: Of all the 172 microbiota that have minimum relative abundances >.005, 13 microbiota were significantly associated with race. We speculate that such association with race could be at least partially driven by neighborhood socioeconomic environment i.e., racialized neighborhood environment - given the high correlation of race and NDI (corr = 0.60, p =3.38E-56). Multivariate-adjusted regression models showed that 5 microbiota were positively associated with NDI (Q-value < .05). Subset analysis of 222 patients with further controlling for genetic ethnicity shows that two microbiotas remain significantly associated with NDI. Conclusions: Residential neighborhood disadvantage was found to impact gut microbiota. Further studies to validate our findings and to delineate the functionality of these NDI-associated microbiota are warranted.

PSA Testing and Prostate Cancer Incidence Following the 2012 Update to the U.S. Preventive Services Task Force Prostate Cancer Screening Recommendation: Implications for Racial/Ethnic Disparities

Kensler KH, Pernar CH, Mahal BA, Nguyen PL, Trinh QD, Kibel AS, Rebbeck TR
Presenter: **Kevin Kensler, ScD**, Dana-Farber Cancer Institute

Purpose The 2012 U.S. Preventive Services Task Force (USPSTF) recommendation against prostate specific antigen (PSA) testing led to a decrease in prostate cancer screening, but its impact on prostate cancer racial/ethnic disparities remains unclear. Methods The proportion of men ages 40-74 years who received a routine PSA test in the past year was estimated over time in the Behavioral Risk Factor Surveillance System (BRFSS; 2012-2018) and the National Health Interview Survey (NHIS; 2005-2018). Screening trends by race/ethnicity were evaluated using logistic regression models to estimate odds ratios (ORs) of screening adjusting for socioeconomic and healthcare-related factors. Prostate cancer incidence rates and rate ratios (IRRs) by race/ethnicity were estimated in the Surveillance, Epidemiology and End Results (SEER) registry data over time (2004-2016). Results In the 2012 BRFSS, PSA testing rates were highest among non-Hispanic white (NHW) men (32.3%), followed by non-Hispanic black (NHB; 30.3%), Hispanic (21.8%), and Asian/Pacific Islander men (17.7%). The absolute screening frequency declined by 9.5% overall from 2012 to 2018, with a greater decline among NHB (11.6%) than NHW men (9.3%). Adjusting for socioeconomic and healthcare-related factors, the relative decline was greater among NHB (OR per year=0.86, 95%CI 0.84-0.88) than NHW men (OR=0.89, 95%CI0.89-0.90; p- het.=0.005), driven by a steeper drop among NHB men ages 40-54. In the NHIS, the 2012 update was associated with a 35% decrease in the odds of screening (OR=0.65, 95%CI 0.51-0.82), though there was no annual change since 2012 (OR=1.00, 95% CI0.98-1.03). Trends in the NHIS did not differ by race/ethnicity. The NHB:NHW IRR for total prostate cancer increased from 1.73 in 2011 to 1.87 in 2012 and has remained elevated, driven by differences in the incidence of localized tumors. Disparity IRRs have been consistent since 2012 for other racial/ethnic populations. Conclusions Although the frequency of prostate cancer screening varies by race/ethnicity, the impact of the 2012 USPSTF recommendation against PSA testing on screening trends did not robustly differ by race/ethnicity. Following 2012, there was a modest increase in the disparity for localized prostate cancer incidence between NHB and NHW men.

Session 4: Cancer Health Disparities across the Cancer Care Continuum
Tuesday, March 24, 1:15-2:45 p.m.

It's not just neighborhoods: Multiple levels of influence on cervical cancer screening across multiple healthcare settings

Pruitt SL, Xiong D, Hughes AE, Borton E, Haas JS, Kobrin S, Sugg Skinner C, Zhang S
Presenter: **Sandi Pruitt, PhD**, The University of Texas Southwestern Medical Center

Purpose: Describe variability in cervical cancer screening across multiple cross-classified levels: healthcare provider, clinic, and neighborhood of residence. Methods: We examined multilevel variation in Pap screening among patients due for screening using electronic health record (EHR) data from 3 healthcare settings in the PROSPR network. This retrospective cohort study included average-risk women aged 21-65 who completed â‰¥1 clinical encounter, had 3 years of EHR data, and whose addresses were linked to census tract data. We excluded women who were: HIV+, already screening up-to-date, not screening-eligible, or with history of cervical cancer or prior cervical abnormality. The outcome was Pap screen within 3 years of cohort entry (yes/no). We fit Bayesian cross-classified 4-level logistic models nesting patients within separate, non-overlapping levels (providers, clinics, census tracts). We estimated multilevel variation using Median Odds Ratios (MOR) and 95% credible interval in empty models (i.e., no covariates) and after adjusting for patient-level covariates (age, sex, race/ethnicity, BMI, pregnancy and smoking status, number of healthcare encounters, and cohort entry year). Results: Approximately half of eligible patients were screened in each setting (1: 54.4% of n=81,668; 2: 48.4% of n=42,127; 3: 47.3% of n=43,991). The magnitude of variation in Pap among all levels was similar among settings. After adjusting for patient-level covariates, the largest variation was at the clinic level (MOR range: 1.44-1.62), followed by provider (MOR range: 1.27-1.35), and neighborhood level (MOR range: 1.17-1.21). For example, we can interpret clinic-level MOR as: if a woman switched from a low-screening to a high-screening clinic, her odds of Pap screen would be 1.44-1.62 times higher. Future results will include one additional healthcare setting and will include provider-, clinic-, and neighborhood-level covariates. Conclusions: Significant and substantial variability in Pap was observed across provider, clinic, and neighborhood levels in 3 different healthcare settings, suggesting that factors at multiple levels are driving cervical cancer screening. Future interventions must identify and modify multilevel influences to reduce disparities in Pap screening.

Trends in late mortality among adolescent and young adult (AYA) cancer survivors

Anderson C, Nichols HB
Presenter: **Chelsea Anderson, PHD**,
American Cancer Society

Purpose of the study: Over the past several decades, treatment of cancer in adolescents and young adults (AYAs, age 15-39 years) has evolved significantly, leading to steady improvements in estimated five-year survival at diagnosis. However, the impact on late mortality in this population is largely unexamined. Therefore the purpose of these analyses was to investigate temporal trends in mortality among five-year AYA cancer survivors. Methods: The Surveillance, Epidemiology, and End Results (SEER) database was used to identify AYAs who were diagnosed with a first primary cancer between 1975 and 2011 and survived at least five years beyond diagnosis. Survival months were accrued from five years post-diagnosis until death or end of 2016, whichever occurred first. Cumulative mortality from all causes, cancer, and noncancer/nonexternal causes (i.e. excluding accidents, suicide, homicide) was estimated according to diagnosis era (1975-1984, 1985-1994, 1995-2004, 2005-2011). Estimates for cancer-specific and noncancer/nonexternal mortality accounted for deaths from all other causes as competing risks. Results: Among 282,969 five-year survivors of AYA cancer, five-year mortality (i.e. from 5 through 10 years post- diagnosis) from all causes decreased from 8.3% (95% CI: 8.0%-8.6%) among those diagnosed in 1975-1984 to 5.4% (95% CI: 5.3%-5.6%) among those diagnosed in 2005-2011. This was largely explained by decreases in cancer-specific mortality (7.0% to 4.3%) between these periods. However, for specific cancer types, including colorectal, bone, cervical/uterine, soft tissue sarcomas, and bladder, cumulative mortality curves demonstrated little improvement in cancer-specific mortality over time. Reductions in late mortality from noncancer/nonexternal causes over time were apparent for Hodgkin lymphoma and trachea, lung, and bronchus cancers; some evidence also suggested improvements for leukemia, central nervous system tumors, and head and neck cancers. Conclusions: Over the past four decades, all-cause and cancer-specific mortality have decreased among five-year AYA cancer survivors overall, but several cancer types have not shared in these improvements.

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- T *Denotes Trainee*

1 - T

Results of a Pilot to Increase Colorectal Cancer Screening in Low-Health Literacy Patients

Abbott A, Strack S, Ryan G, Jones J

A pilot test of three videos developed for individuals with health literacy deficits was conducted to assess patients liking for the videos, knowledge gains, and changes in screening intentions for individuals ages 50-75 who were not current on screening for colorectal cancer (CRC). The pilot was conducted in six of Iowa's federally qualified health centers (FQHCs) which are known to serve high numbers of patients with low health literacy. Data was collected by embedding the videos and the pre- and post-test in Qualtrics survey software. Participants watched one of the three videos based on their answers to three screener questions on CRC-related knowledge and answered assessment items on an internet-enabled tablet. A total of 291 individuals answered the screener questions, of which 74% were screened to the high-deficit, 12% were screened to the medium-deficit and 13% were screened to low-deficit videos. Attrition between the pre- and post-tests left a final N of 118 individuals with full data. The majority of those participants liked the videos at least "somewhat" (mean= 3.2 on 4-point scale), and 52% of participants indicated the videos were "interesting". Participants also gained CRC knowledge from the video they watched with proportions of respondents that indicated they had gained knowledge ranged from a low of 73% to a high of 93% across the different areas. Overall, the videos had a significant, medium effect size on ($t(117)=-5.37$, $p=.000$) on screening intentions from pre- ($M=2.79$, $SD=1.40$) to post-test ($M=3.42$, $SD=1.42$). This pilot provides promising results about the effectiveness of providing patient-education to low-health literacy individuals in attempts to increase CRC screening rates. However, our small N due to attrition between the pre- and post-test does somewhat limit the conclusions we can make from this pilot. Additional efforts need to be undertaken to ensure interventions like these are easy to implement in settings like FQHCs that serve high numbers of patients with health-literacy deficits. The fact that 74% of the initial sample was screened into the video meant for individuals at the lowest level of health literacy (high deficit) provides verification of the need to implement more interventions in this area.

2

What evidence-based interventions exist for increasing the uptake of cancer screening?

Adsul P

Several evidence-based interventions (EBIs) have been previously tested with positive outcomes for improving the uptake of cancer screening behaviors among asymptomatic individuals. These interventions often have multiple components and often use several strategies for delivering the program. In order to understand what program to implement, there is a need to understand what works in what context. We reviewed existing cancer screening programs on the Research Tested Interventions Programs (RTIPs) website to identify goals, content, context, and delivery of the interventions. A total of 50 programs that promoting the uptake of cancer screening were identified on the RTIPs website. Twenty-four interventions were promoting the uptake of breast cancer screening, 22 focused on colorectal cancer, 13 focused on cervical cancer and six programs had more than one cancer site as a focus area. Two programs were developed outside the US. Among these interventions 70.8% breast cancer screening, 95% of colorectal cancer and all cervical cancer programs focused on racial/ ethnic minorities. Twenty-nine programs (58%) were designed to be delivered in a clinical settings, whereas 13 (26%) programs were designed to be delivered in community settings, 6 could also be delivered at both community and clinical settings. There were two programs designed for either workplace settings or home-based. About 56% of all programs used community-based health educators for delivering the intervention and often had varying responsibilities including delivering educational interventions, reducing structural barriers, and providing navigational services. The main target of the intervention was a clinician in only three of the interventions and two of these were based on electronic health reminders. About 14 (28%) programs used reminders in the form of mailings or telephone calls. Three of the studies were focused on improving follow-up to an abnormal screening tests. Findings suggest that most studies used multicomponent interventions and several strategies for implementation. For developers of EBIs and future adaptation, this information could provide a helpful review of interventions and strategies that have previously been successful in promoting the uptake of cancer screening behaviors.

- T *Denotes Trainee*

3

The role of public health communication in addressing socioeconomic and residence-based disparities in health risk perceptions of smoking: findings from the Global Adult Tobacco Survey of Ethiopia

Bekalu MA, Gundersen DA, Viswanath K

Purpose: To examine whether disparities in risk perceptions exist across population subgroups, and whether and how public health communication has a role in addressing such disparities. Methods: Drawing from the Global Adult Tobacco Survey of Ethiopia (GATS 2016), we examined if health risk perceptions of smoking and secondhand smoke exposure varied across socioeconomic and urban vs. rural population subgroups. We also examined whether and how exposure to anti-smoking messages is associated with disparities in health risk perceptions across socioeconomic and urban vs. rural population subgroups. We conducted bivariate analyses and fitted logistic regression models with interaction terms using Complex Samples analytic procedures in IBM SPSS version 20. Results: Health risk perceptions of smoking and secondhand smoke exposure were significantly lower among rural, less educated and less affluent population subgroups compared to their urban, more educated and more affluent counterparts. Controlling for age, gender, education, wealth, place of residence, and exposure to pro-smoking messages, exposure to anti-smoking messages was associated with greater perceptions of the health risks of smoking (OR, 3.75; 95%CI, 1.41 -10.02). Moreover, exposure to anti-smoking messages moderated the associations of place of residence and education with risk perceptions of smoking and secondhand smoke exposure, respectively. The change in the probability of risk perception of smoking associated with exposure to anti-smoking messages was more pronounced among the rural populace compared to urbanites. Similarly, the change in the probability of risk perception of secondhand smoke exposure associated with exposure to anti-smoking messages was most pronounced among individuals without formal education compared to those with some education. Conclusions: There are socioeconomic- and residence-based disparities in health risk perceptions of tobacco use, but such disparities may be tackled by targeted public health communications.

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Older women's views and experiences of mammography screening in relation to aging, health status and healthcare overuse

Brotzman LE, Shelton RC, Agovino M, Rodriguez CB, Moise N, Tehranifar P

Purpose: Breast cancer (BC) screening guidelines recommend shared decision-making and cessation of screening in women ⩾75 years with limited life expectancy or poor health. Yet, despite insufficient evidence of long-term clinical benefit and concerns of overtreatment, over half of women ⩾75 years undergo mammography screening. We examined older women's experiences, beliefs, and opinions about BC screening in relation to aging and health and their perceptions of unnecessary healthcare. Methods: Using purposeful sampling, 19 women, ages 71-83 years, with a recent screening mammogram were recruited from a breast imaging clinic and completed a semi-structured interview. Transcribed interviews were coded using a thematic analytic approach. Results: The majority of women were Hispanic (63%) and received annual mammograms (71%). Women's motivation for obtaining mammogram included agency over their health ("I feel like I'm doing something for my health"), peace of mind from normal results, ease, accessibility and insurance coverage of mammography, and mammography being a personal habit. All women reported one or more prompts for screening including their own calendar reminder, providers' referrals and healthcare system reminder letters/calls. Women deemed the benefits of early detection and peace of mind to outweigh the only perceived screening harm, temporary discomfort. Overall, women did not feel older age or medical conditions should keep them from receiving mammography; most felt growing older meant they needed mammograms more than ever ("it's something I'll do until I die"). No one perceived screening as overuse or unnecessary care ("as long as the doctors let me do it, I'll keep doing it.") Women did not report discussing mammography cessation or harms with their providers, and some expressed they would insist on receiving mammograms even if not recommended by their provider. Conclusions: Older women stated strong intentions for continued BC screening and did not endorse reducing or stopping screening with increasing age or poor health. Their opinions and behaviors were supported by providers and system-level prompts. Focusing on both patient and provider/systems level factors may be needed to improve guideline implementation.

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Gender, Regional and Ethno-racial Disparities in HPV Vaccination Uptake within Routine Recommended Ages in the United States: an analysis of vaccination trends from 2008 to 2017

Chido-Amajuoyi OG, Talluri R, Shete S

Background: The Advisory Committee on Immunization Practices (ACIP) recommends routine HPV vaccination at ages 11-12 years, and allows for initiation as early as 9 years of age. HPV vaccination within the routine recommended period has important implications for vaccine efficacy and vaccination coverage rates. Methods: Data for this study were derived from the National Immunization Survey-Teen (NIS-Teen), spanning years 2008 to 2017. Using health care provider documented vaccination histories, we examined the trends in HPV vaccination initiation and completion within the routine recommended period. Further, we stratified vaccination status in relation to sociodemographic factors and region (US state of residence). Results: HPV vaccination within routine recommended ages increased over the years, with initiation rates rising from 17.3% in 2008 to 60.7% in 2017 and completion rates rising from 13.5% to 33.2% between 2011 and 2017. Since introduction of gender-neutral HPV vaccination, the rates of vaccination completion among boys rose more than 27% between 2011 and 2017, while completion rates increased by only 13% over the same period in girls. Blacks had higher rates of initiation and completion of HPV vaccination than Whites. Hispanic males and females consistently recorded higher HPV vaccination uptake rates than their non-Hispanic counter parts for the most part of the study period. However, HPV vaccination completion rates among Hispanics has declined in recent years, decreasing by 7% between 2015 and 2017. In 2017, while HPV vaccination initiation within the routine recommended period approached rates exceeding 70% in several US states, most states had vaccination completion rates well below 50% - excluding only Rhode Island (59.6%) and Arizona (51.3%). Conclusion: HPV vaccination during the routine recommended period in the US is sub-optimal, representing a missed opportunity for effective vaccination against HPV infection and HPV-related cancers. Further investigations are needed to uncover the underlying factors that contribute to the disparities observed in HPV vaccination uptake within the routine recommended period.

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Breast Cancer Risk Management Following Universal Risk Stratification: Impact of Risk Communication on High-Risk Clinic Visits, Chemoprevention, Genetic Counseling, and Genetic Testing

Conley CC, Augusto B, Garcia J, McIntyre M, Roetzheim R, Funaro K, Gerke T, Kim J, Niell B, Vadaparampil ST

Purpose of the Study: To characterize uptake of breast cancer (BC) risk management behaviors (i.e., high-risk clinic visits, chemoprevention, genetic counseling, and genetic testing) following BC risk stratification among women identified as high risk for BC. Methods: Women presenting for screening mammography underwent BC risk stratification during routine clinical care. Estimated lifetime risk was computed using the modified Gail, Tyrer-Cuzick (TC7), and BRCAPRO models. Numerical risk information was sent to referring providers in conjunction with screening mammography results. Women at high (⩾20%) risk based on any stratification model (N=298) received a mailed letter with categorical risk information and contact information for the institution's high risk breast clinic. A subset of high risk women consented to a follow-up study (n=71); 66 (93%) completed a survey to assess BC risk management behaviors 6 months post-mammogram. Results: Participants were 52 (±8) years old, 89% were non-Hispanic White, and 74% had private health insurance. Since the time of screening mammography, 7 patients (11%) reported any BC risk management behaviors. Six (9%) reported receiving a referral to a high-risk clinic, 5 (8%) scheduled a high-risk clinic appointment, and 4 (6%) attended a high-risk clinic appointment. Although recommended to 5 participants (8%), only 1 participant (2%) initiated primary chemoprevention medication. Finally, 9 participants (14%) discussed genetic counseling with a healthcare provider, 6 (9%) were referred for genetic counseling, and 3 (5%) completed genetic testing. Of those who completed genetic testing, 2 participants had received their results (BRCA1/2 negative=1, variant of uncertain significance=1). Conclusions: Few women reported uptake of BC risk management behaviors following risk stratification. In particular, the rates of high-risk chemoprevention and genetic testing observed in this study are lower than previously reported. This may be due to the follow up time point selected; extended follow-up is necessary to understand uptake of risk management strategies in high risk women unaffected by BC. These pilot data indicate that universal risk stratification alone may not lead to increased utilization of BC risk management behaviors.

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Using natural language processing to determine predictors of healthy diet and physical activity behavior change in ovarian cancer survivors

Crane TE, Culnan J, Sharp R, Wright SJ, Franks G, Klimowski C, Merchant N, Bethard SJ

Purpose of the study: To explore the use of speech technology and natural language processing in evaluating language and vocalics as predictors of behavior change in ovarian cancer survivors participating in a lifestyle intervention. Methods: Recorded telephone coaching sessions from women participating in the Lifestyle Intervention for Ovarian cancer Enhanced Survival (LIVES) study were used for this analysis. LIVES is testing whether women randomly assigned to a lifestyle intervention promoting a high vegetable, fruit and fiber and low-fat diet and increased physical activity will have increased progression free survival as compared to women assigned to an attention control. Motivational interviewing, a directive, patient-centered approach, is used to elicit behavior change. A 10% random sample of call recordings were scored for protocol fidelity. Three automated speech recognition programs, Google cloud to speech, AWS transcriber, and Watson speech to text were tested. The text transcriptions were analyzed by a natural language processing expert for how well they retained the information necessary for evaluating fidelity of the motivational interview to the LIVES protocol. Using the OpenSMILE acoustic feature extraction library, the audio was analyzed by a speech technology expert for how well different aspects of the speech signal (e.g., pitch, spectral energy) reflect low vs. high participant achievement. Results: The three automated speech recognition programs accurately detected between 72 and 76% of text, with Google cloud to speech performing the best. Additionally, the text was correctly attributed to the speaker 68% of the time (32% DER score). Analysis of the transcriptions suggests that the Google output recovers the critical words and phrases for five of six different measures of fidelity to the LIVES protocol. Analysis of the audio suggests that high-achieving participants show more variable pitch than low-achieving patients. Conclusions: Next steps will include analysis of the more than 33,000 recorded hours of LIVES calls for language and sentiment in relation to diet and physical activity behavior change. Speech technology and natural language processing hold high potential for identifying characteristics of language used in coaching calls

8

Characterizing Primary Care Clinician Information Needs and Implementation Strategies to Increase Lung Cancer Screening with Low Dose Computed Tomography

Davis SN, Ferrante JM, Tran T, Steinberg MB, Hudson SV, Kinney AY

Introduction: The National Lung Screening Trials (NLST) have demonstrated the efficacy of low dose chest computed tomography (LDCT) for early detection of lung cancer. Unfortunately, utilization of LDCT remains suboptimal. Increasing primary care clinician awareness of and knowledge towards LDCT may significantly impact patient utilization of LDCT. This study seeks to characterize primary care clinicians' information needs, education preferences, and solutions to increase uptake of LDCT in their practices. Methods: Semi-structured phone interviews were conducted with 30 primary care clinicians (family medicine and internal medicine) from federally qualified health centers, community, and academic primary care practice settings throughout New Jersey. Interviews were audio-taped and transcribed verbatim. Qualitative data were analyzed using content analytic procedures. Results: Many clinicians expressed confidence in the results of the NLST to support the recommendation of LDCT to their patients. Clinicians wanted additional information on billing for shared decision making and tools to help assess patient eligibility of LDCT. Clinicians suggested piggybacking LDCT onto preventive cancer screening, annual visits, and practice quality metrics to increase uptake within practices. Clinicians suggested continuing medical education (electronic and/or seminars), educational presentations (grand rounds or department meetings), or short educational briefs delivered electronically as avenues to improve awareness and increase knowledge of lung cancer and LDCT is via. Clinicians also suggested targeted marketing in the form of in-clinic pamphlets and posters to increase patient knowledge of LDCT. Conclusions: Prioritizing clinician information needs, educational preferences, system-level solutions are necessary to improve patient screening with LDCT. Strategies to increase uptake of LDCT and implementation within practices should incorporate stakeholder engaged system-level interventions, such as those proposed within this study.

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Stagnating rates of healthcare providers' recommendation for HPV vaccine in the US adult population

Fokom-Domgue J, Yu RK, Shete S

Puropose: Although a leading nation for HPV vaccine's introduction and promotion worldwide, the United States lag behind many high income countries with regard to HPV vaccination uptake. In light of this, the 2012 report of the President's Cancer Panel highlighted the overriding contribution of missed clinical opportunities to the suboptimal HPV vaccination coverage. This urgent call to action was then renewed by the Panel in its 2018 report. However, whether rates of provider recommendation for HPV vaccine in the US adult population have increased remains unclear. Methods: Using data from the Health Information National Trends Survey (HINTS) from 2012 to 2018 (HINTS4 cycle 2, HINTS4 cycle 4, HINTS5 cycle1, and HINTS5 cycle 2), we determined trends in the prevalence of provider recommendation for HPV vaccination, as well as its gender, racial and urban-rural variations among US residents eligible for HPV vaccine or living with age-eligible individuals. Results: A total of 1,415, 1,476, 1,208 and 1,344 respondents to the HINTS 4 cycle 2, HINTS 4 cycle 4, HINTS 5 cycle 1 and HINTS 5 cycle 2, respectively, were eligible to this study. In this population, the prevalence of provider recommendation for HPV vaccine decreased from 25.6% in 2012 to 23.0% in 2018. This prevalence was higher among females compared to males (35.0% versus 15.9% in 2012; 29.4% versus 15.5% in 2018). According to race/ethnicity, it moderately decreased from 27.8% in 2012 to 22.4% in 2018 among non-Hispanic Whites, and from 28.0% in 2012 to 21.6% in 2018 among Hispanics; and increased from 21.6% in 2012 to 35.1% in 2018 among non-Hispanic Blacks. The urban-rural difference found (26.2% among urban dwellers versus 22.1% among rural dwellers in 2012), gradually decreased over time (23.3% versus 21.1% in 2018). Conclusion: Despite recent progress, our findings indicate stagnating rates of provider recommendation for HPV vaccine in the US adult population, and persistent gender and racial disparities in this intervention. To accelerate HPV vaccination uptake in the country, immediate actions to enhance provider recommendation for HPV vaccine are needed, especially among males, Hispanics, non-Hispanic Whites, and rural dwellers.

10

An Examination of Causal Attributions of Cancer from a Population Health Assessment

Fuemmeler BF, Miller CA, Ksinan AJ, Do EK, Morris BB, Fugate-Laus K, Fallavollita WL, Kim SJ, Wheeler DC, Dahman B, Gal TS, Ginder GD

Purpose: To determine factors associated with causal attributions of cancer among adults within the Virginia Commonwealth University Massey Cancer Center catchment area. Methods: Data were obtained from a cross-sectional survey of 559 respondents of the Together for Health – Virginia Study, a population-based sample of adults. Individual-level factors including demographic (age, gender, race/ethnicity, rural identity) and socioeconomic (education, income) characteristics were assessed, as well as lifestyle (tobacco use, body mass index), medical history (family or personal history of cancer), delay discounting, and individuals' attitudes towards alternative therapies. Attitudes towards cancer were measured by eight items reported on a 4-point Likert scale (strongly agree to strongly disagree). The first four items reflected participants' agreement on the following as causes of cancer: behavior, tobacco, obesity, and HPV. The other four items included statements that reflected fatalism about cancer (e.g. everything causes cancer, there's not much you can do to lower your chances of getting cancer). Structural equation models were run separately for each type of belief modeled as a latent dependent variable. Results: Respondents were 55.6 years (SD=15.8) on average, 72.6% White, 51.6% female, and 38.3% self- reported rural identity. Fatalistic beliefs about cancer was associated with rural identity (β=0.1, p=0.02) and believing in alternative therapies as a primary cancer treatment (β=0.1, p=0.03) while older age (β=-0.3,p<0.01), higher levels of education attainment (β=-0.2, p<0.01), and having a personal history of cancer (β=-0.2, p<0.01) were significantly associated with lower fatalism. Stronger beliefs in concrete causes of cancer were associated with higher educational attainment (β=0.2, p<0.01) and income levels (β=0.2, p=0.01). These beliefs were lower among Black respondents (β=-0.2, p=0.02). Conclusions: This study provides evidence for the relationship between causal attributions of cancer and individual factors, emphasizing the role that culture may play. Future implementation research is needed to culturally adapt prevention efforts and cancer awareness messaging and campaigns using causal attributions of cancer.

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Concordance of HIV self-report and EHR data capture in cancer patients

Fuzzell LN, Vadaparampil ST, Liu Y, Coghill AE

Purpose: The population living with both HIV and cancer is growing. Accurate information about oncology patient HIV status is important because those with underlying HIV infections experience poorer cancer-specific outcomes than the general cancer population. We assessed the sensitivity of three different metrics for identifying HIV status at a large, NCI-designated comprehensive cancer center. Method: Using the institution's Health Research Information System, we extracted HIV data from the electronic health record (EHR) at a comprehensive cancer center for patients admitted to the institution between January 2009 and September 2019. HIV status was determined via the following sources: 1) electronic patient questionnaire self-report of an HIV/AIDS diagnosis or use of daily HIV prophylaxis pills (PrEP) or antiretroviral therapy (ART); 2) ICD 9/10 diagnosis code affirming HIV status; and 3) evidence of administration of ⩾1 HIV medication (ART) regimen in EHR (of 40 regimen search terms). We report frequencies of patients identified through each metric and concordance of data. Results: 949 persons living with HIV were identified through at least one of the three data sources. 284 (30%) self-reported an HIV diagnosis. The remaining 70% (N=665) failed to self-disclose HIV status and were identified either through HIV medications or ICD diagnosis codes. Only 257 HIV diagnoses (27%) were consistently identified through all three HIV identification metrics, with many patients only identified through a singular metric (e.g., 154 (16%) via diagnosis code only; 192 (20%) via HIV medications only). Conclusions: In our sample, most (70%) of those with HIV did not disclose this information on the standard electronic new patient intake questionnaire. Thus, initial consultations in the oncology setting may fail to consider HIV status in treatment planning and oncology care. Notably, only 27% of oncology patients living with HIV were identified through all three metrics, indicating lack of concordance regarding HIV status in the EHR. These findings highlight the potential for oncology care team members to be uninformed of clinically relevant information, potentially leading to inadequate care for a vulnerable population.

12

Diverse Patients' Experiences of Recruitment and Participation in Cancer Clinical Trials

Ginossar T, Burgess E, Rodeman J, Dunn B, Guest D, Sussman A

Little is known about experiences of cancer patients who participated in Cancer Clinical Trials (CCT). This study aimed to qualitatively explore patients experiences of such participation, including their perceptions of physicians' communication, decision making, and assessments of benefits and disadvantageous. Semi-structured interviews were conducted with 26 cancer patients who participated in CCT in a minority-serving academic center. Thematic analysis methods were used. Patients reported participation in CCT as largely positive due to better medical attention compared to standard of care, satisfaction with providers' communication, altruistic motivation, and clinical outcomes, or lack of other therapeutic options. Participants were often unclear about the financial considerations involved and hence these considerations served as a potential barrier or facilitator to participation. When making the decision to participate, interviewees placed a considerable degree of trust in their doctors. Participants who demonstrated high health literacy and knowledge of their diagnosis and treatment, including CCT expected and received discussion with providers about CCT and utilized diverse information sources, whereas those with low health literacy relied on physicians' top-down information. If offered to participate in a CCT in the future, most will say yes, even if they are somewhat fearful and unclear on the details of the CCT. Compassionate, clear, and on-going communications following the point of decision-making increase patient satisfaction with the CCT process. This study highlighted the importance of physician relational communication and the need for ongoing education of participants in CCT, meeting the different information needs of patients with different health literacy levels. These findings will inform training and educational interventions for patients, family members, and clinical and research teams. Provision of ethical advice on the clinical quality of the CCT at hand is essential, as well as informing patients of the process of approving CCT and protection. Given the stress typical for the time of signing a consent, plain language information should be provided to patients and families for future use.

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Assessment of precision prevention information for melanoma risk reduction

Vadaparampil ST, Doyle S, Kim Y, Sutton S, Del Rio J, Forgas S, Roetzheim R, Kanetsky PA

Purpose | To assess the impact of precision prevention materials conveying melanoma risk information based on inherited genetic variation at the melanocortin-1 receptor gene (MC1R). Methods | We conducted a randomized controlled trial to evaluate the efficacy of feedback of inherited genetic risk (precision prevention) on melanoma prevention behaviors among individuals reporting a sun-resistant phenotype. Participants were randomized within MC1R risk categories (average/high) to receive mailed standard (publicly-available) or precision prevention materials describing prevention activities. At 6 months, participants answered questions about quantity of materials read, clarity and believability of information, intent to change sun protective behaviors, communication of information, additional information seeking, and recall of genetic risk. We report on differences in responses among the standard, average, and high risk groups. Results | The 6-month survey was completed by 398 (70%), 170 (75%), and 240 (70%) participants in the standard, average, and high risk groups, respectively. There were no differences by group in the quantity of material read or seeking additional information about prevention behaviors. Those in the high risk group spoke less (32%) with someone about their materials compared to those in the average risk (41%) or standard (42%) group (p=0.05). Believably and clarity of materials also differed by group; those in the standard group rated believability higher than those in the high risk group (p=0.0017) and clarity higher than both the high (p<0.001) and average (p<0.001) risk group. We did not find a difference by group in intention to change behavior. Although a similar proportion of participants in the average (72%) and high risk (70%) groups recalled their MC1R risk category; accuracy of recall was significantly higher in the average risk (100%) compared to the high risk (77%) group (p<0.001). Conclusions | Despite some differences, educational materials were generally well- received by study participants in the standard and precision prevention groups. The lack of accurate recall of MC1R risk category among those in the high risk group is potentially concerning and should be explored juxtaposed against intervention results.

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Ciclovía: Progressing from Research Intervention to Community Adoption

Ko LK, Jimenez E, Cisneros O, Bishop S, Ibarra G, Brown EVR, Escareno M, Rillamas-Sun E, Kratz M, Mendoza JA

Purpose: Open street events, where roads are temporarily closed to motorized vehicles, provide safe space for physical activity and have potential to become sustainable rural community infrastructure. Since 2017, we have collaborated with a rural community to implement an open street event, named ciclovía. In 2019, ciclovía was adopted as a community-wide program. This paper describes the process of progressing ciclovía from a research intervention to a community-adopted program. Methods: We used community-based participatory research to foster bidirectional learning on how to optimize the content and implementation of ciclovía to be feasible and acceptable for rural communities. The community-academic partnership focused on: 1) understanding the science of ciclovía, 2) learning the implementation process, 3) creating tools to facilitate planning, implementation, and evaluation of ciclovía, and 4) developing transition steps from a research intervention to a community-adopted program. Results: The progression of the research intervention into community adoption spanned two years. First, the partnership met quarterly to discuss the science of ciclovía, its utility, and adaptation for rural communities. Second, the partnership studied processes that facilitated ciclovía implementation. Third, the partnership created the ciclovía planning guide and tools for communities to use to implement their own ciclovía. The guide included forming the planning committee, setting meeting and communication plans, marketing and promotion, and selecting evaluation tools. Fourth, the transition steps from research to community adoption included creating roles and responsibilities, implementing ciclovía using the planning guide, and convening listening sessions for improvement on implementation. Community attendance at ciclovía doubled from 189 individuals (126 children and 63 adults) when it was a research intervention to 394 individuals (277 children and 117 adults) when it was a community program. Conclusion: The progression from a research intervention to a community-adopted program encompasses multiple steps that involve bidirectional learning and partnership with the community. Lessons learned from this study are integrated into a disseminable ciclovía planning guide.

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General and cancer-specific psychosocial outcomes among Black breast cancer survivors: Examining the role of acculturation and patient-provider communication

Lake PW, Conley CC, Pal T., Sutton SK, Vadaparampil ST

PURPOSE: Following treatment, breast cancer (BC) survivors frequently experience higher levels of anxiety and depression due to concerns about recurrence and survivorship challenges. Effective provider communication and patient confidence in communication skills may reduce anxiety and depression. Acculturation may also positively impact these psychosocial outcomes. We examined the impact of patient-provider communication and acculturation on psychosocial outcomes among Black BC survivors. METHODS: Black women ⩽50 years diagnosed with invasive BC between 2009-2012 were recruited from the Florida Cancer Registry (n=351). Women reported patient-provider communication (provider communication quality, patient confidence in communicating with providers), acculturation (religiosity, collectivism, future time orientation), general psychosocial factors (anxiety, depression) and BC-specific psychosocial factors (cancer- related distress, worry about BC recurrence). Patients were categorized into high, moderate, and low levels of communication and of acculturation. Multiple regression analysis examined communication and acculturation variables as predictors of general and BC-specific psychosocial factors while controlling for key sociodemographic variables (marital status, employment, health status and education level). RESULTS: Level of communication was significantly associated with anxiety (β=-.135, $p<.01$) and depression (β=-.103, $p<.05$). More specifically, those with higher confidence in communication and more positive perceptions of communication quality were more likely to experience lower levels of anxiety and depression. Level of acculturation was not significantly associated with any psychosocial outcome. CONCLUSIONS: Results suggest that effective provider communication and patient confidence in communication skills may reduce patients' anxiety and depression post-treatment, suggesting that patient-provider relationships and patient empowerment may be key components of cancer survivorship. Future multi-level interventions should target patients and providers and focus on improving patient-centered communication skills among providers and increasing patient self-efficacy in communicating with providers, particularly among cancer survivors.

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A scoping review of tobacco treatment implementation research in the Veterans Health Administration

LeLaurin JH, Uphold CR, Cardel MI, Salloum RG

Purpose: Tobacco use remains the leading cause of preventable cancer. Veterans consistently use tobacco at higher rates than the general population. Despite efforts to increase tobacco cessation among veterans, gaps remain in adherence to clinical practice guidelines in the Veterans Health Administration (VHA). Tobacco treatment implementation research seeks to fill this gap by promoting the uptake of evidence-based interventions into routine clinical practice. The aim of this scoping review was to summarize tobacco treatment implementation research in the VHA. Methods: We conducted a systematic search of PubMed, PsycInfo, and CINAHL databases for articles published prior to March 2019. Articles were included if they reported on VHA tobacco treatment interventions and evaluated at least one implementation outcome. Included articles were coded according to the PICO framework, implementation strategies used, and implementation outcomes measured. Barriers and facilitators to implementation were also assessed. Implementation strategies were categorized by Waltz's mapping of the Expert Recommendations for Implementing Change and outcomes were classified according to Proctor's framework for implementation outcomes. Results: We identified 23 articles reporting on 19 studies. Study settings included inpatient units (n=4), PTSD clinics (n=4), and primary care (n=3). Common strategies were training and educating stakeholders (n=10), use of iterative strategies (n=10), and changes to infrastructure (n=8). Fidelity (n=12) and reach (n=9) were the most frequently reported implementation outcomes. Perceived implementation facilitators included intervention characteristics (e.g. complexity level), use of tools (e.g. EHR templates), and staff training. Common barriers were competing priorities, lack of resources, and perceived patient disinterest in cessation. Conclusions: This review highlights the various tobacco treatment implementation strategies used in the VHA, along with common implementation challenges. Further understanding of these factors can enhance tobacco treatment and reduce cancer burden in the VHA.

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Decision simulation technology to assess practical application of massage therapists' (MTs) use of a MT-client helping conversation for skin cancer risk reduction

Heslin K, Silva G, Muramoto M, Loescher L

Purpose: To report implementation of the branched-narrative decision simulation component of skin cancer risk reduction e-training for massage therapists (MTs), specifically how simulation helps track specific decision pathways, and provide insight into training competencies and MT satisfaction. Methods: A simulation-based technology platform facilitated assessment of MTs application of e-training content, specifically steps for having a helping conversation with clients about skin cancer risk reduction. The 5 decision simulation cases were competency-based, mimicked a MT client encounter and helped demonstrate MTs application of training knowledge. Each simulation branching node had paths of optimal, feedback, or suboptimal. The choices in each node corresponded to one of 5 helping conversation competencies. We scored each path selected by the MT and tracked performance and choice selection using counters. We downloaded reports of specific learner sessions to view the MT's path through the case, scores, and the amount of real time spent from the first node to the case endpoint. Thirty-six MTs rated their agreement regarding enjoyment of and perceptions of the usefulness of the simulations on a 5-point scale. Results: Eighty-one MTs completed the simulation in an average of 2.7 minutes. The most common feedback and suboptimal responses corresponded to competencies in the Awareness and Helping steps of the helping conversation (starting the conversation and sharing information, respectively). The expression of personal concern was a common mistake when communicating with the simulated client, as was sharing personal experiences in a potentially negative way. The case with the most suboptimal responses (23.4%) pertained to finding a suspicious lesion on a client. The case with the most optimal responses (69.13%) pertained to sun protection. The majority of MTs (86%) agreed or strongly agreed that they enjoyed the simulations (mean score 4.31); 92% agreed that the simulations helpful to include in the training (mean score 4.36). Conclusion: Decision simulation technology integrated into e-training modules was useful for assessing practical application of MT knowledge and skills for a MT-client helping conversation for skin cancer risk reduction.

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Primary Care Physicians' Perspectives on Shared Decision Making about Lung Cancer Screening

Abubaker-Sharif M, Shusted C, Myers P, Lambert E, and Myers RE

Purpose: In 2015, the Centers for Medicare and Medicaid Services announced coverage for annual lung cancer screening (LCS) with low dose computed tomography (LDCT) for patients who satisfy defined eligibility criteria and go through a shared decision making (SDM) session. This study was intended to gain insights into provider perceptions about SDM for LCS practices and the use of an online decision aid. Methods: Between Fall 2018-Fall 2019, we conducted 45-60-minute semi-structured interviews with internal medicine and family medicine physicians in a large urban medical center. The interviewers sought to elicit physicians' views about two categories of interest: 1) SDM in LCS, and 2) use of the Decision Counseling Program© (DCP). The interviews were audio-recorded and transcribed for analysis. Transcripts were coded using direct content analysis in NVivo 12, and major themes were identified. Results: A total of 16 physicians (nine internal medicine and seven family/community medicine) were interviewed in this pilot study. In terms of perceptions related to SDM in LCS, respondents reported: a) physicians and patients have limited information about LCS and related guidelines; b) patients rely on physicians to guide them through decision making about LCS; c) physicians do not use decision aids to support SDM about LCS and believe they are doing SDM; and d) physicians are receptive to exploring alternative strategies for doing SDM related to LCS. Regarding use of the DCP, respondents reported: a) physicians believe that a standard process to support SDM is needed; b) it is important to tailor DCP use to meet patient needs related to language, culture, and health literacy needs; and c) physicians would benefit from guidance on how to integrate the DCP into the practice workflow. Conclusions: Findings from this pilot study indicate that SDM about LCS in primary care is limited, but physicians are receptive to learning how to change this situation. Research is needed to determine how health systems can facilitate the implementation of increasing SDM about LCS in routine care.

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Collecting non-clinical data to address disparities in cancer prevention: Lessons from the field

Padamsee TJ

Background and Purpose: Research on risk-reduction decision making among women at high risk of breast cancer rarely addresses minority groups, despite indications they may face additional burdens at every stage. Because most high-risk women are not in high-risk clinical care, effective prevention research requires recruitment beyond clinical populations. Methods: The Daughter, Sister, Mother Project has collected qualitative and quantitative data from high-risk African American and White women not in clinical care. Non-clinical recruitment sites include social media, volunteer databases, and community organizations. Results: These recruitment methods present unique challenges for which we have developed specific solutions. (1) Risk prediction modeling. Because the individual risk level of women recruited through non- clinical methods is usually unknown, risk prediction modeling must be built into data collection. Telephone screening allows risk prediction modeling before enrollment but requires multiple contact points. Collecting risk- related information within an interview or survey makes data collection possible within a single interaction, but requires risk-prediction modeling and sample trimming afterward. (2) Bots and fraudulent participants. Combining online data collection with social media recruitment facilitates involvement of participants not commonly drawn into biomedical research, but also exposes studies to various forms of fraud. To avoid wasting incentive funds and incorporating fraudulent information into datasets, we have developed methods to distinguish “real” from “fake” participants. These include programming methods, semi-automated and manual data-checking methods, and direct phone contact after data collection. (3) Ongoing connections. African American women not involved in high-risk clinical care may be highly-motivated but hesitant to participate in prevention research. Trust can be built through connections with community organizations, ongoing two-way contact with our research team, and returning findings to the communities where we collect data. Conclusions: Recruiting from non-clinical populations is a useful tool for cancer prevention research, and requires creative recruitment, data collection, and data cleaning methods.

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Assessing acceptance of system-level intervention strategies to increase cervical cancer screening and follow up among women living with HIV

Rodriguez SA, Gonzalez C, Lee SC, Tiro JA

Purpose: Women living with HIV (WLWH) are at increased risk of cervical cancer compared to women without HIV. Previous research revealed inadequate screening (53%) within 12 months and follow-up (42%) within six months among WLWH accessing care in our integrated safety-net healthcare system. This study aimed to obtain patient feedback on 1) the acceptability of system-level interventions (e.g., intensified appointment reminders, patient navigation) aimed at increasing cervical cancer screening and follow-up, and 2) educational messages targeting WLWH. Methods: We utilized our PROPSR cohort database to identify eligible participants. We conducted N=11 semi- structured interviews with WLWH accessing care in our safety-net healthcare system. Interviews were audio- recorded, transcribed, and double-coded using an iterative deductive-inductive approach. Results: Patient recruitment was challenging. Among the 99 eligible women, 24 interviews were scheduled with 13 no-shows. Overall, response rate was 11%. All participants were receptive to intensified appointment reminders via letters and phone calls. Some felt that a text message may be inappropriate due to privacy concerns. All participants felt that a patient navigator would be an important intervention component to improve outreach. Most participants felt educational messages that incorporated statistics and medical information were more impactful to raise perceived risk than short motivational slogans. Two themes emerged inductively. First, most patients spoke about the importance of women taking care of themselves so they may take care of family members. Participants suggested this theme be incorporated into broader messaging relayed through letters, phone calls, and educational materials. Second, women discussed the theme of community. Multiple participants suggested a group for WLWH to come together to discuss health issues including cervical cancer screening. Conclusions: Two important themes emerged from our interviews with patients that were not originally included in the proposed interventions or educational messages. Patient perspectives and feedback are critical to designing patient-centered interventions for increasing cervical cancer screening and follow up.

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Examining Older Adults' Attitudes and Perceptions Towards Cancer Screening and Overscreening

Roy S, Moss JL, Rodriguez-Colon SM, Shen C, Cooper JD, Lengerich EJ, Adelman A, Curry W, Ruffin MT

Introduction (Purpose): The U.S. Preventive Services Task Force (USPSTF) guidelines recommend patients stop screening for breast, cervical, and colorectal cancers based on age or health status. Understanding how older adults perceive cancer screening will help facilitate screening decisions for these cancers and reduce overscreening. The purpose of this study was to examine attitudes and perceptions of older adults regarding cancer screening, specifically related to breast, cervical, and colorectal cancers. Methods: Four focus groups (N= 39) were conducted in two community, urban settings in southeastern Pennsylvania. Study flyers and one-page descriptions were used to recruit participants at community and senior centers. Inclusion criteria consisted of: 1) 65 years of age and older; 2) Not currently being treated for a cancer diagnosis; 3) Not diagnosed with cancer (excluding skin cancer) in the past 5 years; 4) Able to speak, read, and write English and 5) Living independently or in assisted living facility. Inductive thematic analysis was used to analyze the data. Results: The majority of participants were female (74%), Hispanic (69%), and White (56%) with an average age of 74. Results showed that older adults desired tailored information based on individual/family health history and current health status to make a decision about cancer screening. They also valued their physician's recommendation regarding screening but required their physician to justify individual recommendations to stop screening. Overall, attitudes regarding stopping screening among participants varied, ranging from hesitancy due to their awareness of the benefits of screening to eagerness due to previous negative experiences regarding screening (pain, stress, etc.). Conclusions: Multiple factors contribute to a decision by older adults to stop or continue periodic cancer screening. Stopping cancer screening requires giving older adults individualized information on the benefits and risks from screening and how these change with age and health status. Future research should further examine the content, method and timing of patient/provider communication in cancer screening decisions among older adults.

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Using Concept Mapping to Understand Multi-State Perspectives about Barriers and Facilitators to HPV Vaccination

Ryan GW, Askelson NM, McRee AL, Farris PE, Shannon J, Hanson JD, Kenyon DB

Purpose of the Study: We conducted a multi-state concept mapping project to elicit feedback from state-level stakeholders about reasons for low HPV vaccination rates. Methods: Researchers in Iowa, Minnesota, Oregon, South Dakota, and Washington identified state-level stakeholders working in the fields of adolescent health, cancer prevention, or immunization. A total of 157 individuals were invited to participate in an online concept mapping project that included two phases. First, participants brainstormed statements in response to a prompt asking them to identify factors with the greatest influence on HPV vaccination rates, considering both urban and rural areas. Second, participants sorted the statements into piles. They also rated the statements on a scale of 1-5, based on importance and feasibility. Results: Of the 157 people invited, 63 participated in the brainstorming activity, and 27 participated in sorting and rating. Participants identified 10 clusters of factors influencing HPV vaccination which included: education, state support, strong communication, policy, vaccines, collaboration, access, provider influence, evidence-based interventions (EBIs), and consistent messaging. The clusters rated most important were education (4.21), provider influence (4.1), and EBIs (4.07). Clusters identified as the least feasible were state support, access, and policy. There was significant mismatch between ratings for importance and feasibility. For example, while education was rated as highly important (4.21), it rated lower on feasibility (3.66). This same pattern was echoed for provider influence, EBIs, state support, and policy. Conclusions: These results help to contextualize what we already know about low HPV vaccination rates and identify priority areas to address to improve them. The lower feasibility ratings for several of the most important, and possibly most effective, clusters suggest that stakeholders perceive significant barriers (e.g. time and cost) to their work. Our use of concept mapping allowed for easy collection of data in multiple states at the same time. This method should be considered by other researchers looking to draw on stakeholder knowledge to design and prioritize relevant programming for cancer prevention and control efforts.

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Negative cancer beliefs: Socioeconomic differences from the Awareness and Beliefs about Cancer Survey

Sarma EA, Quaife SL, Rendle KA, Kobrin SC

Purpose: Socioeconomic gaps in cancer mortality are widening and may be driven partially by poorer uptake of early detection behaviors among lower socioeconomic status (SES) groups. Lower SES groups may hold both fewer positive and more negative cancer beliefs that discourage uptake of these behaviors. Given persistent cancer disparities by SES, this study examined differences in positive and negative beliefs about cancer by SES among adults in the United States (US). Methods: Telephone interviews with a population-representative sample, aged 50 years or older, were conducted in the US using an adapted Awareness and Beliefs about Cancer (ABC) instrument (N=1,425). Cancer beliefs were measured by three positively and three negatively framed items (e.g., “cancer can often be cured,” “most cancer treatment is worse than the cancer itself”). SES was indexed by educational attainment (bachelor’s degree and above, some college, high school or lower). Multivariable logistic regression models, adjusted for age, gender, marital status, race, self-rated health, and cancer experience, were used to examine associations of SES with cancer beliefs. Results: Agreement with positive statements about cancer was high (>80%) and did not vary with education. In contrast, agreement with negative statements varied with education. Relative to adults with a bachelor’s degree, adults with a high school degree or less were more likely to agree that “treatment is worse than the cancer itself” (45.2% vs. 68.2%; aOR=2.43, 95% CI=1.68-3.51), cancer is “a death sentence” (17.4% vs. 33.2%; aOR=2.51, 95% CI=1.65-3.83), and they “would not want to know if I have cancer” (15.7% vs. 31.6%; aOR=2.88, 95% CI=1.79-4.62). Conclusions: Lower SES groups held more negative cancer beliefs but often in co-existence with positive beliefs about cancer, which were frequently endorsed regardless of SES. Additional work is needed to better understand how lower SES groups develop these negative cancer beliefs, whether they persist over time, and how they might co-exist alongside positive cancer beliefs. In turn, interventions to improve cancer detection behaviors targeting lower SES groups may be more successful if they focus on reducing negative beliefs rather than increasing positive beliefs.

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The Voices and Experiences of Ethnically Diverse LGBTQ+ Individuals on Cancer Prevention and Screening in Cedars-Sinai Cancer's Catchment Area in Los Angeles

Ruiz Vazquez C, Shirazipour C, Zaldivar R, Herrera E, Hutchison H, Barosh L, Haile R, Surani Z

Purpose: To engage diverse LGBTQ+ populations (people of color, non-binary (ENBY), transgender and/or womxn) to: 1) better understand experiences relating to cancer prevention and screening, and 2) obtain feedback on communicating American Cancer Society's (ACS) screening guidelines to LGBTQ+ people. Methods: Three focus groups were conducted with support from our LGBTQ+ Community Advisory Board in August 2019 to identify thoughts, feelings, and experiences of cancer prevention and screening. The first group included 13 trans/non binary individuals; the second group included 14 GBQ men of color, aged 50 and older; and the third group included 10 community outreach organizers who are LGBT identified. To achieve aim 1, a focus group guide was adapted from a melanoma prevention study. To achieve aim 2, ACS screening guidelines were presented to participants for feedback on relevance to LGBTQ+ people. Results: Unmet needs were identified, including very poor knowledge of how cancer impacts this community, types of screening recommended, and where to find LGBTQ+ affirming health care providers. Participants noted that cancer does not receive the same level of publicity within the LGBTQ+ community as other health issues (e.g., HIV, PrEP, STIs, substance use). LGBTQ+ health providers often focus on these noted health issues, resulting in a lack of urgency surrounding cancer and distinct risk factors within the community. In addition, a lack of experienced healthcare providers in LGBTQ+ services was raised as a barrier to patients voicing health concerns. In reviewing the ACS screening guidelines, participants suggested including: 1) biological sex assigned at birth, and 2) current gender identity to promote inclusivity. Simplifying medical language, including visuals, and incorporating technology in the guidelines was also recommended. Conclusion: LGBTQ+ community faces a cancer care system that often lacks cultural sensitivity, with individuals often report delaying needed medical care because of fear of discrimination. Relevant and tailored information on cancer risk, prevention, and cancer screening needs to reach the diversity of LGBTQ+ people and in multiple languages.

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Rural Adults Reactions to Colorectal Cancer Risk and Screening Information delivered by Race and Gender Concordant Virtual Health Assistants

Vilaro MJ, Wilson-Howard DS, Griffin LN, Tavassoli F, Zalake MS, Lok BC, Modave FP, Carek PJ, George TJ, Krieger JL

Exploring user responses to cancer screening interventions delivered by virtual health assistants (VHAs) can provide important insights into culturally-relevant implementation of digital interventions. The purpose of this study is to compare the perceptions of a VHA- delivered colorectal cancer (CRC) screening intervention and screening intentions of patient populations with diverse experiences within healthcare systems. Methods: Twenty-five focus groups were conducted with Black (n=78) and White (n=38) adults between 50-73 years old. Participants tested a CRC intervention, delivered by VHAs matched to user's race and gender, promoting a non-invasive home stool screening test (FIT). Moderated discussions were recorded, transcribed, and analyzed using a constant comparison method and thematic analysis. Results: Overall, cues relevant to trustworthiness and expertise were important with authority, friendliness, and medical expertise cited as essential VHA characteristics. Participants expressed variations in intentions to engage in a number of CRC prevention behaviors after viewing the intervention including, (1) information seeking (wanting to talk to doctor about screening or learn more about risk), (2) information sharing (wanting to share the app with friends and family), and (3) pursuing screening (FIT or colonoscopy). For example, all groups expressed interest in sharing content; however, Black adults wanted to share content with networks "at a younger age". Participants were familiar with non-invasive home screening from commercials; however, few recalled learning about these options from their primary care provider. When screening intentions favored FIT it was largely due to perceived elimination of hassles associated with colonoscopy prep. Other participants expressed preferences for colonoscopy due to lingering concerns over FIT accuracy or lack of clarity regarding benefits of FIT over colonoscopy. Conclusion: A patient-centered approach to understanding how users engage with digital health content can facilitate equity in CRC prevention efforts. Results from this study identify important considerations for VHA interventions seeking to engage demographically diverse patient populations in health behaviors broadly, and CRC screening specifically

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Young adult cancer caregivers' experiences with cancer-related health misinformation on social media

Warner EL, Ellington L, Cloyes KG, Waters A, Kirchhoff AC

Purpose: We interviewed young adult cancer caregivers (YACC) to describe their exposure to cancer-related misinformation on social media and how this influenced their behaviors. Methods: Eligible YACC were 18-39 years old used Facebook, Instagram, and/or Twitter at least once per week, and were engaged in caregiving for an adult cancer patient diagnosed between 6 months to 5 years prior (N=34). Recruitment occurred from 08/2017-06/2018 at oncology clinics in Utah, and online advertising by national caregiving and cancer organizations. Telephone interviews were recorded, transcribed, coded and analyzed through two rounds of qualitative coding. Thematic categories included 1) exposure to cancer-related health misinformation, 2) how misinformation influenced YACC's behaviors. Results: YACC were on average 29.0 years (range 21-38) and cared for cancer patients on average 37.0 years of age (range 19-76). YACC were exposed to a variety of cancer-related misinformation on social media about causes of cancer, cancer cures, symptom management, and cancer treatment. A minority of YACC perceived that misinformation on social media was driven by financial incentives (e.g., selling cancer cures or products for symptom management) while others felt misinformation came from well-intending followers. Misinformation had mixed influences on YACCs behaviors. For some, misinformation led them to avoid using social media for cancer-related purposes. Others did not feel dissuaded from using social media because they felt confident dealing with misinformation. These caregivers used strategies to mitigate misinformation including ignoring information they perceived was incorrect, consulting clinicians about information they were uncertain about, and referencing other online resources to verify questionable information. Conclusions: YACC are a digitally native population who often use social media for health information. YACC's limited exposure to caregiving and cancer may make them especially prone to consumption of cancer-related misinformation on social media. The extent to which YACC correctly identify misinformation on social media is a critical area for future research.

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Parent and Childhood Cancer Survivor Experiences with and Barriers to HPV Vaccination

Waters A, Mann K, Vaca-Lopez P, Kepka D, Wu Y, Kirchhoff AC

Background: Childhood cancer survivors have lower HPV vaccination initiation rates than the general population. HPV-associated cancers are 40% higher among female and 150% higher among male survivors compared to the general population. Improving HPV vaccination uptake among childhood cancer survivors is essential to preventing second cancers. We conducted semi-structured interviews with adult survivors of cancer and parents of younger survivors to evaluate their experiences with and barriers to HPV vaccination, as well as their recommendations on pathways to series completion. Methods: Eligible survivors were ages 18-26 years, completed treatment at Primary Children's Hospital or Huntsman Cancer Institute between 2013-18, and were age eligible for the HPV vaccine. Eligible parents were at least 18 years of age, and the parent of a survivor who met eligibility criteria. Interviews were analyzed using thematic content analysis. Results: Survivors (N=10) were primarily female (60%), non-Hispanic white (90%), and on average 21.2 years of age (range 18-23). Half were HPV vaccinated (50%). Parents (N=10) were female (90%), ages 30-59 years (60%), and non-Hispanic white (80%). Of parents, 30% reported their survivor had received the HPV vaccine. Among the vaccinated group (n=8), 100% reported that a provider recommended the vaccine. Among the n=12 unvaccinated group, only 1 (8.3%) reported receiving a recommendation. Three themes emerged about HPV vaccination among the unvaccinated participants: 1)Participants reported that they lacked adequate information on the vaccine, which limited their decision making ability. 2)Participants felt that receiving a recommendation from their oncologist was essential to vaccine receipt, because they understood survivors' complex health history better than general practitioners. 3)Participants generally felt that vaccine reminders via text or email would result in the survivor getting vaccinated. Conclusions: HPV vaccination is an important opportunity to prevent second cancers in young survivors. Our results demonstrate that survivors and parents feel that oncologists should play an essential role in promoting the HPV vaccine. Additionally, reminder systems are necessary to help survivors complete the multi-dose HPV vaccine series.

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Randomized trial of a web-based personalized breast cancer risk communication and decision support tool on clinical prevention outcomes

Wernli KJ, Knerr S, Li T, Leppig K, Ehrlich K, Farrell D, Gao H, Bowles EJA, Graham AL, Luta G, Mandelblatt JS, Schwartz MD, O'Neill SC

Purpose: We developed a web-based intervention, which incorporates personalized breast cancer risk, values clarification, and patient activation to clinical care, to support communication and decision-making about breast cancer mitigation strategies. We compared clinical outcomes in women who received intervention to usual care. Methods: We randomized 995 women aged 40-69 years to intervention (n=492) or usual care (n=503). Women were members of Kaiser Permanente Washington with a recent normal screening mammogram and a calculated risk of >1.67% based on the Breast Cancer Surveillance Consortium 5-year breast cancer risk model, which include breast density as a risk factor. Primary clinical outcomes were chemoprevention prescriptions and breast MRI by 12 months after baseline interview. Additional outcomes were self- reported distress, clinician conversations, and mammography maintenance. We calculated unadjusted odds ratios (ORs) and 95% confidence intervals (CIs) using logistic regression with generalized estimating equations (GEE) to account for clustering. Differences in distress were calculated with 95% CIs using analysis of variance (ANOVA) with GEE. Results: Baseline demographic and clinical characteristics were similar between the two arms. While women in the intervention arm reported increased communication with their clinician about chemoprevention (OR=3.9, 95% CI 2.3-6.5), overall uptake was <1% with no differences across study arms. Intervention women also reported increased communication with their clinician about breast MRI (OR=2.1, 95% CI 1.4-3.1), and the odds of breast MRI in the intervention arm was 5.7-times the odds in the control arm (95% CI 1.6-19.7). In both arms, the majority of women who received breast MRI had a high 5-year breast cancer risk. Measures of distress (difference of -0.12, 95% CI -0.3-0.1) and screening mammography maintenance (OR=1.1, 95% CI 0.8-1.4) were similar across study arms. Conclusions: While uptake of chemoprevention remains low, women at elevated 5-year breast cancer risk can be activated by personalized information without increases in distress or decreases in mammography maintenance. Future work should explore intervention dissemination in the context of mandated breast density notifications nationally.

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Impact of Prostate Cancer Screening on Colorectal Cancer Screening Behavior Intentions: Qualitative Results from Interacting with a Virtual Healthcare Assistant (VHA)

Wilson-Howard DS, Wilaro MJ, Griffin LN, Tavassoli F, Zalake MS, Lok BC, Modave FP, Carek PJ, George TJ, Odedina FT, Paskett ED, Krieger JL

Purpose of Study: Grounded in the Health Belief Model, our study's objective was to enhance the development of a demographically matched Virtual Healthcare Assistants (VHA) app promoting colorectal cancer (CRC) screening using the Fecal Immunochemical Test (FIT) kit. Methods: In a user-centered design approach, focus group members individually engaged with either a Black or White male VHA app via a smartphone, discussed their experience, and provided recommendations. Seventeen focus groups with 25 Black and 38 White men (n=63) between the ages of 50-73 were conducted from January 2017 to November 2018. Each group contributed iteratively to the final app. Identification of thematic categories from transcripts and a coding manual was created by two team members. All data were analyzed using NVivo software. Results: Feedback of the VHA app was positive and behavioral intentions towards screening for CRC via the FIT, increased in all the focus groups. One essential theme that emerged was perceived patient-level barriers to screening. Common screening barriers identified in the study included: fear and lack of knowledge of different screening methods, fear of positive results, and fear of comprising masculinity associated with anal penetration screening methods (i.e. colonoscopy). An interesting barrier indirectly identified was the confusion between CRC and prostate cancer. Confusion with PSA levels and fear associated with getting the "Finger" were frequently stated as barriers to obtaining CRC screening in multiple focus groups with Black men. The "camera" test (colonoscopy; CRC) was more accepted than the "finger" test (digital rectal exam; prostate cancer). In addition, a fatalistic attitude to not participating in any screening that utilized anal penetration was observed. To resolve the confusion and negative perceptions, the difference between prostate and CRC, their screening methods and overall definition of cancer were continuously discussed. Conclusion: Results from this study highlight a need for tailored messaging interventions addressing gender specific barriers. Tools targeting men, like the VHA app, need to be developed to increase knowledge of cancer, cancer screening methods and eliminate screening barriers associated with comprising masculinity.

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Racial and place-based differences in smoking population attributable risk for lung cancer

Aldrich MC, Munro HM, Mumma M, Sanderson M, Blot WJ

Purpose: To estimate attributable risks for smoking in lung cancer among blacks and whites in a large prospective cohort. Methods: Lung cancer is the leading cause of cancer-related death worldwide. Racial differences in both lung cancer incidence and smoking patterns exist, but few studies have examined racial differences in the smoking attributable risk for lung cancer. We conducted a prospective study among 41,038 African American and 18,062 white low-income adults age 40-79 at baseline in the Southern Community Cohort Study (SCCS) followed for up to 15 years. We estimated the population attributable risk (PAR) percent of lung cancer associated with smoking reported at baseline (classified as ever/never; current or former versus never; <10, 10-19, 20+ pack-years versus never) using multivariable Cox proportional hazard models with robust standard errors by race, race-sex, and geographic urban/rural residence groups. Results: Overall, 83% of lung cancer cases (N=1,039 of 1,251 incident lung cancers) among SCCS participants were attributable to smoking, but the PAR varied by race (PARs of 80% in blacks versus 88% in whites). The higher overall PAR in whites was mainly due to their higher prevalence of 20+ pack-year smokers, with PARs among such heavy smokers of 76% in whites versus 46% in blacks. Lighter smokers (< 10 pack-years) accounted for 3% of cases among whites but 10% among blacks, with moderate smoking (10-19 pack-years) accounting for 9% of cases among whites and 24% among blacks. Despite lower prevalence of smokers among women than men, little differences in smoking PARs were observed between males and females (PARs of 78%, 78%, 88% and 87% respectively among black males, black females, white males and white females), but PARs tended to be higher among urban (PAR 85%) than rural (PAR 76%) residents. Higher PARs for urban residents were maintained across all race-sex groups except for white females.
Conclusions: Racially-specific and place-based population attributable risks were observed. These PARs provide a tool for prioritizing intervention targets to address inequities in lung cancer.

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Barriers to Cancer Screening among Southwest American Indian Men Living on a Reservation

Batai K, Sanderson PR, Hsu CH, Joshweseoma L, Russell D, Joshweseoma L, Burhansstipanov L

Purpose of the study: Screening rates among American Indian (AI) men remain low without programs specifically designed for men. Community surveys were conducted between 2018 and 2019 among AI men to understand colorectal and prostate cancer screening behavior and identify barriers to screening. Methods: The study was implemented using community based participatory research principles with the Hopi Tribe. The surveys were conducted by a male Hopi Native Patient Navigator using an audience response system with small groups of men, 50 years of age or older who live on the Hopi Reservation. Logistic regression analysis was performed to identify factors associated with having cancer screening. Results: A total of 83 eligible men completed the surveys. Colorectal cancer screening rate (having had fecal occult blood test or colonoscopy) increased from 51% in 2012 to 71% in 2018. Prostate cancer screening rate (having had prostate specific antigen test or digital rectal exam) did not change (35% in 2012 and 37% in 2018). Among men who had screening, 51% had colorectal cancer screening and 55% had prostate cancer screening within past 3 years. Thirty-four percent of men responded that they learned about cancer screening from HOPI Cancer Support Services. Only 13% learned about cancer screening from health care providers. Only 33% of men reported that they looked for medical information using electronic devices in the past year. Past prostate cancer screening was significantly associated with having colorectal cancer screening (OR 5.33, 95% CI: 1.38-20.59). Past colorectal cancer screening was significantly associated with having prostate cancer screening (OR 5.37, 95% CI: 1.36-21.17). Conclusion: Lack of knowledge on cancer screening may be one of the major barriers to cancer screening causing screening rates to remain low. There is a desire by Hopi men to have community education interventions and support from a Hopi Native Patient Navigator to help them access screening.

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Awareness of Helicobacter pylori infections in Navajo communities of Northern Arizona

Begay R, Sanderson P, Chief C, Monroy F, Brown HE, Oren E, Harris R

Purpose: Evaluate knowledge and awareness about Helicobacter pylori among participants in the Navajo Healthy Stomach Pilot Project. Methods. Cross-sectional, community surveys (Navajo Healthy Stomach Project) were conducted from June to August 2018 among 105 self-identified Navajo >18 years old living in three Navajo communities in northern Arizona. Participants were assessed on household and individual level factors, including awareness of H. pylori, associated with H. pylori infection. A urea breath test (UBT) was performed to test for active infection. Chi-square analysis was performed to examine differences between H. pylori positive and negative participants. Results. Active H. pylori infection was found in 66 (65.3%) of 101 participants with UBT results. However, only 23.8% of participants had ever heard of H. pylori. Differences in gastrointestinal symptoms in the last 6 months between H. pylori positive and negative participants were not statistically significant ($p > 0.05$), except 'feeling full for a long time' and 'heartburn' was greater for those H pylori positive individuals ($p = 0.01$ and $p = 0.05$, respectively). Previous testing for H. pylori was higher among participants that tested negative (28.6%) compared to those who tested positive (4.5%) and was statistically significant ($p<0.01$). Additionally, 34.3% of those that tested negative were aware of H. pylori while only 18.2% of those who tested positive were aware ($p = 0.07$). Lastly, history of gastroscopy was higher among those that tested negative ($p > 0.05$). Conclusions. H. pylori prevalence is high among participants in the Navajo Healthy Stomach Pilot Project. However, awareness is low. Awareness and knowledge about H. pylori was higher among participants that tested negative, which may be due to prior testing. These findings suggest that prior experiences with infection may influence behaviors to prevent re-infection.

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Challenges of Sampling for Catchment Cancer Needs Assessment

Rosario R, Berges V, Kamath G, Jandorf L, Fei K, Bickell NA

Purpose: To compare cancer screening rates via convenience community and random sampling from an academic medical center's data warehouse (DW), compared with random digit dialing. Methods: We compared demographics & screening rates from NYC BRFSS for Central Harlem (CH), East Harlem (EH) and the Upper East Side (UES), our catchment area, to data collected from random sampling from a medical center's DW and community convenience sampling recruited from community & faith-based organizations, public housing, people on the street and attending neighborhood events. We oversampled from CH & EH to identify potential areas of need and focus for future research, outreach & intervention. Results: We surveyed 1202 residents of our catchment area; 598 (50%) randomly chosen from the hospital's 2018 DW and 604 (50%) from the community. See table below for racial distribution & rates of breast, colorectal (CRC) & lung cancer screening. Random sampling of DW reflected NYC racial distribution; community oversampling did not. Community convenience sampling did reflect NYC rates of screening for breast cancer and CRC; random sampling of medical center patients did reflect NYC rates for breast cancer screening, but did not reflect NYC rates for CRC. Lung cancer screening rates were significantly higher in the DW and Community than NYC. Data Warehouse Community NYC p Race <.00011†* White (n=307) 44% 12% 42% <.0001* Black (n=398) 24% 50% 26% <.0001* Hispanic (n=371) 32% 37% 23% 0.0004* Mammography w/in 2 yrs in 50y+ 86% 79% 82% 0.082** CRC screen (c-scope in 10y; FIT in 1y, Cologuard in 3y) 86% 67% 70% 0.0001†** Lung ca screening (>30 pk yr smokers 55-79yr) 36% 29% 4% 0.0003*** †p: comparison between DW & Community; *p: comparison between Community & NYC; **p: comparison between DW & NYC Conclusions: For cancer screening, community sampling may be more representative of the challenges Community Outreach & Engagement programs face and can inform future directions for community based research, education, outreach and intervention.

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Epidemiologic Profiles of Breast Diseases in Grenada

Bieber CM, Sheth A, Hage R

Background: Breast cancer is the most frequently diagnosed cancer and the leading cause of cancer- related death among women worldwide, with the overall burden of breast cancer shifting considerably toward low- and middle-income countries. The distribution of breast disease seen in such regions underscores the significant public health impact and the necessity of effective public health interventions. Purpose: This study aimed at characterizing the epidemiologic profiles of breast diseases in Grenada during the period of 1984-2009. Methods: Data for the analysis were derived from pathological reports obtained from the General Hospital of Grenada. Results: There were 320 reported cases of breast cancer in Grenadian men and women and 1173 reported cases of benign breast lesions in Grenadian women. The mean age of breast cancer patients for all sexes was 54.85 (±5.59 years) with nearly 1/3 of cancers age 44 and under. Male breast diseases represented 4.24% of diseases and 2.5% of cancer. The three most frequent cancer subtypes in men and women were ductal (61.25%), lobular (6.56%), and medullary (6.25%); the three most frequent benign subtypes in women were fibroadenoma (38.46%), fibrocystic change (25.98%), and miscellaneous (6.75%). Conclusions: The epidemiological characteristics are comparable to those from other developing countries, such as Rwanda and Niger. Similarly, in parallel with other developing nations, the breast cancer reported burden may be underestimated and there is a paucity of high-quality cancer data. Findings from previous and the current studies underscore the importance of establishing reliable cancer surveillance systems in the region to understand and assess the prevalence of cancer. The trajectory of breast cancer morbidity and mortality in developing regions encourages efforts to establish a cancer registry in Grenada in order to provide a foundation for cancer control plans and effective public health interventions. These interventions may include an emphasis on breast cancer education, the promotion of prevention and early detection programs, and the provision of more public facilities and human resources for breast cancer management in order to strengthen the capacity of Grenada's healthcare system.

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Focus Groups with Northern Arizona Navajo Adults: Knowledge, Attitudes and Practices (KAP) related to Helicobactor pylori and stomach cancer

Chief C, Sanderson PR, Willeto AAA, Yazzie A, Harris R, Monroy F, Oren E

Purpose: To determine Navajo adults' level of knowledge and their attitudes and practices regarding Helicobactor pylori (H. pylori) and stomach cancer, a population with elevated rates of stomach cancer. Methods: Focus groups (n=3) were conducted in three Navajo communities (within reservation boundaries) using culturally appropriate strategies. Data were analyzed thematically using a multi-investigator approach mindful of Indigenous research methods. Results: A total of 31 Navajo adults participated in one of the focus groups. Participants had limited knowledge about H. pylori and stomach cancer. There was a voiced need for healthcare providers to demonstrate confidence to Navajo community members about diagnostic and treatment services in a timely fashion. Participants also identified examples of socioeconomic inequalities, environmental injustices, and concerning health care practices they associated with H. pylori infection and stomach cancer. Conclusions: There is a need for community-driven and culturally relevant H. pylori trainings for community members and healthcare providers, particularly in light of recent findings of increased prevalence of infection in this vulnerable population.

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Continued smoking in African American cancer survivors: The Detroit Research on Cancer Survivors (ROCs) Cohort

Malburg C, Fucinari J, Ruterbusch JJ, Ledgerwood DM, Beebe-Dimmer JL, Schwartz AG, Cote ML

Purpose: The Detroit Research on Cancer Survivors (ROCS) study is the largest population-based cohort of African American cancer survivors collecting biospecimens, medical records, and survey data from breast, prostate, lung and colorectal cancer cases. These data were used to identify factors associated with continued smoking after a cancer diagnosis. Methods: Participants who completed their baseline survey within 18 months of cancer diagnosis were used to assess demographic and clinical variables associated with smoking status at cancer diagnosis and baseline survey. Among those who reported smoking at the time of their cancer diagnosis, logistic regression was used to estimate the odds of being a current smoker at baseline. Results: Of 1145 cases analyzed, 497 (43%) reported never smoking, 446 (39%) were former smokers, and 202 (18%) were current smokers at baseline. At time of diagnosis, 356 cases reported smoking, of which 154 (43%) had quit smoking at baseline survey and 202 (57%) remained current smokers. Factors associated with a reduced odds of continued smoking included education (some college or more; [OR=0.21 95% CI (0.06, 0.69)]), and increased social well-being (one of four components of the Functional Assessment of Cancer Therapy, an assessment of quality of life in cancer patients) [OR=0.94 (0.90, .99)]. Factors associated with an increased odds of continued smoking included alcohol use [OR=2.17 (1.16, 4.05)], AJCC stage III or IV diagnosis [OR=2.19 (1.08, 4.44)], living with a smoker [OR=3.99 (2.09, 7.62)], and higher cumulative years of smoking [OR=1.04 (1.01, 1.06)]. Lung cancer cases were most likely to quit after a diagnosis (n=69, 48.6%). Compared to lung cancer, all other cancer sites had elevated odds of continued smoking, with highest odds among prostate cancer patients [OR=6.76 (2.97, 15.39)]. Conclusions: Among African American cancer survivors, a breast, prostate or colorectal cancer diagnosis, late stage diagnosis, years of smoking, and living with a smoker increased the likelihood of continued smoking after diagnosis. These findings reveal that cessation strategies need to be incorporated into treatment plans, especially for prostate cancer survivors, and such strategies should be extended to all smokers in the household.

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Using a process map to identify workflow and intervention points for colorectal cancer screening in community health centers

DaCosta C, Bradley SM, Tucker S, Rabin BA, Hurst S, Gupta S, Liu L, Alvarez F, James A, Nodora

PURPOSE Few community health centers (CHCs) have consistently implemented and sustained evidence-based interventions (EBIs) to increase colorectal cancer (CRC) screening. Our study aimed to understand CRC screening processes in a San Diego County CHC and identify intervention points. METHODS Guided by the contextually expanded RE-AIM framework (PRISM), secondary data were extracted from CHC databases along with new data requests to identify contextual factors influencing CRC screening processes. A CHC-based study coordinator recruited key clinic personnel (e.g., clinic's executive team, clinic managers, referral managers, quality improvement specialists, lab personnel, providers, and referral gastroenterologists) to participate in surveys and in-depth interviews. Adapted process maps, a tool for visualizing the CRC screening process, were developed with the CHC as a strategy to identify key CRC screening intervention points. RESULTS Our partnered CHC has 4 clinic sites serving CRC screening age-eligible patients. Patients are primarily racial/ethnic minorities (77%) with an income status at or below the federal poverty line (98%). The CRC screening rate at the CHC remains low (59%), compared to the American Cancer Society target (80%). We found that the CRC screening process begins with patient screening reminders via mailed letters and provider recommendation at appointments. Despite receiving instructions for CRC screening kits, some kits are completed improperly. Another intervention point was found in the documentation process of colonoscopy results. Clinic personnel reported inaccuracy in patient's electronic health records due to improper naming of documents. CONCLUSION Our results show the need for multi-component implementation strategies with potential intervention points for CRC screening kit distribution and completion, as well as the documentation for the CRC screening process. These include multi-component implementation strategies such as phone client reminders, reducing structural barriers (e.g. appointment scheduling, alternative screening sites, add clinic hours, transportation, language translation, and childcare) and provider feedback (i.e., describe provider performance and compare with a goal or standard).

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Community Partnership Program: A model to build community capacity for addressing the cancer burden in Oregon

Shannon J, Winter-Stone K, Desai N, Varnum M, Wenzel L, O'Gara D

Purpose OHSU Knight Cancer Institute Community Partnership Program provides funding, training and technical assistance to build the capacity of community organizations across Oregon for identifying and addressing local cancer-related needs. Methods Community Partnership Program grants are available in three tiers to support communities with varying resources and experience. Grants range from $10-$50,000 and fund organizations to define local cancer needs, test feasibility and acceptability of evidence-based approaches and evaluate and sustain cancer efforts. Organizations receive dedicated support for evaluation, human subject's protection, and training to select and adapt evidence-based approaches. Statewide networking opportunities offered include an annual conference and a virtual learning community. Evaluation methods include quantitative and qualitative assessment of final reports to determine partnerships, reach, impact and barriers outcomes. Results The program has invested nearly $3 million in 106 projects focused on geographic diversity as well as minorities and underserved populations, reaching all 36 counties in Oregon. Of these, 82% of projects target rural cancer issues, 33 proposals focus on specific cancers such as breast, lung and colorectal and 75 projects focus on cancer-related topics (e.g. diet/nutrition, HPV vaccination, and tobacco cessation). Projects focus along the cancer continuum from prevention to survivorship. Since 2015, 76 projects have completed. 41,544 Oregonians were reached and 380 partnerships (38% new and 62% expanded) were established, with an average of 5-6 partners per organization. Partnerships were based on three core themes: Informing, Listening, and Co-Creating. Top barriers were engaging staff and partners in project implementation and challenges around workflows, logistics, and internal communication. Conclusions The Community Partnership Program effectively builds capacity of organizations across Oregon to address local cancer-related needs. This partnership model offers a unique opportunity for NCI Comprehensive Cancer Center's to inform population specific cancer outreach and local research capacity to maximize reach and enhance impact to reduce the cancer burden in Oregon.

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Delays in breast cancer treatment associations with patterns of SES, access to care and tumor characteristics in the Carolina Breast Cancer Study Phase III

Emerson MA, Golightly YM, Aiello AE, Reeder-Hayes KE, Tan X, Johnson-Thompson M, Olshan AF, Troester MA

PURPOSE: Breast cancer mortality is higher for black and younger women. This study evaluated factors that impact time to treatment and treatment duration by race and age. METHODS: Among 2,841 participants with stage I-III disease in the Carolina Breast Cancer Study Phase III, we identified groups of women with similar patterns of socioeconomic status (SES), access to care, and tumor characteristics using latent class analysis. We evaluated latent classes in association with treatment delay (initiation >60 days after diagnosis) and treatment duration (in quartiles by treatment modality). RESULTS: Thirty-two percent of younger black women were in the highest quartile of treatment duration (versus 22% of younger whites). Black women were more likely to have a higher frequency of delayed treatment initiation [adjusted relative frequency difference (RFD) = 5.5%; 95% confidence interval (CI): 3.2%, 7.8%)] and prolonged treatment duration (RFD = 8.8%; 95% CI: 5.7%, 12.0%). Low SES was associated with treatment delay among white women (RFD 3.5%; 95% CI: 1.1, 5.9), but baseline rates of treatment delay remained elevated among high SES black women (e.g. 11.7% compared to 10.6% and 6.7% among low and high SES whites, respectively). Neither SES nor access to care classes were significantly associated with delayed initiation among black women, but both low SES and more barriers to care were associated with treatment duration in both races. CONCLUSIONS: There are many dimensions of treatment delay, from diagnosis to completion of treatment and social differences compound across the continuum. Delay in treatment duration may be a more sensitive indicator of barriers to care, possibly more sensitive than delayed initiation. By developing an integrated view of where delays happen and compound on the care continuum, and evaluating aggregated characteristics, appropriate multidimensional interventions can be conceptualized.

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Reducing Cancer Health Disparities by Engaging Underrepresented Researchers (UR) in Cancer Research: The Geographic Management of Cancer Health Disparities Program (GMaP) Region 4: A Survey on Training Priorities

Fleisher L, Norbeck C

Purpose: The Geographic Management of Cancer Health Disparities Program (GMaP is a national program funded by the National Cancer Institute's Center to Reduce Cancer Health Disparities (CRCHD). GMaP Region 4 is a thirteen state region utilizing a m multipronged engagement approach to increase recruitment and retention of diverse i investigators and to strengthen professional development. Periodic surveys are c conducted to understands the needs and interest of our broad membership. Methods: A REDCap survey addressing the effectiveness of this network approach open to all 800 GMaP members and was completed (16% response rate) by primarily early stage investigators (46.7%) and graduate/predoctoral (22.4%). Twenty-one, 44.7%, had r received NCI CURE (Diversity Training) funding. The survey assessed the services most v valued for their career development and interest in emerging areas of research. Summary of Results: Respondents ranked via 5 point Likert scale the following services as "Likely or Extremely Likely to Utilize in 1-2 years." Pilot Funds (for feasibility data collection to support ongoing research) – (83.7%); Travel Awards – (81.6%); Grant Review - (79.6%); Webinars – (69.4%); and Introductions to CRCHD Program Officers in Training Navigation - (63.3%). Pilot Awards were rated via 4 point Likert as most valuable (44.7%) followed by Travel Awards (24%), Grant Review (16%) and Biospecimens Pilot funds (16%). Emerging areas of research interest included Implementation Science (81.8%) followed by mHealth (36.4%) and Precision Medicine (34.1%). Though the majority (66.0%) had not been previously involved in research utilizing the collection of biospecimens biospecimens from URM participants, a portion responded yes (48.9%) to interest in GMaP GMaP funded pilot grants to access specimens for cancer research. These data further inform and enhance specific GMaP Region 4 offerings. Recommendations: Strategies utilized by GMaP Region 4 have resulted in over 800+ cancer focused students and researchers. A combined approach of career development support via Expert Grant Review, Pilot Funding, Travel Scholarships, mentor and networking opportunities, and tailored communications has been key in the development of this network, and helped more than 100 potential diverse trainees.

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Use of cervical cancer preventive services among U.S. women aged 21-29: An analysis of the impact of the 2010 Affordable Care Act requirement for coverage of preventive services without cost-sharing

Garrido CO, Coskun R, Lent A, Harris RB, Calhoun E

Since the 2010 rollout, the Affordable Care Act (ACA) has provided millions of people with health insurance coverage (Berchick, Hood, & Barnett, 2018) and facilitated routine cancer screening by requiring insurance providers to cover preventive services without cost-sharing (Kaiser Family Foundation, 2013). Despite greater access to affordable cancer screening, trends in Pap testing continue to show declines over time (Hall et al., 2018; Watson, Benard, & Flagg, 2018). Using multi-year responses from the Behavioral Risk Factor Surveillance System, we examined the effect of the ACA on participation in and adherence to Pap testing and HPV vaccination behaviors as set by guidelines from the American Cancer Society. The sample included women aged 21-29 who completed the survey between 2008 and 2018 (every other year) and who live in 24 U.S. States. As predicted, results showed significant and consistent decreases in Pap testing rates but increases in the uptake of the HPV vaccine series for all age groups and across all demographic variables. However, post-ACA year significantly predicted increases in HPV + Pap co-testing participation and adherence. Women with health insurance coverage were consistently more likely to engage in both behaviors. Results raise concerns around declines in the proportion of women receiving and adhering to Pap testing guidelines. Evidence suggests that increases in HPV vaccination uptake may be responsible for decreases in Pap testing among women in our study. We highlight a need for effective strategies that aim to increase cervical cancer screening uptake among women who have been vaccinated against HPV.

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Cervical cancer incidence and mortality in non-Hispanic African American and White women, United States, 1999-2015

Gopalani SV, Janitz AE, Campbell JE

Background: Cervical cancer has disproportionately affected African American women in the United States (US). To understand the burden of cervical cancer, we assessed incidence and mortality rates and analyzed trends over time among non-Hispanic African American and White women in the US from 1999 to 2015. Methods: We obtained cervical cancer incidence and mortality data from 1999 to 2015 from the Centers for Disease Control and Prevention's (CDC) publicly available online database, WONDER. From age-adjusted incidence and mortality data, we calculated rate ratios (RR) and 95% confidence intervals (CI) to evaluate differences by race. We analyzed incidence and mortality trends using joinpoint regression. We used a log-linear model and interpreted trends in terms of a rate change at a constant percent per year through annual percent change (APC) and average annual percent change (AAPC). We limit our analyses to non-Hispanic African American and White women. Results: From 1999 to 2015, incidence rates for cervical cancer were significantly higher (RR: 1.46; 95% CI: 1.44, 1.47) among African American (10.8 per 100,000 females) than White (7.4 per 100,000 females) women. Similarly, mortality rates were significantly higher (RR: 2.05; 95% CI: 2.01, 2.09) in African American (4.4 per 100,000 females) compared to White (2.1 per 100,000 females) women. During this period of 17 years, the overall incidence trend for cervical cancer decreased significantly for both races, but the mortality trend only decreased significantly for African American women (AAPC: -2.9; 95% CI: -4.1, -1.7). Mortality rates increased with age for both races. In contrast, incidence rates increased for African American women, while decreasing for White women as age increased. Discussion: African American women had a significantly higher cervical cancer incidence and mortality rate than White women. Even as incidence and mortality trends declined significantly, older African American women had three times the rate of cervical cancer than White women. Cervical cancer prevention and treatment programs should be evaluated to identify gaps, particularly for African American women, to ultimately reduce disparities in both incidence and mortality.

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Racial/ethnic differences in healthy lifestyle promotion in older cancer survivors: Data from 12 cancer centers in the Southeastern U.S.

Halilova KI, Azuero A, Williams CP, Williams GR, Martin MY, Bakitas MA, Demark-Wahnefried W, Pisu M

Purpose: To better understand potential gaps in healthy lifestyle (HLS) counseling from medical providers this analysis investigates racial/ethnic differences in the occurrence of HLS discussions between older cancer survivors and their providers. Methods: This secondary data analysis utilized cross-sectional survey data from cancer survivors (⩾65 years) seen at 12 cancer centers in the Southeastern U.S. during 2013-2015. The main outcome was self-report of HLS discussions regarding exercise, diet, or weight management with providers (oncologists, nurses, and/or another doctor). Race/ethnicity was categorized as white and minority (African-American, and other). Descriptive statistics were calculated for survivor demographic and clinical data. Bivariate comparisons were calculated. Odds ratios (OR) and 95% confidence intervals (CI) compared odds of HLS discussions by race/ethnicity using multivariable logistic regression. Results: This sample included 1,460 cancer survivors of mean age 74 years (SD 6). Our sample was majority white (81%), female (60%), college-educated (62%), >1 year post-diagnosis (84%), and overweight and/or obese (64%). Compared to white survivors, minority survivors were less often college-educated (51% vs. 65%), more often younger (67% vs. 56%), obese (40% vs. 25%), and more often reported pain (66% vs. 58%) and distress (59% vs.49%). A higher proportion of minority survivors reported discussing exercise (59% vs. 47%), healthy diet (61% vs. 52%), vegetable consumption (38% vs. 26%), and weight loss (41% vs. 31% respectively) with their providers than white survivors. After adjusting for demographic and clinical characteristics, minority survivors had higher odds of HLS discussions regarding exercise (OR 1.4, 95% CI 1.08-1.90), vegetable consumption (OR 1.5, 95% CI 1.12-2.03), and on all three main HLS topics (exercise, diet, and vegetables) (OR 1.4, 95% CI 1.04-2.07). Similar to white respondents, minorities reported discussing HLS with another doctor more often than with oncologists and nurses. Conclusion: Additional studies are needed to understand reasons for differences in HLS discussions in each racial/ethnic survivor group. Strategies are needed to increase oncologists and nurses promotion of HLS discussions in older adults.

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Helicobacter pylori infections in Navajo communities of Northern Arizona

Harris RB, Sanderson PR, Chief C, Begay R, Monroy F, Brown HE, Oren E

Purpose: Helicobacter pylori (Hp) is a gastric pathogen associated with development of duodenal or stomach ulcers, stomach cancer, and mucosa associated lymphoid-tissue (MALT) lymphomas. While Hp prevalence is declining in many regions, it varies by geographic location, ethnic background, socioeconomic status, and age. This project seeks to understand the role of Hp infection in development of stomach cancer among Native Americans of Northern Arizona, where stomach cancer incidence rates are approximately three times higher than the general population. Methods: A cross-sectional survey was completed in summer 2018, based on a random sample of households selected using census block vectors for tribal lands overlaid onto satellite imagery. Potential household structures were marked and randomly sorted with recruitment goals set to be proportional to underlying population size. Structures were ground-truthed for eligibility and residents approached for participation. A total of 72 households were recruited with 105 self-identified Navajo >18 years from three communities in northern Arizona. Participants were assessed on household and individual level factors and a urea breath test (UBT) was performed to test for active infection. We used logistic regression, adjusted for household clustering, to calculate odds ratios (aOR) and 95% confidence intervals (CI) for associations between UBT results and individual and household factors. Results: Active Hp infection was found in 66 of 101 participants with valid UBT, crude prevalence of 65.4%. Male participants were more likely to be positive (aOR=2.89, 95% CI, 1.03-8.09). Participants with an unregulated household water source had the highest odds for positive UBT (aOR=8.85, 95% CI, 1.50-53.38). There was no association with age or education. Conclusions: Hp prevalence is high among individuals in these Navajo communities. Use of unregulated household water is strongly associated with active Hp infection. Further work is needed to determine potential geographic variation in prevalence and risk factors across tribal chapters and Hp virulence factors predominating in this population. Attention should focus to develop strategies to eradicate the infection among at-risk populations and target earlier detection.

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Disparities in never-smoking lung cancer risk across Asian American, Native Hawaiian, and other Pacific Islander female groups within a multilevel integrated dataset of EHR data and cancer registry data

DeRouen MC, Thompson C, Canchola AJ, Jin A, Nie S, Shariff-Marco S, Lichtensztajn DY, Daida YG, Wong C, Patel MI, Wakelee HA, Liang SY, Waitzfelder BE, Cheng I, Gomez SL

There has been no single sufficiently-large data source to document lung cancer risk by smoking status and sex among specific Asian American, Native Hawaiian, and other Pacific Islander (AANHPI) groups, which is central to understanding and reducing the burden of this disease in these populations. We assembled a large cohort to quantify the burden of lung cancer by smoking status among six single- and multi-ethnic AANHPI groups. To assemble the cohort, we harmonized and pooled electronic health record (EHR) data (including race/ethnicity and smoking) from two large health systems (i.e., Northern California Sutter Health system and Kaiser Permanente Hawaii (KPH)) and linked tumor and diagnosis data from the respective state cancer registries. Age-adjusted incidence rates (AAIR) stratified by sex, detailed race/ethnicity, smoking status, and lung cancer histology were calculated, as well as incidence rate ratios (IRRs) by race/ethnicity. The cohort comprises over 2.3 million individuals (250,000 AANHPI females) followed up to 13 years for incident lung cancer. It includes over 6,000 incident lung cancer cases (558 AANHPI females). With the exception of Japanese females, risk of never-smoking lung cancer was higher among all female single and multi-ethnic AANHPI groups (IRRs ranging from 1.66 among Native Hawaiian to 2.26 among Chinese females) compared to non-Hispanic White females. Rates were highest among Chinese females (AAIR, 22.8 per 100,000) and Asian females reporting multiple races/ethnicities (AAIR, 22.2). Nearly 80% of Chinese females with lung cancer had never smoked. This is the first study to document the disproportionately high burden of never-smoking lung cancer among AANHPI female groups. Ongoing work will include longitudinal analyses of lung cancer risk among never-smoking AANHPI females, including absolute risk modeling to examine five exposure domains representing known and putative lung cancer risk factors (i.e., previous lung diseases; infectious disease; body size; reproductive factors; and neighborhood factors, including air pollution). Results from this work will serve as a critical evidence base to inform screening, research, and public health priorities, especially among AANHPI females.

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The effectiveness of interventions to increase mammography uptake among non-adherent Asian American women: A meta-analysis

Huang LT, Longcoy JA, Tai CY, Wang J HY, Sullivan K

a. Purpose: Breast cancer screening is underutilized among Asian American women despite the effectiveness of mammography (MAM) to detect breast cancer early. Various interventions have been developed to improve their MAM use. However, due to the inconsistency in the effectiveness of current interventions, synthesizing the existing results is important to guide future studies attempting to decrease cancer disparities. Thus, this meta-analysis was conducted to estimate the overall effects of existing interventions developed to increase MAM uptake for Asian American women. b. Methods: A systematic review was conducted to identify studies found in four main databases using the following keywords, including breast cancer screening, MAM, immigrants, and Asian Americans. Study eligibility included randomized clinical trials to promote MAM uptake published in 2003-2019. Odds ratios (ORs) were calculated to estimate effect sizes for each study and the pooled estimate. The heterogeneity was assessed to examine the variability in effect estimates across studies followed by a random effects model to account for the presence of heterogeneity. A funnel plot was generated along with other tests to detect the possibility of publication bias. c. Results: A total of 9 studies were identified, involving interventions that used a individually tailored, culturally sensitive media, or group settings. The pooled estimate of MAM uptake was statistically significant (OR = 2.56, 95% CI: 2.14-3.06). Heterogeneity ($Q = 61.57$, $p < 0.01$) was identified in studies using the interventions involving a group setting compared to individual-directed strategies ($p < .01$) but not in ethnicity groups. Interventions using a group setting (OR = 2.18, $p = 0.04$) and individually tailored strategies provided a larger effect (OR = 2.05, $p = 0.04$). The pooled estimates during the sensitivity analysis were similar despite inclusion of influential studies. No publication bias was identified. d. Conclusions: Educational intervention programs are effective to increase MAM uptake in women who are not adherent to the breast cancer screening guidelines. To yield a greater impact in improving MAM uptake in Asian American women, future studies can use individually tailored interventions and/or a group setting.

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Geographic Variation in the Effect of Prostate-Specific Antigen Testing on Treatment Receipt for Early-stage Prostate Cancer among Elderly Men

Jayasekera J, Onukwugha E, Tom S, Pradel F, Harrington D, Naslund M

Purpose: To examine geographic variation in the effect of systematic pre-diagnosis annual prostate-specific antigen (PSA) testing on the likelihood of undergoing expectant management, as well as the individual and county-level characteristics underlying such variation among Medicare-eligible older men. Methods: We analyzed patients aged 65 years or older from the linked Surveillance, Epidemiology, and End Results (SEER)-Medicare database. The sample included men diagnosed with localized/regional (early-stage) prostate cancer (PCa) from 2004-2007, with continuous fee-for-service Medicare coverage in the 60 months prior to PCa diagnosis. Treatments were categorized into receipt of radiation therapy, radical prostatectomy, cryotherapy, androgen-deprivation therapy (ADT) or expectant management within 2 years of diagnosis. Annual PSA testing was stratified by the receipt of 0-1, 2-3 and 4 or more tests during the 5 years before PCa diagnosis. Cluster-adjusted logistic regression models were used to quantify the effect of annual PSA testing on treatment receipt controlling for patient and county characteristics. We assessed geographic variation in PCa treatment outcomes using random intercept/slope models and variance partition coefficients. Results: Among 35,362 older Medicare beneficiaries, 20% underwent expectant management within the first two years of early-stage PCa diagnosis. Multivariate analyses showed that greater intensity of annual PSA testing was associated with a statistically significant lower likelihood of undergoing expectant management compared to receiving zero or one PSA test prior to diagnosis (4 or more times OR: 0.48, 95% CI 0.43-0.54; 2-3 times OR:0.64, 95% CI: 0.58-0.70). County of residence accounted for 2.5% of the variation in treatment receipt. The effect of annual PSA-testing on treatment receipt varied across counties ($p<0.003$). Conclusions: The use of expectant management among Medicare beneficiaries varied based on preventive health behavior, patient demographic characteristics, and geographic location.

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The Impact of Veterans' Cancer on State Cancer Incidence Rates

Kendall EK, Feng H, Koroukian SM, Zhu H, Abouassaly R, Schumacher FR, Markt SC

Purpose: Quantifying the impact of incomplete ascertainment of Veterans Affairs (VA) cancer cases on state cancer registry's statistics. Methods: State and federal cancer registries, including the Ohio Cancer Incidence Surveillance System (OCISS), reported cancer cases among veterans until approximately 2009. However, due to changes in data sharing policies, VA cancer cases are excluded in many state cancer registries, including Ohio. To quantify the impact of VA exclusion from OCISS, average cancer age-adjusted incidence rates were compared between 1996-2008 and 2009-2016. Given the primarily male composition of the Ohio Veteran population and the prevalence of risk factors (e.g. smoking), we also conducted the analysis separately for prostate cancer and lung cancer, stratified by sex.Results: The overall age-adjusted cancer incidence rate (reported as per 100,000) in males during the time of VA reporting in OCISS (1996-2008) was 560. It decreased to 515/100,000 in the period without VA reporting (2009-2016). Across the same time periods of 1996-2008 and 2009-2016, incidence rates decreased by 23% and 16% for prostate (from 150 to 115) and male lung cancers (from 100 to 84), respectively. Conversely, the average age-adjusted incidence rate of lung cancer in females during VA reporting (1996-2008) was 59/100,000, and remained stable after discontinuation of VA reporting (60/100,000 2009-2016). A similar trend was observed in the incidence rate of female breast cancer (127/100,000 1996-2008 and 126/100,000 2009-2016).Conclusions: Analyzing trends in OCISS data showed male overall cancer, prostate, and lung age-adjusted cancer incidence rates have measurably decreased, while female breast and lung cancer rates remained unchanged. These trends coincide the timeline and demographic changes expected from underreporting of the Veteran population. By failing to include VA cases, biases that mask true trends are introduced into the cancer registry. This will impact states with a large Veteran population, such as Ohio where the adult population is ~10% Veterans. Investigation will be conducted to quantify the impact of VA underreporting across other state and federal cancer registries, and to evaluate generalizability and validity of national cancer statistics.

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Identifying Phenotypes Associated with Advanced Disease Presentation in Breast Cancer

Kim U, Statler A, Koroukian S, Rose J

Purpose Describe the combinations of individual and community factors ("phenotypes") that are associated with advanced disease presentation in breast cancer. Methods We derived phenotypes associated with advanced disease (regional or distant stage disease) in breast cancer patients using K-medoid clustering, an unsupervised machine learning technique. The phenotypes were derived from 6,132 adult, female patients who were diagnosed with advanced breast cancer in 2016 and lived in Ohio. The K-medoid algorithm was applied to 7 compositional variables (age, race, ethnicity, marital status, insurance status, receptor positivity) and 12 contextual variables (% households without access to a car, % without high school degree, median rent, % homeowners, % crowded households, % below poverty, % white collar workers, % Black, % under 18, food desert status, health professional shortage area, rurality). Results We identified 8 phenotypes associated with advanced disease presentation (named A, B, C, D, E, F, G, H). The most common A phenotype (n = 1,168, 19.0%) was comprised of individuals who were more likely to be White and younger and live in communities that are more educated, have lower poverty rates, and have more white-collar workers. Two noteworthy phenotypes were B and C. The B phenotype (n = 569, 9.3%) was comprised of individuals who are more likely to be younger and live in rural communities. The C phenotype (n = 528, 8.6%) was comprised of individuals who are more likely to be White and live in food desert communities with fewer white-collar workers, homeowners, and households with access to a car. Conclusions Risk factors associated with advanced disease presentation are multifactorial, occurring at the individual and community levels. Therefore, we identified phenotypes associated with advanced breast cancer, an approach that differs from traditional cancer disparities studies that often utilize parametric, regression-based approaches that identify independent risk factors associated with advanced disease. Characterizing multilevel phenotypes associated with advanced disease presentation could inform disparities elimination efforts.

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Variations in genomic testing across cancer sites and by demographic characteristics

Koroukian SM, Dong W, Rose J, Schumacher F, Markt S

Study Objective: To identify demographic and clinical factors associated with receipt of genomic testing in Ohioans diagnosed with either incident female breast, kidney, bladder, prostate, colorectal, or lung cancer. Methods: We used data from the 2009 linked Ohio Cancer Incidence Surveillance System and Medicare files, and identified genomic testing using the appropriate procedure codes in claims data. Our study population included 10,945 patients. Independent variables examined were age at diagnosis (< 65, 65-74, 75+), sex, race (White or All Other), dual enrollment in the Medicare and Medicaid program (or 'dual') as a marker for heightened vulnerability, and advanced stage at diagnosis. We conducted multivariable logistic regression analysis to identify correlates of genomic testing by cancer site. Results: For all cancer sites combined, 11.1% were younger than 65, and 40.6% were older than 75 years of age. Eighty eight percent were White, 47.0% were women, 13.9% were duals, and one third were diagnosed with advanced-stage cancer. Overall, only 19.5% underwent genomic testing, ranging from a low of 6.7% in prostate cancer patients, to a high of 39.3% in breast cancer patients. We observed considerable variation in genomic testing by age, race, sex, dual status, and cancer stage across cancer sites. Adjusting for the independent variables, being 75 years of age or older was significantly and positively associated with increased likelihood of undergoing genomic testing in breast (adjusted odds ratio: 1.17, 95% confidence interval: 1.04, 1.32), kidney and bladder combined (1.29 (1.09, 1.53)), and prostate cancer patients (1.45 (1.12, 1.89)). Advanced-stage disease was associated with increased likelihood of genomic testing in breast and colorectal cancer patients (1.40 (1.17, 1.67) and 3.07 (2.30, 4.11), respectively), but with decreased likelihood in kidney and bladder cancer patients (0.66 (0.48, 0.91)). Finally, we note that White patients with lung cancer were significantly more likely than others to undergo genomic testing (2.49 (1.29, 4.78)). Conclusion: Our data from 2009 provide baseline statistics on genomic testing uptake in Ohio. Data for subsequent years will help us to assess trends in providing personalized medicine.

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Tobacco dependence treatment among heterosexual and sexual minority current smokers

Lee M, Salloum RG

Purpose of the study: We examined differences in use of evidence-based tobacco dependence treatments (i.e., behavioral and/or pharmacological treatments) comparing sexual minority current smokers – those identifying with lesbian, gay, or bisexual (LGB) identity – to their heterosexual counterparts using data from a nationally representative survey. Methods: Data were analyzed from the 2015 National Health Interview Survey. Multivariate-adjusted regression models were used to examine the correlates of tobacco treatment use among current smokers, comparing sexual minority populations to their heterosexual counterparts, stratifying by current gender status, and adjusting for sociodemographic factors, provider recommendation, serious psychological distress, and smoking-related cancers. Results: A total of 5,244 adult current cigarette smokers were included in this analysis, whereby 46.4% (n=2,433) identified as heterosexual female, 2.7% as LGB female (n=140), 48.8% heterosexual male (n=2,558) and 2.2% LGB male (n=113). The majority of all current smokers did not use evidence-based tobacco dependence treatments regardless of sexual orientation. Few respondents participated in any pharmacological treatment (LGB females: 12.1% vs. heterosexual females: 16.6%; LGB males: 11.5% vs. heterosexual males: 13.7%) or in any behavioral treatment (LGB females: 2.1% vs. heterosexual females: 5.3%; LGB males: 4.4% vs. heterosexual males: 3.1%). In fully-adjusted models, LGB females were significantly less likely than heterosexual females to receive any smoking cessation treatment (OR=0.47; 95% CI=0.23, 0.98). Conclusions: We found that the population-level use of evidence-based tobacco treatment is low regardless of sexual orientation. Sexual minority female smokers represent a prime target for interventions to expand access and utilization of evidence-based tobacco use treatment.

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An Assessment of Cancer Capacity and Resources in Rural Arizona

Lent AB, Mohan P, Calhoun EA, Jacobs, ET

The purpose of this study was to describe capacity and services for breast, cervical, colorectal, and lung cancer in Arizona's low populous areas. Clinical organizations were surveyed to assess on-site cancer services (screening, diagnosis, and treatment) and numbers of healthcare providers were pulled from the Center for Medicare and Medicaid Services, which were converted to county-level per capita rates. Rural Urban Continuum (RUC) codes were used to designate county metropolitan status. County demographic information from the US Census Bureau, income data from the US Bureau of Economic Analysis, and unemployment rates from the US Department of Labor were included. Descriptive statistics (means and standard deviations) were used to summarize the results. A student's t-test was used to evaluate differences between rural and urban counties. Out of Arizona's 15 counties, 13 were represented. Six were urban (RUC codes 1 – 3) and seven were rural (RUC codes 4 – 7). Urban counties had a larger average population (216,773) than rural counties (49,507) (p-value = 0.01). Rural counties had more per capita clinical sites (20.4) than urban counties (8.9) (p-value = 0.02). Rural counties had more per capita cervical cancer screening sites (18.9) than urban counties (7) (p-value = 0.02) and rural counties had more per capita colorectal cancer screening sites (15.7) than urban counties (2.5) (p-value = 0.02). Urban counties had more per capita gastroenterologists (2.2) than rural counties (0) (p-value = 0.02) and urban counties had more per capita pathologists (1.0) than rural counties (0) (p-value = <0.01). Rural counties had zero medical oncologists. Per capita, rural counties with RUC codes 4 and 6 had hematology and oncology physicians (0.3, 2.5) and radiologists (2.8, 6.0) but those with RUC code 7 had zero. Although not significantly different, rural counties with RUC code 6 had three times as many per capita registered nurses (306.7) than urban counties (90.8). While rural counties may have more physical infrastructure, they lack specialists integral to providing cancer services. Although this may contribute to urban rural cancer disparities, non-physician clinical providers may be more prevalent in rural areas and represent opportunities for improving

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An assessment of poverty and cancer survival in a state registry

Markt SC, Feng H, Koroukian S, Curtis J, Rose J, Schumacher FR

Purpose of the study: The primary goal of this study was to evaluate the association between poverty as a measure of socioeconomic status and cancer survival in the Ohio cancer registry, Ohio Cancer Incidence Surveillance System (OCISS). Methods: OCISS collects information on all cancer diagnoses in the state of Ohio beginning in 1996. From this registry, we obtained demographic, clinical and outcome data on over a million malignant cancer cases diagnosed from 1996-2016. Census tract level poverty was defined as the percentage of individuals living below the poverty line based on the 2000 US census data, and coded: <5%, 5-<10%, 10-<20%, and ⩾20%. We used multivariable Cox proportional hazards regression to calculate hazard ratios (HRs) and 95% confidence intervals (95% CI) for the association between poverty and overall survival, adjusting for cancer site, age, race, sex, stage, and primary treatment. We also evaluated the association with cause-specific mortality for prostate (among men only) and bladder cancers. Results: There were 717,945 (58%) deaths among the 1,232,154 cancer cases in OCISS. For all sites and sexes combined, the association with overall survival between the highest and lowest poverty categories was 1.25 (HR: 1.25; 95% CI: 1.24-1.26). Among men with prostate cancer (n=157,497), increasing poverty index was associated with overall and prostate-cancer specific survival (overall HR: 1.37, 95% CI: 1.33-1.41; prostate-cancer specific mortality HR: 1.43, 95% CI: 1.34-1.54). Among 32,531 cases of bladder cancer, we found similar associations; the highest poverty category was associated with a 35% increased risk of overall mortality (HR: 1.35, 95% CI: 1.29-1.41) and a 32% increased risk of bladder-cancer specific mortality (HR: 1.32, 95% CI: 1.24- 1.41), compared with the lowest poverty category. Conclusions: In Ohio, living in census tracts with higher levels of poverty was associated with both overall and cancer-specific survival. Future analyses will incorporate more discrete categorizations of socioeconomic status, including the area deprivation index and geospatial characteristics, and will assess sex- and race-specific survival across these poverty and deprivation categories.

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Exploring Differences in Cancer Care Values, Needs, and Preferences among Black and White Patients using Thematic Content Analysis

Mitchell KR, Osborne ML, Brassil KJ, Brown RF

Purpose of the study: Existing cancer care disparities are attributed to biological, behavioral, and socioeconomic differences. Patient-centered care (PCC) factors such as respecting values, needs, and preferences, have been linked to care outcomes and failure to value these factors may contribute to disparities. We contend that these factors could influence patient care priorities which may vary according to race. We explored differences between these factors among non-Hispanic blacks (NHB) and non-Hispanic whites (NHW) to understand their influence on patient priorities and NHB care outcomes. Methods: A thematic content analysis of semi-structured individual interviews was conducted. The interviews were audio-recorded and transcribed verbatim. Two trained researchers independently identified themes for: 1) values, 2) unmet needs, 3) preferences, and 4) priorities. Results: The sample consisted of 10 cancer patients, 4 NHB and 6 NHW aged 25 to over 60 yrs old, 50% females in both groups. Four themes emerged under 1) values: a) social roles, b) social interactions, c) religious/spiritual beliefs, and d) optimism. Optimism emerged for NHW participants only. 2) Unmet needs included: a) timely access to care, b) emotional social support, c) informational social support, d) instrumental social support, and e) self-advocacy. The informational social support sub-theme long term treatment plan only emerged among NHB patients. Four preferences themes emerged: a) healthcare engagement, b) care logistics, c) types of provider support, and d) treatment. The healthcare engagement sub-theme research participation was only seen among NHW. The following themes emerged as patient priorities: a) highest quality of care, b) care experience, c) outcomes, and d) family. No racial differences in patient priorities were observed. Conclusions: We observed differences in values, needs, and preferences between NHB and NHW; notably, however, these racial differences were not reflected in patient priorities for care. These study findings are limited by a small sample, but provide support for further investigation of how racial differences in PCC factors may affect evaluations of and engagement in cancer care, and potentially care outcomes.

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Cervical cancer screening among primary care patients in an urban public safety net health system

Montealegre JR, Parker SL, Zare M, Bulsara S, Escobar B, Chiao EY, Cantor SB, Jibaja-Weiss ML, Hilsenbeck SG, Anderson ML, Scheurer ME

Purpose of the study: We assessed characteristics associated with recent cervical cancer screening among women who regularly attend for primary care in an urban safety net health system. Methods As part of a randomized trial to evaluate HPV self-sampling, the electronic health record was used to identify female patients, 30-65 years, with no history of hysterectomy or cervical cancer, who had attended a health system primary care clinic ⩾2 times in past 5 years. Patients were categorized as screened if they had a Pap test in the past 3.5 years or a Pap/HPV co-test in the past 5.5 years. Results Of the 49,699 patients in the analysis, 77.7% were screened, predominantly by Pap/HPV co-testing (95%). All underscreened women (22.3%) had a previous Pap test on record. In bivariable Poisson regression, Hispanic, Asian, and Other race/ethnicity women were more likely than White women to be screened (PRs=1.3, 4.7, and 2.7, respectively, p<0.001), while Black women were less likely (PR=0.9, p<0.01). Spanish-, Vietnamese-, and Other language-speaking women were more likely than English- speakers to be screened (PRs=1.6, 1.2, 2.0, respectively, p<0.001). By health coverage, women with the indigent program were significantly more likely than those with private insurance to be screened (PR=2.5, p<0.001), while those with Medicaid, Medicare, and no coverage were significantly less likely (PRs=0.6, 0.6, and 0.7, respectively, p<0.001). Similar associations between demographic characteristics and screening status were observed in multivariable analyses, with the exception of Hispanic ethnicity. After controlling for insurance status and language, Hispanic women were less likely to be screened compared to White women (PR=0.82, p<0.001). Conclusion The prevalence of underscreened women in this safety net population was higher than nationally (22.3% versus 18.9%), despite frequent use of primary care services. While Hispanic women appear to have higher screening prevalence than White women, the association is reversed after adjusting for insurance status. This may reflect higher rates among immigrant women with indigent program coverage. The higher screening rates among indigent program participants may reflect the lack of option to receive cervical screening elsewhere.

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Culturally tailored Colorectal Cancer Screening Health Education: Screen to Save

Moseley MY, Diaz-Mendez M, Wong C, Pardo EN, Napoles AM, Nguyen T, Pasick RJ, Rhoads KF

Purpose: NCI's Center to Reduce Cancer Health Disparities launched Screen to Save (S2S): Colorectal Cancer (CRC) Outreach and Screening Education Program with a National Outreach Network of Community Health Educators (CHEs) at NCI designated cancer centers to increase CRC education and screening in diverse communities. The University of California San Francisco (UCSF) Cancer Center S2S project implemented culturally tailored CRC health education and assessed increase in knowledge and intent for screening uptake among multi-ethnic, multilingual populations. Methods: UCSF CHEs developed an outreach plan to outline intended audiences, CRC screening rates, assets, partners and activities. Conducted CRC education events to deliver prevention, early detection and screening messages and referrals for connections to care. Developed culturally tailored educational workshops and materials (PowerPoints, audiovisuals) for African American, Latino and Chinese; translated surveys for Chinese and Spanish. Evaluated workshop impacts using a 14-item pre-/post- education survey to measure changes in knowledge, intention to screen for CRC and reduce cancer risk. Respondents received a gift card and CRC materials. Results: UCSF S2S project reached 436 people through 16 culturally tailored CRC education activities; 368 completed the surveys. The majority of respondents (98%) were age >50 years (mean age 65). Respondents were 79% female and 20% male. Paired t-test assessed changes in knowledge score. The scores ranged from 0 to 14 pre-education and 3 to 14 post-education. CRC knowledge scores improved on average 1.9 points (13.5%) (pvalue <0.0001). Post-education, 98% of respondents strongly agreed or agreed to talk to a healthcare provider about screening; 97% strongly agreed or agreed to obtain screening. Conclusion: S2S is part of a national approach to address CRC health disparities. Through community engaged, culturally tailored health education and partnerships, S2S demonstrated efficacy in increasing knowledge. S2S may be a model for improving CRC screening. Future efforts may include a post education event evaluation and follow-up to explore uptake of CRC screening and risk reduction practices.

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Patient- and County-Level Determinants of Surgical Treatment for Non-Small Cell Lung Cancer: A Multilevel SEER-Medicare Analysis

Odahowski CL, Alberg AJ, Zhang J, Schootman M, Eberth JM

Purpose of the study: To identify patient- and county-level determinants of receipt of surgical treatment for non- small cell lung cancer (NSCLC), focusing on rural vs. urban disparities. Methods: The study population was comprised of 63,767 localized and regional NSCLC cases diagnosed between 2003-2011 using SEER-Medicare data. Predictors examined included patient demographics, clinical characteristics and county-level factors, including urban versus rural designation, percent of the 65 and older population in poverty, and Medically Underserved Areas. Analyses examined patients nested within counties in a multilevel logistic regression model stratified by stage at diagnosis, predicting receipt of surgical treatment. Results: Rural residents were less likely to have surgery than urban residents (42.0% vs. 46.8%), and fewer black patients received surgery (32.9%) than white patients (47.1%) and those of other races (48.0%). Rural residence was not a significant predictor of surgery at the county level for local stage cases (OR=0.87, 95% CI:0.74-1.03) nor regional stage cases (OR=1.09, 95% CI:0.95-1.26). However, the odds of surgical treatment decreased per 5% increase in county-level poverty for both local and regional stages (local OR=0.83, 95% CI:0.77-0.91; regional OR=0.84, 95%CI: 0.79-0.90). Patient factors associated with lower likelihood of surgical treatment included increasing age, male sex, black race, those not married, dual Medicare/Medicaid enrollment, increasing number of comorbidities, and bilateral or midline location for both stages. Conclusions: While rural residence itself was not a significant predictor of surgical treatment, the association between county rurality and surgery was attenuated by area poverty, which is observed at higher rates among rural populations. Medicaid enrollment, a proxy measure of patient-level poverty, was also associated with a reduced likelihood of receiving surgery. Both area-level and patient-level factors were observed to contribute to the receipt of surgery among early stage lung cancer cases.

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A claims analysis of colorectal cancer screening initiation among Medicaid enrollees who received a mailed screening intervention

O'Leary MC, Brenner AT, Reuland DS, Wheeler SB

Purpose: This analysis assessed colorectal cancer (CRC) screening patterns in a population of Medicaid enrollees not current with screening who received a mailed fecal immunochemical test (FIT)-based intervention. Methods: In a randomized controlled trial carried out in partnership with a county health department, 2,144 average-risk North Carolina Medicaid enrollees ages 52 to 64 who were due for CRC screening were randomized to receive one of two mailed FIT interventions. The interventions included a mailed reminder letter notifying them that they were due for screening and providing instructions on how to obtain a FIT kit (Reminder Only) and a mailed reminder plus FIT kit (Reminder+FIT). For this analysis, we obtained Medicaid claims data for these enrollees from October 2016 to August 2018, comprising the trial period and 18 months of follow-up from the initial mailing dates. We determined the proportion of individuals who completed FIT screening within 12 months of receiving the intervention. In addition, we identified other non-FIT modalities of CRC screening within 6 months of the initial invitation. Results: Of the 2,144 enrollees, 458 (21.4%) had at least one claim related to CRC screening between October 2016 and August 2018, of whom 411 (89.7%) had a valid address. These 411 enrollees included 229 (55.7%) who received the Reminder+FIT and 182 (44.3%) who received the Reminder Only. Among the 411 individuals with claims data available, 356 (141 in the Reminder+FIT group and 74 in the Reminder Only group) completed a study FIT within 12 months. The interventions also were associated with 50 additional screenings within 6 months by modalities other than FIT. Of these 50 screenings, 32 (64%) were in the Reminder Only group, including 25 colonoscopies, 6 non-study stool tests, and 1 barium enema, and 18 (36%) were in the Reminder+FIT group, including 15 colonoscopies and 3 non-study stool tests. Conclusions: Both mailed FIT interventions were associated with improved CRC screening in a Medicaid population known to have relatively low screening compared to other insured populations. The Reminder+FIT initiated higher screening rates overall and specifically by FIT, whereas the Reminder Only was associated with more CRC testing through other modalities.

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Practice facilitation to increase HPV vaccine-promoting practices in a safety net health system

Parker SL, McGee LU, Boom JA, Ressler K, Kline K, Jibaja-Weiss ML, Montealegre JR

Purpose of the study: Practice facilitation is an implementation strategy that utilizes an external facilitator to work with clinic staff to improve healthcare processes and outcomes. We implemented a provider training/practice facilitation intervention to increase HPV vaccine-promoting practices among pediatric and family practice clinics in a safety-net healthcare system. Methods: This was part of a larger program to improve HPV vaccine rates among medically underserved pediatric populations (ages 11-18 years) in a large, urban safety-net health system. We implemented 3 strategies at 19 Harris Health System clinics from 2016-2019: patient (parent) education; tiered patient tracking, reminder/recall and patient navigation; and provider training/practice facilitation. Training/practice facilitation was led by a pediatrician and consisted of an initial didactic training at each clinic on providing strong provider recommendations for the HPV vaccine; a follow-up visit to identify and recommend clinic-specific improvements; and semi-annual assessment and feedback of HPV vaccination rates. A pre-post survey was given to each clinic to assess HPV vaccine-promoting practices before and after our program. The 10-15 minute survey included 35 questions adapted from existing instruments. Clinics could answer “yes,” “no” or “sometimes” to whether their clinic routinely employs a series of HPV vaccine-promoting practices. Responses were compiled into a score for each clinic’s vaccine-promoting practices. Results: All participating clinics completed the pre-post survey. At baseline, the mean score was 41.3, which increased to 48.1 at follow-up. The most commonly adopted practices were: provider HPV trainings, reminder calls for subsequent/overdue HPV vaccine doses, and procedures for locating missing vaccine records, including contacting schools. Conclusions: Survey results showed a 16.5% increase in HPV vaccine-promoting practices over a 3-year period. Future analysis will assess which clinical practice(s) are associated with increased vaccination rates. Our data suggest that practice facilitation can be used to improve clinical practices that promote HPV vaccination in a safety-net healthcare system.

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Insurance Status and Level of Education Predict Disparities in Receipt of Treatment and Survival for Anal Squamous Cell Carcinoma

Patel KS, Alhatem A, Gadde U, Ahlawat S, Dalla Piazza M

Purpose: The incidence and mortality of anal squamous cell carcinoma (ASCC) continues to rise in marginalized populations despite it having favorable prognosis with chemoradiation therapy. We explored the impact of socioeconomic factors such as insurance status, income, and level of education on treatment and survival for ASCC. Methods: We identified patients with ASCC in the Surveillance, Epidemiology, and End Results Program database from 2004 to 2016. Community level variables were stratified into quartiles. We used Cox proportional hazards models and multivariate regression to explore predictors of cancer specific survival and receipt of chemoradiation. Results: We included a total of 10,868 patients. The median age was 55, 10.4% were black, and 65.4% were female. Greater than 80% of patients received chemoradiation; insured and Medicaid patients comprised 79.9% and 16.3% of patients, respectively. In multivariate analysis, poorer survival was independently associated with Medicaid (HR 1.52, 95% CI 1.34-1.74) and uninsured status (HR 1.68, 95% CI 1.35-2.10), as well as for those from communities with the lowest rates of high school education (HR 1.17, 95% CI 1.02-1.38), lowest income (HR 1.29, 95% CI 1.08-1.54), and highest unemployment (HR 1.21, 95% CI 1.03-1.40). Patients were less likely to receive treatment if they were black (OR 0.72, 95% CI 0.62-0.85), had Medicaid insurance (OR 0.71, 95% CI 0.52-0.96), or had lowest level of education (OR 0.79, 95% CI 0.66-0.93). Income was not independently associated with receipt of chemoradiation. Conclusion: Socioeconomic disparities exist for cancer survival, and this is the first national population based study to demonstrate that insurance status and educational attainment impact both receipt of treatment and survival of ASCC. As biomedical innovations lead to higher rates of treatment success for cancer, further research is warranted to investigate the relationship between social factors and disparities in ASCC outcomes. A greater understanding of these dynamics can lead to the design of targeted interventions that improve treatment delivery, reduce disparities, and improve survival.

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Gentrification and Cancer: A Systematic Review of the Literature

Pichardo CM, Rosas CE, Barraza-Gallego K, Chebli P, Strayhorn SM, Molina Y

Purpose: Neighborhood gentrification represents an important, understudied dynamic neighborhood driver of cancer disparities. However, to our knowledge, no systematic review has examined the health impact of gentrification on cancer disparities and behavioral risk factors in the US. Objective: This review aims to: 1) synthesize the literature on empirical work that tests the association between gentrification, cancer incidence, and lifestyle behavioral risk factors; and, 2) develop a responsive conceptual framework.Method: Between March and November 2019, authors conducted a systematic review via electronic literature searches using PubMed, MEDLINE through Ovid, PsychInfo, and Sociological Abstracts. Studies were included if they reported a measured of a) gentrification, b) cancers and c) behavioral risk factors (e.g., diet, physical activity, smoking, alcohol use). Results: Of the 99 titles and abstracts reviewed, 19 full text articles were reviewed. No articles were focused on cancer incidence, but 4 were associated with behavioral risk factors. All studies focused on alcohol use. One study found a negative association between gentrification and alcohol use two found no association. Other studies, found that these relationships varied for displaced resident. One study found that displaced residents were six times more likely to have alcohol-related hospital admissions, while another found that moving to a neighborhood with higher socioeconomic conditions (as a result of displacement) was associated with a decrease in binge drinking among displaced residents. In contrasts, residents living in neighborhoods less than five years were at greater risk for binge drinking, compared to those in stable communities. The limited literature, establishes a relationship between gentrification and cancer-related lifestyle risk factors (i.e. alcohol use), alluding to a link between gentrification and cancer through, cancer-related lifestyle risk factors (i.e. alcohol use). Conclusion: Given the established causal link between alcohol consumption and multiple cancer types, to inform whether gentrification is associated with cancer through cancer-related lifestyle risk (i.e. alcohol consumption), further empirical work that explicitly test these association are needed.

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Neighborhood socioeconomic status and breast cancer subtypes among Black women: findings from the Women's Circle of Health Study

Qin B, Llanos AAM, Babel R, Plascak JJ, Pawlish K, Diez Roux AV, Ambrosone CB, Demissie K, Hong CC, Bandera EV

Background: Many studies have examined individual-level socioeconomic status (SES) as a major social determinant of more aggressive breast tumor phenotypes. However, the impact of neighborhood-level SES (nSES) on breast cancer is not well understood, particularly among Blacks, who are more likely to develop the aggressive triple-negative breast cancer (TNBC). Objective: To evaluate the impact of nSES on breast cancer subtypes among Black women with breast cancer. Methods: We evaluated the association of interest among 1,220 Black women with invasive breast cancer from 2006 to 2018 enrolled from 10 counties of New Jersey in the Women's Circle of Health Study (WCHS). Residential address at diagnosis was geocoded to the census tract-level. Neighborhood SES was measured using the NCI's census tract-level SES index, a time-dependent score constructed by a factor analysis of seven variables measuring different aspects of census tract SES. In a case-only analysis, we used multilevel multinomial logistic regressions to estimate nSES in relation to breast cancer subtype (TNBC, HER2-enriched, Luminal B vs. Luminal A). Models were adjusted for individual-level SES variables, BMI and reproductive factors, and census tract-level percentage of Black residents. We also tested whether the associations were modified by percentage of Black residents. Results: Higher nSES was found to predict a lower risk of TNBC. Compared to tertile 1 (lowest nSES score), the odds ratio (OR) was 0.91 (95% CI: 0.65, 1.29) for tertile 2 and 0.52 (95% CI: 0.34, 0.79) for tertile 3 (p-trend: 0.001). Higher nSES was borderline significantly associated with a lower risk of Luminal B. The inverse association between nSES and TNBC was observed only among Black women living in census tracts with lower proportion of Black residents (p-for-interaction=0.08). Compared to the lowest nSES tertile, OR was 0.38 (95% CI: 0.21, 0.68) for the highest tertile (p-trend: <0.001). Conclusion: Neighborhood socioeconomic environment may influence the development of TNBC among Black women, which might be buffered by some contextual factors in areas with more Black residents.

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NCCN Treatment Adherence and Endometrial Cancer Survival: Implications for Racial/Ethnic Disparities

Rodriguez VE, LeBrón AMW, Chang J, Bristow RE

PURPOSE: This study aimed to examine differences in overall survival of endometrial cancer based on National Comprehensive Cancer Network (NCCN) treatment guidelines and race/ethnicity. METHODS: Data was extracted from the Surveillance, Epidemiology, and End Results (SEER) National Cancer Registry from January 1, 2007 to December 31, 2015. The study included a total of 80,852 adult women 18 years and older with endometrial carcinomas after exclusion criteria were applied. Descriptive statistics, Kaplan-Meier estimate of survival probability, log-rank tests, and Cox regression proportional hazards models were performed to examine predictors of overall survival after controlling for important sociodemographic, prognostic, and treatment factors. RESULTS: Racial/ethnic distribution of women in the sample consisted of 69.8% non- Latina white, 8.4% Black, 12.1% Latina, 7.2% Asian, 1.3% Pacific Islander, 0.6% American Indian/Alaskan Native, and 0.6% unknown race/ethnicity. Overall, 34.4% of women received NCCN treatment adherent care. Pacific Islander, Asian, and non-Latina white women received the highest percentage of adherent care (40.5%, 38.4%, and 34.4% respectively) whereas Black, Latina, and American Indian/Alaskan Native women received the lowest percentage of adherent care (29.6%, 32.0%, and 31.6% respectively). NCCN treatment adherence was an independent and statistically significant predictor of overall survival. Compared to their non-Latina white counterparts, findings indicate that there was a higher risk of death among Black (HR=1.43, $p < 0.001$) and Pacific Islander (HR=1.54, $p < 0.001$) women whereas improved survival was observed among Asian women (HR=0.85, $p < 0.001$) after adjusting for treatment adherence, age at diagnosis, socioeconomic status, stage at diagnosis, histology subtype, grade, and year of diagnosis. CONCLUSIONS: Adherence to treatment guidelines for endometrial cancer is independently associated with overall survival. Even after adjusting for treatment adherence and other sociodemographic and prognostic factors, disparities in survival persisted among racial/ethnic groups.

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Elucidating factors of geographic variation in early-onset colorectal cancer survival among men

Rogers CR, Moore JX, Henson A, Qeadan F, Huntington MS, Holowatyj AN

Background: Despite reductions in overall colorectal cancer (CRC) burden, incidence rates are rising among individuals age<50 years. Previous studies have identified regional differences in early-onset CRC (EO-CRC) incidence by geographic region; however, no studies have examined geographic differences in CRC mortality specifically among patients age younger than 50 years at diagnosis. We aimed to determine the geospatial distribution of EO-CRC, and total variance explained of personal and county level factors with EO-CRC hazard among men. Methods: EO-CRC “hot spots” (counties with high EO-CRC mortality rates) were derived from CDC data, years 1999-2017. EO-CRC hot spots data were linked to NIH/NCI SEER program data among men aged 15-49 years at CRC diagnosis from 1999-2016. Cox proportional hazards models were used to compare CRC-specific survival probability (and hazard) among men in hot spots versus non-significant counties. To estimate the total variance in EO-CRC survival explained by personal and county level factors, we used a generalized R-square. Results: We identified 232 counties as geographic hot spots for EO-CRC—214 (92%) of which were in the South. Among SEER patients, 32,447 men (1,009 in hot spots; 31,438 in non-significant counties) were diagnosed with EO-CRC. Men residing in hot spots had higher hazard of CRC-specific death compared to men in non-significant counties (HR, 1.22; 95% CI, 1.11-1.35) after adjusting for age, race, stage, grade, surgery, and marital status. AJCC stage independently explained 29.5% of EO-CRC survival, and all factors together explained about 35% of the variation in EO-CRC survival. Conclusion: Survival after EO-CRC diagnosis is significantly worse among men residing in hot spot counties, explained mainly by person-level late-stage diagnosis. Further studies of CRC-related health disparities among non-Hispanic Black men diagnosed with EO-CRC are needed and could have significant implications for early detection and care. Examination of individual-level health behaviors and clinical characteristics among men diagnosed with EO-CRC is warranted to explore gene-environment interactions associated with geographic variation in survival and to tailor clinical algorithms for CRC early detection.

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Recruiting participants to a randomized controlled trial of a diet and physical activity intervention among Latina breast cancer survivors

Santiago-Torres M, Marin-Chollom A, Paul R, Ulanday K, Castellano M, Fuentes Y, Shi Z, Koch P, Tsai WY, Gray HL, Ogden Gaffney A, Crew K, Kalinsky K, Accordino M, Trivedi M, Chen M, Taback B, Camacho F, Hershman D, Contento I, Greenlee H

Cancer survivors are recommended to consume a diet high in fruits and vegetables (F/V) and engage in >150 minutes per week of moderate-to-vigorous physical activity (MVPA). Most Latina breast cancer (BC) survivors do not meet the guidelines and many lack the knowledge/skills needed to sustain diet and PA changes. The Mi Vida Saludable study is a randomized, controlled, 2x2 factorial trial testing the effects of a behavioral, in-person and electronic health (eHealth) communication program on changing diet and PA behaviors in Latina BC survivors (R01CA186080, PI: H Greenlee). The primary aims of the trial are to test the effects of the intervention on changing daily intake of F/V and MVPA from baseline to 12 months. Latina BC survivors were identified via medical records, physician referral, and community events in NYC and screened by phone for eligibility. Eligibility criteria included, stage 0-III BC diagnosis, no evidence of recurrent or metastatic disease, >90 days post-treatment, low intake of F/V (<5 daily servings) or low level of MVPA (<150 minutes/week) and being able/willing to participate. Eligible women were randomized to one of four study arms: A) in-person group classes (classroom education, cooking class, PA session, food shopping trips), B) eHealth communication (text messages, newsletters, website) alone, C) in-person classes plus eHealth, or D) control. Participants were enrolled between July 2016 and March 2019. Of 884 women screened, 27% were eligible. Primary reasons for ineligibility were not being able to participate due to work/life responsibilities (26%) or health reasons (12%), not being willing to participate (23%), or not being able to receive email/text messages (8%). A total of 167 women were randomized into the study, representing more than 11 Latin American nationalities. Women were on average 56 years old, 54% reported college education or higher, and 56% had an annual income of $15,000 or less. The study met its accrual goal and successfully recruited and enrolled a diverse group of Latina breast cancer survivors primarily via medical records and physician referrals. If effective, the Mi Vida Saludable program will provide BC survivors and cancer centers with scalable tools to promote sustained lifestyle behavior change.

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Rural-Urban Disparities in Pancreatic Cancer Stage of Diagnosis: Understanding the Interaction with Medically Underserved Areas

Segel JE, Hollenbeak CS, Gusani NJ

Purpose To estimate differences in stage of pancreatic cancer diagnosis by rurality of patient residence and residence in a medically underserved area (MUA). Methods Using 2010-2015 Pennsylvania Cancer Registry data, we restrict our analysis to adults diagnosed with pancreatic cancer. Using Rural Urban Continuum Codes (RUCC) we categorize each patient's residence as: (1) metro; (2) non-metro adjacent with population ⩾ 20,000; (3) non-metro adjacent with population < 20,000; (4) non-metro non-adjacent, and (5) completely rural; as well as whether the county was a full MUA, partial MUA, or non-MUA. We examine the percent of patients diagnosed with local and locoregional stage of disease for each residential rurality and MUA status grouping. We estimate multivariate linear probability models of local and locoregional stage of diagnosis while controlling for demographics, insurance type, year, rurality, and MUA status. Finally, we estimate models interacting rurality with MUA status to disentangle the relative impact of each on stage of diagnosis. Results We find that no pancreatic cancer patients living in completely rural areas were diagnosed at the local stage, the lowest of all categories of rurality. In adjusted models, we find that patients living in completely rural areas have significantly lower rates of local (9.7 percentage points lower relative to metro areas; 95% CI: 1.2 to 18.1 percentage points lower) and local/regional stage of diagnosis (20.6 percentage points lower relative to metro areas; 95% CI: 6.4 to 34.9 percentage points lower). The estimates are attenuated slightly when controlling for MUA. Finally, we find that patients living in full MUA have lower rates of local and locoregional stage of diagnosis even when controlling for rurality of residence. Conclusions We find significantly lower rates of early stage pancreatic cancer diagnosis for patients living in completely rural areas. While lack of primary medical care resources is an important factor, rural residence remains an important independent predictor in later stage of diagnosis.

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Addressing Lung Cancer Health Disparities and Inequities in a Rural African American Population

Sojourner SJ, Looney SW, Tingen MS

Purpose of the Study: To reduce lung cancer health disparities in rural African Americans (AAs) by providing education on the risk factors of lung cancer, facilitating through navigation to low-dose CT (LDCT) in those eligible, and promoting smoking cessation for current smokers. Methods: 105 AA participants living in rural Georgia and members of three churches participated in a four-week program with objectives of: 1) providing education on risks of lung cancer; 2) promoting low-dose CT (LCDT) screening for those deemed eligible; and 3) facilitating smoking cessation in current smokers. Using a "train-the- trainer" approach, indigenous Community Health Workers (CHWs; 3/church) participated in an 8-hour training on the educational modules for delivering the 4-session intervention. Surveys assessing healthy lifestyle choices, smoking history, cancer screening history, and general knowledge about cancer were given pre- and post- intervention. Results: Participants were 21-79 yrs. (mean age 56 yrs.), 67.6% female, 56.2% were obese, and 15.7% being morbidly obese. 18.1% were current smokers, smoked an average of 7 cigarettes/day for 20 yrs. on average. 68.0% responded they were exposed to second-hand smoke at least some of the time. Pre-post intervention surveys revealed a significant improvement in the correct responses for the recommended screening test for lung cancer (35.2% vs 81.9%; $p<0.001$), the harmfulness of electronic cigarettes compared to traditional cigarettes (67.4% vs 85.7%; $p=0.008$), cancer risk factors (33.3% vs 61.9%; $p<0.001$), and improved survival rates due to lung screening (47.6% vs 72.4%; $p=0.001$). 36.8% of those eligible were scheduled for cessation; 57.1% eligible for LDCT were scheduled for lung screening. Conclusions: AAs are at greater risk for lung cancer incidence, late diagnoses, and mortality, especially in rural areas due to low access to quality healthcare and education efforts. This project demonstrates that education and prevention efforts with navigation to care show promise for reducing cancer incidence, facilitating earlier diagnosis through screening, and promoting healthy behavior choices of quitting tobacco, thus impacting mortality rates among rural and underserved AAs.

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An Assessment of Clinical and Behavioral Cardiovascular Disease Risk Factors in Black and White Breast Cancer Survivors

Sutton AL, Felix AS, Sheppard VB

Purpose: Breast cancer (BC) survivors are at risk of developing cardiovascular disease (CVD). Some of this is due in part to receipt of certain therapies (e.g. anthracyclines) and or existing conditions at the time of diagnosis. Limited data are available regarding non-clinical risk factors that may contribute to CVD. Aims of this analysis were to explore the prevalence of and racial differences CVD risk factors and identify clinical, demographic, and psychosocial predictors of CVD risk. Methods: Newly diagnosed BC survivors were recruited from medical centers in Washington, DC and Detroit, MI. Medical records and surveys captured clinical data (e.g. treatment type), lifestyle (e.g. smoking), psychosocial distress (e.g. anxiety) and stressors (e.g. perceived discrimination). The prevalence of risk factors was assessed via descriptive statistics. Chi- square tests were used to assess risk factors by race and between survivors who received anthracycline chemotherapy and those who did not. Multinomial logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for associations between predictors (e.g. race, insurance status) and risk factor score (0, 1-2, and $\geqslant 3$). Results: Among 358 women, 58.7% were Black and 64.0% were over the age of 50. Black women more commonly received anthracycline chemotherapy (29.5% vs. 14.9%) and experienced depression (43.5% vs. 6.7%) than White survivors. Women on anthracyclines more frequently experienced depression (48.5% vs. 29.2%) and had normal body mass index (36.0% vs. 22.2%) than women not on anthracyclines. Black survivors and survivors were more likely to report perceived healthcare discrimination (44.0% vs. 16.3%). In the multinomial model, Black women (vs. White women, OR=2.79, 95% CI=1.22 to 6.37) and women with high school or less education (vs. more than high school, OR=5.75, 95% CI=1.26 to 26.36) were more likely to have at 3 or more risk factors.
Conclusion: Survivors may require enhanced CVD surveillance prior to treatment and during survivorship. This is particularly salient for Black women who had more risk factors and were more likely to have anthracycline chemotherapy. More research is needed on the impact of stressors and distress on CVD disparities.

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Changes in racial/ethnic disparities and incidence rates of distant stage breast cancer by age, 1992-2015

Acheampong T, Kehm R, Lee Argov E, Terry MB, Tehranifar P

Purpose of the study: Breast cancer (BC) incidence in US women under age 50 has increased in recent decades, with the largest increase for distant stage in women <40 years old. However, it is unclear if this trend has persisted and if it is consistent across racial/ethnic groups. Methods: We used five additional years of data from Surveillance Epidemiology and End Results Program 13 (SEER) to update previously published age-specific distant stage BC incidence trends from 1992-2015 by age group (25-84 years) and racial/ethnic groups (excluding American Indian /Alaska Natives). We estimated annual percent change (APC) and average APC (AAPC) of incidence rate trends using joinpoint software. We also used SEER Health Disparities software (HD*Calc) to calculate racial/ethnic absolute (difference) and relative (ratio) disparity measures comparing racial/ethnic groups with the highest and lowest incidence rates (range measures) and comparing Non-Hispanic (NH) white women to other racial/ethnic groups (rate measures). Results: In all racial/ethnic groups, incidence rates for distant stage BC increased in women aged 25-39 (NH White AAPC: 4.2% (95% CI: 3.5, 5.0), NH Black AAPC: 3.3% (95% CI: 2.1, 4.6), NH API AAPC: 3.5% (95% CI: 1.2, 5.9), Hispanic AAPC: 2.5% (95% CI: 1.2, 3.9)); smaller but statistically significant increases were also observed in women aged 40-54 across all racial/ethnic groups (range of 0.5% in NH White and Hispanic women to 1.0% in NH API women), and in Non-Hispanic API women aged 55-69 (1.4%, 95% CI: 0.4, 2.3). In women aged 25-39, the range difference between racial/ethnic groups with the lowest and the highest distant stage BC rates increased from 1.0 (95% CI: 0.1, 1.9) in 1992, to 2.3 (95% CI: 1.0-3.6) per 100,000 persons in 2004. The trend over time for all other relative and absolute range disparity measures remained mostly unchanged in all age groups, as did rate differences and ratios comparing NH white women to other racial/ethnic groups. Conclusions: Distant stage BC incidence has increased steadily from 1992-2015 in young women of all racial/ethnic backgrounds, and in NH API women for most age groups. Racial/ethnic disparities in distant stage BC persist and remained relatively stable during this time interval.

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Implementation of Community-Focused Patient Navigation Program to Address Barriers to Care for Underserved Cancer Patients

Ver Hoeve ES, High B, Hernandez M, Armin J, Ali-Akbarian L, Hamann HA, Calhoun E

Introduction: Patient navigators have the potential to reduce cancer health disparities by targeting barriers to care. Success depends on navigators' cultural, linguistic, and community knowledge as well as on the receptivity of the clinical care setting. We use the RE-AIM framework to assess if implementation of a community-focused patient navigation program at our NCI-designated comprehensive cancer center is: 1) Reaching underrepresented cancer patients, 2) Effective at reducing barriers to care, 3) Adopted among cancer center clinical teams, 4) Implemented in a consistent manner, and 5) Maintained sustainably over time. Methods: Bilingual patient navigators were trained to address patients' language, health access, financial, and psychosocial barriers to cancer care. They met regularly with cancer center staff and health workers at a federally qualified community health center to improve navigation services. Navigators' efforts to reduce barriers to care were documented in REDCap for research purposes, and in Cerner for clinical care coordination. Results: In the 17 months since the program began, cancer center clinical teams made 160 referrals, and patient navigators enrolled 143 patients. Participants were primarily Latino (63%), reported Spanish as their primary language (43%), and lived in households with incomes <$35,000 (63%). At enrollment, participants reported an average of 4.2 distinct barriers to cancer care (range 1 – 11). The majority of reported barriers involved health access (n=154) and finances (n=149). Following a 3-month intervention, participants exhibited significantly fewer barriers $t(70)=15.8$, $p<0.001$, reported greater self-efficacy $t(65)=-3.9$, $p<0.001$, and expressed high satisfaction with the navigator program. Conclusions: By framing preliminary results within RE-AIM, evidence suggests that our community-focused patient navigation program successfully Reached underrepresented cancer patients, was Effective at reducing barriers, demonstrated Adoption among cancer center clinical teams, and was Implemented in a consistent manner. Maintenance of the program will require further efforts to document cost-effectiveness to cancer center administration for sustainability.

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Comparing trust in sources of cancer health information between Hispanics and Non-Hispanic Whites in the San Diego County

Vu H, McDaniels-Davidson C, San Miguel Y, Chagolla P, Nodora J, Patel SP, Martinez ME

Purpose Receipt and processing of health information by individuals from different racial/ethnic groups is influenced by the degree of trust they have in the source. The purpose of this study was to assess levels of trust in receiving cancer health information and assess differences in these levels between Hispanics and Non-Hispanic Whites (NHW) in San Diego County, a large US-Mexico border county. Methods We mailed Spanish and English surveys to a random sample of 4,000 households and an additional 1,000 households in ZIP codes along the US-Mexico border in San Diego County. Surveys included a variety of questions aimed at assessing cancer-related knowledge, attitudes, and behaviors, along with sociodemographic constructs. Among the cancer-related questions were a series of items asking about the level of trust in receiving cancer information from different sources. Results Of the 720 surveys returned, 151 (21%) respondents identified as Hispanics and 446 (61.9%) identified as NHW. Differences in responses between Hispanics and NHWs were assessed using chi-square tests. Significantly more NHW reported trusting their doctors “a lot” (75.7%) compared to Hispanic (62%; p=.001). Hispanics were more likely than NHW to report “a lot” of trust in insurance companies (6.6% vs 1.6%; p=.002) and in pharmaceutical companies (6.5% vs 2.8%; p=.041). Although not significant, a higher proportion of Hispanics responded that they trusted religious organizations and leaders “a lot” (4.4% in Hispanics vs 1.6% in NHW; p=.058). There were no significant differences between Hispanics and NHWs in reporting trust in charitable organizations, family or friends, government agencies, or health organizations. Conclusion Differences in trust were shown between Hispanics and NHWs. These feelings of trust by Hispanics and NHW should be taken into account when communicating health information to these populations. Fostering trust between these populations and their health information sources is critical to reducing health disparities in cancer screening, diagnosis, treatment, and survivorship.

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Comparing age at cancer diagnosis between Hispanics and non-Hispanic Whites in the United States

Vu A, Parada H, Pinheiro P, Thompson C

Purpose: To examine ages at cancer diagnosis for United States (US) Hispanics compared with non-Hispanic whites (NHWs) after adjustment for population age structure, which may play a role in confounding the age at cancer diagnosis. Methods: We analyzed Surveillance, Epidemiology, and End Results (SEER) data for US Hispanics and NHWs from 18 US regions in 2015. Separately for 32 cancer sites, we calculated crude mean ages at diagnosis and population structure-adjusted mean ages at diagnosis using age- and sex-specific weights. For each cancer site, we examined differences between the crude and the adjusted mean ages at diagnosis using t-tests, by Hispanic ethnicity and sex. Using SEER*Stat, we also examined age-adjusted incidence rates for the three cancer sites with the largest positive/negative mean age differences by ethnicity and gender, as appropriate. Results: Compared to NHW males, Hispanic males were younger at diagnosis of testicular cancer (mean age difference, δ= -4.74, 95% CI= -5.44, -4.04 yrs), and Kaposi sarcoma (δ = -3.58, 95% CI= -6.34, -0.82, but older at diagnosis of gallbladder cancer (δ = 3.15, 95% CI= 1.81, 5.70 yrs) and Hodgkin’s lymphoma (δ = 7.53, 95% CI= 5.72, 9.37 yrs), after adjustment for population age structure. Compared to NHW females, Hispanic females were younger at diagnosis of mesothelioma (δ= -3.72, 95% CI= -6.73, -0.72 yrs), and gallbladder cancer (δ = -3.0, 95% CI= -4.27, -1.74 yrs), but older at diagnosis of Hodgkin’s lymphoma (δ = 7.03, 95% CI= 4.99, 9.07 yrs), and Kaposi sarcoma (δ = 11.3, 95% CI= 2.41, 20.19 yrs), after adjustment for population age structure. Notable changes in crude age at cancer diagnosis differences to after adjustment included: male brain cancer (-11.2 to 1.2 yrs), male bone and joint cancer (-13.4 to -1.06 yrs), female brain cancer (-10.1 to 3.1 yrs), and female bone and joint cancer (-10.1 to 2.9 yrs). Conclusions: Hispanics appear to experience a younger crude age at cancer diagnosis than NHWs; however, after adjustment for population age structure, Hispanics had an older age at diagnosis for many of these cancer sites. Adjustment for population structure may be important for various cancer sites when comparing ages at diagnosis between populations with different underlying age structures.

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Uncovering spatial relationships of the tumor microenvironment in the Carolina Breast Cancer Study

Walens A, Olsson LT, Gao X, Hamilton A, Kirk E, Hoadley KA, Calhoun BC, Troester MA

Breast cancer is the second leading cause of cancer-related deaths in women in the United States. Although breast cancer mortality rates have dropped over the last few decades, the mortality rate for Black women is still 40% higher than White women. Even among the breast cancer subtype with the best prognosis (ER+/HER2-), Black women still have a higher risk of recurrence (ROR). Some work has been done to uncover differences in the biology of breast cancer between White and Black women, but there has been little study of how immune responses differ by race. To identify spatial relationships between tumor and specific immune subpopulations in the microenvironment of breast cancer, we performed digital spatial profiling (DSP) of tumor whole sections and tumor microarrays from the Carolina Breast Cancer Study (CBCS), a large population-based study that oversampled for Black and younger women. DSP identifies relationships among immune subpopulations, analyzing approximately 40 immune markers in areas selected for CD45, CD68, or pan-cytokeratin content. Thus immune 'hot spots' and tumor microenvironment can be evaluated separately. In whole tumor slides, we found that immune hot spots (with high CD45 infiltrations) had elevated expression of many immune markers, suggesting that there was a widespread, robust immune response that included Macrophages, Dendritic cells, B-cells, and T- cells. However, we also observed that immune markers were detectable in tumor-enriched areas, and that tumor- enriched areas had distinct immune signals depending upon subtype, with Tregulatory cell markers being higher in Basal-like and Dendritic cell markers being higher in Luminal A breast cancers. Extending these findings to tumor- enriched material on TMAs, we evaluated 76 patients and once again found subtype-specific immune responses, including enrichment of Tregulatory cell markers in Basal-like breast cancers. DSP elucidates spatial differences in the tumor microenvironment and highlights how whole slide and TMA specimens can be used to understand the breast cancer microenvironment by subtype. The contribution of race to these immune responses will require larger numbers of tumors of specific subtypes, as there are strong immune response differences by subtype.

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Smoking Status at Time of Lung Cancer Diagnosis at an Academic Hospital

Zeigler-Johnson C, Man L, Keith S, Axelrod R

Purpose of the Study: The goal of this study was to examine changes in the prevalence of current smoking among incident lung cancer (LC) patients. Methods: We conducted a descriptive study using deidentified data collected from Thomas Jefferson University Hospital cancer registry from 2005-2016. We described characteristics of patients and smoking patterns in our cohort by gender and by the three largest racial groups (whites, blacks, Asians). We divided our time periods into 2005-08, 2009-12, and 2013-16 and calculated the percent of current smokers at the time of diagnosis by race and gender group for each time period. We used Chi-square tests and Fisher's exact tests to determine differences in current smoking prevalence at each time period. Logistic regression models were used to examine multivariable associations and interactions. Results: Our sample included 4251 LC patients. The median age of our population was 68 years (range: 20- 96) and 53% were female. Our demographics were as follows: 73.7% self-identified as white, 20.7% black, 4.3% Asian. At the time of diagnosis, 1410 patients (33.2% of entire cohort) were current cigarette smokers and 17 (0.4%) were cigar or pipe smokers. Interestingly, Asian LC patients were most likely to be never- smokers in this cohort (69.9% Asian women, 20.6% Asian men). Black men had the highest prevalence of current smoking (46.1%). The prevalence of current smoking decreased significantly over time in white women: 40% from 2005-2008, 33.6% from 2009-2012, and 28.5% from 2013-2016 ($p<0.005$). Multivariable analyses demonstrated a significant interaction indicating that current smoking decreased over time in white women (ORinteraction=0.95, p=0.031). However, in Asians, blacks, and white men, there was no statistically significant interaction with time. Conclusions: Despite a declining number of tobacco users in the US, the prevalence of current tobacco use in our LC patient cohort remained unchanged from 2005-2016 in all groups except white females. Increased efforts to augment tobacco cessation are warranted. Investigations to determine whether different interventions might be more effective in different race and gender groups should be considered.

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Examination of Targetable Mutations by Smoking Status

Arasada RJ, Carbone DP, BIttoni MB

Purpose: The purpose of this report was to develop predictive models examining smoking status, along with demographic and clinical factors, including age, race, gender, stage and vital status, and their association with several lung cancer specific mutations, such as EGFR, ALK, ROS1. KRAS and RET. Methods: The data source for this study was The Cancer Genome Atlas (TCGA) database, which resides at the National Cancer Institute and provides publicly available genomic data for many cancers. Data from 522 histologically confirmed lung cancer cases (adenocarcinoma) were analyzed using multiple logistic regression to examine associations between genetic alterations (ALK, ROS1, EGFR, KRAS and RET) by smoking status (current, former, never) and gender, race, age at diagnosis and stage. Results: Of 522 cases, over half (54%) were female, 86% were white, the mean age was 65 years, and 61% were former smokers, 24% were current smokers and 15% reportedly had never smoked. Adjusted logistic regression models revealed almost a 5-fold increased odds of EGFR for nonsmokers versus both current and former smokers ($p<0.001$), and almost a 2-fold increased odds for males ($p<0.05$). White race showed a 2.5 higher odds of ALK mutation, which approached significance (p-0.07),), and current and former smokers showed a 4- and 3- fold increased odds of EGFR, respectively ($p<0.05$). Current smokers showed a 6.5 higher odds of ROS1 mutation versus nonsmokers ($p=0.004$). Similarly, current and former smokers had a 3- and 5-fold increased odds of KRAS mutation versus nonsmokers ($p<0.05$). No significant differences were found for the RET mutation. Conclusions: This study showed diverse patterns of association between smoking and lung cancer related mutations. Never smokers had a higher odds of EGFR, which is consistent with past findings, but current and former smokers showed a strong increased odds for most of the other mutations. White race showed potential associations with ALK only and males only showed associations with EGFR. Overall, these results shed new light on smoking as a possible predictive factor for genetic alterations, which has implications for treatment and warrants further research. Future research with larger, more diverse populations is needed to further ref

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Cancer Screening Adherence Among African American Cancer Survivors

Bock CH, Ruterbusch JJ, Bolton S, Manning M, Pandolfi SS, Baird TE, Beebe-Dimmer JL, Schwartz AG

Purpose: The goal of this study is to evaluate adherence to colorectal, breast, cervical, and prostate cancer screening guidelines and targets for non-index cancers among African American (AA) cancer survivors. Methods: The Detroit Research on Cancer Survivors (ROCS) cohort study is currently enrolling recently diagnosed African American lung, breast, prostate, and colorectal cancer cases to prospectively evaluate quality of life and other outcomes after cancer diagnosis. Self-reported data from the first 1500 ROCS baseline interviews, completed on average 19 months (median: 14 months) after diagnosis, were used to evaluate screening behaviors of AA breast, prostate, colorectal, and lung cancer survivors. All respondents were asked if they ever received a sigmoidoscopy or colonoscopy. Female respondents were asked about mammography and papanicolaou (PAP) testing ever or in the past year, and male respondents were asked about prostate-specific antigen (PSA) testing ever or in the past year. Here we report the proportion of cases undergoing screening for cancers other than the one they were diagnosed with, within recommended age groups, ever and in the past year. Results: Among breast, prostate, and lung cancer cases ages 50 and older, 71% reported ever having had a colonoscopy or sigmoidoscopy for colorectal cancer screening. 94% of women at least 40 years old and diagnosed with colorectal or lung cancer reported ever having had a mammogram, and 52% of these women reported having a mammogram within the past year. Among all female cancer survivors in the cohort ages 30-65, 90% reported ever having a PAP test, and 48% reported having one in the past year. Among men ages 55 years and older diagnosed with colorectal or lung cancer, 61% reported having ever had a PSA test, but only 38% reported a PSA test in the past year. Conclusions: Breast, cervical, and prostate cancer screening rates for AA discordant cancer survivors well exceed the Healthy People 2020 targets for percent of age-eligible individuals to discuss screening with their health care provider. Compliance with USPSTF colorectal cancer guidelines is 71% among AA breast, prostate, and lung cancer survivors. While these cases are doing better than the targets, there is still room for improvement.

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Breast biopsy patterns and findings among older women undergoing screening mammography: what is the impact of age and comorbidity?

Advani SM, Abraham L, Buist DB, O'Meara ES, Miglioretti DL, Sprague BL, Henderson LM, Onega T, Schousboe JT, Zhang D, Demb J, Walter LC, Kerlikowske K, Braithwaite D

Purpose: The goal of this project is to assess rates of biopsy and biopsy findings among older women undergoing screening mammography by age and comorbidity. Method: We included 171,636 women ages 66-99 years with at least one screening mammogram from the Medicare-linked Breast Cancer Surveillance Consortium (BCSC) during 1999-2010. We calculated percentage of screens followed by biopsy within 90 days by age and comorbidity. Further, we assessed trends in biopsy rates using the Cochran–Armitage trend test. Results: Among 527,254 screening mammograms, 6587(1.2%) were followed by biopsy within 90 days. Whereas the proportion of screens followed by any biopsy did not vary significantly by age (ages 66-74: 1.3%, ages 75-84:1.2%, ages 85-99:1.2%; ptrend=0.07), the proportions increased with increasing Charlson Comorbidity score (CCS) for women ages 66-74 and 75-84 (ages 66-74:CCS0:1.2%,CCS1:1.3%,CCS⩾2: 1.6%; ptrend=<0.001 and ages 75-84:CCS0:1.2%,CCS1:1.3%,CCS⩾2:1.3%; ptrend=0.01) but not ages 85-99 (CCS0:1.1%,CCS1:1.2%,CCS⩾2:1.4%; ptrend=0.16). The proportion of screens followed by benign biopsy increased with increasing CCS for women ages 66-74 and 75-84 (ages 66-74:CCS0:0.77%,CCS1:0.88%, CCS⩾2:0.94%; ptrend<0.001 and ages 75-84:CCS0:0.62%,CCS1:0.75%,CCS⩾2:0.78%; ptrend=0.001) but not ages 85-99 (CCS0:0.48%, CCS1:0.57%, CCS⩾2:0.61%, ptrend=0.23). The proportion of biopsies with a result of invasive cancer did not vary significantly by CCS in any age group ([ages 66-74: CCS0:28.4%, CCS1:25.5%, CCS⩾2:30.8%; ptrend=0.93]; [ages 75-84:CCS0:37.2%,CCS1:36.0%,CCS⩾2:32.0%; ptrend=0.15]; [ages 85-99:CCS0:46.8%,CCS1:43.5%,CCS⩾2:43.8%; ptrend=0.60]). Conclusions: The proportion of screens followed by biopsy and the proportion of screens with a benign finding increased with comorbidity burden among women ages 65-74 and 75-84 years, highlighting potential harm from high rates of benign findings among older women undergoing screening mammography.

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Young onset colorectal cancer risk among individuals with iron deficiency anemia and hematochezia

Demb J, Liu L, Murphy CC, Doubeni CA, Martinez ME, Gupta S

Purpose: Examine the association between iron deficiency anemia (IDA) and the risk of young-onset colorectal cancer (YCRC), as well as hematochezia and the risk of YCRC. Methods: Retrospective cohort study of US Veterans (ages 18-49) during 1999-2016. An analytic cohort for IDA was created by matching individuals with IDA (identified via lab result) to four patients without IDA on sex, birth year, and first visit date (n=240,650). We used the same approach to create a second analytic cohort of patients with hematochezia (identified via diagnoses codes), matched to patients without hematochezia (n=653,740). Primary outcome for each analytic cohort was incident YCRC ascertained via cancer registry and/or National Death Index cause specific mortality data. We derived cumulative incidence and risk differences (RD) using Kaplan-Meier estimation and Cox regression models to estimate hazard ratios (HR) and corresponding 95% confidence intervals (CI) for YCRC. Results: Five-year cumulative incidence of YCRC was 0.43% among patients with IDA compared to 0.04% among those without (RD: 0.39%, 95% CI 0.34%-0.44%), corresponding to a hazard ratio of 12.32 (HR: 12.32, 95% CI: 9.19-16.53). Among individuals with IDA, RD varied by sex and age: 0.78% for men (95% CI: 0.65%-0.91%) and 0.08% for women (95% CI: 0.04%-0.12%); 0.14% for <30 years (95% CI: 0.05%-0.26%), 0.19% for 30-39 years (95% CI: 0.11%-0.27%), and 0.52% for 40-49 years (95% CI: 0.43%-0.63%), compared to individuals without IDA. In analyses on hematochezia, the cumulative incidence was 0.33% among patients with hematochezia compared to 0.03% among those without (RD: 0.30%, 95% CI 0.26-0.33%), corresponding to a hazard ratio of 10.61 (HR: 10.61, 95% CI: 8.72-12.92). Among individuals with hematochezia, RD varied by sex and age: 0.31% for men (95% CI: 0.27%-0.35%) and 0.21% for women (95% CI: 0.14%-0.29%); 0.04% for <30 years (95% CI: 0.01%-0.08%), 0.15% for 30-39 years (95% CI: 0.10%-0.19%), and 0.43% for 40-49 years (95% CI: 0.38%-0.49%), compared to individuals without hematochezia. Conclusions: Risk of YCRC was substantially higher among Veterans with IDA or hematochezia, compared to those without these conditions. For young adults with IDA or hematochezia, colonoscopy should be strongly considered.

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Psychological Distress and Adherence to Mammogram Screening Recommendations: Results from the 2018 Health Information National Trends Survey

Falk D, Noel L, Acquati C, Avis NE, Weaver KE

Purpose: Although epidemiologic research suggests that psychological distress can serve as a barrier to breast cancer screening, no current study has examined this relationship under revised guidelines that prioritize screening in women aged 50-74. Methods: The 2018 Health Information National Trends Survey, conducted by the National Cancer Institute to monitor the US population's use of cancer-related information, provided the data for this analysis. The survey included demographic, self-reported health, distress, and mammogram screening questions. The Personal Health Questionnaire-4 (PHQ-4) measured depression and anxiety with 4 items; the total score was dichotomized by normal/mild (0-5) versus moderate/severe (>=6). Mammogram screening was dichotomized as adherent (screened within the past 2 years) or non-adherent (screened >2 years ago or never). Women with a history of breast cancer were excluded. The sample included women aged 50-74 (N=976), with additional sensitivity analyses for women aged 40-74 (N=1,262). Weighted logistic regression models examined the odds of mammogram adherence. Results: The sample consisted of non-Latina white (73%), non-Latina black (15%), and Latina (13%) women who were predominately college educated (68%). Adherence rates were 81% for women aged 50-74 and 75% for women aged 40-74, with 13% reporting moderate or severe distress regardless of age range. The unadjusted model found women with moderate or severe scores on the PHQ-4 had lower odds of adherence to screening (OR: 0.30, CI: 0.17-0.52). Distress remained an independent predictor of screening when adjusted for age, race/ethnicity, education, and health status (OR: 0.27, CI: 0.10-0.71); incomes of $0-$19,999 (OR: 0.30, CI: 0.11- 0.80) and $20,000-$74,999 (OR: 0.46, CI: 0.23-0.93) were also associated with lower adherence odds. Conclusion: These findings corroborate research linking psychological distress with poor preventative health maintenance. Routine screening for psychological distress might identify women at risk for poor adherence to breast cancer screening who could benefit from supplemental interventions to help them overcome barriers.

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Circulating Fibroblast Growth Factor-21 and Odds of Metachronous Colorectal Adenoma

Florea A, Kohler L, Trejo M, Jurutka P, Klimentidis Y, Harris R, Lance P, Jacobs E

Purpose of the Study: Prior work has shown that higher circulating concentrations of fibroblast growth factor-21 (FGF-21), a key hormone in maintaining energy homeostasis, is associated with an increased likelihood of developing colorectal cancer. This prospective study was conducted to assess the relationship between circulating FGF-21 and odds of developing early neoplastic lesions in the colorectum. Methods: A total of 94 study participants were included from the Ursodeoxycholic Acid (UDCA) trial, a phase III, randomized, double-blind, placebo-controlled clinical trial of the effect of 8-10 mg/kg of body weight UDCA vs. placebo to determine if UDCA could reduce the risk of metachronous (recurrent) colorectal adenoma. Logistic regression analyses were conducted to evaluate the association between tertile of baseline FGF-21 concentrations and odds of developing a metachronous adenoma after an average of approximately 3 years of follow-up. Results: Of the baseline characteristics compared across tertiles of FGF-21, including age, race, sex, BMI, and other variables, only a previous personal history of colorectal polyps prior to entry into the UDCA trial was statistically significantly related to FGF-21 levels, with a proportion of 26.7%, 56.7%, and 50.0% across the first, second, and third tertiles, respectively ($p<0.05$). When baseline characteristics were compared between those who experienced a metachronous lesion vs. those who did not, no statistically significant results were observed. However, higher circulating concentrations of FGF-21 were statistically significantly associated with higher odds of developing a metachronous colorectal adenoma. After adjusting for potential confounders and when compared to the lowest tertile of FGF-21, the adjusted ORs (95% CIs) for metachronous colorectal adenoma in the second and third tertiles were 4.72 (95% CI, 1.42-15.72) and 3.82 (95% CI, 1.15-12.68), respectively ($p\text{-trend}<0.05$). Conclusion: Our results are the first to determine that, in addition to a recently-discovered association with colorectal cancer, circulating FGF-21 concentrations are significantly and directly associated with odds of developing early colorectal neoplasia.

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Economic consequences of increasing mt-sDNA utilization among colorectal cancer screening strategies from a payer perspective

Hathway JM, Miller-Wilson LA, Jensen IS, Ozbay B, Regan C, Yao W, Jena AB, Weinstein MC, Parks PD

Purpose: The American Cancer Society recommends screening individuals ages 45-75 at average risk for colorectal cancer (CRC). When determining coverage for their members, it is important that payers evaluate the potential health outcomes and budget impact of extending CRC screening eligibility to include ages 45-49. A 10-year decision analytic model based on current CRC screening guidelines was simulated to evaluate the health and economic consequences of increasing multi-target stool DNA (mt-sDNA) utilization by 22% among screening strategies from the payer perspective among individuals ages 50-75 and 45-75. Methods: The model included Medicare, Medicaid, and Commercial payer perspectives. It was assumed that all individuals reaching age 65 incurred Medicare costs. Test performance characteristics, clinical treatment and surveillance decisions, and adverse events were derived from the literature. Modality- specific CRC incidences were derived from the Cancer Intervention and Surveillance Modeling Network Screening SimCRC model. Procedure, adverse event (AE), cancer treatment, surveillance, and screening program costs were based on Medicare National Limitation amounts, the Healthcare Cost and Utilization Project, and literature. A Medicare to Commercial cost index (1.27) was applied to costs from published Medicare data to determine Commercial costs. A Medicare to Medicaid cost index (0.72) was applied to Medicare costs to determine Medicaid costs. All costs were based on 2019 USD. Results: Among a hypothetical cohort of 1M covered lives ages 45-75, with all payer types included, greater mt-sDNA utilization yielded increases in diagnostic colonoscopies (2.1K), detected CRC cases (23), and decreases in surveillance colonoscopies (400) and screening colonoscopies (12.8K). The overall cost savings for ages 50-75 was $3.3M, corresponding to incremental savings of $0.03 per member per month (PMPM). For ages 45-75, the cost savings was $3.1M, corresponding to $0.03 PMPM. Conclusion: Increased mt-sDNA use may lead to overall cost savings for payers, when extending screening eligibility to individuals ages 45-75. Increases in diagnostic colonoscopy costs were offset by reductions in screening and surveillance colonoscopies in addition to a reduction in adverse events.

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Trends in managing low-risk prostate cancer

Hoffman RM, Anand S, McDowell BD, Nepple KG

Purpose The advent of prostate-specific antigen (PSA) testing in the late 1980s dramatically increased the incidence of prostate cancer (PCa). Although many PSA-detected PCa were indolent, for decades the majority of men were treated with surgery, radiation therapy, or hormone therapy. In more recent years, active surveillance (AS), a monitoring strategy that defers active treatment in the absence of disease progression, has emerged as a recommended strategy for men with a low-risk PCa. AS enables these men to avoid treatment complications without increasing their risk for cancer mortality. We used SEER-Medicare data to evaluate trends in treatment practice patterns for men with a low-risk or a very low-risk PCa diagnosed from January 1, 2010 through December 31, 2013 with follow up through December 31, 2014. Methods We identified 7,791 men ages 66 and older who were diagnosed with a low-risk PCa (PSA $<$ 10 ng/ml, Gleason score $\leqslant$ 6, and stage T1c or T2a). A subset of 2,929 men also met criteria for having a very low-risk cancer based on PSA $<$ 10 ng/ml, Gleason score $\leqslant$ 6, and stage T1c with $<$ 25% positive prostate biopsy cores. We determined the proportions of these men who deferred treatment (observation cohorts) for at least one year. We further determined the proportions of these men who subsequently underwent treatment. We used descriptive statistics and Kaplan-Meier curves. Results During their first year of follow up, 36.2% of men with a low-risk cancer and 44.3% of the subset of men with a very low-risk cancer deferred treatment. Across years of diagnosis, the proportion of men with a low-risk PCa managed with observation increased from 28.6% to 48.4%; the increase in men with a very low-risk PCa was from 34.0% to 57.9%. At a median follow-up of 2.6 years after diagnosis, 28.5% of men in the low-risk observational cohort underwent treatment versus 27.0% among those in the subset with a very low-risk PCa. Conclusions Increasing proportions of men with low-risk or very low-risk PCa were initially managed with observation, consistent with guideline recommendations. However, the majority of men with a low-risk PCa still underwent cancer treatment. Most men initially managed with observation continued to defer treatment.

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A Missed Opportunity for Colorectal Cancer Screening: Waiting Companions of Patients Undergoing a Colonoscopy

Gray DM, Emerson BJ, Reddy M, Zimmermann BJ, Shoben AB, Reiter PL, Katz ML

PURPOSE: To determine colorectal cancer (CRC) knowledge, screening compliance, and preference(s) for a CRC screening intervention for waiting companions of patients undergoing colonoscopy. METHODS: We approached adults waiting for patients undergoing a colonoscopy (i.e., companions) at one of three endoscopy centers during March-June 2017. Companions ages 50 to 75 were eligible to participate. Participants completed a survey that assessed CRC and CRC screening knowledge, attitudes, beliefs, and behaviors. Participants also provided input about their preferences for the content and format of a future CRC screening intervention. RESULTS: Of the 384 companions approached for participation, 222 (58%) were eligible and completed the survey. This report focuses on the companions at average-risk for CRC (n=164; 74%). Most companions had health insurance (95%), visited a healthcare provider in the past year (86%), were a spouse or a family member of the patient undergoing a colonoscopy (83%), were female (57%), and had a college degree (49%). Additionally, companions were from a minority race/ethnicity (20%), and had annual household incomes of $30,000 or less (19%). Almost one-fourth (n=38; 23%) of companions were not within screening guidelines. Companions lacked knowledge about the age to begin screening (87%) and that African Americans (71%) and males (57%) are at increased risk. The most frequent barriers to CRC screening were being asymptomatic and lack of a provider recommendation. While most agreed that CRC would be serious to their health (99%) and that CRC screening would help protect them (97%), only 29% of companions not within guidelines reported intention to undergo CRC screening in the next 6 months. Suggestions for a future CRC screening intervention included a video that included men and women from all races/ethnicities, healthcare providers, individuals who completed CRC screening, and the intervention should last 15 minutes or less. CONCLUSIONS: Approximately one-fourth of companions were not within CRC screening guidelines. Since companions of patients undergoing a colonoscopy wait 2-3 hours, developing a brief CRC screening intervention for them will address an overlooked educational opportunity.

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Composition of the vaginal microbiome associated with high risk HPV infection and increased risk for cervical cancer

Madhivanan P, Bokulich NA, Coudray M, Colbert B, Ruiz-Perez D, Krupp K, Mathee K, Narasimhan G, Caporaso JG

Persistent high-risk Human papillomavirus (HPV) is a necessary but not sufficient cause for development of cervical cancer. Changes in the vaginal microbiota including reduction of Lactobacillus and increased microbial diversity may facilitate HPV infection and persistence as well as the pathogenesis of cervical cancer. Our objective was to characterize the vaginal microbiota among women with and without persistent HPV infection with HPV 6, 11, 16, 18, 31, 33, 45, 52, 58 in a cohort of young U.S. women. Methods: This analysis used data from a longitudinal study of 1365 women followed for 12 months every two months apart from six locations across the US. HPV genotyping was performed using quantitative PCR using TaqMan probes in a customized plate (ThermoFisher Scientific). Bacterial communities were profiled by 16S rRNA gene sequences from the V3-V4 region using high-throughput pyrosequencing. Persistence was defined by examining for HPV presence in two consecutive visits. Results: Participants included 80 African-American women tested at 3 consecutive time-points. The mean age of participants was 21.4 years. About 43.7% (95%CI: 32.7%-55.3%) had persistent HPV infection, 20% (11.9%-30.4%) were able to clear the infection, and 36.2% (25.8%-47.8%) were consistently negative for HPV infection at all three time points. Atopobium and Peptoniphilus were significantly more abundant in women who were HPV negative suggesting possible protective effects. Prevotella bivia was enriched among women with persistent HPV. Conclusion: Based on these data, we can hypothesize that Prevotella richness is significantly associated with HPV persistence, suggesting a possible role in chronic HPV infection and development of cervical cancer.

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Factors influencing discussion of cancer genetic testing with healthcare providers in a 2018 population based survey

Makhnoon S, Yu R, Cunningham SA, Peterson SK, Shete S

Background: Discussion of clinical genetic testing options with healthcare care providers has typically been the first step towards receiving testing to inform cancer risk assessment, prevention and early detection. Healthcare providers are a trusted source of medical information for most patients and play a critical role in ensuring access to clinical genetic testing for eligible individuals. Given the rapid evolution in genetic testing practice in oncology, up- to-date data representing the population-level landscape of cancer genetic testing behavior is needed. Methods: A questionnaire including items regarding cancer information seeking was administered online to a non-probability Texas population sample. Weighted multivariable logistic regression analysis identified key factors associated with discussion of genetic testing with a provider. Results: Respondents (n=2029; mean age 44.4 years) were 45.5% non-Hispanic white, 35.6% Hispanic and 10% Black. Most (91.9%) had no personal history of cancer, however 62.6% had family history of cancer. Overall, 11% of our sample discussed cancer genetic testing with healthcare providers. This discussion was associated with younger age, having a personal history of breast, ovarian or colon cancer (OR=11.7), and family history of any cancer (OR=1.64). Respondents who sought any health information from any source were less likely to discuss genetic testing with a provider (OR=0.6) compared to those who did not seek health information. Discussion was positively associated with the belief that inherited genetic predisposition significantly affects cancer development (OR=1.7) compared to the belief that other behavioral factors contribute to cancer. Belief in the possibility of cancer prevention was positively associated with discussion (OR=1.65) compared to the belief that cancer prevention was not possible. Conclusion: The 11% cancer genetic testing discussion rate is considerably higher than previously reported estimates and may be attributed to increased public awareness of direct-to-consumer genetic testing, as well as increasing adoption of evidence- based recommendations for genetic testing among healthcare providers. Those who may benefit from genetic testing were more likely to discuss testing with a provider.

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Mammographic calcifications in LCIS: a role in future breast cancer risk?

Nyante SJ, Epps C, Jordan SG, Wang T, Ozdowski EF, Tan X, Zhu A, Lawton TJ

Purpose: To explore the role of mammographic calcifications in breast cancer risk after lobular carcinoma in situ (LCIS), we evaluated associations between calcifications, LCIS patient characteristics, and subsequent breast cancer. Methods: This study included 49 women diagnosed with LCIS at a single institution from 2007-2014. Mammographic calcifications present in the same breast as LCIS were classified by a radiologist using Breast Imaging and Reporting Data Systems® criteria. Histologic features, including involvement of calcifications in LCIS lobules, were assessed by a pathologist. Patient characteristics were abstracted from medical records. Associations between calcifications linked with increased risk for malignancy (i.e., suspicious for malignancy: amorphous, coarse heterogeneous, fine linear/fine linear branching, and fine pleomorphic morphologies; linear and segmental distributions) and patient and histologic characteristics were evaluated using generalized estimating equations models. Subsequent breast cancers were ascertained from medical records and a tumor registry database. Results: Mammographic calcifications were present in the same breast as LCIS for 88% of participants; 71% had at least one instance of calcifications classified as suspicious for malignancy. Among patients where calcifications were involved with LCIS lobules on histology (n=14), 86% had at least one instance of suspicious mammographic calcifications. No other histologic or patient characteristics were associated with the presence of suspicious calcifications (all P>0.05). After a median 5.6 years of follow-up, three of the 49 women were diagnosed with ipsilateral breast cancer; suspicious calcifications were present at the time of LCIS diagnosis in each case (100%). Conclusions: Mammographic calcifications were common among LCIS patients. The presence of suspicious calcifications was more common among women who went on to develop breast cancer (100%) than among those who did not (70%), suggesting a potential relationship between the presence of suspicious calcifications and breast cancer risk. However, the number of incident breast cancers was small. Additional studies with a larger sample size and radiologic-pathologic correlation are needed to confirm these results.

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More than one: Evaluating intra-system variation in the implementation and impact of lung cancer screening

Rendle KA, Saia CA, Horst MA, Wainwright J, Barg FK, Kontos D, Schnall MD, Vachani A

Purpose. To compare multilevel factors associated with lung cancer screening (LCS) in two medical centers affiliated with a single healthcare organization. Methods. Using electronic medical record data and contextual inquiry from stakeholders, we evaluated differences by medical center in baseline and subsequent annual LCS using low-dose computed tomography in patients undergoing baseline screening in 2014-2018. The two centers are located about 90 miles apart in urban and semi-rural locations in Southeastern Pennsylvania. Bivariate and multivariate analyses were conducted to compare differences by center in patient characteristics, (age, sex, race/ethnicity, and smoking status), clinician specialty, baseline LungRADS, and subsequent annual screening. Key informant interviews with clinical leadership were used to describe LCS implementation at each center. Results. To implement LCS, the semi-rural center used a centralized approach, coordinated through a nurse-led program for shared decision-making and coordination; whereas, the urban center used a de-centralized approach, without direct outreach or centralized coordination. In comparison to patients screened at the urban center (n=2,611), patients screened at the semi-rural center (n=3,186) were significantly more likely to be Non-Hispanic White (90.5% vs 64.5%), younger than age 65 (52.7% vs 48.6%), and male (54.7% vs 50.9%), and less likely to be current smokers (48.3% vs 54.4%). Nearly-half (47.3%) of semi-rural center patients received a timely annual screen (<15 months) following baseline in contrast to 17.5% of urban center patients. Semi-rural center patients were 3-times more likely to receive any subsequent LCS in comparison to urban center patients, controlling for patient characteristics (AOR=3.34; 95%CI: 2.62-4.00). Conclusions: Intra-system variation in LCS implementation was associated with differences in optimal adherence, not attributable to observed patient-level factors. As U.S. healthcare systems continue to consolidate, it is important to understand how contextual factors between and within systems impact outcomes. Further research is needed to identify effective strategies to improving screening to ensure that existing disparities are not exacerbated by LCS implementation differences.

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Abnormal Stool Blood Tests and Colorectal Cancer Mortality in a Large United States Cohort

San Miguel Y, Demb J, Martinez ME, Gupta S, May F

Purpose: Our aim was to examine the association between fatal colorectal cancer (CRC) and time to colonoscopy among individuals who underwent diagnostic colonoscopy after abnormal stool blood test (SBT) in a cohort of United States Veterans. Methods: We performed a cohort study of Veterans aged 50-75 years, with an abnormal SBT using the Veterans Health Administration's (VA) national electronic health record data during the years 1999 and 2010. Colonoscopy receipt was ascertained using current procedural terminology codes after abnormal SBT. The study outcome, CRC death, was defined through National Death Index cause-specific mortality data. We followed patients through CRC-related death, other death, or until December 31, 2015. Multivariable Cox proportional hazards modeling was used to generate CRC-specific mortality hazard ratios (HRs) and 95% confidence intervals (CI) for 3- month colonoscopy intervals, with 3-6 months as the reference. Models were adjusted for age, sex, race/ethnicity, smoking, diabetes, body mass index, and Charlson Comorbidity Index. Results: We included 222,004 patients with abnormal SBTs; the average age was 63 with a standard deviation of 7.2 years, 97% were male, 72% were Non-Hispanic White and 20% were Black. Of the 222,004 patients, 69% completed diagnostic colonoscopy within 12 months of abnormal SBT, 4% were diagnosed with CRC, and 1% died of CRC specific death. Compared to patients with a colonoscopy at 3-6 months (standard of care), CRC-related mortality risk was significantly higher for patients with colonoscopies at 0-3 months (HR=1.29; 95% CI, 1.14-1.47), 18-21 months (HR=1.57; 95% CI,1.19-2.06), and 21-24 months (HR=1.46; 95% CI, 1.07-1.97). No significant increase in mortality risk was shown for 6-9 month, 9-12 month, 12-15 month, 15- 18 months, and 24+ month intervals. Conclusion: Time to colonoscopy plays a significant role in CRC death after abnormal SBT. Compared to a colonoscopy performed during a 3-6-month window, a colonoscopy performed outside of the 15-month window had a higher risk for mortality. Given the impact of timely diagnostic colonoscopy on CRC mortality, development of interventions to increase timely diagnostic follow-up after abnormal SBT are essential to CRC outcome improvement.

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Cancer Screening Eligibility and Uptake in a New Jersey Volunteer Fire Department

Shah NN, Black TM, Steinberg MB, Black K, Graber JM

Purpose of Study: Firefighters have higher cancer risk compared to the general population, yet cancer screening behavior among firefighters has been rarely studied, especially among volunteer firefighters. This study explores the uptake and predictors of colon, lung, and prostate cancer screenings in a New Jersey (NJ) volunteer fire department. Methods: A survey was administered to members of the volunteer Toms River Fire Department (TRFD) capturing demographics, healthcare access and use, family cancer history, fire service experience, and environmental and behavioral risk factors. Uptake and predictors of colon, lung and prostate cancer screening, according to the United States Preventative Service Task Force (USPSTF) recommendations, were assessed. Predictors were assessed using bivariate analysis (Chi-square, Fisher's Exact and T-tests). TRFD colon cancer screening rate was compared to colorectal cancer screening uptake as assessed by the NJ Behavioral Risk Factor Survey (NJBRFSS), 2012-2017. Results: Of the 120 participants, 90% (95%CI: 84.6, 95.4) were male and non-Hispanic white. We included 110 respondents for colon, 106 for prostate and 95 for lung cancer screening; 46.4% (95%CI: 36.9, 55.8), 31.1% (95%CI: 22.2, 40.1), and 0% were eligible to receive cancer screening, respectively. Colon and prostate cancer screening uptake rates were similar for participants [76.5% (95%CI: 64.4, 88.5), and 78.8% (95%CI: 64.1, 93.5) respectively]. TRFD had higher colon cancer screening uptake compared to the NJBRFSS age-adjusted rate for employed white males (66.7%; 95%CI: 64.7, 68.7). Some participants were screened outside of the USPSTF criteria: 3.2% (95%CI: 0.1, 6.7) received a chest CT for lung cancer screening, and screenings outside of the age criteria included 15.3% (95% CI: 5.8, 24.7) for colon cancer and 23.3% (95%CI: 13.4, 33.2) for prostate cancer (PSA test). Age was significantly associated with colon and prostate cancer screenings (p=0.002, 0.01 respectively). Conclusions: Understanding cancer screening behavior can help reduce cancer mortality in firefighters who are at increased risk for some cancers. Recently, some firefighter groups have made efforts to expand cancer screening criteria given concerns about excess cancer risk.

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Associations of oral contraceptives with mammographic breast density

Smotherman C, Tamimi R, Heine J, Colditz G, Rosner B, Yaghjyan L

Purpose: We investigated the associations of oral contraceptives (OC) use with percent breast density (PD), absolute dense area (DA), non-dense area (NDA), and a novel image intensity variation (V) measure in premenopausal women. Methods: This study included cancer-free women from a nested case-control study within Nurses' Health Study II cohort. Information on OC use was collected in 1989 and then updated biennially. OC use was defined from the questionnaire closest to the mammogram date. PD, DA, and NDA were measured from digitized film mammograms using a computer-assisted thresholding technique; the V measure was obtained from mammographic images with a previously developed algorithm that measures the standard deviation of pixel values in the eroded breast region. Generalized linear regression was used to assess associations between OC use (use status, total duration, age at first and last use, and time since last use) and density measures (square root-transformed PD, DA, and NDA, and untransformed V).The regression estimates were adjusted for known breast cancer risk factors. Results: Of the 1,233 women, 184 (15%) never used OC, 952 (77%) were past users, and 97 (8%) were current users. In multivariable analyses, OC use was not associated with PD (current vs. never: β =-0.06, 95% CI -0.37,0.24; past vs. never: β=0.10, 95% CI -0.09,0.29), DA (current vs. never: β=-0.20, 95% CI -0.59,0.18; past vs. never: β=0.13, 95% CI -0.12,0.39), and NDA (current vs. never: β=-0.19, 95% CI -0.56,0.18; past vs. never: β=-0.01, 95% CI -0.28,0.25). V measure appeared to be higher in past as compared to never users (β=22.12, 95% CI 0.24,44.00). We observed an inverse association between age at first OC use and the V measure (<20 years vs. never β=26.88, 95% CI 3.18,50.58; 20-24 years vs. never β=20.23, 95% CI -4.24,44.71; 25-29 years vs. never β=2.61, 95% CI -29.00,34.23; ⩾30 years vs. never β=0.28, 95% CI -34.16,34.72, p- trend=0.03). We found no other significant associations for any of the other OC variables with any of the density measures.
Conclusions: We found no associations of OC use with PD, DA, and NDA. However, we observed a suggestive positive association of past use with the V measure and that earlier age at first OC use was associated with significantly greater V.

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New mammography screening performance metrics based on the entire screening episode

Sprague BL, Miglioretti DL, Lee CI, Perry H, Tosteson ANA, Kerlikowske K

Purpose: Established mammography screening performance metrics use the initial screening mammography assessment because they were developed for radiologist performance auditing, yet these metrics are frequently used to inform health policy and screening decision-making. We developed new performance metrics based on the final assessment that consider the entire screening episode, including diagnostic work-up. Methods: We used data from 2,512,577 screening episodes during 2005-2017 at 146 facilities in the Breast Cancer Surveillance Consortium. We compared screening performance metrics based on the final assessment of the screening episode to conventional metrics defined using the initial assessment. We also stratified results by breast density and 5-year breast cancer risk. Results: The cancer detection rate was similar for final (4.1 per 1000; 95% CI: 3.8-4.3) vs. initial assessment (4.1 per 1000; 95% CI: 3.9-4.3). The interval cancer rate was 12% higher based on final (0.77 per 1000; 95% CI: 0.71-0.83) vs. initial assessment (0.69 per 1000; 95% CI: 0.64-0.74), resulting in a modest difference in sensitivity (84.1% [95% CI: 83.0-85.1] vs. 85.7% [95% CI: 84.8-86.6%], respectively). Differences in interval cancer rate between final and initial assessment increased with breast density and breast cancer risk (e.g., absolute difference of 0.29 per 1000 for women with extremely dense breasts and 5-year risk >2.49%). Conclusions: Established screening performance metrics underestimate the interval cancer rate of a mammography screening episode, particularly for women with dense breasts or elevated breast cancer risk. Women, healthcare providers, policymakers, and researchers should use final assessment performance metrics that more accurately reflect clinical outcomes.

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Genome-wide Association Study of Colorectal Adenoma Recurrence in the Selenium Trial

Trejo MJ, Batai K, Chow HHS, Ellis N, Lance P, Hsu P, Jacobs ET

Purpose of the Study: The purpose of this genome-wide association study was to identify genetic variants that are associated with the risk of developing metachronous colorectal adenoma. Methods: A total of 1,215 study participants of European descent from the Selenium Trial, a phase III, randomized, double-blind, placebo-controlled clinical trial, were included. Participants in the Selenium Trial were between the ages of 40 and 80 years and had complete removal of 1 or more colorectal adenoma within the 6 months before study registration. The study included 534 cases with metachronous adenoma detected during three years of follow up, and 681 controls without metachronous lesions. Logistic regression analyses adjusting for three principal components, age, and sex were used to find genetic variants that were related to metachronous adenoma risk. Results: Our study identified variants in two independent loci that are suggestively associated with adenoma recurrence ($P<10\text{-}5$). An intron variant of FAT atypical cadherin 3 in the FAT3 gene, rs61901554, showed the strongest signal of association ($P=1.10x10\text{-}6$). The T allele was associated with increased odds of recurrence (OR 1.67; 95% Confidence Interval [CI], 1.36, 2.06). Two intron variants, rs12728998 and rs6699944, in NLRP3, a gene encoding cryopyrin which forms inflammasomes, had the next strongest signal ($P=2.00x10\text{-}6$; OR, 1.68; 95% CI, 1.36, 2.08). These two variants were in strong linkage disequilibrium ($r2=1.0$). The minor allele, T, of variant rs6101554 was associated with multiple metachronous adenoma (OR, 1.46, 95% CI, 1.05, 2.04) and with advanced metachronous adenoma (OR, 1.99, 95% CI 1.42, 2.80). Finally, the minor allele, A, of variant rs6699944 was also associated with the development of multiple metachronous adenoma (OR, 1.76, 95% CI, 1.27, 2.43) and advanced metachronous adenoma (OR, 1.59, 95% CI 1.12, 2.28). Conclusion: Our results provide new insight into the genetic basis of the development of metachronous colorectal adenoma.

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The Cost of Cure: Understanding Financial Toxicity in Head and Neck Cancer Survivors

Baddour K, Zhao M, Corcoran M, Lyu L, Owoc MS, Peddada SD, Thomas TH, Sabik LM, Johnson JT, Nilsen ML, Mady LJ

Purpose of the Study: To understand head and neck cancer (HNC) survivors' treatment related financial toxicity (FT). Methods: To assess objective out-of-pocket expenses (OOPE), paid claims data were queried for health plan members with HNC-primary diagnosis codes (n=5,156) who received treatment within a 2-year period. To evaluate subjective FT, patients seen in our HNC survivorship clinic between Jan 2018–Aug 2018 (n=252) were offered a survey, the COmprehensive Score for financial Toxicity (COST). This instrument is measured on a continuous scale (0-44) with lower scores indicating worse FT. Patients with both claims and survey data were designated as the target population. The relationship between OOPE and subjective FT was examined using regression models. Additionally, subgroup analysis was performed by type of insurance coverage.
Results: Seventy-one patients met our inclusion criteria (mean age, 64±10yr). Most were male (n=48, 68%), white (n=65, 92%) and were, on average, 6±6yr since treatment completion. The most common insurance was Medicare (n=27, 38%). Most had advanced stage III-IV disease (n=50, 70%). Primary disease of the oropharynx (n=22, 31%) was the most frequent subsite. Multimodal therapy was most common, with 36 (52%) receiving surgery+adjuvant treatment. Average per-member OOPE were $3,309, with the highest incurred by Medicare members ($4,264), and the lowest by Medicaid members ($384). An increase in OOPE after acute treatment was seen overtime, with a rise in 86% when treatment length increased from 1 to 3 years, then 24% from 3 to 5 years. Mean COST was 25±11 with the worst FT in Medicare members (COST=19). Analysis of predictors of FT differed by type of insurance plan. Among patients without employer-based insurance, multiple linear regression modeling showed that OOPE (p=0.038) and years since diagnosis (p=0.028) were significantly associated with worse subjective FT (COST) when controlling for marital status and stage. Conclusions: OOPE vary widely across different insurance plans, with a considerable proportion of survivors reporting high FT. Among survivors without employer-based insurance coverage, OOPE were significantly associated with worse subjective FT suggesting that they constitute a particularly vulnerable population.

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Financial Hardship Reported by Rural and Urban Cancer Survivors in Wisconsin

Fredrick CM, Trentham-Dietz A, Chu K, Zhang X, Malecki KM, Rolland B, Kerch SC, Lecaire T, Tevaarwerk AJ, LoConte NK

Background: Financial toxicity is increasingly recognized as a common consequence of a cancer diagnosis. We aimed to measure the prevalence of financial hardship among cancer survivors in Wisconsin and to examine whether frequency varied between rural and urban residents. Methods: Participants in the Survey of the Health of Wisconsin (SHOW), a comprehensive ongoing annual health survey gathering data on health and a wide range of health determinants across the state of Wisconsin, who previously reported a cancer diagnosis received a mailed survey with questions regarding their cancer experience including the Comprehensive Score for financial Toxicity (COST) measure. Following the recommended scoring approach, COST measures were calculated from 11 questions, with lower scores reflecting greater financial hardship. RUCA codes were used to define urban and rural residence. Results: A total of 486 cancer survivors were approached in October 2019 to complete the cancer survivorship survey; as of 11/1/2019, 176 (36%) have been completed. Survivors were mostly white (94%) and aged ⩾60 (80%); 52% were female, 56% resided in urban areas, and were frequently insured (52% Medicare or 35% HMO/private). Overall, the mean (± standard deviation) COST scores for survivors was 33.0 (±7.9) with minimum 10 and maximum 44. COST scores were similar according to sex and urban/rural residence but reflected greater hardship for non-white (30.8±5.5) compared with white (33.1±8.0) survivors, and younger (<60: 28.4±8.5) compared with older survivors (70+: 34.3±6.6). Survivors with no insurance (16.0±4.2), marketplace (25.4±9.8), and Medicaid (27.7±6.2) reflected greater hardship compared with survivors with HMO/private (32.6±7.9) or Medicaid insurance (34.3±7.3). Rural survivors were more likely than urban residents to borrow money or go into debt for cancer treatment (8.7% vs. 4.9%). On-going data collection will be completed by January 2020. Conclusions: Preliminary results suggest that, even in this highly insured sample, financial hardship is common and more frequently affects younger, rural, and racial minority survivors.

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Financial hardship is associated with lower uptake of colorectal, breast, and cervical cancer screenings

Kasting M, Haggstrom D, Lee J, Dickinson S, Shields C, Rawl S

Purpose: Rising healthcare costs and financial hardship are considerable barriers to cancer screening. This study examined associations between financial hardship and cancer screening in Indiana, a state with the 10th highest cancer mortality rate in the U.S. Methods: Surveys were mailed to a stratified random sample of 7,979 people ages 18-75 who were seen at least once in the statewide health system during the previous year and lived in Indiana counties with higher than average cancer mortality. Participants reported whether they had needed to see a doctor in the past year, but could not due to cost. This was compared to uptake of mammogram, colonoscopy/sigmoidoscopy, and Pap testing in a logistic regression analysis controlling for age, race/ethnicity, and marital status among participants who were eligible for these screening tests based on USPSTF guidelines. Results: 970 surveys were returned, with 52% female respondents, 73% non-Hispanic White, and 76% over age 50. Approximately 15% (n=142) reported they had not been able to see a doctor due to cost, and this was higher among Black than White participants (24% vs. 13%; p=0.001). Of those who were screening age eligible, 80% reported having a mammogram in the last 2 years (n=360), 83% reported ever having had a colonoscopy/sigmoidoscopy (n=735), and 75% had received a Pap test in the last 3 years (n=186). In the regression analysis, those who reported not being able to see a doctor in the last 12 months due to cost were significantly less likely to have had a mammogram (AOR=0.44; 95% CI=0.20-0.95) and to have ever had a colonoscopy/sigmoidoscopy (AOR=0.45; 95% CI=0.27-0.76). They also were less likely to have had a Pap test in the last 3 years, but this difference was not significant (AOR=0.69; 95% CI=0.26-1.81). Conclusions: The associations between financial hardship associated with medical costs and cancer screening were observed among individuals who had at least one medical encounter in the past year, suggesting the need to reduce barriers to cancer screening even among patients who already have some access to healthcare. Future research should explore barriers related to both healthcare (e.g., co-pays) and personal costs (e.g., time off work) as well as ways to increase the survey response rate.

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Financial Constraints on Breast Cancer Risk-Management Decisions Among Women at Elevated Risk

Meadows R, Padamsee TJ

Background: Women at elevated risk of breast cancer, due to BRCA mutations or strong family history, are advised to consider various risk-reduction options (e.g., enhanced screening, prophylactic surgeries, or preventive medication). These options are under-utilized and financial barriers may be one explanatory factor. Financial toxicity of cancer treatment is well-studied. Financial barriers to cancer prevention, however, are often described by simple proxy measures (e.g., income level or insurance status) that existing research suggests fail to capture the magnitude and mechanisms by which financial barriers impede preventive action. Purpose: To identify the health-related financial constraints experienced by high-risk women and document the cancer risk-reduction behaviors affected. Methods: Semi-structured interviews were conducted with 20 African American and 30 White women at elevated risk of breast cancer. Inductive methodology with a directed content analysis approach was used. Results: Sixty percent reported a wide range of financial constraints, which fall into 3 themes: (1) current or history of no insurance (2) under-insurance (i.e., limited coverage, high out-of- pocket costs) and (3) other financial constraints (e.g., medical debt, raising children, managing comorbidities, and affording to take time off work). Over half of women with financial constraints experienced major delays or prevention of risk-management actions (e.g., breast screenings, genetic counseling or testing, prophylactic mastectomy, or oophorectomy). Twenty-two percent of women also reported perceptions of insurance companies that impacted their decision making; these concern lack of price transparency, gaps in knowledge about covered procedures, and distrust. Conclusions: Our findings highlight the centrality and complexity of financial constraints in women's breast cancer risk management. Effective methods to address financial constraints and perceptions may include tailored support interventions, patient navigation, cost conversations between providers and patients, or referral to financial support services. Policies to reduce premiums and out-of-pocket costs would expand access to affordable health insurance and may promote utilization of preventive breast cancer services.

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Insurance coverage, employment status and financial well-being of young women diagnosed with breast cancer

Tangka FKL, Subramanian S, Jones M, Edwards P, Flanigan P, Kaganova J, Smith S, Thomas CC, Hawkins NA, Rodriguez J, Fairley T, Guy Jr. GP

Purpose of the study: This study aims to evaluate the insurance, employment, and financial experiences of young female breast cancer survivors and assess factors associated with financial decline. Methods: We recruited 830 women under 40 years of age diagnosed with breast cancer between January 2013 and December 2014. The study population was identified through California, Florida, Georgia, and North Carolina population-based cancer registries. The cross-sectional survey was fielded in 2017 and included questions on demographics, insurance, employment, out-of-pocket costs, and financial well-being. We present descriptive statistics and multivariate analysis to assess factors associated with financial decline. Results: Although 92.5% of the respondents were continuously insured over the past 12 months, 9.5% paid a "higher price than expected" for coverage. Common concerns among the 73.4% of respondents who were employed at diagnosis included increased paid (55.1%) or unpaid (47.3%) time off, suffering job performance (23.2%), and staying at (30.2%) or avoiding changing jobs (23.5%) for health insurance purposes. Overall, 47.0% experienced financial decline due to treatment-related costs. Patients with some college education, multiple comorbidities, late stage diagnoses, and self-funded insurance were most vulnerable. Conclusions: The breast cancer diagnosis created financial hardship for half the respondents and led to myriad challenges in maintaining employment. Employment decisions were heavily influenced by the need to maintain health insurance coverage. Impact: This study finds that a breast cancer diagnosis in young women can result in employment disruption and financial decline.

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Interventions to Address the Financial Burden of Cancer Care: Recommendations from the Field

Zahnd WE, Petermann V, Teal R, Vu M, Vanderpool RC, Rohweder C, Askelson N, Edward JE, Farris PE, Koopman Gonzalez SJ, Ko LK, Eberth JM

Purpose: To identify and understand recommendations for addressing cancer patients' financial barriers identified by financial and social support staff at cancer centers across seven states. Methods: Members of the Cancer Prevention and Control Research Network (CPCRN) rural cancer workgroup conducted 35 interviews with staff who provided financial navigation services to cancer patients. Participants were recruited from 29 cancer centers in both rural and urban settings, including National Cancer Institute- designated, and Commission on Cancer (CoC)-accredited, and non-accredited centers. A semi-structured interview guide was used to identify best practices in assessing and addressing financial distress. Interviews lasted approximately 60 minutes, were audio recorded, and transcribed verbatim. A codebook was developed from the research questions, interview guide and discussion with research teams. Transcripts were double coded for thematic analysis, and facilitated with Dedoose, a qualitative software program. Results: Current, effective practices identified by participants included using distress screening tools, patient education visits with a financial counselor, tailored resource lists, patient tracking systems, and the use of telemedicine for rural cancer patients. Participants recommended both policy and clinical changes to address financial toxicity. Policy changes included fixing the "broken system" of policies related to health insurance, pharmaceutical companies, and job protection for patients and caregivers. Clinical recommendations included addressing financial concerns prior to treatment initiation through required financial counselor meetings, development of comprehensive resources and networks for staff to assist patients, financial training for cancer center staff, and improving transportation and lodging opportunities for patients. Conclusions: Cancer center staff providing financial navigation services identified core services related to assessment, education, and mitigation of financial distress among cancer patients. They also proposed policy-, system-, and clinic-level approaches to improving reduce costs borne by patients, which may help address the growing challenge of financial toxicity among cancer patients.

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Cardio-Metabolic Risk Factors and Breast Cancer among Nigerian Women

Akinyemiju T, Jones K

Purpose: Previous studies have documented inconsistent associations between obesity and breast cancer risk among African-American women. Recent studies have focused on characterizing obesity-associated cardio-metabolic traits, and to study breast cancer risk in African women who may exhibit different risk profiles. The purpose of this study is to examine the association between BMI, abdominal obesity and hypertension with breast cancer diagnosis among Nigerian women. Methods: Women with suspected breast cancer were enrolled at 4 Nigerian hospitals between 2015 and 2019, and age-matched to existing healthy controls. Detailed epidemiologic, reproductive and anthropometric measures were recorded for cases at diagnosis and for controls at recruitment. Cases with pathologically verified cancer diagnoses and age-matched healthy controls were included in the current analysis. Descriptive statistics and conditional logistic regression models adjusting for health behavior and reproductive factors were used to evaluate the association of BMI, abdominal obesity, and hypertension on cancer diagnosis. Secondary analyses stratified by menopausal status. Results: Overall, 173 case-control pairs (n=346) were included. Cases were less likely to be overweight (32% vs. 35%) or obese (19% vs. 30%) compared with controls, and more likely (56% vs. 51%) to have high blood pressure at enrollment. In adjusted models, obesity was associated with reduced odds of breast cancer (BMI⩾30 vs. normal weight, AOR=0.50, 95%CI 0.25, 0.98), while high blood pressure was associated with a 24% increased odds of breast cancer, although not statistically significant (AOR=1.24, 95% CI: 0.70, 2.21). Similar associations were observed for obesity among pre/peri and post-menopausal women, however high blood pressure was associated with reduced odds of breast cancer among pre/peri menopausal women (AOR=0.86, 95% CI: 0.35, 2.12), and higher odds among post- menopausal women (AOR=1.60, 95% CI: 0.67, 3.81). Conclusion: In one of the few contemporary cohorts of well-characterized breast cancer patients in Nigeria, high blood pressure was associated with increased odds of breast cancer among post-menopausal women, while obesity appeared to be protective.

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Attitudes toward tobacco use and interest in tobacco cessation treatment in Soweto, Johannesburg, South Africa

Hillyer GC, Joffe M, Jacobson JS, Mmoledi K, Makhutle R, Osei-Folfie D, Mulowayi C, Masuabi B, Mapanga W, Bulman WA, Neugut AI

The overall prevalence of tobacco smoking in South Africa (SA) is 18.4%, but ranges from 6.3% to 44.6%, depending on sex and race. Programs that identify tobacco users and refer them to treatment currently exist only in psychiatric facilities in SA. In early 2019, with collaborators at the Wits Health Consortium in SA, we conducted a pilot study for such a program in Soweto, a largely black and poor township of Johannesburg. Participants aged 18+ were recruited from the waiting rooms of community health clinics and non-government organizations by community health workers. Participants responded to a questionnaire regarding demographic characteristics, insurance coverage, employment status, and tobacco use. Nicotine addiction was assessed using a single question: How soon after waking do you smoke? and interest in quitting and number of quit attempts was recorded. Receptiveness to tobacco cessation was evaluated by posing three scenarios: if your doctor told you to quit, if Chantix was free, and if cessation counseling support was available, would you quit? Participants were further asked if a provider had ever recommended quitting, or ever prescribed Chantix/nicotine replacement therapy (NRT). Of the 166 smokers, most (83.5%) received government medical care, and only 35.7% were employed. They began smoking at a mean age of 17.6 years [SD 5.6], had been smoking for a mean of 24.4 [SD 13.4] years, and smoked a mean 10.9 [SD 6.1] cigarettes per day. Nearly half (47.0%) were highly addicted (smoked within 5 minutes of waking); about 60% had tried to quit at least once; and 83.7% reported they wanted to stop smoking. Almost three-quarters (72.9%) stated that they would definitely quit if their doctor told them to; 88.6% if Chantix was free, and 80.1% if counseling support was available. About 37% reported having been advised by a provider to stop smoking; 6.6% that they had received a prescription for Chantix to help them stop, and 3.6% that they had been advised to use NRT.SA smokers wished to stop smoking but appeared to receive little support from healthcare providers. Community health worker-administered behavioral counseling may be a potential, low cost solution to supplement SA's overburdened medical system and reduce the tobacco smoking in Soweto.

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Prevalence of high-risk HPV infection among HIV-infected women undergoing cervical cancer screening in Mysore, India

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Purpose of the Study: Cervical cancer is an AIDS-defining illness and some studies suggest it may be the most common HIV-related malignancy in women. India, with 2.1 million people living with HIV, has the third largest HIV epidemic in the world. About 40% of infections are among women and research suggests they are four to five times more likely to develop invasive cervical cancer compared to the general population. Studies examining the prevalence of high-risk HPV (HrHPV) in HIV-infected Indian women found that it ranged from about 20% in Chandigarh to 46.2% in West Bengal. There is little data on HrHPV prevalence among HIV-infected women living in Karnataka, one of the six HIV/AIDS high prevalence states in India. We assessed the burden of high-risk HPV and pre-cancerous lesions among HIV-infected women in Mysore, the second largest city in Karnataka. Methods: Between January and June of 2017, 160 HIV-infected women underwent a pelvic examination along with Visual Inspection using Acetic Acid (VIA) as part of a community- based cervical cancer screening program. A vaginal swab was taken for HPV testing using the Digene Hybrid Capture 2 Assay to detect 13 HrHPV types (Qiagen, US). If participants expressed interest in participating in the study they underwent an informed consent process and an interviewer-administered questionnaire in Kannada. On receipt of a positive VIA test, women were referred for a free Pap smear. Results: Of the 160 HIV-infected women, 139 elected to participate in the study. Among those, 43.2% (n=60) were found positive for HrHPV. HrHPV positive women were more likely to be younger, married, Hindu, and housewives. About 40% had no education, 25% had a primary education and 35%, secondary education and above. Ten women (16.6%) had squamous intraepithelial lesions (LSIL & HSIL) or atypical glandular cells (AGU) based on PAP smears. Of the 10 PAP positive women, 5 had HSIL, 3 had AGU, and 2 had LSIL. Conclusion: The study suggests a high burden of HrHPV infection and cervical dysplasia among HIV-infected women in Karnataka. There is a compelling need for cervical cancer screening and treatment in this high-risk population.

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Changes in diet quality, energy intake, and the home food environment during an adolescent behavioral weight loss intervention differ by race and food security status

Adams EL, Caccavale LJ, Raynor HA, Bean MK

Purpose: Racial minorities have greater obesity and cancer risk and often fare worse in obesity treatments. This secondary analysis examined if changes in the home food environment, dietary quality, and energy intake observed during adolescent obesity treatment differed by race and food security status, to explore potential reasons for these disparities. Methods: Adolescent (N=82; 63% female; 66% non-White; 24% food insecure)/parent dyads were enrolled in a 4-mo behavioral weight loss treatment. Adolescents were taught empirically-supported strategies to adhere to personalized calorie and “go food” goals designed to create energy imbalance and increase diet quality. Parents were encouraged to make home food environment changes. At baseline and post-intervention, parents completed the Home Food Inventory (HFI), and adolescents completed a 3-day food recall; Nutrition Data Systems for Research calculated energy intake and Healthy Eating Index (HEI) scores. Race (White vs. Non-White) and food security (food secure vs. insecure) were reported at baseline. Mixed models analyzed HFI, HEI, and energy intake over the intervention period, by race and food security status. Results: All adolescents, regardless of race or food security status, decreased energy intake (~300-400 kcal/day; p’s<.05). Diet quality improved for White and food secure (HEI [post-baseline]: 10.9±17.0, p=0.02; 6.9±15.7, p=.04; respectively), but not Non-White or food insecure adolescents (p’s>.05). The home food environment improved for both racial groups and food secure adolescents (HFI decreased; p’s<.01), but not for food insecure adolescents (p=.52). Improved home food environment was associated with improved diet quality and decreased energy intake for White (p’s<.05), but not Non-White (p’s>.05) adolescents. Improved home food environment was also associated with improved diet quality (p=.02), with a trend for decreased energy intake (p=.08), for food secure adolescents. Conclusion: Improvements to the home food environment seemed challenging for food insecure families, which might contribute to poorer diet quality. While non-White adolescents made changes to the home food environment, this was not associated with diet outcomes. Implications for future interventions will be discussed.

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Gamifying Step Count to Increase Cancer Survivors' Motivation and Physical Activity: A Randomized Controlled Feasibility Study of Steps2Health

Robertson MC, Lyons EJ, Liao Y, Baum ML, Basen-Engquist KM

Purpose The primary objective of this study was to evaluate the feasibility and acceptability of Steps2Health, a novel physical activity intervention for cancer survivors. Steps2Health is grounded in Self-Determination Theory (SDT) and uses game design elements with wearable technologies to increase physical activity-related motivation. Methods We randomized 78 insufficiently active cancer survivors to an experimental or comparison group. All participants received a physical activity tracker. Participants in the experimental group also received MMS messages. The messages were triggered by real-time step count and presented information about a virtual journey. They included photographs and vivid descriptions of the journey locations to increase intrinsic motivation associated with physical activity. Additional messages targeted perceptions of autonomy, relatedness, and competence. We administered surveys pre- and post-intervention and conducted 15 individual interviews to evaluate the intervention. We conducted mixed effects linear modeling to explore changes in motivation and physical activity. Results There was minimal loss to follow up (4%), device wear was high (83.5% of days), and technical problems were minimal. Messages targeting intrinsic motivation, autonomy, and competence were generally perceived as enjoyable and compelling. Messages targeting relatedness were less highly rated, and the response rate (36%) to these messages did not meet the feasibility criterion (75%). From pre- to post-test, participants tended to increase their motivation for physical activity (B = 0.156, 95% CI [0.010, 0.302], P = 0.039, d = 0.50), but there was not a statistically significant group difference. Assignment to the experimental group was associated with increases in self-reported physical activity (B = 10.778, 95% CI [3.541, 18.015], P = 0.005, d = 0.69). Conclusions Evidence supports the feasibility and acceptability of Steps2Health's use of real-time game design elements to target intrinsic motivation, however, acceptably targeting relatedness presents additional challenges. Steps2Health may help cancer survivors increase their physical activity levels.

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Beans/Bran Enriching Nutritional Eating For Intestinal health & Cancer Including Activity for Longevity

Baxter BA, Beale M, Ford H, Haberecht H, Hibbs-Ships S, Leach HJ, Ryan EP

Purpose of the study: A pilot, randomized controlled trial was conducted to evaluate increased fiber intake using rice bran plus cooked navy bean powders versus a corn soluble fiber supplement, and while accounting for physical activity levels to reduce colorectal cancer risk. Methods: We enrolled 20 high-risk adults with colon polyps removed in the last 3 years. Participants were allocated to placebo (fibersol-2) or intervention (rice bran 30g + navy bean 30g) for 3-months. Nutritionist Pro was used to analyze 3-day food records and ASA 24 was applied to generate healthy eating index (HEI). Metabolomics of blood, urine, and stool was utilized to measure biomarkers of dietary intake and investigate impacts of fiber sources on lipid, amino acid and carbohydrate metabolism. Physical activity was measured using activePal. All participants received a physical activity education session aligned with the ACS guidelines. Results: All participants improved total HEI scores. All participants exceeded physical activity guidelines for moderate to vigorous activity (min/week), however average steps per day were not met (steps/day). Participants' consuming rice/navy bean intervention showed changes in stool short chain fatty acids and primary and secondary bile acids. Significant decrease in serum triglycerides, and elevated HDL were observed in the intervention group after 3 months when compared to the controls. Plasma metabolite profiling revealed a significant ($p<0.05$) fold difference of pipecolate, S-methylcysteine, S-methylcysteine sulfoxide, lactate, and 9, 10- DiHOME. Urine metabolites with significant ($p<0.05$) fold differences were 4-methoxyphenol sulfate, N- methylleucine, and S-methylcysteine. Interindividual variation in gut microbial taxa between groups showed participants cluster more closely to themselves than by time. Conclusion: This study demonstrates a practical and affordable means of adhering to national guidelines and measuring metabolic responses involving the microbiome for colorectal cancer control and prevention.

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High-intensity interval training improves functional performance, body composition and reported quality of life in a racially diverse group of cancer survivors

Beebe-Dimmer JL, Finlay DG, Ruterbusch JJ, Baird TE, McEldowney C, Simon MS, Abrams J, Harper FWK

Purpose: Given the well-documented benefits of regular exercise to cancer survivors, in 2012, an expert panel assembled by the American Cancer Society recommended that patients engage in at least 150 minutes per week of moderate-to-vigorous physical activity. However, few patients meet this goal. We have also found racial differences in reported participation in regular exercise among cancer survivors living in Metropolitan Detroit, Michigan. The goal of this study was to pilot a 12-week pilot exercise intervention (CAPABLE) that introduces cancer survivors to the sport of CrossFit®. Methods: We evaluated the impact of CrossFit's unique, high-intensity interval training method on functional performance, cardiovascular endurance, body composition, and health-related quality of life (HRQOL) as measured by the Functional Assessment of Cancer Therapy (FACT) instrument. All measures were summarized at baseline and study completion. Paired signed rank tests were used to assess change in each of these measures over time. Results: Of 45 participants enrolled in the pilot, 34 (76%) were considered adherent to the program (attending >75% of sessions over the 12-week period). The mean age of participants was 58.7 years, 74% identified as African American, and the majority of participants were breast cancer survivors (N=19). The mean body mass index (BMI) at baseline was 33.1 kg/m2 decreasing to a mean of 31.9 kg/m2 at exit (BMI change -1.2, $p<0.001$). Similar changes were observed in % body fat measured by bioelectrical impedance. There were significant improvements in all measures of functional performance over 12-weeks (all $p<0.001$). We observed significant and meaningful improvements in overall HRQOL (FACTG total change +9.6 ($p<0.001$)) and in each one of the individual domains (physical, social, emotional, and functional well-being). Conclusions: Cancer survivors who participated in a high- intensity interval training program demonstrated significant improvements in performance, body composition, and quality of life. Understanding and eliminating barriers to unique and effective exercise programs like the CrossFit-based CAPABLE program are critical to improving outcomes and reducing cancer health disparities among diverse groups of cancer survivors.

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Fatigue and Dietary Patterns Among Cancer Survivors Participating in the Women's Health Initiative

Crane TE, Kohler LN, Skiba MB, Thomson CA, Zick SM

Purpose of the study: To explore the relationship between dietary patterns and fatigue among cancer survivors participating in the observation arm of the Women's Health Initiative (WHI). Methods: Secondary data analysis was conducted using the WHI. Validated questionnaires assessed fatigue (vitality, score 0-100) and dietary intake at baseline and year 3 follow-up. Dietary pattern scores were calculated for the Healthy Eating Index 2015 (HEI-2015, score 0-100), alternate Mediterranean Diet Score (aMED, score 0-9) and a newly developed, Fatigue Reducing Diet (FRD) score (0-10). Post-diagnosis fatigue was determined from fatigue assessed at 3-year follow-up. Clinically relevant fatigue was determined as ⩽45 with a lower score indicating less energy and higher levels of fatigue. Adjusted linear regression models were used to assess the relationship between dietary quality at pre-cancer diagnosis (baseline) and post-diagnosis fatigue (year 3). Results: Among 2,632 female cancer survivors the mean age at enrollment was 65.2 7.0 years with 22.5% of women reporting high levels of fatigue (⩽45) post-diagnosis. Women with higher levels of fatigue as compared to women with lower levels of fatigue (>45), had a higher BMI and were significantly more likely to have an increased number of co-morbidities, report higher levels of pain and sleep disturbance at baseline (all p-values <0.001). No significant differences were observed between fatigue levels and age. Average diet pattern scores at baseline were 1.1 (1.1), 4.1 (1.8), and 67.7 (10.0) for the FRD, aMED, and HEI-2015, respectively. In adjusted regression models assessing each baseline diet pattern on fatigue, HEI-2015 (B=0.19, 95% CI 0.09, 0.28) and aMED (B=0.55, 95% CI 0.03, 1.07) were associated with reduced post-cancer diagnosis fatigue. No significant association was seen with baseline FRD and post-cancer diagnosis fatigue, although this was likely due to the low number of women scoring high for this diet pattern. Conclusions: Diet intake is a modifiable behavior and holds potential for reducing fatigue after a diagnosis of cancer. Future intervention trials testing the impact of diet intake on levels of fatigue in cancer survivors are needed.

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Exercise-induced changes in sleep quality and association with insulin resistance in breast cancer survivors

Dieli-Conwright C, Courneya KS, Sami N, Crane TE, Tripathy D, Buchanan TA, Spicer DV, Demark-Wahnefried W

Purpose Poor sleep quality affects nearly one third of breast cancer survivors and is associated with greater breast cancer mortality. A detrimental effect of poor sleep quality is the development of insulin resistance, the underlying pathophysiologic disruptor of metabolic syndrome and type 2 diabetes. The purpose of this secondary analysis was to examine the effects of a 16-week aerobic and resistance exercise intervention on sleep quality among breast cancer survivors. We assessed whether exercise-induced changes in sleep quality were associated with insulin resistance. Methods Sedentary, overweight or obese (BMI>25.0 kg/m2) breast cancer survivors (Stage I-III) were randomized to exercise (n=50) or usual care (n=50). The thrice weekly 16-week intervention included supervised moderate-vigorous aerobic (65-85% maximum heart rate) and resistance (65-85% 1-repetition maximum) exercise. Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI). Insulin resistance was estimated using the homeostatic model assessment of insulin resistance (HOMA-IR) calculated from fasting insulin and glucose levels. Outcomes were measured at baseline and post-intervention (week 17). Within and between group differences were assessed by paired t-tests and repeated measures ANOVA. The association between changes in PSQI and HOMA-IR in the exercise group was computed using Pearson correlation. Results Participants were 52 10.4 years old, overweight (54%), Hispanic (55%), and had undergone a mastectomy (90%) and chemotherapy + radiation therapy (75%). At baseline, 65% of patients were considered poor sleepers. Adherence to the intervention was 95% and post-intervention assessments were available on 98% of participants. Post-intervention, PSQI global score improved significantly in the exercise group when compared to usual care (mean between group difference -2.2; 95% CI -3.2 to -0.6). Change in PSQI was inversely associated with change in HOMA-IR (r=-0.82; p<0.01) among the exercise group. Conclusions An aerobic and resistance exercise intervention appears effective to improve sleep quality in breast cancer survivors. Breast cancer survivors who experience exercise-induced improvements in sleep quality may also experience improved insulin resistance.

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Biomarkers associated with tumor Ki67 and Cathepsin L gene expression in prostate cancer patients participating in a weight loss trial

Frugé AD, Smith KS, Bail JR, Rais-Bahrami S, Demark-Wahnefried W

Purpose: Our previous presurgical weight loss trial among 40 men with prostate cancer found that rapid (but not slow) weight loss resulted in increased tumor Ki67, as well as increased Cathepsin L (CTSL) expression. In follow- up analyses, we strove to better understand these unexpected findings. Methods: Pre- and post-intervention free fatty acids (FFA) and inflammatory cytokines from 27 men with adequate sera were analyzed, and studied in relation to Ki67, body composition, physical activity (PA), fecal microbiota and tumor gene expression data for both the weight-loss intervention (WLI) and control study arms. Cross-sectional and longitudinal associations between biomarkers were assessed with Spearman correlations. Paired sample t- tests compared within group changes in biomarkers. Analysis of covariance was used to assess between group changes in the subsample of participants (n=12) with gene expression data. Results: Positive associations were observed between changes in percent body fat and serum FFA (ρ=0.428, p=0.026) as well as Interleukin-6 (ρ=0.411, p=0.041). In the gene expression subset, WLI lost more weight (-6.8kg vs. -0.3kg, p=0.002) and lean mass (-1.8kg vs. 0.2kg, p=0.029), and had increased Ki67 (+5% vs. -8.1%, p=0.001), with no differences between groups in PA, caloric and macronutrient intake, or inflammatory cytokines. Change in Ki67 was inversely associated with change in lean mass (ρ=-0.887, p=0.001) and change in serum insulin (ρ =-0.650, p=0.042). Change in insulin was also associated with CTSL (ρ=-0.643, p=0.024) and FFA (ρ=-0.700, p=0.016). Relative abundance of the genus Bifidobacterium was associated with CTSL (ρ=0.627, p=0.039) and FFA (ρ=0.691, p=0.019); relative abundance of Firmicutes was positively associated with change in PA (ρ=0.830, p=0.003). Conclusions: Contrary to our hypothesis, FFA decreased with fat loss; glucose metabolism improved and was inversely associated with Ki67 and CTSL. Given these findings and the potential role of the microbiota, the relationship between prostate tumor expression of CTSL and weight-loss associated changes in FFA warrant further investigation.

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Adiposity change over the life course and mammographic breast density in postmenopausal women

Han Y, Berkey CS, Herman CR, Appleton CM, Alimujiang A, Colditz GA, Toriola AT

Purpose: Mammographic breast density is a strong risk factor for breast cancer. Limited studies have investigated the association between long-term adiposity change and mammographic breast density in postmenopausal women, with conflicting results. Therefore, we comprehensively investigated the associations between body mass index (BMI) change from ages 10, 18, and 30 to attained age with mammographic breast density in postmenopausal women. Methods: We analyzed data from 367 postmenopausal women recruited during screening mammography at Washington University School of Medicine, St. Louis, between 2017 and 2018. We used multivariable linear regressions to evaluate the associations of BMI change with volumetric percent density, dense volume, and non- dense volume, assessed using Volpara. Results: At time of mammogram, the mean age was 57.9 years and the mean BMI was 31.3 kg/m2. There were strong inverse associations between BMI change during the life course and volumetric percent density, and the strongest associations were observed for BMI gain from age 10 to age at mammogram with adjustment for confounders (age at mammogram, family history of breast cancer, age at menarche, parity and age at first birth, race, alcohol consumption, menopausal hormone therapy, and BMI at age 10). Compared to women who had a BMI gain of 0.1-5 kg/m2 from age 10, women who had a BMI gain of 5.1-10 kg/m2 had a 24.4% decrease (95% confidence interval [95% CI], 6.0%-39.2% decrease) in volumetric percent density; women who had a BMI gain of 10.1-15 kg/m2 had a 46.1% decrease (95% CI, 33.0%-56.7% decrease) in volumetric percent density; and women who had a BMI gain of >15 kg/m2 had a 56.5% decrease (95% CI, 46.0%-65.0% decrease) in volumetric percent density. Similar, but slightly attenuated associations were observed for BMI gain from ages 18 and 30 to attained age and volumetric percent density. BMI gain over the life course was positively associated with non-dense volume, but not dense volume. Conclusions: BMI changes from ages 10, 18, and 30 to postmenopausal age were associated with mammographic breast density in postmenopausal women. Mechanistic studies to investigate how long-term adiposity change, especially since age 10 is associated with mammographic breast density are neede

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Metabolic Dysfunction Among Colorectal Cancer Survivors: Results from the National Health and Nutrition Examination Survey

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Purpose: Metabolic syndrome (MetS) is a known risk factor for multiple cancers, including colorectal cancer (CRC). However, the prevalence of MetS and the degree of metabolic dysfunction among CRC patients is unknown. Methods: Using National Health and Nutrition Examination Survey (NHANES) data from years 1999-2016, we identified persons with physical and laboratory measurements on components of MetS that also had questionnaire data available. Presence of MetS was calculated using the National Cholesterol Education Program's Adult Treatment Panel III (NCEP ATPIII) criteria of presence of three or more of hyperglycemia, hypertension, obesity, elevated triglycerides, and low HDL-cholesterol. A metabolic syndrome score (MSS) was calculated to determine if presence of multiple MetS criteria was associated with CRC. A metabolic dysfunction score (MDS) was also calculated using clinically validated reference ranges for MetS components (blood pressure, BMI, glucose, triglycerides, HDL-cholesterol), CRP, and HOMA-IR to assess the severity of metabolic dysfunction. Adjusted odds ratios and 95% confidence intervals were estimated using logistic regression analyses after adjusting for covariates. Results: Data were available on 164 adult participants with CRC and 25,761 controls. 63.41% of CRC cases and 53.09% of controls were classified as having MetS per the NCEP ATPIII definition. Overall, presence of MetS was not associated with CRC (OR 1.06, 95% CI 0.76-1.48). Among study participants with MetS, a positive trend with increasing age was observed for CRC (age <50 [OR 0.57, 95% CI 0.10-3.11], age 50-59 [OR 0.69, 95% CI 0.24- 1.96], age 60-69 [OR 0.83, 95% CI 0.43-1.62], age 70-79 [OR 1.01, 95% CI 0.57-1.80], age >80 [OR 1.72, 95% CI 0.86-3.43]), however this trend was not statistically significant (p-interaction = 0.73). Presence of metabolic dysfunction was also not associated with CRC, as suggested by the MSS and MDS [OR (95% CI) = 0.99(0.92- 1.06) and 1.02(0.88-1.18), respectively]. Conclusions: Our findings suggest that presence of MetS or metabolic dysfunction is not associated with CRC in this NHANES cohort. Future prospective studies, with larger number of CRC cases, are needed to understand the role of metabolic syndrome and metabolic dysfunction in CRC.

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Associations between sedentary behavior, blood lipids, and glucose among individuals at high risk for colorectal cancer

Hidde MC, Beale MN, Lyden K, Baxter BA, Ryan EP, Leach HJ

Purpose: Dyslipidemia and hyperglycemia are associated with increased risk of colorectal cancer (CRC), the third leading cancer diagnosis in the United States. Moderate-vigorous physical activity (MVPA) can improve components of dyslipidemia and hyperglycemia, but the role of sedentary behavior (SB), independent of PA, is not as clear. This study examined cross-sectional associations between components of SB, blood lipids, and glucose among individuals at high risk for CRC. Methods: Adults (⩾18 years) with ⩾ 1 adenomatous polyps removed within the past 3 years, were monitored continuously for 7 consecutive days using an activPAL accelerometer to measure SB and PA. Fasted blood samples were analyzed for total cholesterol, triglycerides, high density lipoprotein (HDL), low density lipoprotein (LDL), and glucose using standard procedures. Pearson correlations explored associations between a series of lipids and glucose with minutes in SB >30 or >60, and number of SB bouts >30 or >60 minutes. Variables with at least moderate associations (r>.3) were included in hierarchical regression models along with waist circumference (WC) and MVPA to predict blood lipid and glucose outcomes. Results: Participants (N=23) were M=58.9 ± 9.0 years old (52.2% female) spending on average 71.22 ± 23.02 min/day in MVPA and 560.03 ± 97.31 min/day sedentary. Time spent in SB bouts >30 min (r= .50) and >60 min (r= .56), number of SB bouts > 30 min (r=0.36) and >60 min (r=.59) were associated with glucose. SB bouts lasting >30 min was associated with total cholesterol (r= .35). The regression model for number of SB bouts lasting >60 min, WC and MVPA was significant [F(3, 18)=3.17, p=.05, R2=.35], and accounted for an additional 34.5% of the variance [=7.56, SE=2.47, t(3)=3.07, p=.007]. Regression models for the other predictors were not significant. Conclusion: Findings from this study suggest that, in terms of glucose control, those at high risk for CRC may benefit from reducing long duration bouts of SB in addition to participating in MVPA. Additional studies are needed to examine the effects of changes in SB on biomarkers for CRC control and prevention.

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Central adiposity and the risk of invasive breast cancer: results from the Nurses' Health Studies

Houghton SC, Eliassen H, Tamimi RM, Willett WC, Rosner B, Hankinson SE

Purpose: Increased body mass index (BMI), an indicator of general adiposity, is associated with lower premenopausal breast cancer risk and higher risk of postmenopausal breast cancer; however, less is known about the association between central adiposity and breast cancer, particularly for tumor subtypes. Methods: We prospectively examined the association between self-reported waist circumference (WC), hip circumference (HC) and waist-to-hip ratio (WHR) and incident invasive breast cancer in 96,746 women in the Nurses' Health Studies (NHS, 1986-2016; NHSII, 1993-2017) by menopausal status. WC and HC were collected twice, 10-12 years apart. Clinician diagnoses of breast cancer were self-reported and confirmed by medical record review. Hazard ratios (HR) and 95% confidence intervals (CI) adjusting for breast cancer risk factors and BMI were estimated by Cox proportional hazard models. Tumor heterogeneity by hormone receptor and molecular subtypes defined by immunohistochemical markers was assessed using competing risk analyses. Results: Over 24-30 years of follow-up, 6,129 incident invasive cases were diagnosed (1,131 premenopausal cases, 2,089 postmenopausal cases with premenopausal WC, 2,909 postmenopausal cases with postmenopausal WC). At baseline, the mean (SD) WC, HC and WHR were 79.0 (10.9) cm, 100.9 (10.0) cm and 0.78 (0.07) respectively. WC and HC were not associated and WHR was positively associated with premenopausal breast cancer risk (quintile 5 vs. 1: HRQ5vQ1=1.27, 95%CI=1.04-1.54, p-trend=0.01). Stronger associations were observed for premenopausal estrogen receptor-negative (ER-)/ progesterone receptor-negative (PR-) and basal-like breast cancers. Premenopausal WC, HC and WHR were not associated with postmenopausal breast cancer risk. Postmenopausal WC was positively associated with postmenopausal breast cancer (HRQ5vQ1=1.38, 95%CI=1.16-1.64, p-trend=0.002); no significant association was seen for HC or WHR. Associations were stronger for postmenopausal ER+/PR+ and luminal B breast cancers. Conclusions: Women with greater central adiposity had higher risk of both premenopausal and postmenopausal breast cancers, independent of BMI. This suggests that maintaining a healthy waist circumference may prevent breast cancer even among premenopausal women.

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Assessing a Culinary Medicine Program to Increase Healthy Eating among Cancer Survivors and Their Caregivers

James JM, Brumfield N, Wilson G, Lowman J, Bolton L, Pierce JY

Purpose This pilot project aimed to evaluate the efficacy of a 6-week culinary medicine program among adult cancer survivors, their caregivers, and primary care patients in Alabama by assessing participants' nutrition knowledge, beliefs and self-reported dietary habits. Methods Participants completed a culinary medicine program (Health Meets Food™ curriculum) consisting of six, 2-hour weekly sessions combining a 30-minute didactic nutrition lesson with 1.5-hours of hands-on cooking. Didactic sessions covered primary components and benefits of the Mediterranean and Dietary Approaches to Stop Hypertension (DASH) diets, nutrition labels, and portion sizes. Participants (N=16) completed a 50-question survey assessing dietary knowledge, self-reported weekly diet, and cooking behaviors at baseline and 6-weeks post-program. Results The majority of participants were between 55-74 years of age (93.8%), female (87.5%), non-Hispanic White (68.8%) and overweight or obese (62.5%). Overall program attendance was 82.0%. Positive changes were observed between pre- and post-program for: cooking/helping cook a meal ⩾5 times per week (50.0% vs. 68.8%); preparing meals at home including breakfast (53.3% vs. 75.0%), lunch (50.0% vs. 75.0%), and dinner (37.5% vs. 73.3%); and using nutrition labels to make food choices (43.8% vs. 62.5%). Also, 18.8% of participants reported never eating sweet snack foods in the previous week at baseline compared to 37.5% post-program. At baseline, no participants reported having knowledge of the Mediterranean or DASH diets and associated health effects compared with 75.0% and 56.3% who reported being knowledgeable or very knowledgeable of these, respectively, post-program. Individuals' dietary habits improved post-program, with those reporting poor or fair overall eating habits decreasing from 31.3% to 6.7%. Conclusions Findings from this pilot project demonstrate the potential effectiveness of a culinary medicine program as an educational and behavioral intervention to increase healthy eating behaviors in cancer survivors, their caregivers, and primary care patients. Further research is needed to determine the sustainability of these behavioral modifications, generalizability of the program, and potential improvements of metabolic indices.

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Associations of recreational physical activity and body mass index with breast tissue composition in a cohort of African American and Hispanic women in New York City

Kehm RD, Lilge L, Walter EJ, Zeinomar N, Hervstman J, Miller R, Tehranifar P, Terry MB

Purpose: Recreational physical activity (RPA) and body mass index (BMI) are independently associated with breast cancer risk, but less is known about associations with breast tissue composition over the lifecourse. We previously found an association for RPA and BMI with breast tissue composition in a cohort of adolescent girls. Here we examine associations of RPA and BMI with breast tissue composition of mothers in the cohort. Methods: 212 African American and Hispanic women living in the South Bronx or Northern Manhattan participated in Columbia's Breast Cancer and the Environment Research Project (BCERP) Study (mean age=41.8±5.3 years; 94% premenopausal). Women completed a clinic visit during which we measured breast tissue composition using optical spectroscopy (OS), a non-invasive tool that provides both functional and structural information. We used principal component (PC) analysis to reduce spectral data by generating 7 PC scores for each participant averaged over both breasts. We measured height and weight at the clinic visit, and women reported by questionnaire average hours per week of moderate and strenuous RPA during the past year. We converted hours per week of moderate and strenuous RPA to total metabolic equivalents (METs). We used multivariable linear regression to examine the association of RPA and BMI with the first 5 OS PCs, which explained 99.7% of the sample variation. We modeled RPA and BMI as both continuous and categorical measures, and we adjusted for age and ethnicity. Results: 23% percent of women reported no RPA in the past year. Women reported an average of 17 METs per week in the past year (range: 0-111 METs). Average BMI in the sample was 30.8 kg/m2 (range: 18.2-57.1 kg/m2), and 80% of women had a BMI ⩾25 kg/m2. BMI was not correlated with RPA (ρ=-0.01) in our sample. BMI was significantly associated with 2 of the 5 OS PCs ($p<0.05$). RPA was not significantly associated with OS PCs in models unadjusted or adjusted for BMI, or stratified by BMI (all $p>0.05$). Conclusions: Our preliminary results suggest that BMI may be associated with breast tissue composition in African American and Hispanic women, independent of RPA. Unlike our findings for adolescent girls, RPA was not associated with breast tissue composition of mothers.

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Restoring Balance, a physical activity intervention for Native cancer survivors and their familial support persons (NNR.14.192)

Lane T, de Heer H, Schwartz A, Charley B, Yazzie E, Yellowhair J, Hudson J, Mitchell M, Wertheim BC, Bea JW

Though physical activity improves survivorship, no studies have focused on Native American cancer survivors. Methods: Native cancer survivors and family members were enrolled in a 12-week multi-site, randomized supervised and home-based physical activity intervention (n = 63). The intervention included 1d/wk supervised resistance, aerobic, flexibility, and balance and 2-5 days/wk of home-based exercise. National guidelines for survivorship exercise training were culturally tailored based focus groups and interviews, as well as cultural expert program review by representatives from 10 tribes. Preliminary descriptive statistics (mean, SD) and twelve-week changes in weight (kg), BMI (kg/m2), fat mass by bioelectrical impedance (%), metabolic function by HbA1c (%), fitness by 6min walk test (meters), and quality of life by PROMIS10 questionnaire score have been assessed by paired t-test. Results: Cancer survivor mean age was 57.7 ± 12.1 years. Familial support persons were aged 40.1 ± 14.8 years. For cancer survivors, tumor types were breast (24%), colorectal (26%), gynecologic (8%), hematologic (8%), stomach (5%), lung (5%), and other varied cancers (24%). Significant improvements in fitness occurred in both survivors and familial support persons (6min walk distance +68.2 ± 111m and 60.1 ± 57.6m, respectively; $p<0.05$). Familial support persons also experienced significant improvements in HbA1c (-0.4 ± 0.7%) and quality of life scores (2.2 ± 4.2; $p<0.05$). Non-significant improvement in quality of life scores was demonstrated among survivors (1.4 ± 5.9). Non-significant reductions in BMI (-2.8 ± 9.9) and fat mass (-0.6 ± 1.9%) were demonstrated among familial support persons. Conclusions: Physical activity improves fitness in Native cancer survivorship, which may be shown to influence other important health outcomes with a longer intervention or greater follow-up. Cancer risk biomarkers reductions with physical activity among Native family members of cancer survivors may have a meaningful impact on cancer prevention in this population with shared heritable and environmental risks.

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Feasibility of Beans/Bran Enriching Nutritional Eating For Intestinal health & Cancer Including Activity for Longevity (BENEFICIAL), a pilot trial to improve healthy lifestyles among individuals at high risk for colorectal cancer

Leach HJ, Baxter BB, Beale MN, Smith H, Rao S, Ryan EP

Purpose: To evaluate the feasibility of an intervention to increase dietary fiber from rice bran (RB) and navy beans (NB) among individuals at high risk for colorectal cancer, while measuring physical activity (PA). Methods: A 12-week, pilot, randomized, single-blind, dietary intervention comparing RB+NB to a fibersol-2 a placebo control. Participants were ⩾18 years of age, had one or more adenomatous polyps removed ⩽3 years, and had not received chemotherapy or radiotherapy with their surgical removal of polyps/tumors. Three-day food logs were analyzed using Nutritionist Pro™ to estimate caloric and fiber intake, macronutrient and micronutrient consumption. The Automated Self-Administered 24-hour (ASA24®) Dietary Assessment Tool, and a SAS macro was used to calculate Healthy Eating Index (HEI). PA was measured at baseline and post-intervention using an activPAL accelerometer. Feasibility was assessed by recruitment and retention rates, compliance to RB+NB intervention and PA measurement procedures, and median percent change from baseline to post-intervention for fiber, HEI whole grain and HEI total scores. Results: Out of N=68 assessed for eligibility, N=23 enrolled (33.8% accrual), and N=20 completed the intervention (86.9% retention). Compliance was 92% in the RB+NB intervention vs. 89% in the fibersol-2 control. In the RB+NB group, consumption of NB increased from 2 g/day to 30 g/day, and RB from 0 g/day to 30 g/day. Compliance with activPAL procedures and provision of valid data (⩾10 hours of wear time per day, for ⩾4 days) was 100%. Fiber intake (g/day) increased by 73% in RB+NB, and 82% in fibersol-2. HEI whole grain score improved by 270% in RB+NB, and 37% in fibersol-2. HEI total score improved by 10% in RB+NB, and 9.1% in fibersol-2. Conclusions: This pilot study supports the feasibility of a RB+NB intervention that included PA measurement. Participants were compliant to the RB+NB intervention and showed greater increases in whole grain intake than the Fibersol control. A larger trial is warranted to evaluate efficacy of RB+NB consumption, and PA changes on metabolic and cancer-related outcomes.

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Adherence to WCRF/AICR cancer prevention guidelines and cancer outcomes: A systematic review and meta-analysis

Lee E, Figueroa A, Durham N, López Castillo H

Purpose: The World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) publishes cancer prevention guidelines to reduce cancer risk in healthy people and to minimize health risks in cancer survivors. However, few studies examined whether the impact of adhering to these guidelines on mortality is the same as on cancer incidence and whether there is an effect modification by cancer type. Methods: Web of Sciences and EBSCOhost (including Medline and CINHAL) were searched up to December 2018 for relevant publications using the key search terms. The search was limited to studies published in English, with publication date from 1997, and original articles published in peer-reviewed journals. Data extraction was performed using DistillerSR software. The study characteristics, participants, recommendations, and summary effect sizes were estimated for cancer incidence and mortality overall and by cancer types. Meta-analysis was conducted using random-effects models Results: Thirty-five articles among the 176 initially identified were eligible for full-text review, and 25 (18 cohort studies and 7 case-control studies) were included in data extraction. Meta-analysis showed that adhering to one additional WCRF/AICR recommendations could reduce overall cancer incidence and mortality by 10% (RR 0.90, 95%CI 0.88–0.92). Subgroup analysis for cancer incidence showed that the strength of the association varied by cancer types with head and neck cancer having the highest impact (RR 0.60, 95%CI 0.55-0.65) and prostate cancer having the lowest, nonsignificant impact (RR 0.97 95% CI 0.93-1.01). For mortality, stomach cancer had the highest impact (RR 0.71 95%CI 0.54-0.93) with urinary tract cancer having the lowest, nonsignificant impact (RR 0.99, 95%CI 0.78-1.26). Additionally, higher adherence was associated with 27% reduced risks for cancer incidence and mortality (RR 0.73 95% CI 0.68-0.79; RR 0.73 95% CI 0.68-0.78, respectively) compared to lower adherence. Conclusions: Adhering to WCRF/AICR cancer prevention guidelines has the same effect on cancer incidence and mortality. Healthcare providers can encourage cancer survivors to comply with cancer prevention guidelines to improve their survival.

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Effects of a One-week Intensive Health Camp on Dietary Behaviors among American Indian Youth

Lopez-Pentecost M, Gachupin FC, Hazelwood R, Honanie O, Quamahongnewa J, Thomson CA

Background: American Indians (AI) suffer the highest rates of diabetes in the U.S.; a chronic disease that is increasingly prevalent among AI children and is associated with increased risk of cancer. Toward developing effective means to reduce diabetes and cancer burden in this population, a summer camp was developed to improve disease risk-reducing behaviors among AI youth in Arizona. Purpose: To examine the efficacy of a one week intensive health camp on dietary behaviors among AI youth and to examine if results vary by sex. Methods: AI children ages 10 to 15 years from tribes across Arizona are invited to a one week intensive residential camp. Kids participate in a week of experiential learning focused on healthy eating and physical activity. An in-depth assessment is performed to track progress. 24h dietary recalls are collected by trained staff before and after the camp. T-tests were conducted to analyze differences in mean consumption of energy (kcals/day), total fat (g/day), saturated fat (g/day), total fiber (g/day), added sugars (g/day), and servings of fruit and vegetables (svg/day) pre- and post-camp. Results: A total of 313 dietary recalls were collected as a result of a Tribal-University partnership. Matched diet recalls for 45 children (boys=19, girls=26) were included in the current analysis. Results showed a statistically significant decrease in mean energy intake (P-value = 0.028), total fat (P-value = 0.004), and saturated fat (P-value = 0.026). No significant difference was seen for total fiber intake (P-value = 0.136), added sugars (P- value =0.267), fruit intake (P-value = 0.82) and vegetable intake (P-value = 0 .224). When examining differences by sex, a statistically significant decrease for energy (P-value = 0.014), total fat (P-value = 0.008), and added sugars (P-value = 0.027) was observed among boys. No statistical significant results were found among girls. Conclusion: The American Indian health camp was effective at reducing total energy intake (kcals/day), total fat (g/day), and saturated fat (g/day), among American Indian children ages 10-15 years. When stratifying by sex, the camp was more effective at improving energy intake, total fat, and added sugar eating choices among boys as compared to girls.

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Exploring the chemopreventive effect of a maize fiber dietary intervention to reduce colon cancer risk in rats treated with 1,2-dimethylhydrazine by water proton Nuclear Magnetic Resonance

Mendez-Encinas M, Carvajal-Millan E, Álvarez-Bajo O, Rascón-Chu A, Astiazarán-García H, Valencia-Rivera D

Purpose of the study: Ferulated arabinoxylans (AX) are dietary fiber from cereals that present prebiotic and antioxidant properties, which make them attractive biomolecules for cancer prevention, particularly colon cancer. The present study aims to investigate the effect of a maize AX dietary intervention on the colon cancer risk in rats treated with 1,2-dimethylhydrazine (DMH). Methods: Adults male Wistar rats were divided into three groups. Each group was fed with one of the following diets for 35 days: a standard diet (Control); the same standard diet (rats treated with DMH); the same standard diet supplemented with AX (4.8% w/w, rats treated with DMH). DMH was administered nine days after the beginning of experimental diets (40 mg/kg, 2 doses/week, 2 weeks, subcutaneous injection). At the end of the experiment, the rats were sacrificed, and the colon tissue was removed and analyzed by water proton Nuclear Magnetic Resonance (NMR) to obtain the spin-lattice relaxation time (T1). The bodyweight of the rats was recorded during the trial. Morphological analysis of the colon tissues at the end of the test was also performed. Results: There were no differences ($p < 0.05$) in body weight gaining between the three experimental groups. The body weights, in the beginning, were 277, 257 and 259 g, and 323, 302, and 308 g at the end of the experiment for Control, DMH, and DMH+AX groups, respectively. The T1 for the DMH+AX group (570 ms) was significantly lower ($p < 0.05$) than that for the DMH group (600 ms). The T1 value for the Control group (500 ms) was significantly lower ($p < 0.05$) than those of DMH and DMH+AX. The colon of Control and DMH+AX animals displayed normal morphology with no apparent signs of abnormality, while DMH treated colon revealed morphological changes. Conclusions: The incorporation of maize AX to the diet of rats treated with DMH reduced the T1 value of the colon tissue and conserved the colon morphology normal. The evidence suggests that maize AX could have a chemopreventive effect and reduce colon cancer risk. Additional studies are being carried out to increase our understanding of maize AX anticancer properties as well as the opportunities and challenges of their use in the context of diet intervention and colon cancer prevention.

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Physical Health Composite and Risk of Cancer Mortality

Moore JX, Carter SJ, Williams V, Khan S, Lewis-Thames MW, Gilbert K, Howard G

It is unclear how resting myocardial workload, as indexed by rate-pressure product (RPP), coupled with physical activity (PA) is associated with the overall risk of cancer mortality. We performed prospective analyses among 28,810 men and women from the REasons for Geographic and Racial Differences in Stroke (REGARDS) cohort. We used a novel physical health (PH) composite index and categorized participants into one of four groups based on combinations from self-reported PA and RPP: 1) No PA and High RPP; 2) No PA and Low RPP; 3) Yes PA and High RPP; and 4) Yes PA and Low RPP. We examined the association between PH composite and cancer mortality adjusted for potential confounders using Cox regression. A total of 1191 cancer deaths were observed over the 10-year observation period, with the majority being lung (26.87%) and gastrointestinal (21.49%) cancers. Even after controlling for sociodemographics, health behaviors, baseline comorbidity score, and medications, participants with No PA and High RPP had 71% greater risk of cancer mortality when compared to participants with PA and Low RPP (adjusted HR: 1.71, 95% CI: 1.42 – 2.06). These associations persisted after examining BMI, smoking, income, and gender as effect modifiers and all-cause mortality as a competing risk. Poorer physical health composite, including the novel RPP metric, was associated with a nearly 2-fold long-term risk of cancer mortality. The physical health composite has important public health implications as it provides a measure of risk beyond traditional measure of obesity and physical activity.

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The role of home-based exercise in maintaining muscle quality during preoperative pancreatic cancer treatment

Parker NH, Gorzelitz J, Ngo-Huang A, Petzel MQB, Prakash L, Garg N, Schadler K, Fogelman D, Tzeng CW, Kim MP, Lee JE, Basen-Engquist K, Katz MHG

Purpose: We previously showed that home-based exercise program (EP) participation is associated with maintenance of muscle quantity (skeletal muscle index, SMI) during preoperative pancreatic cancer treatment. Despite their physiologic importance, muscle quality measures (skeletal muscle density, SMD, and gauge, SMG) have not been examined in this context. We compared changes in SMD and SMG between EP participants and a usual care (UC) comparison group. We hypothesized that EP participation would be associated with maintenance of SMD and SMG. Methods: Home-based EP recommendations included moderate-intensity aerobic exercise and resistance training (⩾60 min/wk each) during preoperative therapy. UC patients had no formal exercise program. Average SMD (Hounsfield Units, HU) of muscle cross-sections at the L3 vertebra was quantified using Tomovision SliceOmatic software and CT scans from baseline and following preoperative treatment. SMG was calculated as SMI*SMD (arbitrary units, AU). Linear regression models adjusted for sex, age, change in BMI, therapy received (chemotherapy, chemoradiation, both), and baseline SMD/SMG were used to evaluate differences in rates of SMD and SMG change between groups. Results: Clinicodemographic profiles of EP (n=33) and UC (n=63) were similar (p>.05 for differences in sex, age, BMI, sarcopenia, and therapy received). Rate of SMD change was .05±.3 HU/wk for EP compared to -.02±.4 HU/wk for UC (p=.4). Rate of SMG change was 2.6±18.6 AU/wk for EP compared to -4.1±19.0 AU/wk for UC (p=.1). In adjusted models, there was no significant association between group and rate of SMD change (B=.09, p=.3), but EP participation was favorably associated with rate of SMG change (B=8.1, p=.04). Conclusions: The home-based EP helped patients undergoing preoperative pancreatic cancer treatment maintain SMG, which incorporates both muscle quantity and quality. There is insufficient evidence for maintaining muscle quality alone (SMD), which may be an important predictor of physical function and risk for impairments. Future interventions should focus on progressive resistance training in order to improve muscle density.

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Randomized Trial of Weight Loss on Circulating Ghrelin Levels Among Breast Cancer Survivors

Puklin LS, Cartmel B, Harrigan M, Lu L, Li F, Sanft T, Irwin ML

Purpose: Obesity is associated with increased breast cancer risk and mortality. The hormone ghrelin is part of a negative feedback loop regulating body weight. This study aims to determine the effect of a weight loss intervention on ghrelin levels in breast cancer survivors with a body mass index (BMI) (>25 kg/m2). Methods: The Lifestyle, Exercise, and Nutrition (LEAN) study was a 6-month randomized trial, which examined the effectiveness of a weight loss intervention versus usual care in 151 breast cancer survivors with BMI ⩾25 kg/m2. Ghrelin was measured in fasting baseline and 6-month blood samples. Baseline associations between ghrelin, body composition and blood biomarkers were examined. Six-month change in ghrelin was compared between the study arms. Results: Ghrelin levels were available for 128 women. At baseline, ghrelin was correlated with age (r=0.28, p<0.001) and inversely correlated with weight (r=-0.18, p=0.03), lean body mass (r=-0.18, p=0.02), and leptin (r=-0.18, p=0.03). Over 6-months, ghrelin increased 12.08% in the intervention group and decreased 31.05% in the usual care group (p=0.04). Conclusions: These findings support our hypothesis that weight loss, achieved through a lifestyle intervention, is associated with higher ghrelin levels in breast cancer survivors. Further research should explore ghrelin's effect on long-term weight-maintenance and breast cancer mortality.

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Healthy cooking practices are not associated with the carotenoid content of home-prepared meals: implications for food preparation interventions among childhood cancer survivors and their families

Raber MP, Basen-Engquist K, Moran NE, Chandra J

Healthy home cooking programs are an increasingly popular approach to nutrition education and have the potential to promote diet quality among childhood cancer survivors (CCS). A cornerstone of many programs is the use of fresh fruits and vegetables, which may support increased intake of many components, including carotenoids, to improve survivor health. As most carotenoids in the US currently come from processed vegetables, however, it is unclear if the incorporation of fresh fruits and vegetables is associated with carotenoid content of meals. The objective of this study is to examine the relationship between practices commonly taught in healthy cooking classes and the carotenoid content of prepared meals. This is a secondary analysis of an observational study examining the quality of home cooking practices using an evidence-based index of behaviors. Parents with one CCS or non-CCS school-aged child were recruited for this study. Evening meal preparation events were observed in participant homes and cooking practices examined and quantified. Prepared meal nutrition, including total and individual carotenoid content was assessed.Forty parent-child dyads participated in this study including 11 CCS and 29 non- CCS families. Nutrition optimizing cooking practices, as quantified by the Healthy Cooking Index, were not associated with the carotenoid content of meals. Further, total fruit and vegetable content of meals was not associated with total carotenoids, indicating heterogeneity in the carotenoid profiles of foods used in this population. High carotenoid meals tended to use more canned and/or frozen tomato and vegetable products, and carotenoid content was associated with meals with greater total refined grain and sweetener content. This analysis informs the future development of healthy cooking curricula for CCS and their families. Our findings indicate an opportunity to promote skills that couple both overall healthy cooking practices and the thoughtful incorporation of high carotenoid food products. Carefully designed cooking education programs have the potential to translate dietary guidelines, including the consumption of colorful carotenoid-rich fruits and vegetables, into practical skills that support long-term

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Health Beliefs and Cancer Preventive Lifestyle Behaviors among Adult Survivors of Adolescent and Young Adult Cancer Survivors: A HINTS Analysis

Skiba MB, Crane TE, Jacobs ET, Kopp LM, Thomson CA

Purpose: We aimed to evaluate cancer preventive lifestyle behaviors among adolescent and young adult cancer survivors (AYAs; age 15-39 y) compared to older adult cancer survivors (OACs; age ⩾40 y) and cancer- free adults (CFAs). The influence health beliefs, including self-efficacy on these behaviors in adults was also examined. Methods: Data available from the Health Information National Trends Survey (HINTS) 5 Cycle 1 was used to characterize lifestyle behaviors and cancer-related health beliefs in a sample of 3285 nationally representative adults. Cancer history was determined from self-report of age at cancer diagnosis. Lifestyle behaviors were defined as meting recommendations established by American Cancer Society Guidelines of ⩾5 servings fruit and vegetables/day (FV), ⩾150 min moderate physical activity/week (PA), and a body mass index ⩽30 kg/m2. Using adjusted logistic regression models with survey weights and jackknife replicates, the lifestyle behaviors of AYAs compared to OACs and CFAs was assessed and the association of cancer-specific health beliefs including health self-efficacy and meeting recommendations was completed. Results: Average age at cancer diagnosis was 30.8 and 60.1 y with a mean time since diagnosis of 3.8 y and 2.7 y for AYAs (n= 114) and OACs (n= 364), respectively. Fewer than half of AYAs met recommendations for FV (43.8%) and PA (31.5%), and 32.5% were obese. There was no difference in meeting FV and PA recommendations among AYAs compared to OACs or CFAs. AYAs had lower odds of obesity compared to OACs and CFAs (OR: 0.41, (95%CI: 0.20-0.83), p= 0.01 and OR: 0.49, (95%CI: 0.26-0.91), p=0.025, respectively). High health self-efficacy was associated with higher odds of meeting FV (OR: 1.89, (95%CI: 1.09-2.31), p= 0.017) and PA recommendations (OR: 1.92, (95%CI: 1.28-2.87), p=0.002). Cancer-specific health beliefs including cues to action and perceived severity, susceptibility, and threat were not associated with meeting recommendations. Conclusions: These results suggest that AYA lifestyle behaviors are similar to OACs and CFAs and many do not achieve established recommendations. Higher self-efficacy supports meeting recommendations for cancer preventive lifestyle behaviors, while other health beliefs may not.

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Smoking and Cessation Behaviors in Patients at Federally Funded Health Centers - United States, 2014

Trapl ES, VanFrank B, Kava C, Trinh V, Land S, Williams R, Frost E, Babb S

Federally funded health centers provide care to the most vulnerable populations in the U.S., including populations with significant disparities in smoking prevalence. This study compared demographic characteristics of adult health center patients by smoking status and assessed exposure to and uptake of evidence-based smoking cessation treatment. This analysis used 2014 Health Center Patient Survey data and was restricted to adults (>18 years) with non-missing smoking status (n=5,583). Univariate, bivariate, and multivariable analyses were conducted using complex sampling procedures. Overall, 28.1% were current smokers and 19.2% were former smokers. Current smokers experienced high burden of chronic disease and behavioral health conditions. A majority of current smokers reported wanting to quit in the past 12 months (79.0%) and reported receiving advice to quit from a healthcare professional (HCP) (78.7%). In a multivariable model, desire to quit was strongly associated with age, race, COPD diagnosis, >2 mental health diagnoses, and past 3 month use of marijuana. Few former smokers (15.2%) reported using cessation treatment, though use was higher among those who quit within the previous year (30.6%). Although most health center patients who currently smoke report a desire to quit, low uptake of evidence-based treatment may reduce the number who attempt to quit and succeed in doing so. In light of the substantial burden of tobacco use among these patients, future efforts could focus on unique personal, HCP, or health system barriers to connecting to cessation treatments. Increasing access to cessation treatments within health centers could reduce disparities in smoking prevalence and improve population health.

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Potential DNA methylation markers for breast cancer development

Castle J, Lin N, Liu J, Wang C, He C

DNA methylation plays a key role in breast cancer development. Abnormal DNA methylation contributes to genomic instability and leads to gene dysregulation. Changes in DNA methylation are tissue-specific and are influenced by both environmental and genetic factors. However, it remains a challenge to identify tissue-specific DNA methylation markers for breast cancer development prospectively. We hypothesized that DNA methylation changes that drive breast cancer development occurs in normal breast tissue before cancer diagnosis, and such changes were correlated with the time interval to diagnosis. In this study, we compared genome-wide DNA methylation profiles of normal breast tissue between women who developed breast cancer within 7 years of tissue donation (cases) and women who remained no breast cancer with at least same length of follow-up (controls). Cases and controls were matched on exact age at tissue donation. Out of the 3.3M CpGs tested, we identified approximately 29K and 16K CpGs that were differentially methylated ($|\Delta\beta|>0.10$, $P<0.05$) between cases and controls for women of European Americans (EA) and African Americans (AA), respectively, and 1002 and 820 of those CpGs whose $\Delta\beta$ were also highly correlated with the time interval between age at donation and age at diagnosis among cases ($|r|>0.9$, $P<0.05$). Further gene annotation and pathway analyses suggested these CpG sites were enriched in inflammation response for both EA and AA women, but enriched in cell differentiation and lipid metabolism for EA women and in angiogenesis for AA women. Our study identified potential DNA methylation markers that drives breast cancer development. Further research is needed to validate these results in larger samples.

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Hepcidin-regulating iron-metabolism genes and pancreatic ductal adenocarcinoma: a pathway analysis of genome-wide association studies

Julián-Serrano S, Yuan F, Benyamin B, Wheeler W, Amundadottir L, Jacobs E, Kraft P, Li D, Petersen GM, Risch HA, Wolpin B, Yu K, Klein AP, Stolzenberg-Solomon R

Pancreatic ductal adenocarcinoma (PDAC) is a highly lethal cancer, and epidemiological studies have suggested positive associations with iron and red meat intake. Rare mutations in genes involved in the hepcidin-regulating pathway are known to cause iron overload and hemochromatosis. We hypothesize that the hepcidin-regulating pathway as characterized by common variants from genome-wide association studies will be associated with PDAC. Methods: We conducted a large pathway-based meta-analysis of the hepcidin-regulating genes using the summary based adaptive rank truncated product (sARTP) method in 9,253 PDAC cases and 12,525 controls of European descent from the Pancreatic Cancer Cohort (PanScan) and the Pancreatic Cancer Case-Control (PANC4) consortia. Our analysis included 11 hepcidin-regulating genes (BMP2, BMP6, FTH1, FTL, HAMP, HFE, HJV, NRF2, SLC40A1, TFR1, TFR2) and adjacent genomic regions (20 kb upstream and down-stream) with a total of 412 single-nucleotide polymorphisms (SNPs). We also conducted the sARTP with four iron status biomarkers (serum iron, transferrin, transferrin saturation, and ferritin, n=23,986) using summary statistics from previous GWAS studies (Benyamin, et al 2014) to examine if the hepcidin-regulating genes were also associated with these iron traits. The sARTP method combines SNP-level associations across variants in a gene or a pathway. Signals from up to five of the most associated SNPs for each gene studied were accumulated. Results: The hepcidin-regulating pathway was significantly associated with PDAC (P-value=0.002) with the HJV, TFR2, and TFR1 genes contributing the most to the association (gene level P-values = 0.001, 0.014, and 0.019, respectively). The pathway associations were more significant in women than men. This pathway was also significantly associated with the four biomarkers of iron metabolism (P-values <1.5 +/- 10-7). Conclusions: Our results support that genetic susceptibility related to the hepcidin-regulating pathway is associated with PDAC and a potential role of iron metabolism in pancreatic carcinogenesis. Further studies are needed to evaluate the modifying effect of iron-rich foods and genetic susceptibility of this pathway and PDAC risk.

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Analysis of a rare PMS1 variant identified in discordant sibling pairs from hereditary breast cancer families

Landry KK, Dragon JA, Seward D, McKinnon WC, Colello L, Wallace SS, Cuke M, Wood ME

Background: Additional genes associated with hereditary breast cancer likely exist. We previously identified a rare and potentially pathogenic PMS1 variant in two affected sisters from hereditary breast cancer families. This variant was not present in the unaffected sister-pair. Published in silico analyses previously predicted that this variant may have functional clinical significance. Objectives: 1.) To determine the genotype-phenotype correlation within the two families wi with the rare PMS1 variant. 2.) To sequence PMS1 mRNA from cell lines with and wi without the c.605G>A variant to test the hypothesis that the PMS1 c.605G>A germline va variant disrupts PMS1 mRNA splicing. Methods: 1.) Germline DNA from extended family members were collected and analyzed to determine if the PMS1 c.605G>A variant tracks with affected family members. 2.) Using NCI-H441 lung cancer cells heterozygous for the PMS1 c.605G>A variant we s sequenced PMS1 mRNA and compared the results with cell lines harboring WT PMS1 to d determine whether PMS1 c.605G>A impacts exon 6 utilization. Results: The PMS1 c.605G>A variant did not track with cancer in either family. No PMS1 c.605G>A variant-dependent differences in exon 6 utilization were detected between PMS1 WT cell lines and the NCI-H441 cells. Conclusions: Given the PMS1 c.605G>A variant did not segregate with disease and there was no variant-dependent impact on splicing; the PMS1 c.605G>A variant is likely b benign. This information can help others investigating functional significance of either s somatic or germline mutations.

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Serological evidence of infections is associated with extent and intensity of intra-prostatic inflammation in men without prostate cancer or indication for biopsy in the placebo arm of the Prostate Cancer Prevention Trial

Langston ME, Umbehr MH, Barber JR, De Marzo AM, Goodman PJ, Nelson WG, Tangen CM, Thompson IM, Platz EA, Sutcliffe S

Purpose: Emerging evidence suggests that inflammation may contribute to prostate cancer risk and mortality. However, the source of inflammation is unclear. Therefore, we examined cross-sectional associations between selected infections [Human papillomavirus (HPV) 16, 18, and 31; Human herpes virus (HHV) 8, Cytomegalovirus (CMV), and Trichomonas vaginalis] and histological inflammation in prostate tissue within the placebo arm of the Prostate Cancer Prevention Trial (PCPT). Methods: We measured infection history using serum IgG antibodies and visually assessed histological inflammation from biopsied prostate samples of 247 men (92.7% non-clinically indicated) without evidence of prostate cancer. Associations between infection serostatus and the prevalence, extent, and intensity of inflammation were assessed, using linear and logistic regression and adjusting for age and race. Results: Overall, 80% of men had at least one biopsy core (~3.3 evaluated per man) with histological inflammation. Seroprevalences of HPV 16, 18, 31, CMV, HHV-8, were 19%, 4%, 17%, 64%, 10%, respectively, while seroprevalence of T. vaginalis was 15% for high seropositivity and 41% for low seropositivity. 116 men (47%) were seropositive for multiple infections and 46 (19%) were seronegative for all selected infections. Seronegative men had the lowest prevalence of inflammation (67%) with 5% mean percentage of tissue area inflamed. Comparing men seropositive for one infection to men seronegative for all infections, each seropositive group (CMV, HPV, and T. vaginalis) was possibly positively associated with intraprostatic inflammation. However, after adjustment for age and race only CMV and HPV seropositivity were significantly associated with inflammation as evidenced by an increased mean percentage of tissue area inflamed (CMV=+8.3%, 95% CI: 2.3-14.4; HPV=+10.6%, 95% CI: 1.9-19.2) compared to men seronegative for all infections. Similar findings were seen for men seropositive for multiple infections or any infection compared with men overall seronegative for all infections. Conclusions: These findings suggest that either a correlated, unmeasured infection or the cumulative burden of infections influences intraprostatic inflammation, which may have implications for prostate cancer risk. *A SWOG Study S9217

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Air pollution and terminal duct lobular involution of the normal breast

Niehoff NM, Keil AP, Jones RR, Fan S, Gierach GL, White AJ

Purpose: Air pollution has been associated with a higher risk of breast cancer. We examined whether air pollution was associated with involution of terminal duct lobular units (TDLUs), the histologic site where most breast cancers arise and an intermediate marker of breast cancer risk. Methods: Pathologist enumerated TDLUs (i.e., TDLU count, a metric inversely associated with involution), were assessed in H&E (Hematoxylin and Eosin)-stained breast tissue sections from 1,908 United States-residing women ages 18-75 who donated to the Susan G. Komen Tissue Bank (2009-2012). The 2009 annual PM2.5 total mass (g/m3) at each woman's residential address was estimated from the Environmental Protection Agency's Downscaler Model that combines Community Multiscale Air Quality (CMAQ) System modeling data with air quality monitoring data. We secondarily considered CMAQ-modeled components of PM2.5 and gaseous pollutants. We used K-means clustering to identify groups of individuals with similar levels of PM2.5 components, selecting 3 groups via cluster stability analysis. Relative rates (RRs) and 95% confidence intervals (95% CIs) for the association between air pollutants and TDLU counts were estimated from a zero-inflated negative binomial regression model adjusted for confounders. Results: PM2.5 total mass was associated with higher TDLU count among all women (interquartile range (IQR) increase, RR=1.03; 95% CI: 1.00-1.06). The magnitude of the PM2.5-TDLU count association was stronger among postmenopausal women (RR=1.10; 95% CI: 1.03-1.18). Using K-means, we identified 3 groups that corresponded to clusters that varied geographically and roughly represented high, medium, and low levels of PM2.5 components. Compared to the cluster with low levels, the clusters with both high (RR=1.25; 95% CI: 0.95- 1.63) and medium (RR=1.24; 95% CI: 0.95-1.62) levels were associated with higher TDLU counts; associations were again stronger among postmenopausal women. Conclusions: Higher PM2.5 was associated with reduced TDLU involution as measured by TDLU counts. Air pollution may influence the histologic characteristics of normal tissue which could in turn affect breast cancer risk. This may be particularly relevant for the breast tissue of postmenopausal women.

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T cell landscapes of colorectal adenomas

Matejcic M, Khan A, Hoehn A, Schmit SL

Purpose of the study: Lymphocytic infiltration is a positive prognostic indicator for colorectal cancer outcomes, but the immune landscapes of precancerous lesions have not been thoroughly explored. In this study, we characterized the T cell receptor repertoires of colorectal adenomas and compared quantity and clonality features of tumor-associated T cells across adenoma subtypes. Methods: Thirteen fresh frozen and 17 formalin-fixed paraffin-embedded (FFPE) adenoma samples were collected from 22 Moffitt Cancer Center Total Cancer Care participants, including 8 synchronous lesions from 4 patients. Adenomas were classified into low- and high-risk categories based on American Gastroenterological Association guidelines. T cell receptor complementarity-determining region 3 (CDR3) sequences were determined using the DNA-based immunoSEQ assay (Adaptive Biotechnologies). Relative T cell abundance and clonality were compared across adenomas subtypes using linear regression models adjusted for tissue type, age, and sex. The overlap of CDR3 amino acid sequences across synchronous lesions was also examined to identify common receptors potentially recognizing specific predicted neoantigens. Multiplex immunofluorescence (Vectra 3.0, Perkin Elmer) was conducted on the FFPE adenoma tissues to measure density and location of specific T cell subtypes. Results: High-risk adenomas had significantly lower T cell infiltration compared to low- risk adenomas (RR=0.26, 95%CI=0.13-0.51, P<0.001). High-risk adenomas also had significantly higher clonality values, indicative of a less diverse T cell response (RR=1.74, 95%CI=1.20-2.53, P<0.01). Synchronous lesions had similar T cell repertoires, as demonstrated by the partial overlap in CDR3 amino acid sequences, but no putative tumor neoantigens were identified. Conclusions: To our knowledge, this is the first study to investigate the T cell receptor repertoires of colorectal adenomas. Our findings suggest that low T cell quantity and diversity in the adenoma microenvironment are associated with high-risk histopathological features and that immune-related biomarkers could be used to identify patients who may benefit from more frequent surveillance or novel immunoprevention strategies.

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Shift work and working at night in relation to breast cancer incidence

Sweeney MR, Sandler DP, Niehoff NM, White AJ

Purpose of the study: Several studies have assessed night shift work in relation to breast cancer risk, with inconsistent results; case-control studies have demonstrated a positive association while cohort studies have been largely null. We aimed to assess the association between shift work that disrupts circadian rhythm, which has been classified by the International Agency for Research on Cancer (IARC) as a probable carcinogen in humans, and the risk of breast cancer in a large prospective cohort. Methods: In the prospective Sister Study cohort, current and past occupational history was collected at baseline (2003-2009) for 48,451 participants. We used Cox proportional hazards models to estimate adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for the association between work schedule characteristics (including duration of jobs with rotating shifts with or without nights, any work at night, or working irregular hours) and incident breast cancer. Results: During follow-up (mean=9.1 years), 3,191 incident breast cancer cases were diagnosed. We observed little to no increase in risk associated with work schedule characteristics (ever working rotating shifts: HR=1.04, 95% CI: 0.91-1.20; ever working rotating night shift: HR=1.08, 95% CI: 0.92-1.27; ever working at night: HR=1.01, 95% CI: 0.94-1.10; ever working irregular hours: HR=0.98, 95% CI: 0.91-1.06). While short-term night work (>0 to 5 years vs. never, HR=1.12, 95% CI: 1.00-1.26) and rotating shift work at night (>0 to 5 years vs. never, HR=1.30, 95% CI: 1.05-1.61) were associated with increased breast cancer risk, working nights for more than 5 years was not associated with risk. Conclusions: Overall, we observed little evidence that rotating shift work or work at night was associated with a higher risk of breast cancer, except possibly among those who participated in such work for short durations of time.

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Intratumoral heterogeneity of prognostic multigene signatures for breast cancer

Wilcox AN, Hamilton A, Olsson LT, Kirk EL, Calhoun BC, Geradts J, Sherman ME, Troester MA

Purpose of the study To assess whether clinically-relevant multigene scores are subject to intratumoral heterogeneity. Methods Tumors from 37 patients were assayed repeatedly at different spatial locations, specifically targeting regions that had distinct histological characteristics such as tumor cellularity, differentiation, and inflammation. Using the FFPE block, up to two 1-mm cores were sampled from each histologically distinct region and used for RNA extraction. A pathologist also assessed heterogeneity in mitotic activity and presence of immune infiltration across samples. Gene expression was quantified using a research version of the PAM50 assay, on the Nanostring platform, and the expression data were normalized. Samples were classified for intrinsic subtype (Luminal A, Luminal B, HER2-enriched, or basal-like) and for and risk of recurrence score (ROR-P, high vs.med/low). The Euclidean distances between samples were also calculated across the 50 genes, and compared for samples that were concordant and discordant for each multigene classifier. Results Of the 37 tumors, 11 had samples with discordant PAM50 calls and 7 had samples with discordant ROR-P group, corresponding to 75% and 83% agreement, respectively. The Euclidean distance between paired samples with discordant PAM50 intrinsic subtype or ROR-P score was significantly greater than that among concordant tumors. Samples discordant for ROR-P had more heterogeneity in mitotic activity and immune infiltration, while discordance of PAM50 call was not predicted by heterogeneity of these histological characteristics. Conclusion The high concordance of PAM50 subtype calls and ROR-P, despite oversampling of heterogenous-appearing tumor regions, demonstrates the robustness of the PAM50 classifier for breast cancer tumor intrinsic subtyping. However, a substantial proportion of tumors showed intratumoral heterogeneity, suggesting that assay sampling strategies for histologically heterogeneous tumors merit consideration.

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Incidence of second primary cancer among survivors of gynecologic cancers in the United States: A population-based study

Adjei Boakye E, Osazuwa-Peters N, Grubb L, Ladage H, Lee MJ, Grabosch S

Introduction: With advances in treatment technology, the population of gynecologic cancer (GC) cancer survivors is rapidly growing and are at risk for developing second primary cancers (SPCs). SPCs are the leading causes of morbidity and mortality among GCs survivors. Identifying and targeting at-risk sites through cancer screening and s surveillance may help to guide best practices. We examined the incidence of SPCs a among survivors of GCs and to identify anatomic sites at elevated risks of SPCs. Methods: Using the Surveillance, Epidemiology and End Results (SEER) cancer registries, we identified survivors of GCs (cervical, endometrial, ovary, vaginal, and vulva) between 2000 and 2016. SPC was defined as the first subsequent primary cancer occurring at least 2 months after first cancer diagnosis. SPC risk was quantified by calculating standard incidence ratios (SIRs -- defined as observed to expected cases) and excess absolute risks (EARs -- defined as observed - expected cases) per 1 0 000 person-years at risk (PYR). SIRs and EARs were calculated for all subsequent cancers s stratified by each index cancer site and latency interval. Results: Of 301,210 patients with GCs, 19,005 (6.31%) developed a SPC, which corresponded to an overall SIR of 1.16 (95% CI, 1.15-1.18) and EAR of 17.2 cases per 10,000 PYR compared to that of the general population. All index cancer sites (except ovary) were associated with a significant increase in SPC risk (the SIR ranged from 1.06 to 2.16) with greatest risk among survivors of vulvar cancer (SIR=2.16; 95% CI, 2.06-2.27; EAR=139.5 per 10,000 PYR). Secondary vaginal cancer was the most common SPC among survivors of index cervical, endometrial, ovary, and vulvar. For survivors of index cervical and vulvar cancers, the majority of the second cancers survivors developed were tobacco-related such as lung and bronchus, bladder, and oral c cavity. The increased risk of SPC among survivors was greatest in the first 5 years f following initial diagnosis for cancers except ovary. Conclusions: Survivors of GCs are at an increased risk of subsequent SPCs compared to the general population, particularly in those diagnosed with index vulva cancers. These findings have the potential to inform surveillance recommendations for survivors of GCs.

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Head and neck cancer survivors' views of chronic nutrition impact symptom burden after radiation: a qualitative study

Crowder SL, Najam N, Douglas KG, Sarma KS, Arthur AE

Head and neck cancer (HNC) survivors may face an array of nutrition impact symptoms (NIS) including dysphagia, xerostomia, taste alterations and difficulty chewing that occur as a result of tumor location and treatment with radiation. Few qualitative studies have assessed the chronic impact of NIS on everyday life. The aim of this study was to obtain a comprehensive understanding of the lived experience of chronic NIS burden among HNC survivors. Methods: Between March 2018 and May 2019, semi-structured, face-to-face interviews were conducted among 31 HNC survivors. An interview guide was utilized to consider themes developed based on a review of the literature and the researchers' clinical experience with the HNC population. There were probes within the interview for participants to raise unanticipated issues and flexibility to follow such leads. A single researcher conducted the interviews to maintain consistency in data collection. Interviews lasted approximately 1 hour and were audio recorded. All interview transcripts were professionally transcribed verbatim and checked for accuracy to ensure a complete account of participants' responses. Two researchers independently reviewed all transcripts to identify themes using code-based thematic qualitative content analysis.Results: Four categories of themes emerged from the interview data: symptom presence, dietary preferences, eating adjustments, and addressing symptoms. The most common symptoms were dysphagia, xerostomia, taste alterations and bothered chewing. Survivors avoided citrus fruits, dry foods, raw vegetables, sweets, and meats and preferred soft, moist foods, spices or seasonings, sauces, and gravies. Eating adjustments were described as increased time to consume meals, cutting food into smaller pieces, consuming less food, consuming more fluid, and reporting dietary pattern changes pre-to-post treatment. All survivors experienced one or more chronic NIS and nearly 40% were unaware of the severity of long-term symptoms.Conclusion: The results of this study provide a unique qualitative insight into the lived experience of HNC chronic NIS burden and have relevance for healthcare professionals working in this patient population. HNC survivors may require additional symptom monitoring and man

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Symptom management interventions, costs and health care use among Latinas with breast cancer and their caregivers

Badger TA, Sikorskii A, Segrin C, Givens CW

Objective: To examine the relative cost savings from two telephone symptom management interventions and health service use outcomes for 181 Latinas with breast cancer. Methods: In a randomized controlled trial of an 8-week telephone interpersonal counseling (TIPC) intervention versus an 8-week supportive health education (SHE), data were collected using telephone interviews at baseline, 2-and 4-months. Global symptom distress was measured using the general symptom distress scale. Participant-reported data at month 4 on hospitalizations and urgent care and emergency department (ED) visits in the prior month were analyzed using logistic regression models in relation to trial arm, age, global symptom distress, and health services use in a month prior to baseline. Fixed and variable costs of each intervention were evaluated. Results: Urgent care and ED visits were reduced in SHE versus TIPC, odds ratio (OR)=0.31, 95% confidence interval (CI) (0.12, 0.88), p=.03, as were hospitalizations, OR=0.59, 95% CI (0.26, 1.37), p=.07. Greater global symptom distress at month 2 was associated with greater odds of urgent care and ED visits at month 4, OR per unit of increase (-10) in distress 1.23, 95% CI (1.04, 1.45), p<.01, and hospitalizations OR=1.23, 95% CI (1.03, 1.49), p<.01. The variable cost to deliver SHE to 100 survivors was $17,500 with fixed costs at $4,469. Variable costs to deliver TIPC to 100 survivors was $15,500 with fixed costs $5,472. The cost saving from reduction of ED/urgent care visits rate of 9% (at least 9 visits per 100 survivors) in SHE versus TIPC would range from $1,800 (if all were urgent room visits) to $18,000 (if all were ED visits). The range of total cost savings resulting from urgent care/ED visits is from $800 to $17,000. Cost from reduction of hospitalization rate of 7% (7 per 100 survivors) in SHE versus TIPC would be $14,000. Total cost savings resulting from reduced hospitalizations is approximately $13,000 per 100 survivors. Conclusions: Greater cost of SHE versus TIPC was offset by reductions in the health services use. Reductions in survivor's symptom distress were associated with lower health services use. Based on this evidence, SHE can be a cost-saving solution that may benefit not only survivors, but also the health care system.

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Healthcare utilization patterns among safety-net patients with cancer and multimorbidities

Balasubramanian BA, Jetelina KJ, Obinwa UC, Miller ME, Higashi RT, Lee SC

Purpose: To examine how cancer diagnoses influence healthcare utilization for patients with multiple chronic conditions receiving care in a county safety-net health system. Methods: We conducted a mixed-methods study examining healthcare utilization of patients served by Parkland Health and Hospital System in Dallas County, TX. We used electronic health record data to randomly select 631 cases defined as patients diagnosed with Stage I-III breast or colorectal cancer during 2010 to 2016 AND at least one other chronic condition. Controls, comprised of a random sample of patients with at least two chronic conditions and no history of cancer, were matched to cases on gender and comorbidity risk profile (i.e. Charlson score). Multi-level regression models compared healthcare utilization patterns of cases and controls. Semi- structured interviews (n=20 patients) assessed experiences with healthcare processes and referrals between primary care and specialty care. Transcripts were thematically analyzed in an iterative deductive and inductive coding scheme to identify anticipated and emergent findings. Results: After adjusting for comorbidity risk profile scores, cases had significantly lower number of encounters with the health system compared to controls (N=46,960 vs. 146,229). Both quantitative and qualitative findings indicated that cases were more likely to visit oncology and less likely to visit primary care (IRR=0.18; 95% CI: 0.16, 0.20) and the emergency department (IRR=0.15; 95% CI: 0.13, 0.18) compared to controls. Cancer patients were more likely to complete an appointment (AOR=4.83; 95% CI: 4.32, 5.39) compared to controls. Interviewed cases indicated a pattern of not seeking primary care appointments for various reasons, including not understanding the purpose of primary care visits as they received urgent services in oncology for chronic conditions. Conclusions: Health systems need to find innovative, effective solutions to increase primary care utilization among cancer patients with chronic care conditions. Oncology is not the ideal location for these services, as it is an inefficient use of resources. Further, care quality measures for chronic conditions may be inadequately addressed, ultimately impacting the long-term survival of cancer patients.

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A pilot intervention to understand primary care physicians' perspectives towards survivorship care in order to improve communication between primary care and oncology

Ehsani S, Hsu P, Algotar A

Purpose of the study: With number of cancer survivors projected to increase to 20.3 million by 2026, there is increasing need for improved communication between oncologists and primary care providers (PCPs) to manage the needs of cancer survivors. Survivorship care plan (SCP), is a tool for communication between oncology and primary care. A mixed methods approach was used to assess the knowledge base of PCPs and their staff regarding SCP, to evaluate the effect of a brief presentation and to understand primary care perspective towards improving communication between oncology and PCPs. Methods: A brief, in-person presentation followed by open discussion was conducted by the study team with residents as well as faculty in family and internal medicine departments. Pre and post intervention surveys were conducted to assess baseline knowledge and the effect of the intervention. These surveys included closed and open-ended questions. Results: A total of 96 individuals were surveyed (77 providers and 19 staff). In the pre-intervention survey, 63% of providers indicated they had never received an SCP and 31% indicated they did not know what an SCP was. The proportion of participants providing correct answers to questions in the pre-survey asking them about appropriate content and recipients of the SCP were 62.3% and 59.7% respectively. Comparative proportions of the same questions in the post surveys were 94.3% and 84.3%, demonstrating an effect size of 32% and 27.6% respectively. Response to open ended questions could be classified in three groups: 1) To extend direct communication between oncology and primary care to increase awareness, 2) SCP to be tailored to the provider and 3) To utilize the capacities of the electronic medical record system to improve communication between oncology and primary care. Conclusions: There is lack of awareness among primary care providers regarding the role of survivorship care plans. PCPs are keen to improve communication with oncology in order to optimize survivorship care.

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Psychological Distress and Immune Alterations in Patients with Indolent B-cell-derived Neoplasms

Fang CY, MacFarlane AW, Svoboda J, Cohen AD, Khan N, Barta S, Handorf EA, Fung HC, Nasta SD, Landsburg D, Fisher RI, Vogl DT, Garfall AL, LaRatta N, Campbell KS

Purpose: Some subtypes of leukemias, lymphomas, and myelomas are slow-growing a and can be clinically managed with surveillance until symptoms emerge; however, many p patients report elevated levels of distress and worry during the surveillance phase. P Psychological distress may have clinical implications given that natural killer (NK) and T c cells are not only sensitive to distress, but also critical in controlling disease progression. T Thus, the purpose of this study was to examine associations between psychological and i immune factors in patients with indolent blood cell cancer being managed with s surveillance. Methods: 227 patients diagnosed with low-grade B-cell-derived neoplasms not requiring immediate therapy were enrolled. At study entry, participants completed the Hospital Anxiety and Depression Scale (HADS) and provided a blood sample for immune phenotyping using multiparametric flow cytometry (up to 12-color). Biomarkers of a activation, viability, proliferation, and exhaustion were assessed on subsets of T, NK, and m myeloid cells, and the percentage of cells staining for individual biomarkers were d determined. Immunophenotyping has been completed for the first 115 patients enrolled ((62 males; mean age = 64.3 years) and are presented below. Results: Spearman correlation analyses revealed that higher levels of anxiety and depressive symptoms were associated with greater % of classical (CD14++CD16-) monocytes, the subgroup that produces IL-6, IL-8, and IL-10, is highly phagocytic, and expresses proliferative/anti-apoptotic genes ($p < 0.02$); but negatively associated with % of non-classical (CD14+CD16+) monocytes, the subgroup that produces TNF-alpha and IL-1beta, exhibits “patrolling” behavior and has anti-proliferative/pro-apoptotic properties (($p < 0.01$). Higher anxiety and depressive symptoms were also associated with lower NK c cell viability in blood ($p \leqslant 0.04$). Conclusion: In patients with indolent blood cell cancer, psychological distress is associated with altered immune function, notably differential patterns of monocyte distribution and greater susceptibility of NK cells to activation-induced apoptosis. These findings may have direct translational relevance and enable the early identification of patients at-risk for disease progression and poor outcomes.

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Formative Research to Inform Smoking Cessation Initiatives in an urban Cancer Center

Klassen AC, Leader A, Perera U

Purpose: Smoking increases risk for poor outcomes in most cancers, and diagnosis can increase the salience of cessation for patients who smoke. Although evidence-based approaches to cessation services such as the Five As (Ask, Advise, Assess, Assist, and Arrange) require modest clinician time and effort, many cancer patients do not receive cessation support consistently throughout survivorship. The goal of this formative research was to inform a comprehensive cessation approach within an NCI-designated cancer center in Philadelphia, a city with one of the highest tobacco addiction rates in the U.S. Methods: We are conducting 25-30 in-depth interviews with purposive samples of cancer care clinicians and other center stakeholders, and with current cancer patients who smoke. Audio-recordings are transcribed verbatim and thematically analyzed, with initial findings informing subsequent sampling and interview content, as well as emerging thematic saturation. Results: Most patients report at least initial discussions with clinicians about cessation, but not all have been told its direct benefit for survival. Although the majority wish to quit, few have been offered or followed through on referrals to cessation services. Most have attempted reduction strategies, and describe varied preferences for pharmacotherapies, counselling modalities, and interest in exploring complementary strategies during cessation treatment, including mindfulness, exercise, and nutrition. Clinicians report attempting persuasive strategies to address cessation with their patients, but none know evidence-based strategies, such as the 5 As, and most have low self-efficacy regarding the impact of their efforts. All welcome, in principle, a more comprehensive approach to cessation for the cancer center. However, using the 5As at each visit felt too time-consuming, and tracking through the EMR was seen as problematic. Conclusions: From a predisposing-enabling-reinforcing framework, both patients and clinicians are predisposed to support cessation after cancer diagnosis. However, enabling via clinician training as well as reinforcing infrastructure are needed to change provider behavior during clinical visits, to improve use of evidence-based cessation approaches throughout survivorship.

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Social isolation, social support, and treatment delays in breast cancer patients treated within an integrated health care system

Kroenke CH, Stewart A, Kwan ML, Gomez SL, Ergas IJ, Roh J, Kolevska T, Lee M, Kushi LH

Purpose: Women diagnosed with breast cancer (BC) with greater social support have b better survival but its relation to suboptimal treatment is unclear. We evaluated a associations of social support and delays to initial surgery or to adjuvant chemotherapy in P Pathways a large, BC cohort from Kaiser Permanente Northern California (KPNC). Methods: 4,056 women were diagnosed with stages I-IV BC from 2005-2013, had s surgery <1 year after diagnosis, and responded to questions about social integration ((Kroenke, 2013), personal support using the Medical Outcomes Study Social Support s survey, and clinician support from the Interpersonal Processes of Care survey a approximately two months following diagnosis. The analysis of chemotherapy delays i included a subset of patients who received adjuvant chemotherapy (N=1,721). Time to s surgery was defined from the date of diagnosis to the date of definitive surgery. Time to c chemotherapy was defined from the date of diagnosis or definitive surgery to the date of c chemotherapy initiation. We used logistic regression to evaluate associations with >30 d day surgery delays and >90 day (from diagnosis) or >60 day (from surgery) c chemotherapy delays and linear regression to evaluate associations with continuous o outcomes. Results: Twenty-five percent had surgery delays and 18% had chemotherapy delays (26% from surgery date) from time of diagnosis. Women in the lowest tertile of personal social support had greater surgery (OR=1.35, 95% CI: 1.11-1.63, p-continuous=0.003) and chemotherapy (OR=1.49, 95% CI: 1.08-2.04, p-continuous=0.04) delays compared to women in the highest tertile. Women with low clinician support had greater surgery (OR=1.28, 95% CI: 1.06-1.55, p-continuous=0.0006) but not chemotherapy (p-continuous=0.73) delays. We noted suggestive, nonsignificant associations of social integration with delays. Women in the lowest tertiles of all three sources of support had a two-fold (OR=1.96, 95% CI: 1.30-2.95) higher odds of surgery delays (p-value, test for three-way interaction=0.08). Associations with chemotherapy delays from the time of d diagnosis were qualitatively similar but we noted no significant associations when delays w were measured from the date of surgery. Conclusion: Women with low social support had greater treatment delays.

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Association between daily physical functioning and accelerometer-measured physical activity in colon cancer patients: An ecological momentary assessment study

Liao Y, Robertson M, Demark-Wahnefried W, Peterson S, Basen-Engquist K

Purpose of the study: To test if daily self-reported physical functioning is associated with device-measured physical activity in a sample of colon cancer patients' daily lives. Methods: This study analyzed data from a pilot study arm as part of the Cyberinfrastructure for Comparative Effectiveness Research (CYCORE) feasibility trial, which recruited colorectal cancer patients (stage I-IV) for two bursts of 5-day monitoring of ecological momentary assessment (EMA) and accelerometer wear. This study used data from the evening EMA surveys that asked questions about physical functioning. These included 10 items adapted from a quality-of-life measure (SF-36) that asked "Today, how much did your health limit you in…" A summary score was calculated based on the SF-36 scoring rules with a range from 0 to 100. Actigraph data was processed to estimate daily minutes in moderate-to-vigorous physical activity (MVPA). Multilevel linear regression models were conducted to test the between-subject (BS) and within-subject (WS) associations between daily physical functioning scores and total MVPA minutes. Results: A total of 48 colon cancer patients enrolled in the pilot study arm. Of them, 39 had at least one completed EMA evening survey during the monitoring period. Three out of the 39 patients did not have any valid accelerometer data. Thus, 36 patients were included in the current analysis. They were 50% female, 78% white, and average age was 54 years old (ranged 25-70, SD=11.5). Patients on average had 5 days of EMA- accelerometer matched data (ranged 1-10, SD=2.8). Their average physical functioning score was 84 (ranged 29-100, SD=18) and average daily MVPA minutes was 42 (ranged 0-159, SD=38.2). A positive association was found between physical functioning and MVPA minutes at the BS level (β=0.15, p=0.04). There was no significant association at the WS level. Conclusion: Colon cancer patients' physical functioning was not associated with that day's device-measured physical activity. However, patients who generally engaged in more MVPA than others reported better physical functioning. Remote monitoring tools such as EMA and accelerometry provide us opportunity to investigate dynamic associations in cancer patients' behavioral performance and outcomes in their daily lives.

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Sulindac Improves Stiffness and Quality of Life in Women Taking Aromatase Inhibitors for Breast Cancer

Martinez JA, Stopeck AT, Wertheim BC, Roe DJ, Chalasani P, Chow HHS, Thompson PA

a. Purpose: The purpose of this study was to evaluate the effect of sulindac, a non-selective, non-steroidal anti-inflammatory drug (NSAID), on aromatase inhibitor–associated arthralgia (AIA) and quality of life in breast cancer patients. b. Methods: As a feasibility study, a total of 101 breast cancer patients stable on AI therapy were non-randomly enrolled to an open-label phase 2 clinical trial of sulindac 150 mg BID (n=51) or observation (n=50) for 12 months. Arthralgia, physical function, and pain measures were derived from the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) index and Brief Pain Inventory Short Form (BPI-SF). Quality of life was assessed using the Functional Assessment of Cancer Therapy – General form (FACT-G). Linear mixed models adjusted for age at baseline, BMI, time on AI, and use of pain medication were used to estimate the change in each outcome for each arm separately. c. Results: Sulindac use for 12 months was associated with a significant decrease in mean Total WOMAC score (-129.5: 95% CI [-228.5, -30.5]; $P = 0.010$), and Stiffness (-20.3: 95% CI [-31.6, -8.9]; $P < 0.001$) and Physical Function subscales (-87.2: 95% CI [-158.6, -15.8]; $P = 0.017$), with a non-significant decrease in the WOMAC Pain subscale (-22.6: 95% CI [-50.1, -5.0]; $P = 0.108$) and no change in BPI-SF Worst Pain, Severity, or Interference. Sensitivity analysis supported stronger benefit in patients reporting higher baseline pain, physical dysfunction, and stiffness symptoms. With regard to quality of life, there was a significant mean increase in the Fact-G Total score (3.1: 95% CI [0.2, 5.9]; $P = 0.035$). In a sensitivity analysis, patients with lower baseline scores showed the greatest improvements in the FACT-G Total score and all four subscales (all $P < 0.05$). In contrast, observation-arm participants reported no change in WOMAC, BPI-SF, or FACT-G scales over 12 months. d. Conclusions: While NSAIDs are frequently used to manage AIA in clinical practice, this is the first study to provide evidence demonstrating that sulindac at 150 mg BID improves AIA symptoms with positive effects on quality of life. Randomized trials are needed to determine the optimal NSAID dosing to reduce AIA symptoms and improve AI adherence.

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Does age influence self-reported symptom burden and in turn modify sedentary time in ovarian cancer survivors?

McElfresh JJ, Skiba MB, Crane TE, Thomson CA

Purpose The purpose of this study is to evaluate the relationship between age and affective symptoms (fatigue, distress, sadness) and the association with sedentary time in women participating in the Lifestyle Intervention for oVarian Cancer Enhanced Survival [(LIvES)- GOG/NRG 0225]. Methods Self-reported baseline affective symptom severity (N= 499) and interference (N= 165; 0- 10; mean score of symptom interference from all symptoms with mood, relations with other people, and enjoyment of life) were collected using the MD Anderson Symptom Inventory from ovarian cancer survivors participating in the LIVES study. Sedentary time (hours/day) was estimated from and the Arizona Physical Activity Questionnaire (N= 1133). Total symptom severity, affective symptom severity and affective symptom interference were compared between survivors <65 and $\geqslant 65$ years of age using 2-sided t- tests. Adjusted linear regression models were used to evaluate symptom constructs with sedentary time by age. Results The mean age of ovarian cancer survivors in the study was 59.8 y; 32.9% were $\geqslant 65$ y. Total symptom severity was significantly lower in survivors $\geqslant 65$ years of age (mean: 1.15 ± 0.86, $p= 0.002$) when compared to those <65 years. Affective symptom severity also differed by age (mean: 2.05 ± 1.80, $p= 0.02$). However, no difference in affective symptom interference by age group was demonstrated ($p= 0.09$). Total symptom severity and affective symptom interference were not associated with sedentary time overall nor by age group of survivors. However, among survivors <65 years of age, affective symptom severity was associated with higher sedentary time ($\beta= 0.32$, 95% CI= 0.06-0.58, $p= 0.018$); the same was not observed for survivors $\geqslant 65$ years. Conclusions Key findings from this study include that younger survivors carry a higher total symptom burden and affective symptom burden than older survivors. Age is therefore an important factor when evaluating symptom burden. Additional research is needed to more robustly evaluate the impact of age on symptom burden in ovarian cancer survivors.

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Neighborhood Social Capital and Distance from Facility Predict Consenting to Participate in a Clinical Trial among Cancer Patients

McIntire R, Keith S, Nowlan T, Butt S, Cambareri K, Chandrasekar T, Kelly WK, Leader A

Purpose: This study identified demographic, clinical, geographic, and neighborhood predictors of consenting to trial participation among cancer patients in an urban cancer center. Methods: We selected all patients with new diagnoses of cancer during 2015-2017 from an institutional cancer registry. We linked patient demographics and clinical data to information on trials participation. We geocoded patient addresses, limited the dataset to patients that resided in Philadelphia (N=3254), and joined an index describing patients' neighborhood-level social capital. We calculated driving distance between each patients' residence and the cancer center. We used generalized linear mixed effects conditional logistic regression models to identify the individual and neighborhood correlates of consenting to participate in a clinical trial. Results: Compared to patients under age 50, those 50-69 had higher odds of consenting to a clinical trial (AOR=1.42) while patients age 80+ had lower odds of consenting (AOR=0.36). Non-Hispanic (NH) Asian patients had lower odds of consenting compared to NH-Whites (AOR=0.51). Compared to patients with other solid tumor cancer types, those with breast cancer had nearly a 4-fold higher odds of consenting (AOR=3.87) and those with hematologic cancer had 2-fold higher odds of consenting (AOR=2.12). Compared to patients with local stage cancer, those with regional stage cancer had higher odds of consenting (AOR=1.79). Interestingly, each kilometer of driving distance from a patient's residence to the trials facility was associated with a 4% increase in odds of consenting (AOR=1.04). Compared to patients who live in neighborhoods in the lowest quartile of our sample's social capital index, those in the 2nd quartile had a 35% higher odds of consenting (AOR=1.35) and those in the highest quartile had a 50% higher odds of consenting (AOR=1.50). Conclusions: We found geographic and neighborhood-level predictors of consenting to clinical trials among cancer patients. Residential distance from the cancer center was inversely related to consenting to trials. Patients living in neighborhoods with higher social capital had higher odds of consenting. These results can inform cancer center programs to improve patient participation in clinical trials

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Risk and protective factors of tobacco, alcohol, and marijuana use among young adult childhood cancer survivors: a longitudinal study

Cappelli C, Miller KA, Ritt-Olson A, Salahpour S, Pentz MA, Milam JE

Purpose The current investigation sought to examine prospective changes in substance use during young adulthood among a cohort of childhood cancer survivors (CCS). Methods: Participants included a sample of 127 CCS (57% were Hispanic, 55% female, average age at diagnosis 12.4 yrs) who participated in the Project Forward pilot study and a subsequent expanded Project Forward cohort study. Cases were identified from the Los Angeles Cancer Surveillance Program and were diagnosed with any cancer type (except Hodgkin lymphoma) at two large pediatric medical centers in Los Angeles County between 2000 and 2007, between the age of 0-18 at diagnosis, and at least two years from diagnosis. Measures assessing cancer treatment intensity, depressive symptoms, survivorship clinic attendances, and prior 30-day binge drinking of alcohol, marijuana use, and cigarette/tobacco use were completed between 2007-2009 at baseline/Time 1 (T1), with follow-up/Time 2 (T2) surveys completed between 2015-2018. Mean age at T2 was 24.9 yrs. Results: Rates of 30-day use increased over time for binge drinking of alcohol (from 25% to 38%), marijuana (from 11% to 23%), and cigarette/tobacco (from 7% to 8%). After adjusting for T1 substance use, depressive symptoms and survivorship clinic attendance (at T1) were not associated with any T2 substance use. T1 Marijuana use and T1 cigarette use were significantly association with T2 Marijuana and cigarette use, respectively. T1 binge drinking was not associated with T2 binge drinking. Receipt of more intensive cancer treatment was protective for tobacco use over time, but not associated with the other substances. Conclusions: As CCS mature into adulthood, their substance use increases which may compound the risk for treatment-related late effects. Greater health education efforts among CCS on potential risks associated with tobacco, alcohol and marijuana use are needed in this at-risk population.

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Survivorship Care Plan Use, Preferences, and Barriers among Asian American Breast Cancer Survivors: An Integrative Review

Nolan TS, Arthur EK, Wills A, Kue J

Purpose: Cancer is the leading cause in death among Asian American women, who are part of the fastest growing racial or ethnic group in the United States. Those surviving cancer, like others, require follow-up for surveillance and management of cancer and treatment sequelae. The survivorship care plan (SCP) is an individualized document containing information on cancer diagnosis, treatment, surveillance, and health promotion recommendations. It is endorsed that every cancer survivor receive and be educated on the contents of the SCP. This integrated review examines the extant literature to understand use, preferences, and barriers to delivery of SCPs among Asian American women. Methods: In May 2019, two independent reviewers searched PubMed, PsycINFO, Cumulative Index to Nursing and Allied Health Literature, and EMBASE for articles containing data related to Asian American women diagnosed with breast or cervical cancers and survivorship care plans. The search yielded 416 unique titles and abstracts that were reviewed. Forty-one received a full-text review, of which 10 were selected for inclusion and quality appraisal. Results: There was little evidence surrounding utilization of the SCPs among Asian American women. Articles identified only addressed breast cancer survivorship, predominately using samples of Southeast Asian descent. Asian American breast cancer survivors reported preferences surrounding their survivorship needs including practicing culturally-sensitivity (e.g., language and communication styles), address of psychosocial needs along with physical concerns, and integration of alternative/complementary therapies and spirituality into care. Barriers to delivery of the SCP were low acculturation, socioeconomic status, and access to resources. Conclusion: There is a paucity of information guiding evidence-based delivery of SCPs in the vastly heterogeneous population of Asian American cancer survivors. More research is needed to examine the impact of SCPs on cancer survivorship outcomes and to guide high-quality cancer survivorship care to these women.

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Cognitively-Based Compassion Training to Improve Health-Related Quality of Life in Solid Tumor Cancer Survivors and Their Informal Caregivers: Findings from a Pilot Randomized Trial

Pace TWW, Dodds S, Sikorskii A, Badger TA, Segrin C, Negi LT, Harrison T, Crane TE

PURPOSE OF THE STUDY: Cancer survivors and their informal caregivers (ICs)(i.e., family members or friends) often experience health-related quality of life (HRQOL) impairments after primary cancer treatment including psychological distress, fatigue, and feelings of social isolation. The goal of this pilot trial was to promote well-being in dyads consisting of solid tumor cancer survivors and ICs with an 8-week compassion meditation-based intervention called CBCT® (Cognitively-Based Compassion Training). We expected that CBCT would improve HRQOL in both solid tumor cancer survivors and ICs. METHODS: Dyads (N = 31) included solid tumor survivors within 10 years of completing primary treatments (chemotherapy, radiation, surgery) and ICs, with at least one dyad member with mild depression or anxiety symptoms (determined by Patient Reported Outcomes Measurement Information System [PROMIS] 4a short forms). Dyads were randomized 1:1 to either CBCT or an 8-week active attention control (cancer health education, CHE). We used PROMIS 8a forms to assess depression and anxiety, the Positive and Negative Affect Scale to assess positive and negative affect, and the Quality of Life Index (QLI) to assess HRQOL. General linear models related post-intervention outcomes to trial arm, and outcomes at baseline were used to estimate the adjusted effects sizes (ES) for the differences between trial arms. Effect sizes exceeding 0.33 are often deemed clinically significant. RESULTS: Among survivors (mean age 63, standard deviation 11, 87% female), post-intervention improvements were seen in depression (ES=0.74), anxiety (ES=0.46), positive affect (ES=0.72), and QLI (ES=0.44). Among caregivers (mean age 64, standard deviation 12, 58% female, 42% spouses or partners of the survivor), post- intervention improvements were seen in anxiety (ES=0.45) and negative affect (ES=0.42). CONCLUSIONS: CBCT exhibited preliminary evidence of efficacy versus CHE to improve HRQOL in survivors and ICs. This pilot trial informs future definitive trials to assess the benefits of CBCT for HRQOL among dyads.

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Health-Related Quality of Life Outcomes Among Breast Cancer Survivors

Park J, Rodriguez JL, Nichols HB, Hodgson ME, O'Brien K, Weinberg CR, Sandler DP

Purpose: Our study aims to (1) describe physical and mental health-related quality of life (HRQOL) in a large sample of U.S. female breast cancer survivors, (2) identify associations between HRQOL and breast cancer clinical characteristics, prognostic factors, and initial treatment characteristics, and (3) evaluate associations between poor HRQOL after diagnosis and total mortality. Methods: Female breast cancer survivors (n= 2,401) who were ⩾1 year post-diagnosis and responded to a Survivorship Survey in 2012 were identified from the Sisters Study. Physical and mental HRQOL were assessed using the 10-item PROMIS global short form. Scores were transformed to T-score distributions with a mean of 50 and a standard deviation of 10. T-scores <40 were defined as poor functioning. Multivariable logistic regression was used to assess predictors associated with poor HRQOL. Cox regression was used to assess the association between HRQOL and mortality. Results: Overall, 5.0% of breast cancer survivors reported both poor physical and mental HRQOL (6.2% reported poor physical HRQOL alone and 5.9% reported poor mental HRQOL alone). Women with higher Charlson Comorbidity Index scores had increased odds of poor physical HRQOL (1 vs. 0; Odds Ratio [OR]=2.66, 95% CI=1.95, 3.62 and ⩾2 vs. 0; OR=9.23; 95% CI=6.20, 13.74, respectively). Women who underwent breast reconstruction had a better physical HRQOL compared to women who did not (OR=0.87; 95% CI=0.61, 1.24); however, the result was not statistically significant. Dissatisfaction with reconstruction or experiencing surgery complications were associated with poor physical HRQOL (OR=2.66; 95% CI=1.57, 4.51 and OR=1.93; 95% CI=1.41, 2.66). During follow-up (mean 3.9 years), 88 deaths were identified. Both poor physical and mental HRQOL were independent predictors of mortality outcomes (HR=2.36; 95% CI=1.43, 3.90 and HR=1.92; 95% CI=1.16, 3.20) after adjusting for age at diagnosis, time since diagnosis, prognostic factors, and comorbidity. Conclusions: Prognostic and cancer-treatment related factors impact HRQOL in breast cancer survivors and may inform targeted survivorship care. PROMIS global health measures may offer additional insights to patients' well-being and mortality risk profiles.

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Association of breast cancer risk factors and clinical characteristics with risk of contralateral breast cancer in postmenopausal breast cancer survivors in the NIH-AARP Diet and Health Study

Ramin C, Mullooly M, Schonfeld SJ, Advani, PG, Bodelon C, Gierach GL, Berrington de Gonzalez A

Purpose of the study: Approximately 5% of breast cancer survivors, aged 50 years or older, will develop a contralateral breast cancer (CBC) within 10 years after a breast cancer diagnosis. It is unknown whether pre- diagnostic lifestyle and reproductive factors, and to what extent clinical characteristics of the first breast cancer, are associated with the development of CBC in older postmenopausal women. Methods: We identified 11,267 postmenopausal women diagnosed with a first primary breast cancer (81% invasive; mean age=69 years) between 1995-2011 in the NIH-AARP Diet and Health Study. CBC was defined as a second primary breast cancer diagnosed in the opposite (contralateral) breast at least 3 months after the first breast cancer diagnosis. Exposures included pre-diagnostic lifestyle (body mass index, physical activity, smoking status, alcohol consumption) and reproductive factors (age at menarche, reproductive behavior, menopausal hormone use, age at menopause), and clinical characteristics of the first breast cancer (age at diagnosis, year of diagnosis, stage, grade, hormone receptor status, and initial treatment [radiation, chemotherapy, and endocrine therapy]). We used multivariable Cox proportional hazards regression to calculate hazard ratios (HRs) and 95% confidence intervals (CIs) adjusting for breast cancer risk factors and clinical characteristics for the first breast cancer. Results: During 6.4 median years of follow-up, 442 women developed CBC (72% invasive). An increasing trend in CBC risk by age at diagnosis (p-trend=0.01) and a decreasing trend in CBC risk by year of diagnosis (p-trend=0.001) were observed. Women who received endocrine therapy had a 33% lower risk of CBC compared to women without endocrine therapy (HR=0.67, 95% CI=0.52-0.86). No associations between lifestyle and reproductive factors and CBC risk were found. Similar patterns of association were observed when analyses were restricted to women with invasive first breast cancers. Conclusions: Clinical characteristics for the first breast cancer – independent of pre-diagnostic lifestyle and reproductive factors- were the strongest risk factors for CBC in this population of older postmenopausal breast cancer survivors.

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HPV vaccine attitudes and practices among pediatric oncologists: a national survey

Shay LA, Griimes A, Embry L

Purpose: Compared to the U.S. general population, childhood cancer survivors (CCS) are at increased risk of human papilloma virus (HPV)-related cancers, yet are under-vaccinated. Many CCS do not transition back to a pediatrician or primary care physician for preventive care after cancer treatment, but instead continue to see their oncologist for ongoing care. The aim of this study was to determine HPV vaccine practices and attitudes among U.S. pediatric oncologists. Methods: We conducted an emailed, online survey of pediatric oncologists. Physician email addresses were identified from a paid dataset (SK&A) from IQVIA. Surveys were administered through REDCap. Results: 195 pediatric oncologists completed the survey. Less than half offered on-site administration of the HPV vaccine (43%) as compared to 99% for flu, 69% for meningococcal, and 56% for Tdap. Of the 106 physicians who reported not having on-site HPV vaccine, 59% said they would be interested in adding this to their practice, 24% were not interested, and 17% were not sure. In open ended-responses among those who were not interested in adding it to their practices, the most common rationale was that HPV vaccine is available from primary care physicians in the community. Other barriers included perceived cost and time and lack of nursing staff for vaccine administration. Only 38% of pediatric oncologists agreed that childhood cancer survivors are at a greater risk of developing HPV-related cancers than the general population. However, 57% of participants stated that they would like additional training around HPV and effective HPV vaccine communication. Conclusions: Despite the increased vulnerability of CCS to secondary HPV-related cancers, this population has largely been neglected in the research, education, and large-scale HPV vaccine initiatives. Our results indicate that most pediatric oncologists do not offer the HPV-vaccine on-site and that their knowledge of the increased risk among CCS is lacking. With the rising incidence of HPV-related cancers, low uptake of HPV vaccination, and increased susceptibility of CCS to HPV-related disease, targeting this population within the oncology follow-up setting is both novel and risk-directed.

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Responsive Engagement and Cessation in Cancer Health (REACCH): Preliminary Results of a Nurse Navigator Led Tobacco Cessation Program

Crane TE, Slack SD, High E, Garland L, Soto J, Alvarez AA, Houston YM, Thomson CA, Gordon JS

Purpose of the study: To present the preliminary findings of an oncology nurse navigator led tobacco cessation program implemented as part of the National Cancer Institute's Comprehensive Cancer Center Initiative. Methods: In January 2019, after gathering stakeholder requirements through environmental scans, focus groups and interviews, the Responsive Engagement and C essation in Cancer Health (REACCH) program launched at the University of Arizona Cancer Center (UACC). All new patients at the UACC meet with an oncology nurse navigator and undergo assessment of tobacco use. Patients reporting tobacco use are referred to the REACCH program tobacco treatment specialist (TTS) as part of their cancer treatment. The TTS meets with patients (in-person or by phone) and designs an individualized tobacco cessation program which may include nicotine replacement therapy (NRT), counseling sessions, text messaging and/or cessation applications. Patients are enrolled for up to 90 days quit and may re-enroll anytime. Follow-up data on tobacco use are collected by telephone at 6 months. Results: Since program launch, 212 referrals have been made to REACCH with 98.5% of all new patients screened for tobacco use. Over 89% of referrals were received from the oncology nurse navigator team with the majority of referrals from hepatobiliary, thoracic, hematology oncology, head and neck clinics, respectively. The mean age of patients is 59.8 (23-83) years, 60% are male and 95% are non-Hispanic whites. Of the 212 referrals, 78% (n=166) received some form of tobacco cessation treatment; 25% receiving NRT and more than 60% engaging in at least one counseling session and 33% receiving 2 or more counseling sessions. Conclusions: With the oncology nurse navigator team, all patients are assessed for tobacco use and referred to the REACCH program as part of their cancer treatment. This model may be useful for implementation of a tobacco cessation program at other cancer centers.

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Association of Provider Type and Receipt of Preventive Health Services Among Women Who Received Genetic Testing for Breast Cancer Risk Assessment in The Health of Women (HOW) Study®

Roberts MC, Srinivasan S, Klein W, Samimi G, Minasian L, Loud J, Silver MI

Purpose: To examine the association between the type of provider (genetic counselor (GC) vs. primary care (PCP) vs. others) who reported genetic test results related to hereditary breast and ovarian cancer and the uptake of related preventive health services. Methods: The Health of Women (HOW) Study® is an online study of ~55,000 individuals that aims to better understand the causes of breast cancer. 4585 women from this study, who had received a genetic test for breast cancer risk assessment, and had completed baseline and family history questionnaires were included in our study sample. Logistic regression was used to examine the association of provider type with receipt of prophylactic (1) mastectomy, (2) oophorectomy, and (3) guideline-concordant mammography for high-risk women, defined according to 2015 NCCN guidelines. Ordered logistic regression was used to examine the association of provider type with (1) age at initiation, and (2) frequency of mammography. Results: The rate of guideline-concordant mammography in the high-risk sample was 68.62% (n=3426), and receiving test results from a PCP was associated with higher odds of receiving guideline-concordant mammography than receiving results from a GC (OR 1.46, 95% CI 0.90-2.43); however, this finding was not statistically significant. Similarly, receiving genetic test results from a PCP was not significantly associated with receiving a mastectomy (OR 0.84, 95% CI 0.53-1.28) or initiating mammography at an earlier age (OR 0.87, 95% CI 0.61-1.25). Finally, receiving genetic test results from a PCP was not significantly associated with receiving oophorectomy (OR 1.32, 95% CI 0.81-2.08) or of receiving routine mammography at a greater frequency (OR 1.18, 95% CI 0.77-1.84). Conclusions: We found no statistically significant association between provider type and uptake of preventive health services, including receipt of prophylactic surgery and dimensions of routine mammography, suggesting that providers may be equally able to able to connect patients to preventive health services. However, about one third of women with a high risk of breast cancer did not receive guideline-concordant mammography, suggesting a need for future work to optimize the uptake of guideline-concordant screening among high-risk wom

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Does colorectal cancer site influence stress, QoL, and sleep?

Ton M, Labadie JD, Malen RC, Phipps AI, Hua X, Lozano-Esparza S, Burnett-Hartman AN, Newcomb PA

Purpose: Understanding quality of life (QoL), stress, and sleep quality among colorectal cancer (CRC) patients could contribute to improved survivorship care. Methods: We ascertained QoL, stress, and sleep quality within an ongoing population-based study of 1,451 CRC patients identified through the Puget Sound SEER cancer registry. We assessed QoL as physical, social, emotional, and functional well-being using the standardized 36-item Functional Assessment of Cancer Therapy: Colorectal Cancer (FACT-C). We assessed stress and sleep quality using the standardized Perceived Stress Score (PSS-10) and components of the Pittsburg Sleep Quality Index, respectively. Differences in QoL, stress, and sleep quality by CRC site were analyzed using chi-square and ANOVA tests. We used logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the association of tumor site (rectal vs. colon) with QoL score (higher vs. lowest quartile), stress (moderate/high vs. low), and sleep quality. ORs were adjusted for sex, age at diagnosis, education level, and cancer stage. Results: 37% of study participants (N=543) had rectal cancer compared to 63% (N=908) with colon cancer. The study participants were diagnosed with localized (37%), regional (43%), and distant (18%) cancer stage. Participants with rectal (vs. colon) cancer were more likely to have low FACT-C (OR [CI]: 1.46 [1.13-1.88]), as well as low individual physical, emotional, functional, and CRC-related well-being scores. Compared to colon cancer cases, rectal cancer cases reported trouble sleeping due to getting up to use the bathroom (OR [CI]: 1.52 [1.19-1.94]) and pain (OR [CI]: 1.51 [1.11-2.06]). There were no significant differences between rectal and colon cancer cases in terms of social well-being scores (FACT-C component), perceived stress, amount of sleep, and other sleep issues. Conclusions: Overall, rectal cancer patients had poorer QoL and sleep quality, and higher perceived stress compared to colon cancer patients. This suggests that survivorship care may be adapted according to CRC site to ensure patients receive appropriate support.

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Cardiovascular Health Assessment in the Oncology Setting: Perceptions and Knowledge of Cardiovascular Risk Factors among Breast Cancer Survivors

Weaver KE, Klepin HD, Wells BJ, Dressler AV, Winkfield KM, Hundley WG, Davidson EC, Lopetegui M, Foraker RE

Purpose: Our team adapted an electronic health record cardiovascular health (CVH) data visualization application, initially developed for primary care, for use in survivorship care. We evaluated the Automated Heart-Health Application (AH-HA) and assessed change in breast cancer survivors' knowledge of CVH pre- and post-use of the tool and concordance of self-reported and EHR-reported CVH risk factors. Methods: Post-treatment breast cancer survivors (n=49) completed a survey pre- and post-use of AH-HA to assess CVH perceptions, defined as: 1) confidence in understanding risk of heart disease, 2) understanding steps needed to improve CVH, and 3) perception that heart disease poses a risk to health. Items were assessed on a 5-point Likert scale from strongly disagree (1) to strongly agree (5). The pre-survey also assessed knowledge of four CVH factors [weight/height for body mass index (BMI), blood pressure, total cholesterol, and hemoglobin A1c/fasting glucose]. Survivors reported factors as "high" (poor), "somewhat high" (intermediate), or "normal" (ideal). Self-reported values were compared to EHR-abstracted values to calculate percent agreement, in accordance with American Heart Association Simple 7 Guidelines. Results: Enrolled survivors (84% White, 8% Black; 4% Hispanic) were on average 64 years old and 11 years post-diagnosis. Ninety-two percent had early-stage cancers. Prior to viewing the tool, 24% of survivors expressed strong agreement that they understood their risk of CV disease; 58% agreed. Yet, 65% reported not knowing the level for one or more CVH factors. On average, only 45% of survivors' known factors were at an ideal level. Less than half of survivors had BMI (24%), blood pressure (24%), and cholesterol (49%) in the ideal category. Concordance of self-reported with EHR categorization of CVH factors was 90% for BMI, 47% for blood pressure, 41% for cholesterol, and 33% for blood glucose. Significant positive changes after viewing the AH-HA tool were observed for understanding of CV risk ($S=-65$, $p=0.009$), understanding steps to improve CVH ($S=-70.5$, $p<.001$, and perception of CV risk ($S=-45$, $p=0.007$). Conclusions: Integration of CVH assessment tools in oncology care may enhance awareness and understanding of CVH among breast cancer survivors.

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MD Anderson Cancer Center
is proud to congratulate
Paul Cinciripini, Ph.D., for his receipt of the Joseph W. Cullen Memorial Award.

2020 Joseph W. Cullen Memorial Award for Excellence in Tobacco Research

Dr. Cinciripini has more than thirty years' experience conducting basic and clinical research in the area of smoking cessation and nicotine psychopharmacology. He is the founding director of MD Anderson's Tobacco Treatment Program, which provides personalized tobacco treatment to nearly 1,200 new patients every year and serves as a national model for comprehensive tobacco treatment. Nearly half of all cancer patients who entered the program successfully quit and abstained from smoking. Outcomes from the pioneering program were published in 2019 in JAMA Network Open.

As a leader in the field of smoking cessation and nicotine dependence, Dr. Cinciripini has authored numerous peer-reviewed articles and book chapters and served as principal investigator on multiple studies funded by the NIH, Cancer Prevention and Research Institute of Texas and others. His early work on a novel treatment for smoking cessation, called scheduled smoking, has been the inspiration for several subsequent studies on gradual smoking reduction. He is recognized nationally and internationally for his expertise in the treatment of nicotine dependence using pharmacological and behavioral approaches.

Dr. Cinciripini was a founding member of the Behavioral Science department at The University of Texas MD Anderson Cancer Center in Houston and was named chair of the department in 2015. He also holds the Margaret & Ben Love Chair in Clinical Cancer Care in honor of Dr. Charles A. LeMaistre, the second full-time president of MD Anderson.

2020 ASPO Joseph F. Fraumeni, Jr., Distinguished Achievement Awardee

Georgetown | Lombardi
COMPREHENSIVE CANCER CENTER

50 Years of Changing Lives

Georgetown Lombardi Comprehensive Cancer Center salutes Jeanne Mandelblatt, MD, MPH, a pioneer researcher who helped establish the field of cancer and aging.

One of the world's foremost authorities in cancer control, Dr. Mandelblatt began her "first" career as a family doctor working in underserved community health centers in New York City in the 1970s. This work deeply impacted the arc of her career by giving rise to one of her earliest research questions involving cancer and aging: Why were so many of the older women she screened for cervical cancer testing positive? Her observations and speculations about diminished immune responses associated with aging were published in 1986 in the Journal of the American Medical Association — her first publication and cornerstone of her life's work. The work led to cost-effectiveness analyses that provided the basis for the addition of Pap smear screening to Medicare benefits — the program's first covered preventive service. It also launched her second career as a research scientist focused on aging and cancer.

In 1993, Dr. Mandelblatt was recruited to build a cancer prevention and control program at Georgetown Lombardi. She continued her career at Georgetown Lombardi focusing on cancer and aging research and cancer policy. For two decades she served as principal investigator of the NCI's CISNET (Cancer Intervention and Surveillance Modeling Network). With her modeling colleagues, she led analysis providing key evidence that supported U.S. Preventive Services Task Force recommendations in 2009 and again in 2015 that women ages 50 to 74 be screened every two years instead of annually.

Today, her unique translational survivorship research uses population-based research findings to drive basic discovery about cancer and aging in animal models. Dr. Mandelblatt leads a nationwide team of investigators for the "Thinking and Living with Cancer" study, the largest U.S. study of cognition in older cancer patients. The insights gained will inform the next generation of clinically relevant population research studies and address the policy questions that arise from the results.

Recognizing her many years of sustained leadership and collaborative scientific accomplishments, Dr. Mandelblatt was awarded a seven-year NCI Outstanding Investigator Grant (R35) in 2015 — the inaugural year for the award — to study cancer care in older individuals.

Dr. Mandelblatt's contributions to the field continue to inspire, and are amplified through the careers of the many men and women she has mentored who are now in academic or public health careers at institutions around the country

Georgetown Lombardi congratulates Dr. Mandelblatt for her important accomplishments as a scientist, thought leader, devoted colleague and friend.

NIH NATIONAL CANCER INSTITUTE

cpfp.cancer.gov

Cancer Prevention Fellowship Program

Applications accepted May–August for positions starting the following June.

Get support for postdoctoral research and leadership training, plus:

- Competitive stipends, relocation expenses, health insurance benefits, and travel allowances
- Support for up to four years
- Opportunity to earn your MPH, sponsored by NCI
- Research opportunities with experienced NCI mentors

A Multidisciplinary Fellowship Opportunity

Health Disparities
Epidemiology
Medicine
Nursing
Health Services
Engineering
Nutritional Sciences
Biostatistics
Translational
Psychology
Toxicology
Biomedical Sciences
Behavioral Science
Public Health

LEARN MORE!

cpfp.cancer.gov

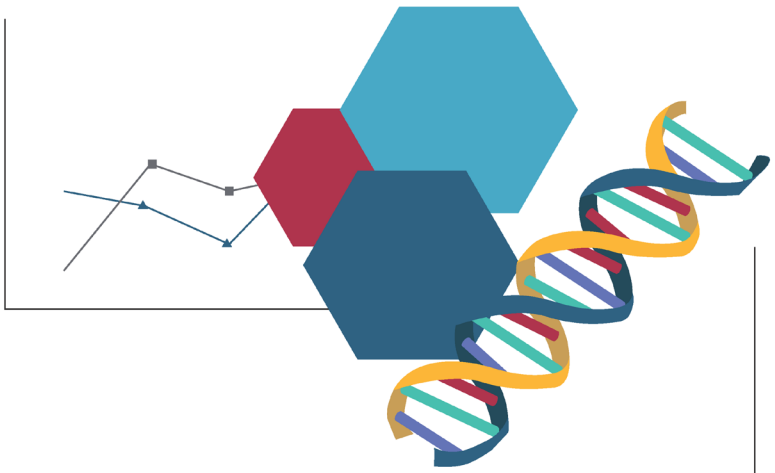
cpfpcoordinator@mail.nih.gov

240-276-5626

NIH NATIONAL CANCER INSTITUTE

Division of Cancer Control and Population Sciences

Visit https://cancercontrol.cancer.gov



Your SOURCE for

- Cancer control research tools, data, resources, and funding announcements
- Upcoming events related to cancer control research
- Information on research networks and consortia focused on cancer control issues
- Survey instruments, measurement tools, and public use data for many topic areas, such as cancer information seeking and decision making, diet, physical activity, tobacco use and cessation, cancer screening, quality and cost of care, cancer outcomes, health disparities, and survivorship
- Cancer statistics, geospatial data, statistical software, and interactive tools from the SEER Program and State Cancer Profiles websites, among others
- Reports, including the *Cancer Trends Progress Report* and the *Annual Report to the Nation on the Status of Cancer*
- Monographs about tobacco control, diet and physical activity, cancer incidence, cancer costs, cancer staging and registry data, mortality, and survival
- Intervention products for health communication, nutrition, cancer screening, and smoking prevention and cessation
- Employment and training opportunities in the division
- Smokefree.gov web and mobile mHealth resources for use in research studies
- Information on dissemination and implementation research
- Newsletters, webinars, and social media accounts

What's NEW

Data Resources

- Updated SEER linked data resources, including SEER-Medicare, SEER-Consumer Assessment of Healthcare Providers and Systems (SEER-CAHPS), and SEER-Medicare Health Outcomes Survey (SEER-MHOS)
- Statistics by molecular subtypes for breast, lung, esophageal, and thyroid cancers on SEER*Explorer as well as new SEER Cancer Stat Fact Sheets for several cancer types and topics
- Free, public use data files from all iterations of the Health Information National Trends Survey (HINTS)
- Free, public use data from the National Health Interview Survey (NHIS) Cancer Control Supplement, with new data now released annually
- Free, public use physical education and nutrition policy data with interactive maps and tables from the Classification of Laws Associated with School Students (CLASS)
- Initial data release from the 2018–2019 Tobacco Use Supplement to the Current Population Survey (TUS-CPS)

Research Tools

- Over a dozen language translations of the Patient-Reported Outcomes version of the Common Terminology Criteria for Adverse Events (PRO-CTCAE™)
- New version of the Automated Self-Administered 24-Hour (ASA24) Dietary Assessment Tool, a free web-based tool for researchers, clinicians, and educators to collect 24-hour recalls or food records
- Data from the annual Cancer Control Supplement to the National Interview Health Survey that includes rotating content on cancer screening, sun protection, tobacco use, physical activity, diet, genetic counseling, and other cancer control-related behaviors

Staying Up to Date

- Surveillance Research Program Blog: Toward Precision Cancer Surveillance
- NCI Tobacco Policy Viewer, an interactive online resource for the mapping, querying, and downloading of historical smoke-free policy data in the United States
- NCI Monograph 22: *A Socioecological Approach to Addressing Tobacco-Related Health Disparities*
- *Did You Know?* video series, highlighting key topics and trends in cancer statistics
- May 2020 workshop for the research community concerning Hispanic representation in cancer epidemiological studies
- Vaping cessation information and steps for quitting on Smokefree Teen

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SCHOOL OF MEDICINE

CASE WESTERN RESERVE UNIVERSITY

The Department of Population and Quantitative Health Sciences at Case Western Reserve University (CWRU) School of Medicine (http://pqhs.case.edu/) seeks to fill a faculty position in Biostatistics at the Assistant or Associate Professor rank in either the Tenure or non-Tenure track. Rank and tenure status will be determined based on applicants' background and expertise. Interested applicants should send (1) a cover letter, (2) a Curriculum Vitae, (3) a statement of research expertise, (4) a statement of teaching expertise/philosophy and (5) names and contact information for three references to Chair, Biostatistics Search Committee at: biostatisticssearch@case.edu.

The successful candidate will be expected to establish a track record of extramurally-funded research as Principal Investigator and/or as a collaborator. The successful candidate will be expected to contribute to the Department's MS in Biostatistics program, PhD program in Epidemiology Biostatistics, and MPH program.

Cancer Epidemiologist - Assistant / Associate / Full Professor

Stanford MEDICINE

Stanford University School of Medicine seeks candidates for a full-time tenure line faculty position in the newly formed Department of Epidemiology and Population Health. The predominant criterion for appointment in the University Tenure Line is a major commitment to research and teaching. The position requires expertise that enables a robust population science research agenda, and an outstanding record of research excellence as evidenced by the ability to obtain and sustain independent or collaborative extramural NCI or other NIH-type funding. We seek faculty who conduct research on the causes, prevention, and treatment of cancer across a broad array of disciplines that includes cancer epidemiology, and could be focused in the areas ofgenetic epidemiology, molecular epidemiology, cancer prevention and survivorship including pediatric and adult cancers. A doctoral level degree in Epidemiology or a related field, with research experience relating to career stage, is required. Faculty rank will be determined by the qualifications and experience of the successful candidate.

The successful candidate will be expected to further strengthen collaborations and able to build strong inter and intra programmatic collaborate research within the Population Sciences Program and within Stanford Cancer Institute and Stanford University. Any successful candidate at the Associate or Full Professor level must have a proven track record of excellence in leadership in order to assume a critical role within the SCI for Population Science program. Qualified applicants should send: (1) a letter that describes research and career interests and (2) a curriculum vitae, addressed to Allison Kurian, MD, MSc, Co-Chair, Stanford Epidemiology Search Committee. Candidates applying to the Assistant Professor rank will be expected to supply three letters of reference. Candidates applying to the Associate/Full Professor rank will be expected to supply the names of three references upon request. Candidates are encouraged to apply electronically in one pdf file to: https://apply.interfolio.com/73400.

Stanford is an equal employment opportunity and affirmative action employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, protected veteran status, or any other characteristic protected by law. Stanford welcomes applications from all who would bring additional dimensions to the University's research, teaching and clinical missions.

UFHealth
CANCER CENTER

Associate Director for Population Sciences

The University of Florida Health Cancer Center (UFHCC) is recruiting a dynamic researcher, academician, and leader for the position of Associate Director for Population Sciences. Cejka Search has been engaged to lead this important recruitment effort.

Under the direction of the UFHCC Director, the Associate Director for Population Sciences, with the Deputy Director and the other Associate Directors comprise the UFHCC Executive Committee. The UFHCC mission is to prevent, detect, treat, and ultimately cure cancer while addressing the unique challenges of the cancer burden faced by the population we serve. The Executive Committee is charged with directing the research strategy of the center in the furtherance of our mission

Comprised of over 300 members in three research programs with a funding base over $33M, the Cancer Center serves a population of 2 million residents residing in 22 counties of Northcentral Florida. The Associate Director for Population Sciences is charged with overseeing the population sciences research activities and initiatives of the Cancer Center. The Associate Director for Population Sciences is responsible for identifying opportunities for strategic growth and development to facilitate trans-disciplinary cancer research so as to harness the considerable intellectual talent and scientific resources of UFHCC and focus on solving the nation's cancer problem.

Areas of research expertise of the candidate could include, but are not limited to, cancer epidemiology, cancer screening and early detection, obesity, tobacco, risk assessment and reduction, cancer communication, prevention and intervention, dissemination and implementation research. The incoming Associate Director will develop a vision to bring together the outstanding research, educational, and clinical resources available of the UFHCC and its affiliated partners to improve cancer outcomes in Gainesville and Northcentral Florida.

The following minimum qualifications are required to be considered for this position:

- Academic appointment with tenure, or tenure-track position.
- Terminal degree in social or behavioral sciences, or comparable.
- Extensive cancer relevant research experience.
- Proven extramural funding track record.
- Extensive publication experience.
- Proven trainee and mentorship responsibilities.
- Experience in, and coordination of, collaborative grants and managing trans-disciplinary research.

The position offers generous start-up package, with resources to promote research efforts across the center, as well as a competitive salary, relocation assistance and excellent benefits.

The University of Florida is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status in all aspects of employment including recruitment, hiring, promotions, transfers, discipline, terminations, wage and salary administration, benefits, and training.

Alan D. Johns
Executive Vice President/Managing Principal
Cejka Search
404-304-1984
ajohns@cejkasearch.com

Together, we can end cancer

Karen Basen-Engquist, Ph.D., M.P.H.
Professor, Behavioral Science
MD Anderson Cancer Center
ASPO President

Shine Chang, Ph.D.
Professor, Epidemiology
MD Anderson Cancer Center
ASPO At-Large Executive Committee Member

Paul Cinciripini, Ph.D.
Chair, Behavioral Science
MD Anderson Cancer Center
2020 Joseph W. Cullen Memorial Award Recipient

Lorna McNeill, Ph.D., M.P.H.
Chair, Health Disparities Research
MD Anderson Cancer Center
ASPO Program Committee Member

At MD Anderson Cancer Center, we believe the first and best way to prevent cancer is to reduce the risk of getting it. That's why prevention is critical to our mission to end cancer.

All of us at MD Anderson extend our deepest gratitude to our faculty who serve in leadership positions within the American Society of Preventive Oncology (ASPO), including Karen Basen-Engquist, Ph.D., M.P.H., as she takes on the role of president.

We also offer our heartfelt congratulations to Paul Cinciripini, Ph.D., as he is honored with ASPO's 2020 Joseph W. Cullen Memorial Award for his impactful work in the fight against tobacco and tobacco-related diseases.

Thank you for your dedication to advancing the field of cancer prevention.

THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center

Making Cancer History®

THE UNIVERSITY OF KANSAS CANCER CENTER

Faculty Positions Available:

Associate Professor/Professor In Population Science

The University of Kansas Cancer Center is the region's **only** National Cancer Institute-designated cancer center where patients gain access to the most promising therapies, cutting-edge clinical trials and world class research. The Cancer Prevention and Control Program includes over 50 scientists across 3 campuses and multiple schools and departments (e.g., Population Health, Family Medicine, Internal Medicine, Nursing, Nutrition, Psychology) located at KU Medical Center, KU Lawrence, and Children's Mercy Hospital. Population health scientists have strong long-standing collaborations with many community and clinical partners throughout region in both urban and rural locations, providing a rich environment for impactful community-engaged research. KU Medical Center is home to a large PCORnet that brings together data from a diverse patient population across 9 states.

We are seeking two mid- to senior-level faculty dedicated to research in cancer prevention, control and/or survivorship who will play a major role in KUCC's population science initiatives, with a focus on tobacco control, cancer screening, lifestyle/obesity, genetic testing, or cancer care delivery.

Ideal candidates will have a progressive research agenda aimed at accelerating uptake of evidence-based practices in cancer prevention and control within an expanding learning health network that includes more than 75 primary care practices and 15 cancer treatment sites. Candidates with an interest in rural cancer control or with an interest in leadership positions within the Cancer Center are strongly encouraged to apply. **Position Requirements:** Candidates should have a MD or PhD in any population science discipline, an independent and collaborative extramurally funded research program, and a demonstrated track record of peer-reviewed publications.

The faculty rank for these positions is open and is commensurate with qualifications and experience. Assistant Professor applicants with a promising track record of extramural funding and peer-reviewed publications will be considered. We offer a competitive compensation package which includes start up package and paid relocation.\

For more information or to apply please go to: **https://jobs.kumc.edu/postings/25780**. Feel free to contact Theresa Leinwetter, Director of Human Resources at: **tleinwetter@kumc.edu** with any questions you may have.

KU Medical Center is an Equal Opportunity/Affirmative Action employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, protected veteran or disability status, or genetic information.

NCI Cancer Center

A Cancer Center Designated by the National Cancer Institute

Associate Director of Population Sciences & Cancer Control

The UNM Comprehensive Cancer Center is searching for a distinguished national leader in cancer population sciences.

Seeking candidates with a sustained track record of outstanding scholarly achievement reflected in peer-reviewed funding (preferably NCI and NIH), high quality publications, and collaborative interdisciplinary research with a scientific focus in either cancer epidemiology, cancer prevention and control, health services research, behavioral intervention, or cancer health disparities. A distinguishing characteristic of the UNMCCC is the multiethnic, multicultural, rural, and underserved populations it serves in its catchment area - primarily Hispanic/Latino, American Indian, and non-Hispanic White - with strikingly different patterns of cancer incidence, mortality, and disparity. This position will lead the UNMCCC mission in cancer population sciences by focusing on those cancers with high incidence and disparity in the New Mexico catchment area and translating discoveries to community interventions. Candidates must have interest and expertise in working with underserved and minority populations; strong leadership, organizational, interpersonal, and communication skills; and the ability to develop and lead successful interdisciplinary collaborations. Holding the Carolyn R. Surface Endowed Chair in Cancer Population Sciences and joining the UNMCCC Senior Leadership Team and Executive Committee, the successful Associate Director will oversee the highly collaborative and vibrant Cancer Control & Cancer Disparities Research Program and facilitate its collaborations with other UNMCCC Research Programs and institutions; the Behavioral Measurement and Population Science Shared Resource; and the faculty and staff of the Office of Health Equity and Community Partnerships. ***Search Chairs:*** *Marianne Berwick and Chuck Wiggins.*

Endowed Chairs and Professorships, significant resources, leadership roles, and comprehensive start-up packages available.

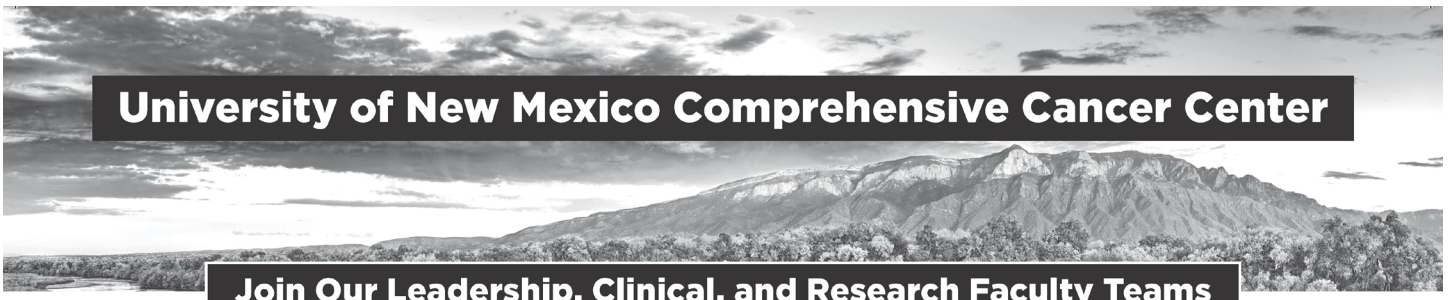
For details and to apply, visit cancer.unm.edu/JoinTheBest

Questions? Contact Search Coordinator Amanda Leigh at ALeigh@salud.unm.edu, (505) 272-2201.

The University of New Mexico Comprehensive Cancer Center (UNMCCC) is the Official Cancer Center of New Mexico and the only National Cancer Institute (NCI) designated comprehensive cancer center in a 500-mile radius. Our 134 oncology physicians, 122 cancer research scientists, and staff focus on discovering the causes and cures for cancers disproportionately affecting the people of the American Southwest — primarily Hispanic, American Indian, and Non-Hispanic White — with strikingly different patterns of cancer incidence, mortality and disparity. In the past year, our center cared for 12,000 patients; 12 percent participated in therapeutic interventional studies and 35 percent in interventional studies. UNMCCC has outstanding programs in Cancer Control and Population Sciences, Cellular and Molecular Oncology, and Cancer Therapeutics. Our research houses national centers: The Molecular Discovery and High Throughput Target Screening Center (nmmlsc.health.unm.edu), one of six Chemical Biology Consortium Centers of Excellence in The NCI NExT Program; Spatiotemporal Modeling of Cell Signaling (stmc.unm.edu), one of 13 NIH National Centers for Systems Biology; and a NIH Clinical and Translational Sciences Center. We enrich our endeavors by collaborating with Sandia and Los Alamos National Labs and Lovelace Respiratory Research Institute. Benefit from our Shared Resources, which include biospecimen collection and tissue analysis, genomics, biostatistics, bioinformatics, cancer population science and behavioral interventions, and the conduct of clinical interventions. UNMCCC is the center of our statewide cancer clinical trials and health delivery research network — partly funded by a NCI NCORP Grant — and is an Oncology Research Information Exchange Network (ORIENcancer.org) member. Our center has conducted 60+ statewide community-based cancer education, prevention, screening, and behavioral intervention studies involving more than 10,000 New Mexicans. Learn more at cancer.unm.edu.

UNM is an Equal Opportunity/Affirmative Action Employer and Educator

Photo: Bill Tondreau, "River Edge", panoramic photographic, courtesy of sumnerdene.com



University of New Mexico Comprehensive Cancer Center

Join Our Leadership, Clinical, and Research Faculty Teams

The University of New Mexico Comprehensive Cancer Center (UNMCCC) is the Official Cancer Center of New Mexico and the only National Cancer Institute (NCI) designated comprehensive cancer center in a 500-mile radius. Our 134 oncology physicians, 122 cancer research scientists, and staff focus on discovering the causes and cures for cancers disproportionately affecting the people of the American Southwest — primarily Hispanic, American Indian, and Non-Hispanic White — with strikingly different patterns of cancer incidence, mortality and disparity. In the past year, our center cared for 12,000 patients; 12 percent participated in therapeutic interventional studies and 35 percent in interventional studies. UNMCCC has outstanding programs in Cancer Control and Population Sciences, Cellular and Molecular Oncology, and Cancer Therapeutics. Our research houses national centers: The Molecular Discovery and High Throughput Target Screening Center (nmmlsc.health.unm.edu), one of six Chemical Biology Consortium Centers of Excellence in The NCI NExT Program; Spatiotemporal Modeling of Cell Signaling (stmc.unm.edu), one of 13 NIH National Centers for Systems Biology; and a NIH Clinical and Translational Sciences Center. We enrich our endeavors by collaborating with Sandia and Los Alamos National Labs and Lovelace Respiratory Research Institute. Benefit from our Shared Resources, which include biospecimen collection and tissue analysis, genomics, biostatistics, bioinformatics, cancer population science and behavioral interventions, and the conduct of clinical interventions. UNMCCC is the center of our statewide cancer clinical trials and health delivery research network — partly funded by a NCI NCORP Grant — and is an Oncology Research Information Exchange Network (ORIENcancer.org) member. Our center has conducted 60+ statewide community-based cancer education, prevention, screening, and behavioral intervention studies involving more than 10,000 New Mexicans. Learn more at cancer.unm.edu.

Associate Director for Cancer Population Sciences

Endowed Chair and Senior Leadership Role

The UNM Comprehensive Cancer Center is searching for a national leader in cancer population sciences. Seeking candidates with a track record of outstanding scholarly achievement reflected in peer-reviewed funding (preferably NCI and NIH), high quality publications, and collaborative interdisciplinary research with a scientific focus in either cancer epidemiology, cancer prevention and control, health services research, behavioral intervention, or cancer health disparities. *Search Chairs: Marianne Berwick and Chuck Wiggins.*

Cancer Molecular & Genetic Epidemiology

Endowed Chair and Senior Leadership Role

Seeking cancer population scientists with expertise in population-based molecular and/or genetic epidemiology. Looking for epidemiologists engaged in biomarkers of risk and prognosis, genomics, epigenetics, gene-environment interactions, genetic ancestry, and genetic risk assessment. *Search chairs: Marianne Berwick and Linda Cook*

Cancer Control, Health Services & Behavioral Intervention

Endowed Faculty and Leadership Role

Seeking established population scientists focused on cancer control, health services research, and behavioral intervention research to lead programmatic efforts. Looking for mid-career to senior faculty with outstanding scholarly achievement, including peer-reviewed funding (preferably NCI and NIH) and impactful publications. *Search chairs: Linda Cook and Shiraz Mishra*

Biostatisticians

Seeking PhD biostatisticians to join an outstanding team engaged in statistical methodology relevant to cancer and in biostatistical applications integrated with basic, translational, clinical, and population science research. *Search chairs: Shane Pankratz and Linda Cook*

Cancer Immunology & Tumor Microenvironment

Two Positions: Basic or Translational Scientist

Seeking established mid-career or senior scientists focused on analysis and modeling of pathways that mediate response or resistance to immune therapies, and on signaling perturbations in the context of the tumor microenvironment that enhance or inhibit the immune response to cancer cells. *Search chairs: Eric Prossnitz and Sarah Adams*

Cancer Cell Signaling

Seeking cancer cell biology, signaling, and systems biology experts with interests in dissecting mechanisms of perturbed signaling in cancer cells, on analysis and modeling of pathways mediating response or resistance to targeted therapies. *Search chairs: Diane Lidke and Eric Prossnitz*

RNA Biologist

Seeking highly interactive basic and translational scientists focused on gene expression, transcriptional regulatory and alternative splicing mechanisms relevant to cancer; the biology and role of noncoding RNAs in cancer development and/or progression; and functional genomics (including investigators employing CRISPR/CAS or other functional genomic screening technologies). *Search chair: Scott Ness*

For details and to apply, visit cancer.unm.edu/JoinTheBest

Questions? Contact Search Coordinator Amanda Leigh at ALeigh@salud.unm.edu, (505) 272-2201.

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Endowed Chairs and Professorships, significant resources, leadership roles, and comprehensive start-up packages available.

Photo: Bill Tondreau, "River Edge", panoramic photographic, courtesy of sumnerdene.com

Washington University in St. Louis
School of Medicine

The Division of Public Health Sciences
Postdoctoral Fellowships in Cancer Prevention and Control Research

The Division of Public Health Sciences in the Washington University School of Medicine and Siteman Cancer Center, a National Cancer Institute-designated Comprehensive Cancer Center, are seeking applications for Postdoctoral Fellowships.

Current openings include those focusing on:

- **Shared Decision Making**
- **Implementation Science**
- **Cancer Disparities**
- **Community-Based Cancer Prevention and Control**

However, all applications will be considered. Applications are considered on a rolling basis.

Eligibility

PhD, DrPH, MD, or other doctoral degree in a public health-related discipline, or a doctoral degree in another discipline with an interest in transitioning to public health research. Applicants are limited to United States citizens, non-citizen nationals, or must be lawfully admitted for permanent residence and possess an Alien Registration Receipt Card.

The Division of Public Health Sciences

The division has **a strong mentoring and career development program** with a track record of successfully placing trainees. We conduct world-leading research, education and outreach to prevent cancer and other diseases, promote population health, and improve quality and access to health care in Missouri and beyond.

Washington University offers excellent benefits and competitive salaries. Support for tuition, books, software and conference travel is available.

Benefits

- Diverse faculty and transdisciplinary environment
- Trainees linked with a mentoring team
- Support for further training and professional development
- Two years of support, possible third year
- Some funding is from the T32 grant (T32CA190194) from the NCI

Send inquiries to: Dr. Aimee James, Training Director, at aimeejames@wustl.edu

To apply: send an application, cover letter, curriculum vitae and professional reference list by email to Blanka Hodzic at bhodzic@wustl.edu

The division is led by Graham Colditz, MD, DrPH, an internationally recognized leader in cancer prevention. Our vibrant group of multidisciplinary faculty conducts research on a wide range of health issues, and there are opportunities to collaborate with clinical, basic science, statistical, and other faculty across the academic campuses of Washington University.

SITEMAN CANCER CENTER | Washington University in St. Louis School of Medicine | BJC HealthCare

To learn more about the Division and our faculty, please visit: https://publichealthsciences.wustl.edu/

Division of Public Health Sciences | 600 S. Taylor Avenue, 2nd Floor | St. Louis, MO 63110 | (314) 454-7940

Wake Forest® Baptist Medical Center

NCI Comprehensive Cancer Center

Postdoctoral Training Program in Cancer Prevention and Control

Now accepting applications for 2020

The NCI-funded T32 Training Program in Cancer Prevention and Control at the Wake Forest Baptist Comprehensive Cancer Center is now seeking outstanding postdoctoral candidates for 2020. Our program focuses on cancer survivorship, healthy lifestyles, and cancer care delivery. Key resources are also provided by our Clinical and Translational Science Institute and NCI-funded Community Oncology Research Program (NCORP) Research Base.

The program offers:

- Two to three years of funding
- Competitive salary
- Tuition support
- Health insurance
- Travel allowances
- Research support
- Opportunities for publications from existing data

Application Requirements:

- Cover letter stating research and training interests
- Curriculum vitae
- 3 letters of recommendation
- Must be a U.S. citizen or permanent resident
- Recent doctorate (PhD, DrPH, MD, DO) in health-related area

Inquiries should be sent to either of the Program Co-Directors, Dr. Nancy Avis at navis@wakehealth.edu or Dr. Kristie Foley at kfoley@wakehealth.edu. Applications will be accepted until the positions are filled, although those submitted before **April 1st** will have highest priority. Applications should be submitted to Dr. Nancy Avis at navis@wakehealth.edu.

For more information, please visit our website at:
https://school.wakehealth.edu/Research/Institutes-and-Centers/Comprehensive-Cancer-Center/Post-Doctoral-Training-Program-in-Cancer-Prevention-and-Control

Wake Forest Baptist Medical Center is an Affirmative Action and Equal Opportunity Employer with a strong commitment to achieving diversity among its faculty and staff.

Mayo Clinic Comprehensive Cancer Center - Faculty

Positions in Cancer Population Sciences - OPEN RANK

The Mayo Clinic Comprehensive Cancer Center is recruiting candidates for three institutionally-supported faculty positions in its Population Sciences Program. Faculty will be expected to develop cutting edge research programs across the spectrum of cancer population sciences that improve the health of patients and communities, and leverage Mayo Clinic's vast research resources. Successful candidates can choose to locate at any of Mayo Clinic's three Cancer Center sites (Rochester, MN, Scottsdale, AZ and Jacksonville, FL) to help achieveeffective results through active community outreach programs, including reducing health care disparities. The Population Sciences Program spans three overarching themes: (1) Cancer risk factors and biomarkers; (2) Primary and secondary cancer prevention; and (3) Survivorship and health care delivery/health equity. Appointments will include substantial, long-term research support, including a highly competitive compensation package, technical and computational resources, and exceptional benefits. Academic rank, salary, and start-up package will be commensurate with experience. For more information, contact: Gloria M. Petersen, PhD, Search Committee Chair (She is attending the ASPO meeting) (petersen.gloria@mayo.edu) or Jennifer Schilbe, Recruiter (Schilbe.jennifer@mayo.edu).

Cancer Control | Research Training Program

UTHealth
The University of Texas Health Science Center at Houston
School of Public Health

Seeking applicants with

Outstanding promise of scholarly achievement that contributes to cancer prevention and control

Eligibility

Individuals with a PhD, DrPH, MD, or other doctoral degree in public health, health promotion, a behavioral or social science, epidemiology, health services research, health economics, biostatistics, or medicine

Open to U.S. citizens and permanent residents only

Training directors

María E. Fernández, PhD
Sally W. Vernon, PhD
Patricia Dolan Mullen, DrPH

Visit the website *@https://bit.ly/nci2019*
Questions? *ncifellowships@uth.tmc.edu*

A quality program with career benefits

- Funded by the National Cancer Institute
- A thriving interdisciplinary environment with collaborations in diverse populations and areas of Texas
- Houston campus located in the world's largest medical center
- Regional campuses - Austin, Brownsville, Dallas, El Paso, and San Antonio
- Support for up to 3 years
- Annual stipend starting at $50,004, depending on experience plus health insurance
- Tuition and fees, books, software, and travel
- Project portfolios with interdisciplinary teams addressing diverse risk factors with a focus on underserved groups
- Established track record, now in its 27th year
- Mentoring and training opportunities that advance fellows' skills, experience, networks, and research productivity
- Weekly seminar focused on proposals, publications, and career development

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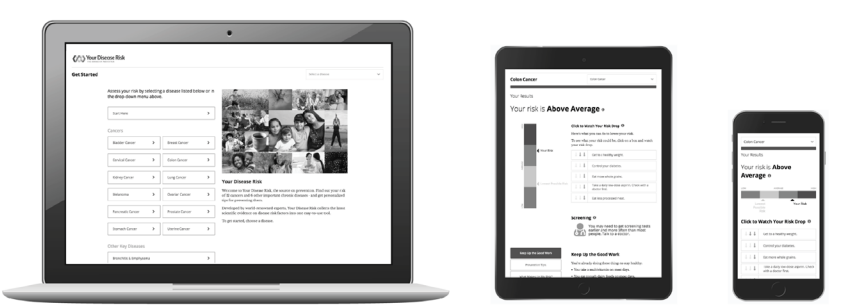
Your Disease Risk™

20 YEARS OF PREVENTION

yourdiseaserisk.wustl.edu

Celebrating 20 years, *Your Disease Risk* offers the public free risk estimates and prevention tips for 12 cancers, COPD, diabetes, heart disease, osteoporosis and stroke.



SITEMAN CANCER CENTER

Washington University in St. Louis
School of Medicine

MAYO CLINIC

Center for Health Equity and Community Engagement Research

Public Health Analyst Job Posting

The Mayo Clinic Center for Health Equity and Community Engagement Research aims to transform communities for everyone to achieve the highest possible level of well-being and health. Our mission is to create innovative solutions on health disparities throughout the life course and advance the ideal of health equity, locally and globally, through research and community engagement.

The Center has an exciting job opening for a Public Health Analyst. If you have a passion for analyzing and using data to positively impact communities, consider joining our team.

The Public Health Analyst will support the Center by conducting comprehensive research, review and analysis using a variety of analytical, quantitative, qualitative and programming skills on a wide variety of health related data that address multi-functional issues. The Public Health Analyst will utilize software applications to collect and summarize data elements from the electronic medical record and databases (internal, local, regional and national) to produce a variety of reports for research, quality improvement and Center planning. The Public Health Analyst will be responsible for evaluating the reliability of data sources to ensure data integrity and will also design and maintain project specific quantitative and qualitative databases including the management and updating of data.

The candidate can choose to be located at our Jacksonville, FL or Phoenix/Scottsdale, AZ location.

For more information about the position: https://jobs.mayoclinic.org/jobs/public-health-analyst-128577br/

For more information about the Center: https://www.mayo.edu/research/centers-programs/center-for-health-equity-community-engagement-research/about

Pioneering research to offer new hope.

Postdoctoral researchers and research scientists in the Division of Population Science at Moffitt Cancer Center work under the guidance of internationally recognized faculty with diverse backgrounds in cancer, genetic, and molecular epidemiology; health outcomes and behavior; and more. At Moffitt, we nurture the next generation of talented and imaginative transdisciplinary cancer researchers.

Learn more about opportunities in the Department of Cancer Epidemiology and the Department of Health Outcomes and Behavior at Moffitt's exhibitor table or by visiting Moffitt.org/ASPOPostDoc.

Equal Employment Opportunity
Moffitt Cancer Center is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or protected veteran or disabled status. We seek candidates whose skills, and personal and professional experience, have prepared them to contribute to our commitment to diversity and excellence.

MOFFITT CANCER CENTER

The University of Wisconsin Carbone Cancer Center gratefully acknowledges 30 years of dedicated service by **Heidi Sahel** to the American Society of Preventive Oncology and the Carbone Cancer Center.

We wish her a happy retirement!

Carbone Cancer Center
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

RUTGERS
Cancer Institute
of New Jersey
RUTGERS HEALTH

NCI
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Comprehensive
Cancer Center

CANCER DISPARITIES AND HEALTH EQUITY

OPEN RANK, TENURE TRACK FACULTY POSITIONS AVAILABLE

In partnership with Rutgers School of Public Health, we seek a cancer disparities and health equity researcher with a productive and transformative research agenda to eliminate disparities and promote health equity in cancer prevention and control in New Jersey. We seek candidates with expertise in community intervention trials, dissemination and implementation science, and/or cancer care delivery research in underserved populations in which cancer disparities exist.

The successful candidate will: have NIH-funded, cancer focused research or very strong potential for such funding and engage in cancer disparities research. The selected individual will also be inspired to capitalize on opportunities for transdisciplinary collaborations. Applicants are also expected to have: 1) a doctoral degree in public health or closely related health disciplines such as psychology, sociology, or health policy: 2) postdoctoral training or experiences in community intervention research and/or dissemination/implementation science, and/or cancer care delivery research; 3) experience in cancer disparities and health equity research; 4) evidence of research productivity, including high quality publications; 5) demonstrated experience working in a diverse environment or commitment to do so; and 6) experience (or motivation if early career researcher) in mentoring faculty and students.

Please address your cover letter and inquiries to Anita Kinney, PhD, RN, Associate Director for Cancer Health Equity and Engagement.

For more information and to apply, please visit:
http://jobs.rutgers.edu/postings/83346

The Rutgers Cancer Institute of New Jersey has exceptional research resources including the New Jersey State Cancer Registry, ORIEN (Oncology Research Information Exchange Network), and shared resources including: 1) Biometrics, 2) Population Research Support, 3) Genomics; 4) Biomedical Informatics; 5) Biospecimen Repository and Histopathology Service; and 6) Metabolomics.

RUTGERS
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of New Jersey
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Cancer Center

CANCER EPIDEMIOLOGY AND HEALTH OUTCOMES

OPEN RANK, TENURE TRACK FACULTY POSITIONS AVAILABLE

In partnership with Rutgers Robert Wood Johnson Medical School, we seek a cancer epidemiology and health outcomes researcher to join our growing Cancer Epidemiology and Health Outcomes section. Active areas of research include nutrition and obesity, social determinants of health, cancer survivorship, and cancer health disparities. There are excellent opportunities for collaborations with other CINJ members at the Rutgers Cancer Institute of New Jersey, Rutgers School of Public Health, Robert Wood Johnson Medical School and Princeton University. CINJ houses the New Jersey State Cancer Registry, which facilitates research through rapid case ascertainment of new cancer cases. There are also opportunities to be involved in several ongoing studies, including a cohort of breast cancer survivors and to participate in research consortia.

The successful applicant will be expected to establish an innovative, independent, collaborative and extramurally funded research program. Candidates should possess a doctoral degree in epidemiology or related field with a sustained focus on cancer research, a strong publication record, and a history of external grant funding or strong potential for funding. Please address your cover letter and inquiries to Elisa V. Bandera, MD, PhD, Chief, Cancer Epidemiology and Health Outcomes, Rutgers Cancer Institute of New Jersey.

For more information and to apply, please visit:
http://jobs.rutgers.edu/postings/105895

The academic rank for these tenure-track positions is commensurate with qualifications and experience. Rutgers Cancer Institute of New Jersey is the state's only NCI designated comprehensive cancer center, and a consortium cancer center that includes faculty members from across Rutgers University including Rutgers Robert Wood Medical School, Rutgers School of Public Health, and Rutgers New Jersey Medical School, as well as Princeton University. New Brunswick, NJ is a prime central northeast location, famous for our beaches and surrounding landscape perfect for skiing and hiking. We are also easily accessible to Manhattan, Newark Airport, and Philadelphia by public transportation. Rutgers, The State University of New Jersey is an Equal Opportunity/ Affirmative Action employer.

The Walking Warriors Battling Breast Cancer Salute their team founder, Dr. Jeanne Mandelblatt on her receipt of the ASPO Joseph F. Fraumeni, Jr. Distinguished Achievement Award

WALKING WARRIORS

Dr. Mandelblatt believes in hands on, or in this case, feet on the ground, approach to battling breast cancer. The year 2020 will be Mandelblatt's 20th breast cancer walk. While maintaining her active research program, Mandelblatt originally led a Georgetown Lombardi team of more than 100 men and women in more than ten walks sponsored by the Avon Foundation, raising more than $1.5 million. In 2004, she founded the Capital Breast Care Center (CBCC) with a million dollar gift from Avon to Georgetown Lombardi Comprehensive Center. CBCC, now under the leadership of Dr. Lucile Adams-Campbell, provides community education and navigation to DC area women.

When Avon ended its walk in 2017, Mandelblatt and her teammates recognized the need to carry the mission forward. And so, Walking Warriors Battling Breast Cancer was born. We are a 100% volunteer organization. Now in its third year, the Walking Warriors, an independent 501C3, funds research grants and community access to care. The team's guiding principles is that "no one walks alone"- in the battle against breast cancer.

Together, we are committed to walking to eliminate the burden of breast cancer in our lifetimes! "One team, one fight." For more information on how to join us or donate go to WWBBC.org.

Walking Warrior's congratulates Dr. Mandelblatt on her achievement.