0.94, 95% CI, 0.81–1.08) or AD use (OR 1.07, 95% CI, 0.93–1.22). When these exposures were included together in the same model, depression remained unassociated with breast cancer risk (OR 0.87, 95% CI, 0.74–1.03) while AD use exhibited a small, borderline significant increase in risk (OR 1.15, 95% CI, 0.98–1.35). The latter association remained consistent for selective serotonin reuptake inhibitors (SSRIs; OR 1.16, 95% CI, 0.96–1.39) but was not apparent for other classes of ADs (OR 1.07, 95% CI, 0.85–1.35). Conclusions: These initial results indicate that depression is not associated with breast cancer risk, while we could not exclude a slight increase in risk associated with SSRI use. Further analyses will update exposure information over follow-up and also evaluate whether associations differ by menopausal status or hormone receptor disease subtypes. Clarifying the effects of these exposures on breast cancer risk will provide critical information for the millions of women who are depressed and/or use ADs.

Adolescent Endogenous Sex Hormones and Breast Density in Early Adulthood

Jung S, Egleston LB, Chandler DW, Horn LV, Hylton MN, Paris K, Klifa CC, Lasser NL, Le Blanc ES, Shepherd JA, Snetselaar LG, Stanczyk FZ, Stevens VJ, Dorgan JF

During adolescence the breasts undergo rapid growth and development under the influence of sex hormones. Although the hormonal etiology of breast cancer is hypothesized, it remains unknown whether adolescent sex hormones are associated with adult breast density, which is a strong risk factor for breast cancer. METHODS: Percentage of dense breast volume (%DBV) was measured in 2006 by magnetic resonance imaging in 177 women aged 25–29 years who participated in the Dietary Intervention Study in Children from 1988–1997 and had sex hormones and sex hormone binding globulin (SHBG) measured in serum collected on 1–4 occasions between 8 and 17 years of age. Multivariable linear mixed-effect regression models were used to evaluate the associations of adolescent sex hormones and SHBG with %DBV. RESULTS: Dehydroepiandrosterone sulfate (DHEAS) and SHBG measured in premenarche serum samples were significantly positively associated with %DBV (all Ptrend $\leq$ 0.03) but not when measured in postmenarche samples (all Ptrend $\geq$ 0.42). The multivariable geometric mean of %DBV across quartiles of premenarcheal DHEAS and SHBG increased from 16.7% to 22.1% and from 14.1% to 24.3%, respectively. Estrogens, progesterone, androstenedione, and testosterone were not associated with %DBV pre- or post-menarche (all Ptrend $\geq$ 0.16). CONCLUSIONS: Our results suggest that higher DHEAS and SHBG levels during adolescence, particularly before the onset of menarche, are associated with higher%DBV in young women. Whether this association translates into an increased risk of breast cancer later in life is currently unknown.

E-cigarette and Traditional Cigarette Use Among Smokers During Hospitalization and 6 Months Later

Harrington KF, Cheong J, Hendricks S, Kohler C, Bailey WC

Use of electronic nicotine delivery systems, most commonly called e-cigarettes (e-cigs,) has been rising over the past few years, with the greatest use among traditional cigarette smokers. The utility and harm of this group of emerging tobacco products are under debate. While some propose them as novel tobacco cessation tools, others decry their potential for sustained addiction and negative health effects. We examined smokers' e-cig use and smoking behaviors at hospitalization and 6 months later. Methods: 979 smokers hospitalized at a tertiary care medical center were recruited to a longitudinal observational study and provided baseline data during hospitalization and 6-months later. Past 30-day (current) e-cig use and smoking rates at both baseline and 6-month follow-up were examined with t-tests. Chi square test examined baseline e-cig use and 6-month smoking status. Results: 823 (84.1%) participants provided data at both time points: mean age was 46 years; 53.6% were White, 44.0% were Black, and 2.5% other; 22.5% had less than a high school degree, 38.8% had a high school diploma/GED, and 38.7% had some college or more; 30.8% were married/domestic partner and 53.6% were male. Current e-cig use was reported by 171 (20.7%) at baseline and 246 (29.9%) at 6-month follow-up, with 98 (11.9%) reporting current e-cig use at both time points. At 6-months follow-up, 12.2% of baseline current e-cig users vs. 13.4% of baseline non-users reported quitting smoking ($P = 0.80$), with 22% of baseline e-cig users who quit still using e-cigs at 6–months follow-up. Baseline current e-cig users reported higher daily cigarette consumption (14.1 vs. 11.9; $P = 0.010$) at baseline but not 6-months later (10.3 vs. 9.8; $P = 0.619$); whereas, continuing smokers with current e-cig use at 6 months follow-up reported fewer cigarettes per day (8.4 vs. 10.5; $P = 0.008$). Conclusions: Among adult smokers, current e-cig use at hospitalization was associated with higher cigarette consumption at baseline but was not predictive of quitting or consumption (among continuing smokers) at 6-months follow-up. Further, current e-cig use at 6 months was associated with a greater reduction in cigarettes smoked per day among continuing smokers at 6-months after hospitalization.

Statewide Vaccine Registry Data Indicate High Number of Missed Opportunities for the HPV Vaccine Among Eligible Girls

Kepka D, Balch A, Warner E, Spigarelli M

This study investigates the rate of missed opportunities for the HPV vaccine among eligible girls using statewide vaccine registry data. Methods: Using data from the Utah Statewide Immunization Information System (USIIS) from 2008–2012 for approximately 55,000 girls ages 11–18, we assessed the frequency of missed opportunities (receipt of other recommended vaccinations such as TDap, MCV4, and/or flu and not the HPV vaccine)

among eligible female patients for the HPV vaccine. USIIS is a free, confidential, web-based information system that contains immunization histories for Utah residents of all ages. Records of all persons born in Utah since 1998 are in USIIS. USIIS is designed to help enrolled healthcare providers track immunization records for patient care by consolidating immunizations from enrolled providers into one centralized record. Vaccine administration from 86% of healthcare providers in Utah is reported to USIIS. USIIS data used for the study include date of birth, age, gender, ethnicity and race, zip code, and date and type of vaccine received. Descriptive statistics and chi-square tests were used to assess rate of missed opportunities for the HPV vaccine and associated demographic factors. Results: Approximately 65% of preteens (ages 11–12; $N = 2{,}593$) and 32% of female teens (ages 13–18; $N = 4{,}937$) had a missed opportunity for the HPV vaccine between years 2008–2012 in Utah ($P < 0.001$). Race and ethnicity related to rates of missed opportunities for the HPV vaccine among all girls ages 11–18 (Whites = 36%, $N = 2{,}454$; Hispanics = 21%, $N = 254$) ($P < 0.001$). Rural and urban locations were also associated with rates of missed opportunities for the HPV vaccine (urban = 31%, $N = 4{,}448$; large rural town = 42%, $N = 202$) ($P < 0.001$). Conclusions: For more than eight years, a vaccine to prevent cervical and other HPV-related cancers has been available, yet receipt of the 3-dose HPV vaccine in the United States is far below national goals for girls (33% vs. 80%; actual vs. target). Using statewide vaccine registry data, our study demonstrates that administering the HPV vaccine when providing other recommended adolescent vaccinations may dramatically improve rates of HPV vaccination among girls in a state with low HPV vaccine uptake. In addition, targeting rural communities and non-Hispanic White patients may further reduce missed opportunities.

Effects of a 16-week Resistance and Aerobic Exercise Intervention on Metabolic Syndrome in Overweight/Obese Latina Breast Cancer Survivors

Dieli-Conwright CM, Mortimer JE, Spicer D, Tripathy D, Buchanan T, Demark-Wahenfried W, Bernstein L

This randomized controlled trial was designed to assess the effects of a 16-week combined (aerobic and resistance) exercise intervention on metabolic syndrome (MetS) in overweight and obese Latina breast cancer survivors (LBCS). MetS is associated with increased risk of cardiovascular diseases, type 2 diabetes, and possibly cancer recurrence, and is defined by increased waist circumference (WC), elevated blood glucose (BG), high triglycerides (TG), low high-density lipoprotein cholesterol (HDL), and elevated blood pressure (BP). Methods. Forty LBCS (BMI ≥ 25 kg/m2) were recruited from the USC Lee Breast Clinic and Los Angeles County Hospitals. Participants were randomized to either the Control (CON; $n = 20$) or the Exercise (EX; $n = 20$) groups. Participants were tested for MetS outcomes including BP, WC, fasting levels of FBG, HDL, and TG at baseline, post-intervention, and 12-weeks post-intervention (EX group only). The EX group participated in aerobic and resistance exercise sessions 3 times a week for 16 weeks, supervised by an exercise specialist at the WHEL. Aerobic exercise included cycling, walking, or jogging at 65–85% heart rate maximum. Resistance exercise was performed in circuit-fashion with 3 sets of 10–15 repetitions including upper and lower body exercises at 65–70% 1-repetition maximum. The CON group was asked to maintain less than 120 min/week of exercise during the study period. Repeated measures ANOVA was used to test for statistically significant between-group differences in MetS. Results. There were no significant group differences in MetS between the EX and CON groups at baseline ($P > 0.01$). However, post-intervention, all MetS components were significantly lower in the EX group than the CON group ($P < 0.01$). Further, in the EX group, MetS at 12-week post-intervention was not statistically different from post-intervention ($P > 0.01$). Conclusions. A 16-week supervised resistance and aerobic exercise intervention attenuated MetS in overweight and obese LBCS. Further, reductions in MetS components were maintained following the completion of the intervention, suggesting that the benefits of the intervention on MetS were sustainable in the absence of a supervised intervention.

Symptoms, Weight Loss and Physical Function in a Lifestyle Intervention Study of Older Cancer Survivors

Kenzik KM, Morey MC, Cohen HJ, Sloane R, Demark-Wahnefried W

Cancer is most often a disease of aging, and frequently, a disease for which obesity serves as a risk factor. Thus, many cancer survivors are older, overweight or obese, with higher illness burden, symptoms, and comorbidities. Against this backdrop, survivors are at increased risk for functional decline. The question is whether lifestyle interventions can still benefit older, sicker survivors? The purpose of this study was to examine how overweight long-term survivors' symptom severity prior to a diet and exercise intervention is associated with post-intervention function and to determine symptoms' effects on function through change in physical activity, diet quality, and weight status. Methods This is a secondary data analysis of 514 breast, prostate, and colorectal cancer survivors who participated in the one-year home-based diet and exercise intervention, Reach-Out to Enhance Wellness (RENEW) trial. Pre- and post-intervention data were analyzed. Measures of this study included pre-intervention symptoms, changes in weight, physical activity, diet quality, and post-intervention overall physical function (PF), and basic and advanced lower extremity function (BLEF and ALEF). Simple and serial mediation analyses were conducted to examine direct effects of symptom severity on BLEF and ALEF and the indirect effects of symptom severity through changes in diet quality, physical activity, and weight status. Results Increased symptom severity was directly associated with lower functioning scores for PF (b $= -0.63$ $P < 0.001$), BLEF (b $= -0.33$, $P < 0.001$) and ALEF (b $= -0.22$, $P < 0.001$). Indirect effects of symptom severity through weight loss, physical activity and diet were not significant. Weight loss and increased physical activity were significantly associated with higher

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