## Postmenopausal Hormone Therapy Is Primarily Associated with Reduced Risk of Colorectal Cancer Arising through the Adenoma-Carcinoma Pathway

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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 postmenopausal 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.

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## Do-It-Yourself Sunscreen Tutorials on YouTube

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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.

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## A Retrospective Study of Administrative Data to Identify Factors Associated with Future Disability Status among Older Colorectal Cancer Survivors

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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 and colleagues 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.

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## 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

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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% CI 0.89–0.90; 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% CI 0.98–1.03). 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.

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## 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

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.

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