

Recent Findings



Smoking Cessation and Weight Gain: An Ongoing Debate

Weight gain associated with smoking cessation can act as a deterrent to smokers considering quitting. In two analyses of the Nurses' Health Studies from last year, researchers set out to examine if weight gain after smoking cessation is avoidable and if the health benefits of quitting outweigh the health risks of gaining weight.

The first study, conducted by researchers from the Harvard T.H. Chan School of Public Health, looked at nearly 20,000 participants in the NHS and NHSII cohorts who were smokers at baseline. Even though women who quit smoking, on average, experienced significant weight gain, the researchers estimated that the weight gain could be avoided by engaging in at least 30 minutes of moderate-to-vigorous exercise per day and following a healthy diet, defined by: ≤ 2 servings per week of unprocessed red meat; ≥ 5 servings per day of fruits and vegetables; minimal sugar-sweetened beverages, sweets and desserts, potato chips or fried potatoes, and processed red meat. By following these healthy habits, researchers estimated that women who quit smoking would have gained, on average, 13 pounds less than those who quit without incorporating healthy diet and exercise into their routine.

The second study looked at the risk of developing cardiovascular disease or dying of any cause among people with type 2 diabetes in the NHS and Health Professionals Follow-up Study (HPFS) cohorts. People who quit smoking without any weight gain had a significantly reduced risk of cardiovascular disease and mortality.

Smokers who gained weight after quitting still had a reduced risk of mortality when compared with people who continued to smoke. However, weight gain largely attenuated the beneficial effects

of quitting on the risk of cardiovascular disease. Nonetheless, regardless of weight change, smoking cessation universally led to significantly reduced risk of premature deaths, especially deaths due to cardiovascular causes. Among diabetics, smoking cessation alongside weight management results in even greater health benefits. Taken together, these two studies indicate that weight gain after smoking cessation does not outweigh the health benefits of quitting. Minimizing weight gain through diet and exercise can maximize the health benefits of quitting.



“5-a-day” for a Longer Life

Diets rich in fruits and vegetables help to reduce the risk of developing numerous chronic health conditions that are leading causes of death, including cardiovascular disease and cancer. Our researchers investigated the association between fruit and vegetable intake and mortality in the NHS and HPFS cohorts. We also conducted a meta-analysis pooling results from 26 studies that included about 1.9 million participants from 29 countries and territories in North and South America, Europe, Asia, Africa, and Australia to further examine this association. Their results showed that about five servings of fruits and vegetables daily was associated with the lowest risk of death, with little additional benefit from eating more than five servings. Not all fruits

“**Diets rich in fruits and vegetables help reduce risk for numerous chronic health conditions.**”

and vegetables are equally beneficial, however; the greatest health benefits came from eating green leafy vegetables and fruits rich in beta carotene and vitamin C (citrus fruits, berries, and carrots). On the other hand, starchy vegetables like potatoes were not as beneficial.



Attending Religious Services and Hypertension

In an analysis of NHSII data from 2001-2003, investigators examined how religious service attendance, religious coping, and hypertension might be related. Looking at nearly 45,000 women, the investigators found that the women who attended religious services were slightly less likely to develop hypertension than women who did not. The association was strongest among women who attended at least once per month, and there is evidence that the relationship is mediated through body mass index. When looking at religious coping, results showed that religious coping had a marginal association with hypertension. The researchers concluded that religious service attendance

was modestly associated with decreased risk of hypertension through the possibility of lowering body mass index, and that future research is needed to elucidate the biological and social mechanisms for this decreased risk of hypertension.



Better Diet Quality Associated with Better Breast Cancer Outcomes

Investigators examined whether a healthier post-cancer diet among women with breast cancer in NHS and NHSII led to better outcomes. Our investigators looked at a diet pattern that is associated with a lower risk of diabetes, with components including higher intakes of cereal fiber, coffee, nuts, and whole

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Nurses' Health Study Participant Names NHS as Beneficiary (cont. from page 1)



If you have daughters and granddaughters as I do, you want to hand down a legacy to future generations, and this is the way to do it.



In the many roles Gail held—from launching new projects and programs to writing and securing grants—her eagerness to chart new territory was evident throughout her long career. This was especially evident when she served as the nurse practitioner for San Diego's first charter school that largely accommodated underserved students with educational, mental, and physical health challenges. In all, Gail held 13 positions that spanned every grade level and multiple programs until retiring 10 years ago at the age of 72.

So it's no surprise that when Gail was invited to participate in the first cohort of the Nurses' Health Study in 1976, she readily agreed; eager to join the pioneering

effort led by Brigham and Women's Hospital and Harvard Medical School.

For 45 years, Gail has faithfully completed the biennial survey, answering questions about her health and lifestyle. "With such a paucity of research out there for women's health issues, this study is so important," says Gail. "I've been extremely honored to be a part of it."

Inspired by the investigation's groundbreaking implications and grateful for the opportunity to participate, Gail named the study in her estate plans. Working with her attorney, she named the study as a beneficiary of her trust. In honor of her generosity, the hospital welcomed her into The Brigham Legacy Society, which celebrates those dedicated to shaping the future of medicine by making a planned gift to the Brigham.

Gifts like Gail's are instrumental in sustaining and growing the Nurses' Health Study, particularly as funding for epidemiologic research around the world has not kept pace with research opportunities and cost.

"My hope is that the study will keep going for a long time and will impact areas of women's health that haven't been addressed before," she says. "If you have daughters and granddaughters as I do, you want to hand down a legacy to future generations, and this is the way to do it."

fruits, along with a lower glycemic index, and lower intakes of trans fat, sugar-sweetened beverages/fruit juices, and red meat. The research team assigned each participant a score based on the degree to which they complied with each of the items in the scale. Women with the highest scores, or in other words, with the 'healthiest' dietary pattern, had a 17% lower risk of breast cancer-specific mortality compared with those with the lowest scores. Women with high scores also had a 33% lower risk of dying from any cause. Finally, women who improved their score from low to high after their breast cancer diagnosis were 19% less likely to die from that cancer than women who consistently maintained a low diet score.



Inflammatory Diets Associated with Higher Risk of Colorectal Cancer

Previous research has found that a dietary pattern with high intakes of foods such as red meat, processed meat, refined grains and high-calorie beverages has the potential to cause harmful inflammation in the body, which in turn is associated with increased risk of developing colorectal cancer in women and men. In a recent analysis, Dr. Fred K. Tabung and colleagues analyzed the dietary patterns of 121,500 women and men from NHS and HPFS and developed scores based on 18 food groups to characterize the potential

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Diets with higher inflammatory potential were associated with a higher risk of developing colorectal cancer.
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of individuals' diets to contribute to chronic systemic inflammation. There are two types of inflammation: helpful inflammation, such as when your body's immune system responds to a foreign invader and your skin heats up to fight off bacteria; then there is

harmful or chronic inflammation, which hampers the body's ability to fight off disease, including cancer. There are several stimulators of chronic inflammation, and diet is one of those factors that can constantly stimulate the body toward a more chronic inflammatory state, depending on the type of habitually consumed dietary pattern.

The researchers found that diets with higher inflammatory potential were associated with a higher risk of developing colorectal cancer during the 26-year follow-up period. When women and men were analyzed together, those whose diets were the most pro-inflammatory had a 32% greater risk of developing colorectal cancer than those whose diet contained the lowest amounts of inflammation-causing foods. For women alone, the relative risk increase - 22% - was smaller than for men (44%) but still significant. Dietary recommendations on how to lower the inflammatory potential of the diet are to consume a dietary pattern with lower intake of processed meat, red meat, refined grains, and sugar-sweetened beverages coupled with higher intake of green-leafy vegetables, dark-yellow vegetables, coffee, and tea.



Healthy Lifestyle Habits and Life Expectancy Free of Chronic Disease

Does a healthy lifestyle after being diagnosed with an illness help to keep you healthy? Using data from up to 28 years of follow-up in HPFS and 34 years of follow-up in NHS, researchers analyzed the effect of healthy lifestyle factors on life expectancy free of cancer, cardiovascular disease, as well as type 2 diabetes and survival expectancy after diagnosis of these diseases. In detail, the five healthy behaviors included: not smoking, eating a healthy diet, regularly exercising (30+ minutes a day of moderate to vigorous activity),

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A healthier lifestyle was associated with a lower risk of cancer, cardiovascular disease, and diabetes.”

keeping a healthy body weight (a BMI of 18.5-24.9), and moderate alcohol consumption (5-15 grams/day for women - one drink or less - and 5-30 grams/day - 2 drinks or less - for men).

The results indicated that a healthier lifestyle was associated with a lower risk of cancer, cardiovascular disease, and diabetes as well as lower mortality, with an increased total life expectancy and number of years lived free of these

diseases. Adherence to a low-risk lifestyle was associated with a longer life expectancy free of major chronic diseases, adding approximately 7.6 years in men and 10 years in women when compared with participants who had not adopted any of the lower risk lifestyle factors.

The findings suggest that promotion of a healthy lifestyle would help to reduce the healthcare burden through lowering the risk of developing multiple chronic diseases, including cancer, cardiovascular disease, and diabetes, and extending disease-free life expectancy.



Consuming More Olive Oil is Associated with Less Heart Disease

Olive oil has been traditionally used as the main culinary fat and cooking oil in Mediterranean regions and, recently, has become popular worldwide. Compared with people in the NHS and HPFS who consumed no olive oil, those who consumed at least 1.5 teaspoons of olive oil per day had a 14% lower risk for cardiovascular disease and an 18% lower risk for coronary heart disease. Olive oil was better in reducing cardiovascular disease than most animal fats and margarine, although other vegetable oils appeared to have similar benefits in this study population. These findings support current recommendations to replace saturated and animal fats with unsaturated plant oils, such as olive oil, for the prevention of cardiovascular disease.



DATA SECURITY & DATA SHARING

We work hard to earn—and maintain—your trust. We protect your answers to NHS questionnaires as we would protect our own private information. NHS data are stored only by study ID number, never by name or SSN. We do not share any identifiable data with genealogy companies, or with the US or foreign governments.

We have never had a data breach. De-identified data may be shared with other scientists, but never in a way that it can be connected with the person who provided that information. We do participate in scientific consortiums in which several studies combine their data about a particular disease (often rarer cancers like pancreatic, ovarian, or hematologic) to maximize the size of the data pool.

Again, no information that can be traced back to an individual is ever shared.

Study Updates

MICRO-N

Our project to collect stool samples from as many NHSII participants as possible is on-going. To date over 14,500 nurses have submitted stool and saliva samples. If we reach out to you, we hope you will agree to participate. Studying the human microbiome is one of the cutting-edge areas where our work can really advance scientific knowledge.

guts GROWING UP TODAY STUDY

The Growing Up Today Study (GUTS) has been following the offspring of Nurses' Health Study II participants since 1996. Today, over 27,000 GUTS participants, who are now in their thirties and forties, are helping us study health through the life course. If your kid(s) are in GUTS, we hope you'll encourage them to visit GUTSlogin.org to complete the 2021 GUTS questionnaire. They (or you) can email us at guts@channing.harvard.edu with any questions or with issues logging in. We hope to hear from as many GUTS participants as possible! So far in 2021, we have had a great turnout, with about 9,000 GUTS members completing the survey. Long-term research of this kind is only possible thanks to the generous commitment of both GUTS and NHS II participants. Your kids' continued participation is important for studying how factors early in life and between generations can influence health and well-being in adulthood. There are several new sub-studies that will be enrolling soon! A list of recent GUTS-related research can be found at our redesigned website, gutsweb.org. Even if it has been a few years since your son or daughter last participated, we'd love to hear from them in 2021!



NURSES' HEALTH STUDY 3

RECRUITMENT

The Nurses' Health Study 3 (NHS3) team is renewing efforts to boost recruitment of participants in the next generation of the Nurses' Health Study. With the aim of ensuring that the cohort reflects the changing nursing profession, we especially hope to increase participation of men and racial/ethnic minorities. We are almost halfway to our goal of 100,000 NHS3 participants! Thank you to those in NHS and NHS II who have spread the word for us. Please continue to direct any nurses or nursing students you know who may be interested (and born after 1964) to www.nhs3.org.

NEW RESEARCH EFFORTS

Thanks to a number of newly funded grants, NHS3 will be deepening our focus in a few different areas. We continue to be interested in pregnancy and related life experiences, and we have an ongoing study to collect a blood sample among women who are pregnant. We are about to begin a large biospecimen collection from thousands of NHS3 participants, which will make NHS3 an even stronger resource for investigating pulmonary and cardiovascular health. Lastly, we plan to expand our work examining how the environment can impact health, by collecting environmental samples from participants who are also providing biospecimens.

Like NHS3 on Facebook to see updates on findings, and visit our redesigned website at www.nhs3.org,



GOING ELECTRONIC

Completing your online survey is simple, secure and easy. Over 70,000 participants in the NHS and NHSII completed their 2019 questionnaires on the web. During the Covid-19 pandemic, this was especially helpful to us, as our staff were not able to work in the office to receive and process mailed forms. Receiving surveys electronically is extremely beneficial as it speeds data processing, diminishes environmental impact, reduces errors and saves money. If possible, we would be most grateful if you complete future questionnaires online.

FOCUS ON THE NHS TEAM:

Heather Eliassen, ScM, ScD



Dr. Heather Eliassen has worked with the Nurses' Health Studies since she came to Harvard as a doctoral student in 1999. She is now Professor of Nutrition and Epidemiology at the Harvard T.H. Chan School of Public Health and Associate Professor of Medicine and Epidemiology at Harvard Medical School, Associate Director of the Channing Division of Network Medicine and Associate Epidemiologist at Brigham and Women's Hospital.

Dr. Eliassen is a cancer epidemiologist with a focus on breast cancer. Her main goal is to identify ways in which women may reduce their risk of

breast cancer through changes in lifestyle. She utilizes our stored biospecimens to better understand how factors such as body weight and diet impact risk of breast cancer, using measures in blood such as endogenous hormones, carotenoids, and the relatively new field of metabolomics. She also studies the experiences of breast cancer survivors in our cohorts, investigating whether diet or lifestyle factors after diagnosis may improve survival.

Dr. Eliassen oversees research operations for the cohorts, working with our fantastic team members who are experts in questionnaires and data collection, data management, and managing our archived biospecimens. She also enjoys mentoring students, postdoctoral fellows, and faculty, supporting their research programs and career development.

Outside of her work on the Nurses' Health Studies, Dr. Eliassen enjoys spending time outside hiking, biking, cross-country skiing, and running with her family, including her husband Wyatt, who teaches at Emerson College in Boston, and daughters Alta, age 14, and Piper, age 12, and their Labrador retriever.

Nurses' Health Study Responds to Covid-19 continued from page 1

Common themes emerged, although the concerns of the nurses shifted throughout the year. Early in the pandemic, many people were challenged by abrupt changes to workplace mandates regarding PPE reuse and rationing. Mandated furloughs and unplanned redeployment were also common stressors. Later, there was more burn-out and frustration as participants felt they were asked to shoulder ever greater responsibilities at home and at work. Many nurses spoke about the internal stresses of being a 'hero'. There were some bright spots about supportive colleagues and communities, but your candid comments have painted a very clear picture about an extraordinarily stressful year.

The Covid study has fostered important analyses on diverse topics, from cognitive and psychological impacts to sexual orientation-based inequities to how Covid-19 affects the gut microbiome. Specific topics addressed by the Covid study have shifted to meet the changing landscape of the pandemic: while the first questionnaires targeted information concerning acute

symptoms, access to personal protective equipment (PPE) and job stress, the focus has since shifted to vaccination, resilience factors, lifestyle changes, and the experience of "Long Covid." Importantly, participant feedback was taken into account when designing questionnaires.

Though the end of the Covid-19 pandemic seems increasingly elusive, the United States has seen a massive reduction in new cases and deaths from the disease, and for many in the U.S., life is returning to some sort of normalcy. Thanks to the unwavering resilience of frontline healthcare workers and the families and friends that support them, we are likely through the worst of it. Through the Covid-19 sub-studies, researchers will hopefully gain a deeper understanding of the direct and collateral effects of the pandemic and associated shut-downs on the health and well-being of cohort participants, providing concrete evidence to help the government and the healthcare profession to respond better in the future.

Friends of the Nurses' Health Study

We are deeply grateful to the participants who made donations or who chose to honor the Nurses' Health Study in their estate plans. Please see the story on page 1 about Gail, one of the participants in NHS, who has kindly remembered the study in her trust. The generosity of participants like Gail will help to sustain and expand our research for future generations.

Make a Tax-Deductible Donation Today:

To make a gift online: Visit nurseshealthstudy.org/donations

To donate by mail: Make your check payable to *Friends of the Nurses' Health Study* and mail it to us using the enclosed reply envelope at the address below..

There are many ways that you can support the Nurses' Health Study:

- Donate cash or appreciated securities
- Make a qualified charitable distribution from your IRA
- Name the Nurses' Health Study as a beneficiary of your will, trust, retirement plan, or life insurance policy
- Create a gift that provides you and/or a loved one with lifetime income such as a charitable gift annuity

If you need assistance or would like to speak to someone about supporting our work, please contact Danielle Hernon at 617-424-4334 or dhernon@bwh.harvard.edu

Thank you. Your support truly makes a difference.

Staying in touch

To report name or address changes, please visit www.nurseshealthstudy.org
Letters and feedback are welcome!



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