


The Nurses' Health Studies




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Overview

1. How it all began
2. The original cohort and its expansions
3. The second cohort (NHS II) and its expansions
4. The third cohort (NHS III) begins
5. Summary of major findings
6. Contribution to social epidemiology



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The Nurses' Health Studies - The Beginning -



DR. SPEIZER

DR. WILLETT

DR. COLDITZ

DR. HANKINSON

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Harvard Medical School, Boston



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Original Cohort

- Established in 1976 by Dr. Speizer with funding from the National Institutes of Health
- Primary goal: investigate the potential long term consequences of oral contraceptive use
- Registered nurses were followed over time (prospectively):
 - Pilot studies led to nurses as a suitable population for study at low cost and high efficiency
 - Their medical training would provide a high degree of accuracy in the information provided
 - Highly motivated to participate in a long term research study on health

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Original Cohort

- 121,700 married, female registered nurses
- 30-55 years of age at that time
- 11 states in the US when enrolled
- Major initial hypotheses:
 - Oral contraceptive use and breast cancer
 - Smoking and cancer
 - Hair dyes and breast cancer
 - Postmenopausal hormones and cancer
- Follow up questionnaires sent out every 2 years
 - Response rates are at 90%

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Original Cohort Expansions

- The first food frequency questionnaire was collected in 1980
 - The FFQ measured dietary intake and allowed researchers to study possible links between nutrition and disease.
- Quality of life questionnaires were added in 1992
 - Used to assess factors that influence healthy aging (i.e. weight maintenance, physical activity)
- Other updated exposures included:
 - Reproductive factors, weight, smoking, use of hormones and other medications...
- Sample collection:
 - Toenail samples to measure minerals that become incorporated in food from the soil in which it is grown
 - Blood samples to identify potential biomarkers

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NHS II

- Established in 1989 by Dr. Willett with funding from the National Institutes of Health
- Primary study goals: oral contraceptives, diet, and lifestyle risk factors in a younger population
- Initial target population: female nurses between the ages of 25 and 42
 - 116,686 women in the final NHS II cohort
- Follow up questionnaire sent out every 2 years; topics include:
 - Smoking, hormone use, pregnancy history, and menopausal status

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NHS II Expansions

- The first food frequency questionnaire was collected in 1991
- A quality of life supplement was included in 1993
- Blood and urine samples were collected from approximately 30,000 nurses in the late 1990's
 - Blood collection used to evaluate various markers and exposures of disease risk: endogenous hormones, lipids, genetic markers, assessment of etiologic pathways, support lifestyle findings...
- Response rates are at 90%

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NHS III

- Launched in 2010 to examine how new hormone preparations, dietary patterns, and nursing occupational exposures impact women's health
- New features:
 - Closer look at fertility and pregnancy events, greater focus on adolescent diet and breast cancer risk, more ethnically diverse backgrounds...
- Recruitment of 100,000 licensed female nurses and nursing students, age 20 to 46, from the US and Canada
- Entirely web-based questionnaires

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NHS III Enrollment

- | Who can join? | What is involved? |
|--|--|
| <ul style="list-style-type: none"> • Female nursing students, LPNs, RNs, BSNs, NPs, etc... <ul style="list-style-type: none"> ▫ Can have subsequent degrees or certifications ▫ Do NOT need to be an active practitioner • Ages 20 to 46 (born after January 1, 1965) • Living in the US or Canada | <ul style="list-style-type: none"> • Visit www.nhs3.org and join the study • Complete questionnaires at entry, 6 months, 12 months, and then approximately every 2 years • Approximately an hour of time a year spent on questionnaires • Entirely web-based |

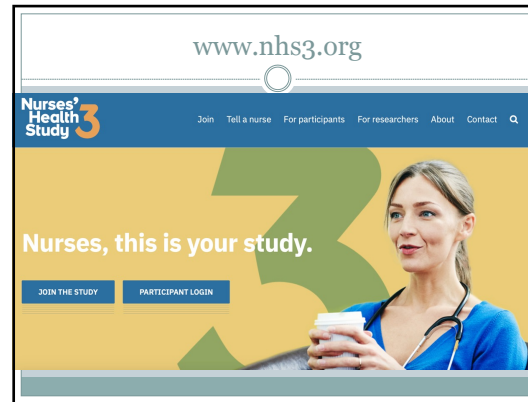
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www.nhs3.org

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The Nurses' Health Study

NHS	NHS 2	NHS 3
<ul style="list-style-type: none"> Started in 1976 121,700 registered nurses aged 30-55 Biennial follow-up questionnaires Blood & urine (2000) specimen sampled 	<ul style="list-style-type: none"> Started in 1989 116,678 registered nurses aged 25-42 Urine specimen sampled from 1996-1999 26,613 participants 	<ul style="list-style-type: none"> Started in 2010 Recruiting Online QQ Currently >50,000

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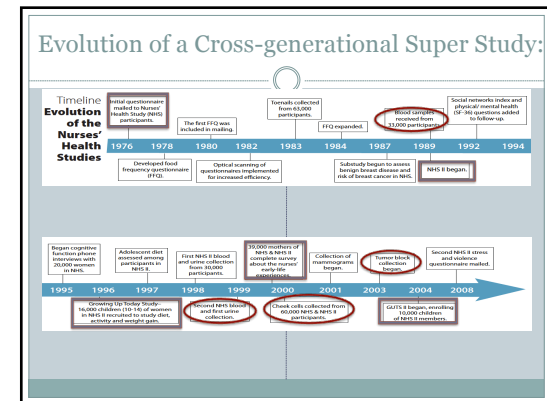
Cross-generational Super Study:

Growing Up Today Study
Children of nurses in NHS cohorts were enrolled in 1996: 27,805 girls and boys ages 9-14

The Nurses' Mothers' Study is a study in which 39,000 moms of nurses in NHS and NHS2 who were alive participated

www.NursesHealthStudy.org

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Cohort Website: chandoc.bwh.harvard.edu

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1976 Baseline NHS Questionnaire

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2019 NHS Questionnaire

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2021 NHS Questionnaire

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The NHS Infrastructure Team

Sue-Wei Chiang, Maren Ireland, Sherry Hahn, Lisa Dunn, Lori Ward, Marion McPhee, Steven Stuart, Gary Chase, Karen Conzano, Cindy Neholaine, Frank Speizer, Barbara Egan, Laura Sampson

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Unix system - ascii files - raw and derived data

The screenshot shows a Unix terminal window with two columns of text. The left column contains raw data, and the right column contains derived data. The text is a mix of code and data, likely related to a bioinformatics pipeline.

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Internal Manuscript Review

1. Program review
 - o Data ID form
 - o Manuscript
2. Technical review
3. Statistical review
3. Channing review
 - o Manuscript
 - o Signed data ID form
 - o Manuscript check list

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Manuscript checklist Data id form

The screenshot shows two forms side-by-side. On the left is a 'MANUSCRIPT CHECKLIST' with various checkboxes and fields for reviewers to mark. On the right is a 'MANUSCRIPT DATA IDENTIFICATION FORM' with a table for listing data files and their locations.

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Epidemiological Study Designs

A graph showing the relationship between Validity (y-axis) and Cost (x-axis) for different study designs. The designs are plotted as follows:

- intervention trial (highest validity, highest cost)
- prospective cohort study (circled in red, high validity, moderate cost)
- retrospective cohort study (moderate validity, moderate cost)
- nested case-control study (moderate validity, low cost)
- case-control study (moderate validity, low cost)
- cross-sectional study (low-moderate validity, low cost)
- ecological study (low validity, low cost)
- case series (low validity, low cost)
- anecdotes (lowest validity, lowest cost)

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Major Findings: Coronary Heart Disease

- Risk of CHD increased as number of cigarettes per day increased. Even light smokers who smoked 1 to 4 cigarettes per day were more than twice as likely to develop CHD when compared to women who had never smoked.¹
- Walking and vigorous exercise are associated with substantial reductions in the incidence of coronary events. Brisk walking for 3 or more hours per week could reduce the risk of coronary events in women by 30 to 40%.

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Major Findings: Coronary Heart Disease

- Intakes of foods that are major sources of trans fats (e.g. margarine, cookies, cake, and white bread) were each significantly associated with higher risks of CHD. These findings support the hypothesis that consumption of partially hydrogenated vegetable oils may contribute to occurrence of CHD.²

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Trans fats

Artificial trans fats, widely linked to heart disease, are officially banned



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1 Democrats prepare for next phase of budget fight as House readies package and Biden meets with Senate skeptics

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Trans fats banned in 2018

- **The Washington Post:** “Once ubiquitous in everything from frozen pizza to coffee creamer to popcorn, artificial trans fats are — as of June 2018 — banished from U.S. restaurants and grocery stores.
- Food-makers have had three years to phase out the ingredient, which the FDA ruled unsafe to eat in 2015.
- Nutrition researchers and public health advocates long ago found artificial trans fats, a modified form of vegetable oil, raised “bad” cholesterol and contributed to heart disease.”

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150+ Articles Targeting Psychological or Social Factors

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Assessment of Depression

- 5-item Mental Health Index
- 10-item Center for Epidemiologic Studies-Depression
- 15-item Geriatric Depression Scale
- Anti-depressant use
- Clinician diagnosed depression

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Depression Risk Factors

- Long sleep duration
- Restless legs syndrome
- Urinary/fecal incontinence
- Psoriasis/psoriatic arthritis
- Genetic factors
- Coffee consumption:
 - Among 50,739 women, there was a 20% lower risk of depression for those in the highest vs. lowest categories of caffeine intake.¹



¹ Lucas M, Mirzaei F, Pan A, et al. Coffee, caffeine, and risk of depression among women. *Arch Intern Med.* Sep 26 2011;171(17):1571-1578.

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