



CHEERS TO INCREASED AWARENESS: ALCOHOL CONSUMPTION AND FEMALE BREAST CANCER RISK

Julia Curry, PA-C, MPAS

Allina Health Cancer Institute, Department of Surgical Oncology

02/01/25



1

I HAVE NOTHING TO
DISCLOSE.


2

I COME IN PEACE.



https://en.wikipedia.org/wiki/Peace_Pilgrim

3

**National
Comprehensive
Cancer
Network®**

**NCCN Guidelines Version 1.2025
Breast Cancer Risk Reduction**

**NCCN Guidelines Index
Table of Contents
Discussion**

COMPONENTS OF RISK/BENEFIT ASSESSMENT AND COUNSELING

Options for risk reduction should be discussed in a shared decision-making environment. For breast cancer risk reduction, elements of this discussion include:

- Genetic testing
 - If an individual is at elevated risk for breast cancer due to a personal history of breast cancer, germline cancer, or breast cancer, or if the individual has a strong family history of cancer, genetic counseling should be offered. See [NCCN Guidelines for Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic](#).
- Healthy lifestyle for breast cancer risk reduction
 - Consider [discontinuation of use of hormone therapy](#) if appropriate.
 - Limit alcohol intake to no more than one drink equivalent in a day and no more than three drinks per week.
 - Engage in moderate-to-vigorous physical activity for at least 150–300 minutes of moderate-intensity physical activity per week, exceeding the upper level is optimal.
 - Weight control
 - In postmenopausal individuals, a BMI >25 can incrementally increase breast cancer risk.
- Risk-reducing agents (see [Discussion](#))
 - Discussion of relative and absolute risk reduction with tamoxifen, toremifene, or aromatase inhibitors.¹
 - Contraindications to tamoxifen or toremifene: history of deep vein thrombosis, pulmonary embolism, thrombotic stroke, transient ischemic attack, or known inherited clotting trait.
 - Contraindications to tamoxifen²: current pregnancy or pregnancy potential without effective nonhormonal method of contraception.
 - Hormonal intrauterine devices (IUDs) are not contraindicated with tamoxifen.
 - See [Table 1](#) for details and dosing.
- Risk-reducing surgery
 - Risk-reducing mastectomy should generally be considered in individuals with a pathogenetically pathogenic germline variant in high-penetrance breast cancer susceptibility genes (see [NCCN Guidelines for Genetic/Familial High-Risk Assessment: Breast, Ovarian, and Pancreatic](#)).
 - Ongoing family history, or breast imaging chest wall reduction, before 30 years of age. There is no established benefit of risk-reducing mastectomy in individuals with pathogenetically pathogenic variants in moderate- or low-penetrance breast cancer susceptibility genes in the absence of a compelling family history. While this approach has been previously considered for LCB, the currently preferred approach for LCB is a risk-reducing endocrine agent. Risk reduction is a complex and individualized process; the NCCN Panel does not recommend a specific risk cutoff for decision-making regarding risk-reducing mastectomy. Individualized management is important.
 - Whether the decision is made to spare the nipple or not, the completeness of the mastectomy is critical for optimal risk reduction.
- Options of participation in clinical research for screening, risk assessment, or other risk-reducing intervention.
- Relative use of pathogenic risk scores (PRS) in breast cancer risk assessment is discussed. Further validation is required to understand interaction of single nucleotide polymorphisms (SNPs) with environmental or hormonal risk factors and disease outcomes in diverse populations. Ongoing research will shed light on utility of PRS in comprehensive risk assessment models to guide personalized therapy.

https://www.nccn.org/professionals/physician_gls/pdf/breast_risk.pdf

4

OBJECTIVES

- Review current statistics on breast cancer incidence and risk factors
- Introduce U.S. and global statistics of alcohol-related cancer cases and deaths
- Outline current dietary guidelines regarding alcohol consumption in U.S.
- Identify sites of alcohol-related cancer
- Discuss proposed biological mechanisms of how alcohol influences cancer risk
- Explore how alcohol consumption affects female breast cancer risk
- Discuss barriers for clinicians in addressing alcohol consumption and cancer risk
- Share current efforts to reduce future cancer incidence related to alcohol consumption

5

Approximately 1 in 8 women in the U.S. (13.1%) will develop breast cancer, and 1 in 43 (2.3%) will die from the disease. ⁽¹⁾

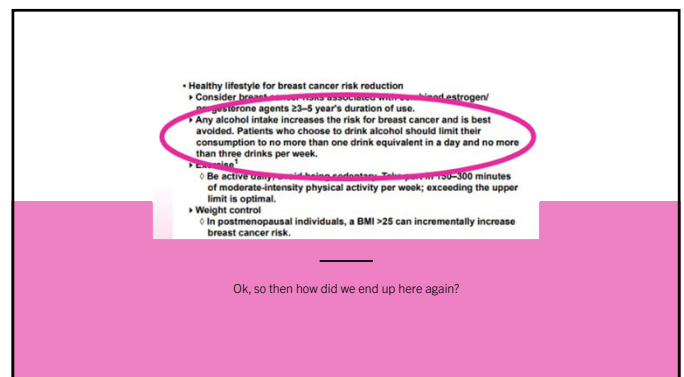
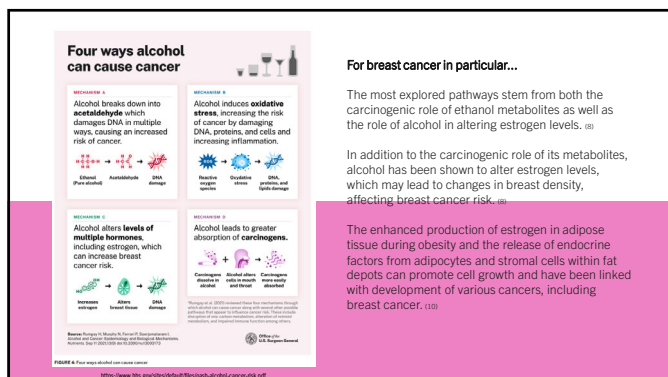
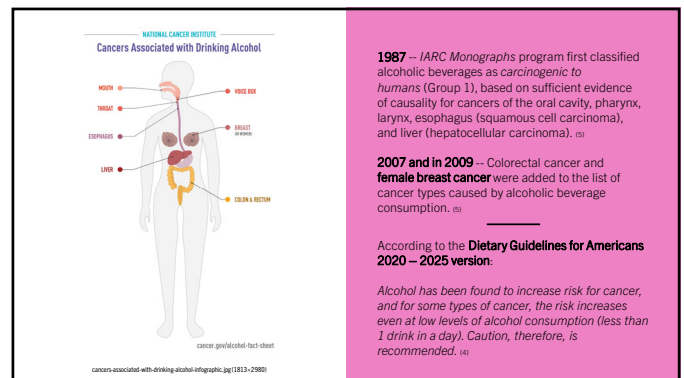
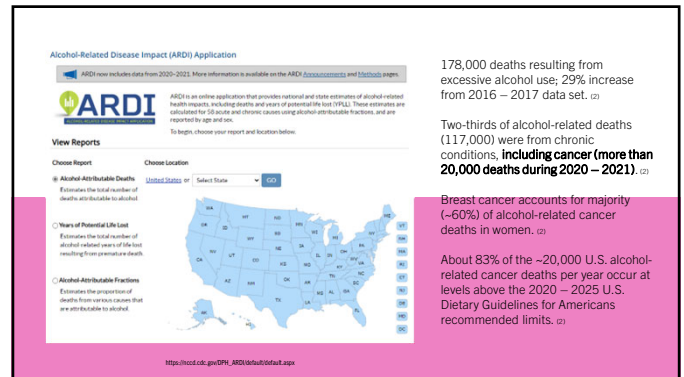
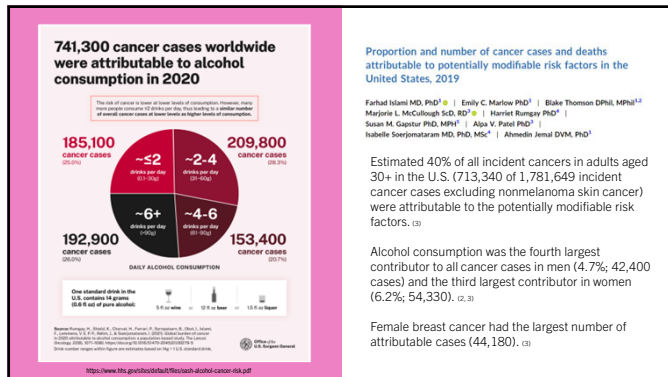
In 2024, an estimated 310,720 new invasive breast cancers will be diagnosed in the U.S.; 16% of which will be in women younger than 50 years old. ⁽¹⁾

Approximately 30% of breast cancer cases can be attributed to potentially modifiable risk factors, such as excess body weight (postmenopausal breast cancer), physical inactivity, and alcohol consumption. ⁽¹⁾

Relative risk	Factor
>4.0	Age 50+ versus 40+ years, although risk increases until all ages until age 80 Biopsy-confirmed atypical hyperplasia Cancer-related genetic mutations for breast cancer (e.g., BRCA1, BRCA2, PALB2, TP53) Lifestyle modifiers Personal history of early-onset (40+ years) breast cancer
2.1-4.0	Ductal carcinoma in situ High endogenous estrogen or testosterone levels (postmenopausal) High-dose radiation to chest (e.g., Hodgkin lymphoma treatment) Menopausal hormone therapy (20% or more breast) Menopausal history of breast cancer (50+ years) Two or more first-degree relatives with breast cancer
1.1-2.0	Alcohol consumption Body mass index (BMI) ≥30 years Height (tall) Late age at first full-term pregnancy (>35 years) Late age at menopause (55+ years) Never breastfed a child No full-term pregnancies One first-degree relative with breast cancer (breast) Personal history of endometrial or ovarian cancer Physical inactivity Proliferative breast disease without atypical hyperplasia Recent and long-term use of menopausal hormone therapy containing estrogen and progestin Recent hormonal contraceptive use Type 2 diabetes Weight gain in adulthood

Note: Relative risk for some factors may be breast cancer incidence relative to White, non-Hispanic women living in the United States and without family history.

6



Alcohol Consumption and Breast Cancer in the
Epidemiologic Follow-up Study of the First National
Health and Nutrition Examination Survey

Authors: Arthur Schatzkin, M.D., DR.P.H., D Yvonne Jones, Ph.D., Robert N. Hoover, M.D., Sc.D., Philip R. Taylor, M.D., S. M., Louise A. Brinton, Sc.D., Regina G. Ziegler, Ph.D., M.P.H., Elizabeth B. Harvey, Ph.D., Christine L. Carter, Ph.D., M.P.H., Lisa M. Licitra, B.A., Mary C. Dufour, M.D., M.P.H., and David B. Larson, M.D., M.S.P.H. Author Info & Affiliations

Published May 7, 1987 | N Engl J Med 1987;316:1169-1173 | DOI: 10.1056/NEJM198705073161901
VOL. 316 NO. 19

Moderate Alcohol Consumption During Adult Life,
Drinking Patterns, and Breast Cancer Risk

Wendy Y. Chen, MD, MPH
Bernard Rosner, PhD
Susan E. Hankinson, ScD
Graham A. Colditz, MD, DrPH
Walter C. Willett, MD, DrPH

Context Multiple studies have linked alcohol consumption to breast cancer risk, but the risk of lower levels of consumption has not been well quantified. In addition, the role of drinking patterns (ie, frequency of drinking and “binge” drinking) and consumption at different times of adult life are not well understood.

Objective To evaluate the association of breast cancer with alcohol consumption during adult life, including quantity, frequency, and age at consumption.

Design – Prospective observational study **105,986** women enrolled in Nurses’ Health Study, followed from 1980 – 2008 with periodic alcohol assessment questionnaires. (12)

13

14

Table 1. Demographic Characteristics	
	Consumption: Average Daily Alcohol Consumption, g/d
	0 3.0-9.9 10-29.9 30-59.9 ≥60
All women, No.	10,987 27,720 17,995 12,212 4,976
Age, mean (SD), y	47.7 (10.1) 47.7 (10.1) 47.7 (10.1) 47.7 (10.1) 47.7 (10.1)
Age at menarche, mean (SD), y	12.4 (1.6) 12.4 (1.6) 12.4 (1.6) 12.4 (1.6) 12.4 (1.6)
First live birth, mean (SD), y	27.6 (6.8) 27.6 (6.8) 27.6 (6.8) 27.6 (6.8) 27.6 (6.8)
Parity, mean (SD), No.	2.4 (1.2) 2.4 (1.2) 2.4 (1.2) 2.4 (1.2) 2.4 (1.2)
Married, %	88 88 88 88 88
Smoking status, %	
Never	18 18 18 18 18
Former	40 40 40 40 40
Current	42 42 42 42 42
Education, %	
Less than high school	12 12 12 12 12
High school graduate	22 22 22 22 22
Some college	32 32 32 32 32
College graduate	34 34 34 34 34
Postgraduate	2 2 2 2 2
Annual household income, \$, %	
<15,000	12 12 12 12 12
15,000-24,999	22 22 22 22 22
25,000-34,999	32 32 32 32 32
35,000-44,999	34 34 34 34 34
≥45,000	2 2 2 2 2
Region, %	
North	42 42 42 42 42
South	40 40 40 40 40
West	18 18 18 18 18
Midwest	12 12 12 12 12
Other	2 2 2 2 2
Time since last alcohol consumption, %	
<1 y	12 12 12 12 12
1-5 y	22 22 22 22 22
6-10 y	32 32 32 32 32
11-15 y	34 34 34 34 34
≥16 y	2 2 2 2 2
Time since last alcohol consumption, %	
<1 y	12 12 12 12 12
1-5 y	22 22 22 22 22
6-10 y	32 32 32 32 32
11-15 y	34 34 34 34 34
≥16 y	2 2 2 2 2

Results –

- Increased alcohol consumption was associated with increased breast cancer risk, and was statistically significant at levels as low as 5.0 - 9.9g per day (equivalent to 3 – 6 drinks / week) RR 1.15; 95% CI, 1.06 - 1.24 (12)
 - 30g alcohol daily (at least 2 drinks / day) had greater risk of BC (RR 1.51; 95% CI, 1.35 - 1.70) (12)
- Little difference regarding type of alcohol and association with breast cancer risk (12)
- Intake both earlier and later in adult life was independently associated with risk (12)
- Modest association with binge drinking, but not frequency of drinking (12)

Conclusions – Low levels of alcohol consumption were associated with small increase in breast cancer risk, also found strong association with cumulative drinking over multiple decades of life (12)

Moderate Alcohol Intake and Cancer Incidence in Women

Naomi E. Allen, Valerie Beral, Delphine Casabonne, Sau Wan Kan, Gillian K. Reeves, Anna Brown, Jane Green; on behalf of the Million Women Study Collaborators

Design – Prospective cohort study including 1,280,296 middle-aged women in the U.K. (part of the Million Women Study). Participants were recruited to the study between 1996 and 2001. Researchers identified cancer cases through the National Health Service Central Registries. (13)

Cox regression models were used to calculate adjusted relative risks and 95% confidence intervals (CIs) for **21 site-specific cancers** according to amount and type of alcoholic beverage consumed. (13)

Also examined associations by type of alcoholic beverage, smoking status, and (for breast cancer) use of hormone replacement therapy. (13)

15

16

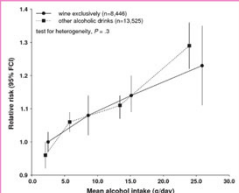


Figure 3. Relative risk (95% floating confidence interval) of breast cancer by amount and type of alcohol consumed (drinkers only). The relative risk is plotted against the mean (unrounded) value of alcohol intake (g/d) in each category. Analyses are adjusted for age, region of residence, socioeconomic status, body mass index, smoking, physical activity, use of oral contraceptives and hormone replacement therapy. FCI = floating confidence interval. “Other alcoholic drinks” is defined as drinkers of beer and/or spirits exclusively or a mixture of wine, beer, and/or spirits.

Results –

- Women in the study who drank alcohol consumed, on average, one drink per day (13)
- During an average 7.2 years of follow-up per woman 68,775 invasive cancers occurred (13)
- Risk of any type of cancer increased with increasing alcohol consumption (13)
- Trends were similar in women who drank wine exclusively and other consumers of alcohol (13)
- Found no difference in BC incidence in women who consumed alcohol and reported history or current use of HRT (13)

Conclusions – Regular consumption of low to moderate amounts of alcohol by women increases the risk of cancers of the upper GI tract (esophagus), rectum, liver, and breast, all of which have been classified by the IARC to be causally linked to alcohol intake (13)

ALCOHOL CONSUMPTION & INVASIVE BREAST
CANCER RISK BY SUBTYPE

European Prospective Investigation into Cancer and Nutrition (EPIC) study (14)

- In this prospective study of 334,850 women and 11,576 incident BC cases, an increased intake of 10 g of alcohol / day was related to a 4.2% increased BC risk (95% CI: 2.7 - 5.8%). This was observed for both ER+/PR+ and ER-/PR- tumor subtypes with the largest risk observed for triple negative tumors (ER-/PR-/HER2+).

Alcohol consumption and breast cancer risk by estrogen receptor status: in a pooled analysis of 20 studies (15)

- A pooled analysis of 20 cohort studies including 1,089,273 women over 6 – 18 years of follow-up with 21,624 ER+ and 5,113 ER- breast cancers. Alcohol consumption was positively associated with risk of ER+ and ER- breast cancer. The pooled multivariable RRs (95% confidence intervals) comparing ≥30 g / day with 0 g / day of alcohol consumption were 1.35 (1.23 - 1.48) for ER+ and 1.28 (1.10 - 1.49) for ER- breast cancer.

Moderate alcohol consumption during adult life, drinking patterns, and breast cancer risk (12)

- In the NHS cohort, alcohol consumption appeared to be more strongly associated with risk of ER+/PR+, ER-/PR- BC than with risk of ER-/PR- BC, but difference was not significant.

17

18

Chen et al. Breast Cancer Research (2024) 26:145
https://doi.org/10.1186/s13058-024-01894-7

Breast Cancer Research

BRIEF REPORT

Open Access

Increasing rates of early-onset Luminal A breast cancers correlate with binge drinking patterns

Jianju Chen¹, Rebecca Kehm^{1,2}, Wan Yang^{1,2} and Mary Beth Terry^{1,2*}

Design – Ecological study to examine whether alcohol consumption, and specifically binge drinking trends were associated with early-onset female breast cancer (age <40) using breast cancer data from Surveillance, Epidemiology, and End Results (SEER) Cancer Registry; study period was from 2010 – 2019. (22)

Accounted for a latent period before cancer diagnosis by using exposure 10 years before the outcome (10-year lagged analysis); also conducted a cumulative analysis, using the sum of exposure over the 10 years before the outcome. (22)

19

Chen et al. Breast Cancer Research (2024) 26:145

Page 4 of 7

	10-year lag	Cumulative		
Luminal A				
Binge drinking	1.06 (1.02, 1.11)**	0.006	1.05 (1.02, 1.07)**	<0.001
Daily drinking (≥1 drink/day)	1.02 (0.99, 1.04)	0.13	1.02 (1.00, 1.03)**	<0.001
Daily drinking (≥2 drinks/day)	1.05 (0.97, 1.04)	0.84	1.02 (1.02, 1.03)**	<0.001
Luminal B				
Binge drinking	1.04 (0.99, 1.09)	0.11	1.04 (1.02, 1.07)**	0.008
Daily drinking (≥1 drink/day)	1.03 (0.95, 1.12)	0.22	1.02 (1.00, 1.05)	0.03
Daily drinking (≥2 drinks/day)	0.98 (0.89, 1.07)	0.20	1.01 (1.00, 1.02)*	0.04
ERBB2-enriched				
Binge drinking	1.00 (0.91, 1.09)	0.96	1.00 (0.98, 1.02)	0.87
Daily drinking (≥1 drink/day)	0.99 (0.91, 1.04)	0.74	1.01 (0.99, 1.03)	0.03
Daily drinking (≥2 drinks/day)	0.99 (0.94, 1.04)	0.79	1.01 (0.98, 1.04)	0.00
Triple-negative				
Binge drinking	1.00 (0.90, 1.12)	0.81	1.01 (0.98, 1.04)	0.30
Daily drinking (≥1 drink/day)	1.00 (0.91, 1.10)	0.89	1.01 (0.99, 1.04)	0.37
Daily drinking (≥2 drinks/day)	1.00 (0.90, 1.11)	0.73	1.00 (0.97, 1.03)	0.79

Fig. 3 The association of binge and heavy alcohol drinking with ER, subtypes among 30–39 year-old women. ER, data came from SEER 17 years (20–39 years). ERBB2-enriched data came from BRISQ since 2003 (in account for time-lag between the exposure and cancer incidence). All reported with 95% confidence interval and standardized.

Results –

- Daily drinking (or moderate alcohol consumption, ≥1 and ≥2 drinks/day) was associated with Luminal A breast cancer in cumulative model (22)
- Binge drinking was associated with an increased rate of early-onset Luminal A breast cancer in both the 10-year lag and cumulative model (22)
- Binge drinking was also associated with early-onset Luminal B breast cancer in the cumulative model; but no associated with H2N or triple negative early-onset breast cancer in either model (22)

Conclusions –

- Findings support hypothesis that increased alcohol consumption (including binge drinking) may be one reason for increase in early-onset breast cancer incidence, and that the association between binge drinking may be specific to hormone receptor positive breast cancer (22)

20

SAME FOR WOMEN AT HIGH RISK OF DEVELOPING BREAST CANCER?

Moderate alcohol consumption and the risk of breast cancer. (8, 22)

- Study among 89,538 U.S. women that defined breast cancer risk by age and a set of other risk factors, compared to non-drinkers, alcohol consumption was associated with an increased breast cancer risk in women who were at low (RR 2.5, 95% CI 1.5–4.2) as well as high risk (RR 1.5, 95% CI 1.1–1.9) (8)

Minnesota Family Study (8, 20)

- Compared to never drinkers, first-degree relatives who consumed alcohol daily had a greater risk of developing breast cancer (RR 2.71, 95% CI 1.33 – 5.53), with less evident increase among second-degree relatives (RR 1.15, 95% CI 0.62 – 2.13) and no increase in marry-ins who reported daily use of alcohol.

Alcohol consumption and the risk of breast cancer among *BRCA1* and *BRCA2* mutation carriers. (21)

- Modest inverse association between breast cancer and reported current alcohol consumption was observed among women with a *BRCA1* mutation (OR = 0.82, 95% CI 0.70 – 0.96), but not among women with a *BRCA2* mutation (OR = 1.00, 95% CI 0.71 – 1.41). Compared to non-drinkers, exclusive consumption of wine was associated with a significant reduction in the risk of breast cancer among *BRCA1* carriers (p-trend = 0.01).

21



22

Surgeon General calls for new label on drinks to warn Americans of alcohol's cancer risk

Alcohol is a leading cause of cancer, a risk that should be clearly labeled on drinks Americans consume, U.S. Surgeon General Vivek Murthy proposed on Friday.

By AMANDA SEITZ
The Associated Press
JANUARY 3, 2025 AT 3:54PM

23

KEY TAKE AWAYS & CALL TO ACTION

Alcohol is an established (**modifiable**) risk factor for several types of cancer, **including female breast cancer**

Any alcohol intake increases risk of developing female breast cancer, thus there is no “safe” level of consumption

Consumers are often unaware of how standard drinks are defined and standard sizes are commonly exceeded

The most investigated mechanisms of how alcohol consumption influences cancer risk include carcinogenic role of ethanol metabolites and effect of alcohol on circulating estrogen levels (research is ongoing to further clarify current and other proposed mechanisms)

- Association between alcohol consumption and incidence of HR+ breast cancer, but data is also inconsistent showing incidence of other subtypes too

Increasing awareness in healthcare providers as well as the public of the relationship between alcohol consumption and cancer risk is critical and may lead to future reduction of cancer burden / deaths

24

(1) American Cancer Society. Key Statistics for Breast Cancer. American Cancer Society. Published January 12, 2024. <https://www.cancer.org/cancer/you/breast-cancer/about-the-cancer/cancer-facts-figures/>

(2) Alcohol and Cancer Risk 2025: The U.S. Surgeon General's Advisory. U.S. Department of Health and Human Services, 2025:1-21. Available at [Alcohol and Cancer Risk 2024](#). Accessed January 17, 2025.

(3) Islami F, Marlow EC, Thompson B, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States, 2019. *CA: A Cancer Journal for Clinicians*. Published online July 11, 2024. doi:<https://doi.org/10.3327/caj.71896>

(4) United States Department of Agriculture. Dietary Guidelines for Americans 2020-2025. USDA, 2020. <https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary-Guidelines-for-Americans-2020-2025.pdf>

(5) Gaspur SM, Vironique Boward, Nathan ST, et al. The IARC Perspective on Alcohol Reduction or Cessation and Cancer Risk. *The New England Journal of Medicine*. 2023;389(26):2486-2494. doi:<https://doi.org/10.1056/nejme.2309172>

(6) Singletary KW, Gaspur SM. Alcohol and breast cancer: review of epidemiologic and experimental evidence and potential mechanisms. *JAMA*. 2001 Nov 7;286(17):2143-51. doi: 10.1001/jama.286.17.2143. PMID: 11494156.

(7) Ouyesami O, Snyder D, Sultan N, Reaton J, Treadwell J, Scholtes KM. Alcohol consumption and cancer risk: understanding possible causal mechanisms for breast and colorectal cancers. *Evid Rep Technol Assess (Full Rep)*. 2023;New(337):1-151. PMID: 33126076; PMCID: PMC7476486.

(8) McDermott JA, Goyal A, Terry MB. Alcohol Intake and Breast Cancer Risk: Weighing the Overall Evidence. *Curr Breast Cancer Rep*. 2013 Sep;5(3): 10.1007/s12609-013-0114-z. doi: 10.1007/s12609-013-0114-z. PMID: 24205860; PMCID: PMC3832299.

(9) Selz HK, Pelucchi C, Bagnardi V, La Vecchia C. Epidemiology and pathophysiology of alcohol and breast cancer: Update 2012. *Alcohol Alcohol*. 2012 May-Jun;47(3):204-12. doi: 10.1093/alcalag/afg011. Epub 2012 Mar 29. PMID: 22459019.

(10) Bhandal P, Au CC, Benito-Martín A, et al. Estrogens and breast cancer: Mechanisms involved in obesity-related development, growth and progression. *The Journal of Steroid Biochemistry and Molecular Biology*. 2015;189:161-179. doi:<https://doi.org/10.1016/j.jsb.2015.05.002>

(11) Freudenheim JL. Alcohol's Effects on Breast Cancer in Women. *Alcohol Res*. 2020 Jan 16;40(2):11. doi: 10.3949/ajcr.40.2.11. PMID: 32582503; PMCID: PMC7296977.

(12) Chen WY, Rosen B, Hankinson SE, Colditz GA, Willett WC. Moderate alcohol consumption during adult life, drinking patterns, and breast cancer risk. *JAMA*. 2011 Nov 2;306(17):1884-90. doi: 10.1001/jama.2011.1590. PMID: 22545766; PMCID: PMC3292347.

25

(13) Allen NE, Bani V, Casabonne D, Kar SW, Reeves GK, Breen A, Green J, Million Women Study Collaborators. Moderate alcohol intake and cancer incidence in women. *J Natl Cancer Inst*. 2009 Mar 4;101(5):296-305. doi: 10.1093/jnci/djp014. Epub 2009 Feb 24. PMID: 19244173.

(14) Bagnardi V, Rota M, Botteri E, Tramacere I, Islami F, Fedirko V, Scotti L, Jenab M, Turati F, Pasquale E, Pelucchi C, Galeone C, Bellocchio R, Negri E, Corrao G, Boffetta P, La Vecchia C. Alcohol consumption and site-specific cancer risk: a comprehensive dose-response meta-analysis. *Br J Cancer*. 2015 Feb 3;112(3):580-93. doi: 10.1038/bjc.2014.579. Epub 2014 Nov 25. PMID: 25422009; PMCID: PMC4453639.

(15) LaCorte NK, Browder AM, Kaur JS, Merrill JK, Alberg AJ. Alcohol and Cancer: A Statement of the American Society of Clinical Oncology. *J Clin Oncol*. 2018 Jan 1;36(1):83-93. doi: 10.1200/JCO.2017.76.1195. Epub 2017 Nov 7. PMID: 29112463.

(16) Bagnardi V, Rota M, Botteri E, Tramacere I, Islami F, Fedirko V, Scotti L, Jenab M, Turati F, Pasquale E, Pelucchi C, Bellocchio R, Negri E, Corrao G, Rehm J, Boffetta P, La Vecchia C. Light alcohol drinking and cancer: a meta-analysis. *Ann Oncol*. 2013 Feb;24(2):301-308. doi: 10.1093/annonc/mds337. Epub 2012 Aug 21. PMID: 22910638.

(17) Diet, Nutrition, Physical Activity and Breast Cancer. <https://www.wcrf.org/dietphysicalactivity/2024/08/Breast-cancer-report.pdf>

(18) Romieu J, Soccianti C, Chahbi V, et al. Alcohol intake and breast cancer in the European prospective investigation into cancer and nutrition. *International Journal of Cancer*. 2015;137(8):1921-1930. doi:<https://doi.org/10.1002/ijc.29069>

(19) Jung S, Wang M, Anderson K, Baggett L, Berglund L, Bernstein L, van den Brandt PA, Britton L, Buring JE, Ekström AH, Falk R, Gaspur SM, Giles GG, Goodman G, Hoffman-Bottom J, Horn-Ross PL, Inoue M, Kotonen LN, Krogh V, Lof M, Maas P, Miller AB, Neuhouser ML, Park Y, Robien K, Rohan TE, Scarmo S, Schuitzen LJ, Sieri S, Stevens VL, Tsugane S, Vasanathan K, Wilkens LR, Wolk A, Woldarska E, Willett WC, Zeleniuch-Jacquotte A, Zhang SM, Zhang K, Ziegler RG, Smith-Warner SA. Alcohol consumption and breast cancer risk by estrogen receptor status in a pooled analysis of 20 studies. *Int J Epidemiol*. 2016 Jun;45(3):675-88. doi: 10.1093/ije/dyw156. Epub 2016 Aug 28. PMID: 26320333; PMCID: PMC5005989.

(20) Vachon CM, Carhan JR, Verkanen RA, Sellers TA. Investigation of an interaction of alcohol intake and family history on breast cancer risk in the Minnesota Breast Cancer Family Study. *Cancer*. 2002 Jul 15;90(2):240-8. doi: 10.1002/1097-0142(20020715)90:2<240::aid-cncr1315>3.0.co;2-I. PMID: 11466675.

(21) Dennis J, Ghadirani P, Little J, Lubinski J, Gronwald J, Kim-Sing C, Foulkes W, Muller P, Lynch HT, Neuhausen SL, Domchek S, Aronson S, Isaacs C, Tung N, Sweet K, Ainsworth P, Sun P, Krawak D, Narod S. Hereditary Breast Cancer Clinical Study Group. Alcohol consumption and the risk of breast cancer among BRCA1 and BRCA2 mutation carriers. *Breast*. 2010 Dec;19(6):478-85. doi: 10.1016/j.breast.2010.05.009. Epub 2010 Jun 15. PMID: 20541536; PMCID: PMC3795317.

(22) Willett WC, Stampfer MJ, Colditz GA, Rosner BA, Hennekens CH, Spiegel FE. Moderate alcohol consumption and the risk of breast cancer. *N Engl J Med*. 1987 May 7;316(19):1174-80. doi: 10.1056/NEJM198705073161902. PMID: 3574368.

(23) Chen J, Kahn R, Yang W, Terry MB. Increasing rates of early-onset Luminal A breast cancers correlate with binge drinking patterns. *Breast Cancer Res*. 2024 Oct 18;26(1):145. doi: 10.1186/s13058-024-01894-7. PMID: 39425225; PMCID: PMC11487698.

26

THANK YOU!

Julia Curry, PA-C, MPAS
Julia.curry@allina.com



27