

Alcohol and Cancer:

Identifying Evidence Gaps
and Research Challenges
Across the Cancer Continuum

December 8-10, 2020



Virtual Workshop

Alcohol consumption is an established preventable cause of at least seven types of cancer¹⁻⁴. Approximately 5.8% of all cancer cases and 4.0% of cancer deaths (except nonmelanoma skin cancer) in 2014 were attributed to alcohol consumption⁵. In the clinical setting it is recommended that cancer patients should avoid or minimize alcohol consumption during treatment because of its adverse effects on chemotherapeutic clearance and toxicities⁶. However, the effects of (both pre- and post-diagnosis) alcohol consumption on long-term patient-reported outcomes and on cancer survival is not fully understood, and most research focuses on breast, colorectal and head and neck cancer.⁷⁻¹⁰ Although the exact cause of alcohol-induced cancer is currently unknown, several possible underlying mechanisms have been suggested and are currently under investigation. These include DNA and protein damage and adduct formation, oxidative stress, inhibition of DNA repair, cell death and hyper-regeneration, nutritional malabsorption, changes in DNA methylation, and metabolic effects, and for breast cancer, increased estrogen levels^{4,11-13}. Alcohol consumption also affects the composition and function of the gut microbiome, leading to inflammation and changes in the function of the immune system, both of which are known to promote and exacerbate cancer¹⁴. Through its induction of CYP450 enzymes, alcohol may contribute to the metabolic activation of other carcinogens, such as environmental pollutants and/or contaminants generated during alcoholic beverage production^{15,16}. Despite the evidence that alcohol is a cause of several types of cancer, awareness among the public as well as health professionals about this link is suboptimal¹⁷. In addition, fewer than half of the U.S. Centers for Disease Control and Prevention-funded comprehensive cancer control plans specify goals, objectives, or strategies for alcohol control¹⁸. Moreover, while the World Health Organization has identified three alcohol policies – increasing alcohol taxes, banning or restricting alcohol advertising, and reducing and restricting alcohol availability – as “best buys” for reducing alcohol problems (i.e., interventions that cost less than \$100 per disability-adjusted life-year averted)¹⁹, research on the relationship between alcohol policies and cancer incidence, mortality and survivorship is in its infancy.

GOALS: This workshop brings together basic, epidemiological, behavioral, translational, clinical, regulatory, and communication scientists to discuss evidence gaps related to the role of alcohol across the cancer continuum. In particular, the workshop will summarize what is known about alcohol and cancer and, more importantly, identify critical gaps in scientific evidence related to the epidemiology and biology of alcohol and cancer risk and prognosis, effects of alcohol use during and after cancer treatment, awareness of and communications about the alcohol and cancer link, and individual and policy level interventions focused on reducing the burden of cancer caused by alcohol. This workshop should further enhance attention to specific research challenges concerning: 1) risk, prognosis, survivorship, and mechanistic knowledge; 2) behavioral, communication, and policy advancements; 3) encouragement of talented early career scientists to include alcohol and cancer in their research programs; and 4) inter-disciplinary efforts by clinical and public health researchers and practitioners to reduce alcohol consumption.

DAY 1 – December 8, 2020

9:45-10:00 am Enter WebEx

10:00-10:10 Welcome, Goals and Introductory Remarks
Co-chair: William Klein

10:10-10:30 Order of the Workshop and Overview of Alcohol and Cancer:
Chair: Susan Gapstur

A broad overview of trends on alcohol consumption, the link between alcohol cancer, and other chronic diseases, as well as overarching themes regarding alcohol consumption raised by the COVID-19 pandemic, as well as health disparities.

10:30-12:00 Understanding the Role of Alcohol Consumption in Cancer Etiology
Session Co-chairs: Elisa Bandera, Kevin Shield and Vasilis Vasiliou
Panelists: Pietro Ferrari; Mary Beth Terry; Ed Giovannucci; Lorraine Gudas

This session will begin by reviewing current evidence on the relationship between alcohol consumption and cancer incidence and mortality, as well as its contribution to the overall burden of disease. There will also be a review of putative biological mechanisms underlying these associations.

Discussion Topics:

- How do different patterns of consumption (i.e., binge drinking vs. daily consumption of lower amounts; liver “holidays”) or reducing or ceasing drinking affect cancer risk (including early onsets of liver and colon cancer)? How can biologic studies help inform why binge vs. low level consistent consumption affect risk?
- What is the impact of alcohol consumption at different times of life on cancer risk (including early onsets of liver and colorectal cancer)? How does pre-gravid consumption affect risk over time?
- What is unknown about interactions of alcohol and genetic, lifestyle, environmental and sociodemographic characteristics on cancer risk? To what extent are the NCI Cohort Consortium, other collaborative efforts, large cohorts or other novel data sources covering these issues?

- What is the impact of methodological issues in assessing alcohol consumption (underreporting in certain populations, dimensions of alcohol), reverse causation, and residual confounding on alcohol-cancer associations? Are there corrections that can be applied to improve measurement?
- Is there heterogeneity of alcohol-cancer associations by tumor subtype (breast cancer intrinsic subtypes) and tumor location (e.g., for colorectal cancer)?
- How can we better understand the role of alcohol in cancer etiology based on studies of alcohol effects on the immune system, metabolome, epigenome, and microbiome?

12:00-12:30 BREAK (breakfast, lunch, dinner)

12:30-1:45 Health Effects of Alcohol Consumption During and After Treatment

Session Co-chairs: Noelle LoConte and Abenaa Brewster

Panelists: Nina Sanford; Emily Tonorezos; Colleen Spees

This session will begin by reviewing the current evidence on the impact of alcohol use on cancer survivors, both in terms of prognosis but also tolerance of cancer therapies. There will also be a review of the optimal ways for clinicians to assess alcohol use and aid their patients in reducing their alcohol use.

Discussion Topics:

- Characterize pre- and post-diagnosis drinking (and change in drinking from pre-to post) among survivors (i.e., impact of a cancer diagnosis on alcohol consumption)
- Further characterize associations of pre- and post-diagnosis (and change in drinking from pre-to post) on prognosis (disease specific mortality vs. overall mortality) and patient-reported outcomes (e.g., quality of life, sleep, fatigue, neuropathy)
- How does ongoing alcohol use affect chemotherapy tolerance, side effects, treatment efficacy, and guideline concordant treatment? What is the effect on radiation and oncologic surgery treatment?
- What is the optimal way for physicians and other providers to ask about alcohol use? What is the optimal electronic health record based screening tool? What are the weaknesses for assessing alcohol use in currently available datasets?
- What is best practice about helping cancer patients cut down on their drinking?
- Cross cutting issue: COVID-19 effects of alcohol use? What is the particular effect on women?

1:45-2:00 Prelude to Day 2 and Discussion

Workshop Co-chairs: Susan Gapstur and Bill Klein

DAY 2 – December 9, 2020

9:45-10:00 Enter WebEx

10:00-10:15 Reminder of Day 1 and Charge for Day 2

Workshop Co-chairs: Susan Gapstur and Bill Klein

10:15-11:30 Effective Policies Relevant to Reducing the Health Effects of Alcohol Consumption

Session Co-chairs: David Jernigan and Tim Naimi

Panelists: Penny Buykx; Maristela Monteiro; Alicia Sparks

This session will begin with an overview of effective alcohol policies, and their impact on population-level alcohol consumption, both singly and in combination. It will continue with an introduction to evidence concerning the relationship between population-level alcohol consumption (which is shaped by policies) and cancer.

Discussion Topics:

- What more do we need to know?
 - Do we need longitudinal research on the relationship between specific policies and policies in combination on cancer incidence, prevalence and survivorship?
 - What types of modeling studies are needed to estimate policy effects on cancer?
 - How to characterize effective multi-component interventions addressing multiple policy domains?
- What are the translational science needs – cost studies, economic effects, policy coherence within larger non-communicable disease (NCD) framework, role of women and low and middle income (LMI) communities and countries to enhance policies to reduce alcohol consumption?
- How do we address normalization of alcohol use and alcohol industry efforts to influence science and messaging about science?
- What are the research gaps that, if filled, would be helpful to the efforts of the non-governmental organization (NGO) community?

11:30-12:00 BREAK (breakfast, lunch, dinner)

12:00-1:15 Designing Public Communication Efforts to Address Alcohol and Cancer Risk

Session Co-chairs: Brian Southwell and Courtney Scherr

Panelists: Nadine Barrett, Neil Lewis, Jr., Joseph Cappella

This session will begin with a brief discussion of the current public understanding of the link between alcohol and cancer and patient-provider discussion of alcohol reduction.

Discussion Topics:

- What roles could public communication campaigns play to affect alcohol use?
- How should we think about misinformation circulating about relationship of alcohol and cancer as a topic to investigate?
- How can we mitigate health disparities through communication?
- How can we best support health care professionals as they discuss alcohol and cancer with patients and their families?
- How should we counsel cancer patients about the utility of alcohol reduction?

1:15-1:45 Open Discussion/Comments

Introduction: Susan Gapstur

Moderators: NCI Staff

1:45-2:00 **Prelude to Day 3**
Workshop Co-chairs: Susan Gapstur and Bill Klein

DAY 3 – December 10, 2020

9:45-10:00 **Enter WebEx**

10:00-10:05 **Reminder of Day 2 and charge for Day 3:** Susan Gapstur

10:05-10:45 **Invited Presentations**

- **Stephanie Mencimer:** Perspectives on alcohol and cancer from a patient advocate:
- **Maria Roditis:** Perspectives on alcohol and cancer from public health practice

10:45-12:00 **Morning Concurrent Breakout Sessions:**

Introduction: NCI Staff

- Health Effects of Alcohol Consumption During and After Treatment
- Effective Policies Relevant to Reducing the Health Effects of Alcohol Consumption

12:00-12:30 **BREAK (breakfast, lunch, dinner)**

12:30-1:45 **Afternoon Concurrent Breakout Sessions**

Introduction: NCI Staff

- Understanding the Role of Alcohol Consumption in Cancer Etiology
- Designing Public Communication Efforts to Address Alcohol and Cancer Risk

1:45-2:45 **Report Back from Breakout Session Co-Chairs and Final Discussion**

Moderator: Susan Gapstur

2:45-3:00 **Closing Remarks**

Co-chair: William Klein

3:00-4:00 **Closed Meeting: Steering committee and co-chairs to discuss next steps and deadlines**

Citations

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16. Teschke R. Alcoholic liver disease: Alcohol metabolism, cascade of molecular mechanisms, cellular targets, and clinical aspects. *Biomedicines*. 2018;6(4).
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19. WHO. The updated appendix of the who global ncd action plan. http://apps.who.int/gb/ebwha/pdf_files/WHA70/A70_R11-en.pdf. Accessed 2020.