# Alcohol Use During Chemotherapy: A Pilot Study

Lin Zhao, MD, MPH; Alexandria Cull Weatherer, MPH; Sarah Kerch, MPH; Tamara LeCaire, MS, PhD; Patrick L. Remington, MD, MPH; Noelle K. LoConte, MD


## ABSTRACT

**Introduction:** Alcohol use increases the risk for some cancers and can cause complications during treatment. The prevalence of alcohol use during chemotherapy has not been well documented in current literature. This pilot study aimed to examine self-reported alcohol use during chemotherapy among cancer survivors as a basis for future research and interventions.

**Methods:** We surveyed Wisconsin cancer survivors (N=69) who participated in the ongoing population-based research study, Survey of the Health of Wisconsin (SHOW), on alcohol use during chemotherapy.

**Results:** Of the cancer survivors who reported receiving chemotherapy, 30.4% (N=21) reported consuming alcohol while receiving chemotherapy, and 38.1% (N=8) of those who drank reported complications. Alcohol use during chemotherapy was higher among older adults (age 65+, rate ratio [RR], 1.9; 95% CI, 0.7-4.9), men (RR, 2.7; 95% CI, 1.3-5.4), former and current smokers (former: RR, 1.6; 95% CI, 0.7-3.8, current: RR, 2.5; 95% CI, 1.1-5.8), and those with non-alcohol-related cancers (RR, 2.0; 95% CI, 0.9-4.2.)

**Conclusion:** Alcohol use during chemotherapy is common and may increase the risk of complications. More research is needed to better understand this problem and to design effective interventions.


## BACKGROUND

Alcohol is a well-established risk factor for the development of cancers, including upper aerodigestive tract cancer, hepatocellular carcinoma, breast cancer, and colorectal cancer.[1] Cohort studies demonstrate an 8% increase in overall cancer-related mortality and a 17% increased risk for cancer recurrence in the highest versus lowest alcohol consumers.[2] Despite this, a significant proportion of cancer survivors continue to consume alcohol.[1] Epidemiologic studies to inform alcohol surveillance and counseling guidelines for cancer patients are currently lacking.[3]

Cancer treatments like chemotherapy can cause severe adverse side effects and stress in cancer patients. Some documented side effects include severe gastrointestinal complications (nausea, vomiting, mucositis, constipation, and diarrhea), cardiotoxicity, and central and peripheral neuropathy.[4] Little is known about how concurrent alcohol use affects chemotherapy delivery and efficiency and how persistent drinking during treatment affects long-term cancer risk. This study aimed to examine preliminary evidence of self-reported alcohol use during chemotherapy among cancer survivors as a basis for future research and evidence-based intervention design. In this study, a person is considered to be a cancer survivor from the time of diagnosis until the end of life.

## METHODS

This was a cross-sectional analysis of a geographical cohort of patients participating in the Survey of the Health of Wisconsin (SHOW) from 2009 to 2019. Details of SHOW methods have been described previously by Malecki et al.[5] Participants who reported a previous diagnosis of cancer (n = 337) were sent a cancer survivorship survey by mail; the study sample for this analysis included only a subset (n = 69) who indicated chemotherapy and completed an alcohol questionnaire (Figure).

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**Author Affiliations:** Department of Population Health Sciences, University of Wisconsin School of Medicine (UWSMPH), Madison, Wisconsin (Zhao, Remington); Carbone Comprehensive Cancer Center, UWSMPH, Madison, Wisconsin (Cull Weatherer, Kerch, LoConte); Wisconsin Alzheimer's Institute, Department of Medicine, UWSMPH, Madison, Wisconsin (LeCaire); Department of Medicine, UWSMPH, Madison, Wisconsin (LoConte).

**Corresponding Author:** Alexandria Cull Weatherer, MPH, Department of Population Health Sciences, 610 Walnut St, Madison, WI 53726; phone 608.262.2774; email acull@wisc.edu.



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All participants were asked a general question about consuming alcohol during chemotherapy (yes, no, never). For those reporting alcohol use, general information about complications from chemotherapy were also collected (yes, no). Other alcohol consumption questions were asked but were not reported in our results due to the small sample size including the amount of alcohol used per day (1 to 5 or more drinks), binge drinking behavior (yes, no), and hospitalization due to chemotherapy complication (yes, no).

Self-reported demographic characteristics included age (at time of survey), sex (male, female), smoking status (current, former, never), and self-reported type of cancer at diagnosis (eg, breast, colorectal).

Data analyses were completed using SAS University edition. Prevalence of alcohol consumption among cancer survivors receiving chemotherapy and prevalence of chemotherapy complications among cancer survivors who drank and their 95% Clopper Pearson confidence intervals were calculated. Rate ratios and 95% confidence intervals were calculated using Cochran-Mantel-Haenszel method.

All study protocols were approved by the University of Wisconsin Health Sciences Institutional Review Board, and all participants were provided written informed consent during the initial home visit.

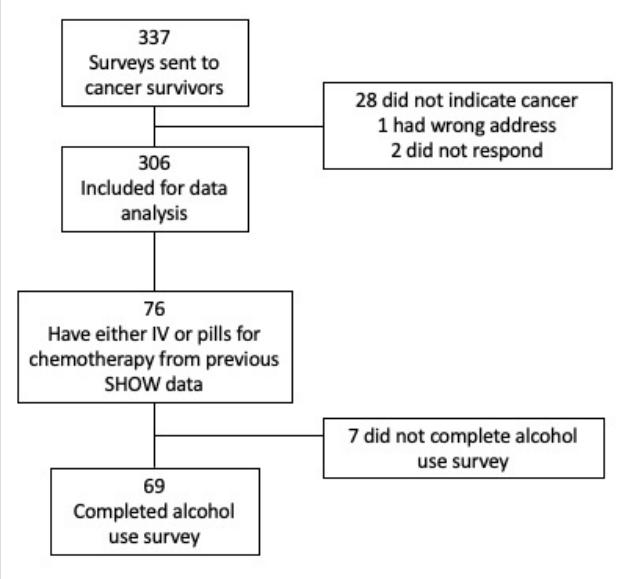
## RESULTS

Cancer survivorship surveys were sent to 337 SHOW participants: 306 confirmed a history of cancer and 76 indicated chemotherapy use – the focus on this research; and 69 (90.8%) completed the alcohol consumption survey (Figure).

The average age of the study population was 68.4 years (range, 36-87) at the time of survey completion in 2019. Forty-six (66.7%) cancer survivors were women. Sixty-six (95.7%) were non-Hispanic White. Nine (13.4%) were current smokers, 17 (25.4%) were former smokers, and 41 (61.2%) reported never smoking. Thirty-eight (55.1%) of the cancer survivors were initially diagnosed with at least 1 cancer type where alcohol is a risk factor: esophageal cancer (n = 1), breast cancer (n = 28), colorectal cancer (n = 8), and both breast and colon cancer (n = 1).

Among the 69 cancer survivors, 21 (30.4%; 95% CI, 19.9%-42.7%) reported alcohol use while receiving chemotherapy. Alcohol use was higher among those who were older (age 65+, RR, 1.9; 95% CI, 0.7-4.9), male (RR, 2.7; 95% CI, 1.3-5.4), and former or current smokers (former: RR, 1.6; 95% CI, 0.7-3.8, current: RR, 2.5; 95% CI, 1.1-5.8). Alcohol use was higher among those who reported having a non-alcohol-related cancer compared with those who reported having had an alcohol-related cancer (RR, 2.0; 95% CI, 0.95-4.2). Among those who drank alcohol during chemotherapy, 8 (38.1%; 95% CI, 18.1%-61.2%) reported having chemotherapy complications. (See results in Table.)

**Figure.** Flow Diagram of Study Participants, Alcohol Use During Chemotherapy Pilot Study, Survey of the Health of Wisconsin (SHOW)




Participants who reported a previous cancer diagnosis (n = 337) were sent a cancer survivorship survey by mail; the study sample for this analysis included only a subset (n = 69) who indicated chemotherapy and completed an alcohol questionnaire.

**Table.** Prevalence of Alcohol Use During Chemotherapy, Survey of the Health of Wisconsin (SHOW)

| | Total Participants (N = 69) | Prevalence of Alcohol Use | Rate Ratio (95% CI) | *P* value |
|---|---|---|---|---|
| Total | 69 (100%) | 21 (30.4%) | – | |
| Age[a] | | | | |
| < 65 years | 21 (31.8%) | 4 (19.0%) | Ref | |
| 65+ years | 45 (68.2%) | 16 (35.6%) | 1.87 (0.71 – 4.90) | *P* = 0.18 |
| Sex | | | | |
| Female | 46 (66.7%) | 9 (19.6%) | Ref | |
| Male | 23 (33.3%) | 12 (52.2%) | 2.67 (1.32 – 5.39) | *P* = 0.006 |
| Smoking status[b] | | | | |
| Never | 41 (61.2%) | 9 (22.0%) | Ref | |
| Former | 17 (25.4%) | 6 (35.3%) | 1.61 (0.68 – 3.82) | *P* = 0.30 |
| Current | 9 (13.4%) | 5 (55.6%) | 2.53 (1.11 – 5.75) | *P* = 0.04 |
| Cancer type | | | | |
| Alcohol-related[c] | 38 (55.1%) | 8 (21.1%) | Ref. | |
| Non-alcohol-related[d] | 31 (44.9%) | 13 (41.9%) | 1.99 (0.95 – 4.18) | *P* = 0.06 |

[a]Three participants did not report their age.

[b]Two participants did not report their smoking status.

[c]Alcohol-related cancers include breast, colorectal, esophageal cancer, and both breast and colorectal.

[d]Non-alcohol-related cancers include bladder, bone, brain, leukemia, lymphoma, lung, ovarian, prostate, skin, testicular, thyroid, uterine.



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## DISCUSSION

In this preliminary descriptive study, 30.4% cancer patients drank alcohol while receiving chemotherapy. Other studies have collected information about alcohol use among cancer survivors in general but have not specifically examined alcohol use during chemotherapy. Miller et al reviewed 3 studies on alcohol use after oral cancer diagnosis and concluded that 34% to 57% of upper aerodigestive tract cancer patients continue to drink after diagnosis.[6] Sanford et al found that the current prevalence of alcohol use among cancer survivors after recovery was 57%.[7] Penfold et al also showed that the prevalence of high alcohol consumption in cancer survivors of head and neck cancer reduced from 54% to 35% at 4 months after diagnosis but then increased to 41% at 12 months.[8] Combined with our data, this suggests that a high proportion of cancer survivors drink alcohol continuously after cancer diagnosis—even during treatment—despite the risk and side effects associated with alcohol.

People's drinking patterns changes as their social and environmental stress changes. A recent study based on an online survey among the general population found that 93% of adults reported alcohol consumption.[9] The same study found that there was an increase in frequency and quantity of alcohol use among people who drink while social distancing at home during the SARS-CoV-2 (COVID-19) pandemic. Combined with our finding that a high percentage of cancer survivors continue to use alcohol during treatment, we think that interventions for alcohol use should take into account the stress caused by cancer diagnosis and treatment.

In the current study, alcohol use during chemotherapy was higher among certain subgroups, such as men, smokers, and those with non-alcohol-related cancers. Several of these findings have been reported in studies that examine alcohol use among cancer survivors. Breast cancer is found to be associated with lower odds of drinking at all levels,[8] which explains our findings that both men and those with non-alcohol-related cancers have higher drinking rates. Our finding that alcohol use is higher among smokers is also supported by the literature.[8] The high co-occurrence of smoking and drinking means that ongoing tobacco cessation efforts for cancer survivors can also include alcohol reduction approaches.

Lastly, we found that 38.1% of those who drank during chemotherapy treatment reported at least some complications. In a similar study, 60% of patients who consumed more than the normal amount of alcohol determined by the American Heart Association (1 to 2 drinks per day for men and 1 drink per day for women) developed stage III osteoradionecrosis as a complication of radiation therapy.[10]

Limitations of our study include the small sample size of 69 patients for analysis, the cross-sectional survey design subject to recall bias, and the lack of a comparison group.

## CONCLUSIONS

This small sample of cancer survivors from an ongoing population-based research study sample of Wisconsin residents suggests that about one-third of cancer survivors report drinking alcohol while receiving chemotherapy. Larger and more powerful studies are needed to identify the risks and benefits of alcohol intake during cancer treatment. Researchers and clinicians must address the impact of alcohol use after cancer diagnosis, especially during cancer treatment.

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## REFERENCES

**1.** LoConte NK, Brewster AM, Kaur JS, Merrill JK, Alberg AJ. Alcohol and cancer: a statement of the American Society of Clinical Oncology. *J Clin Oncol*. 2018;36(1):83-93. doi:10.1200/JCO.2017.76.1155

**2.** Schwedhelm C, Boeing H, Hoffmann G, Aleksandrova K, Schwingshackl L. Effect of diet on mortality and cancer recurrence among cancer survivors: a systematic review and meta-analysis of cohort studies. *Nutr Rev*. 2016;74(12):737-748. doi:10.1093/nutrit/nuw045

**3.** Nekhlyudov L, Mollica MA, Jacobsen PB, Mayer DK, Shulman LN, Geiger AM. Developing a quality of cancer survivorship care framework: implications for clinical care, research, and policy. *J Natl Cancer Ins*t. 2019;111(11):1120-1130. doi:10.1093/jnci/djz089

**4.** Nurgali K, Jagoe RT, Abalo R. Editorial: adverse effects of cancer chemotherapy: anything new to improve tolerance and reduce sequelae?. *Front Pharmacol*. 2018;9:245. doi:10.3389/fphar.2018.00245

**5.** Malecki KMC, Nikodemova M, Schultz AA, et al. The Survey of the Health of Wisconsin (SHOW) program: an infrastructure for advancing population health sciences. Preprint. *medRxiv.* 2021;2021.03.15.21253478. doi:10.1101/2021.03.15.21253478

**6.** Miller PM, Day TA, Ravenel MC. Clinical implications of continued alcohol consumption after diagnosis of upper aerodigestive tract cancer. *Alcohol Alcohol.* 2006;41(2):140-142. doi:10.1093/alcalc/agh245

**7.** Sanford NN, Sher DJ, Xu X, et al. Alcohol use among patients with cancer and survivors in the United States, 2000-2017. *J Natl Compr Canc Netw.* 2020;18(1):69-79. doi:10.6004/jnccn.2019.7341

**8.** Penfold CM, Thomas SJ, Waylen A, Ness AR. Change in alcohol and tobacco consumption after a diagnosis of head and neck cancer: findings from Head and Neck 5000. *Head Neck*. 2018;40(7):1389-1399. doi:10.1002/hed.25116

**9.** Boschuetz N, Cheng S, Mei L, Loy VM. Changes in alcohol use patterns in the United States during COVID-19 pandemic. *WMJ*. 2020;119(3):171-176.

**10.** Chronopoulos A, Zarra T, Tröltzsch M, Mahaini S, Ehrenfeld M, Otto S. Osteoradionecrosis of the mandible: a ten year single-center retrospective study. *J Craniomaxillofac Surg*. 2015;43(6):837-846. doi:10.1016/j.jcms.2015.03.024



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