

## Health & Physiology

# Ten cigarettes in a bottle of wine for cancer

by **Theresa Hydes**<sup>1</sup> | Postdoctoral Research Fellow

<sup>1</sup>: University Hospital Southampton NHS Foundation Trust, Southampton, Hampshire, UK

This Break was edited by Max Caine, *Editor-in-chief* - TheScienceBreaker

### ABSTRACT

*In contrast to our knowledge about the relationship between smoking and cancer, the public's understanding of the link between alcohol and cancer is poor. We therefore used cigarettes as a 'yard-stick' to communicate the cancer risks associated with alcohol and found that drinking one bottle of wine/week carries an equivalent cancer risk to smoking 10*



Image credits – Flaherty – CC BY-NC-ND 2.0

Do you drink one small glass of wine a day? Four pints of beer a week? Did you know drinking at even these relatively low levels can increase your risk of cancer? Less than 15% of the population are aware of a link between alcohol and cancer despite it causing at least seven cancer types (mouth, throat, voice box, gullet, bowel, breast and liver). While the risks increase the more you drink, no level of consumption is completely safe. What about smoking? Over 70% of individuals understand the causal relationship between tobacco and cancer - rightly so as smoking is the single largest preventable cause of cancer worldwide. Yet tobacco use is plummeting, while alcohol consumption continues to rise in Northern and Eastern European countries, China and India. We aimed to use well established public knowledge on smoking and cancer to better

communicate the cancer risks linked to alcohol, answering the question: "in terms of cancer - how many cigarettes are there in a bottle of wine?"

We looked at the cancer risks of drinking 10 and 30 units of alcohol a week (approximately one and three bottles of wine) to communicate harm for low and hazardous levels of drinking. We first needed to understand the lifetime risk of developing cancer for "never-drinkers never smokers". We calculated this by subtracting the fraction of cancers caused by smoking and drinking (attributable fractions) from the overall lifetime cancer risk for all tobacco and alcohol-related cancers. We then multiplied this "baseline lifetime risk" by the relative risk of developing cancer as a result of smoking 10 or 30 cigarettes or drinking 10 or 30 units of alcohol per

week. This allowed us to calculate the “absolute increase in lifetime cancer risk” associated with these behaviours compared to not drinking or smoking.

A difficult issue we faced was the “synergistic” interaction between alcohol and tobacco (when both risk factors are present the cancer risk is more than additive). We, therefore, multiplied the alcohol and tobacco-attributable fractions by the frequency of alcohol-consumers who have never smoked, and smokers who are non-drinkers respectively for cancers in which both alcohol and tobacco are risk factors.

We estimated that compared to not drinking, if 1,000 men and 1,000 women (non-smokers) each drank one bottle of wine per week, around 10 men and 14 women would develop cancer as a result (19 men and 36 women when consumption increases to three bottles of wine per week). Of the 14 cases for women, approximately 8 would be breast cancer. Compared to not smoking, if 1,000 men and 1,000 women (non-drinkers) each smoked 10 cigarettes per week, around 20 men and 15 women would develop cancer (74 men and 46 women for 30 cigarettes per week). These figures represent population-level risks - they are not an exact measure of any given individual’s cancer risk.

This gender gap occurs because relatively low levels of alcohol consumption increase the risk of breast cancer to a greater extent compared to other alcohol-related cancers, and the increase in cancer risks due to smoking are slightly greater for men compared to women for most other cancers.

To answer our question “how many cigarettes are in a bottle of wine”, we estimated that drinking one bottle of wine per week carries the same increased cancer risk as smoking 10 cigarettes per week for women and five for men. Drinking three bottles of wine a week carries the same increased risk as smoking 23 cigarettes per week for women (approximately one packet), and eight for men.

We hope our message “ten cigarettes in a bottle of wine for cancer” will help tackle the persistent lack of public awareness of the relationship between alcohol and cancer. While the risk of most alcohol-related cancers generally occurs with heavy drinking, the risk of breast cancer is significant even at low levels of consumption. This issue is pressing as breast cancer is the leading cause of cancer among women in Europe and nearly 10% of cases are linked to alcohol.

The vast contrast between the public’s understanding of the cancer risks associated with these behaviours is nearly certainly a result of the daily messages we see. Cheap alcohol prices, celebrities for advertising and sports sponsorship have helped engrain alcohol within our culture, compared to an absolutely appropriate ban on smoking in public places, heavy taxes and plain packaging with graphic health warnings. We hope this paper will help influence policy-makers to start treating alcohol as a comparable carcinogen to tobacco.