



Is winemaking a risky career?

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Introduction

Wineries are not generally assumed to be dangerous workplaces, although one hears occasionally of asphyxiation from carbon dioxide and machinery and fall accidents. The point I want to raise in this article is to do with winery professionals health as it may be affected by exposure to alcohol. There are two important health issues, one of addiction, the other of alcohol induced illness. It is the second, and likely the larger issue, that of alcohol induced reduced health which will be addressed in what follows.

For the Australian population at large, there is significant public health concern about alcohol use; there is clear evidence that excessive consumption can create poor health outcomes including increased risk of heart disease and stroke. And let us not forget the social problems caused by alcohol and drunkenness including domestic violence which is unfortunately

rampant in our community and presently the subject of much concern.

This article will emphasise health issues of alcohol consumption, which I will introduce by recounting personal issues regarding cancer and wine consumption which raised my awareness of a possible link. From that perspective I will discuss the broader issue of the known role of alcohol in causing cancer now evident for frequent alcohol consumption, and the implications for wine professionals, their employers and the wine sector at large.

Personal experiences with cancer and alcohol

I write this article from the background of a 78-year-old wine-related professional whose health has very likely been severely affected by wine consumption; I have had oral and neck cancer now five times. The first was a tongue cancer in the 1980s, leading to surgical incision and follow

up radiotherapy. Saliva production was affected as were my teeth, and I received upper and lower dentures. Subsequently in 1990 there was more cancer on the tongue, resolved by surgery and part of the tongue was replaced with duodenum tissue, affecting my swallowing ability. Subsequently I had another bout of tongue cancer treated surgically, and also throat larynx cancer treated by radiotherapy around 2015. The net result has been a present loss of my ability to swallow and clean my mouth after eating. I eat only homogenised food and use thickened drinks. I have mostly lost my voice which continues to deteriorate.

I asked my head and neck oncologist at the wonderful Peter Mac cancer hospital in Melbourne why might I have had so many oral cancers; he replied it is likely in my genotype, though I do not recall any relatives so afflicted. The 'penny dropped for me' when I came across recent health warnings about alcohol

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from Canada in January 2023 on the internet. A summary of their guidance is presented in Figure 1, and an 81-page report is available, see Paradis *et al.* (2023). While my personal use of wine was frequent but “moderate” in amount by personal and industry standards, the Canadian guidelines suggested that using 3 to 6 standard drinks a week placed me at moderate risk of developing several types of cancer, including to the oral cavity.

One might ask whether results of this consumer study may be extended to wine professionals, whose very job depends on frequent wine tasting?

Alcohol Consumption Per Week



Figure 1. Courtesy of Canadian Centre on Substance Use and Addiction

Since becoming involved in the industry in the mid-1960s, wine was my alcoholic drink of choice. I began making wine with friends at Griffith in the mid-1960s (we called it ACE DRY RED), and more in the 1970s when I taught at Roseworthy College and had a family vineyard in the Barossa Valley. Wine was our preferred household beverage. I finally gave up smoking due to public health campaigns in the early 1990s.

I decided to further abstain from alcohol in early 2023 after reading the Canadian advice; it was *not easy*, and I suffered PAWS (Partial Alcohol Withdrawal Symptoms). Thank goodness for alcohol-free beer which tastes like real beer! Now I have an occasional small glass of wine, say once a week, which I dilute 50:50 with water, and often add thickener.

The urge to constantly drink alcohol has now passed.

Other health warnings for alcohol and cancer

The World Health Organization (WHO) has recently, in 2021, come out strongly against alcohol consumption as a cancer risk, based on concerns in the Mediterranean region. Paradoxically it is in these countries that the Mediterranean diet is promoted by some as protecting against cancer when taken in small amounts with red wine. However, advice from WHO is now quite contrary, saying that there is *no safe level of alcohol consumption*. WHO publications emphasise (See WHO in reference list) that even small amounts of alcohol can cause cancer, particularly in

women. Nearly a third of breast cancers caused by alcohol drinking are due to moderate as opposed to heavy drinking. Most cancers caused by alcohol in the EU were of the colorectum, breast and oral cavity. Cancer warnings are now present on wine bottles in Ireland, and there may be other countries to follow, including perhaps Australia following some press reports.

I was prompted to think about this association between frequent wine use and cancer again from personal experience. In the 1970s I was a member of the small Roseworthy grape and wine faculty; two of our members, both involved in winemaking, have passed away due to bowel and stomach cancer respectively. I reflected on frequent

exposure to alcohol and the possibility of an association with cancer

Further, during 2021 an article was also published by Woo *et al.* (2021) regarding a large Korean study of the impact of frequency of alcohol consumption; this topic is of great relevance to the title of this article. This was a very large study with 1.7 million participants, which showed that the risk of gastro-intestinal cancer was increased linearly with the frequency of drinking. One might ask whether results of this consumer study may be extended to wine professionals, whose very job depends on frequent wine tasting?

Alcohol, acetaldehyde and cancer

That these three entities are linked is very well known to medical science. Acetaldehyde is a common wine constituent formed in fermentation and storage. It is also the primary metabolite of alcohol in the human body, formed in the mouth and also the blood. Drinking alcohol produces acetaldehyde, and acetaldehyde is a carcinogen. See for example the Cancer Council of Victoria website cancer.vic.org.au, and Figure 2, showing seven types of cancer associated with alcohol. The link between acetaldehyde and human cancer has been known for more than 30 years, yet research has shown that most Australians are unaware of the fact that alcohol causes cancer. Inside the body, ethanol is metabolised to acetaldehyde which in combination with alcohol damages cells by binding with DNA leading to incorrect cell replication. Acetaldehyde can cause permanent DNA damage which can lead to cancer. Most ethanol is converted to acetaldehyde in the liver, with smaller amounts converted in the mouth and stomach.

The interesting story of wine alcohol and acetaldehyde has recently developed another twist with a 2023 report in the journal *Nature* by Devi, Levin and Waterhouse from the University of California. The paper offers a new hypothesis to explain “red wine headaches”, attributable to a dysfunctional ALDH2 variant which normally converts toxic acetaldehyde to harmless acetate. (ALDH2 encodes the mitochondrial aldehyde dehydrogenase (ALDH) enzyme, the principal catalyst for

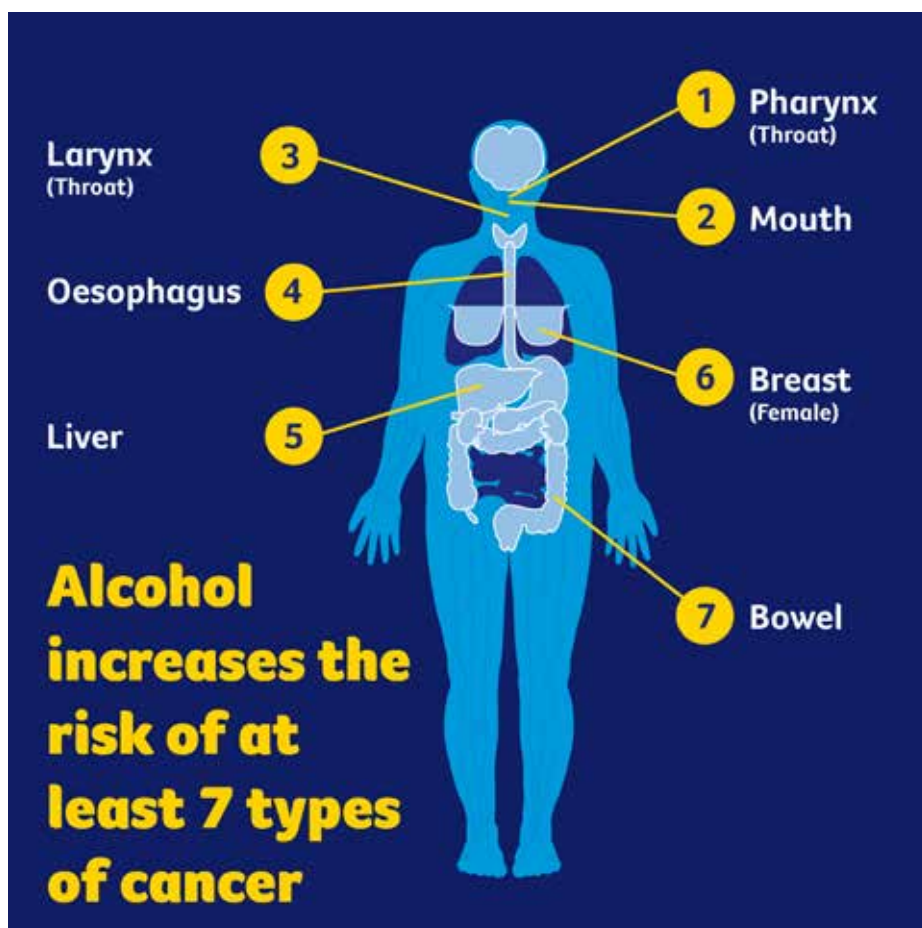


Figure 2. Courtesy of Cancer Council of Victoria website

oxidation of acetaldehyde during alcohol metabolism). This ALDH2 dysfunction allows acetaldehyde to accumulate in the body. The dysfunctional variant is present in approximately 40% of East Asians, and the so-called “Asian flush” is a condition of alcohol intolerance relatively common among East Asian people, causing red faces upon alcohol consumption; it is in fact an allergic reaction to acetaldehyde.

The Californian authors propose that a metabolite of the red wine phenolic quercetin inhibits ALDH, resulting in elevated acetaldehyde levels and the subsequent appearance of headaches in susceptible subjects. In another twist to this story, it is known that “premium”, low volume Cabernet Sauvignon wines contain more quercetin (four-fold) than high volume, “bulk” wines. So better wine quality is more likely to give you a headache than lower quality wine! The difference in quercetin content is related to grape cluster exposure to sunlight, known to be four- to eight-fold difference between sun exposed to shaded.

Will mandatory health labels on wine be welcomed or argued against by the Australian wine industry? Might a winery employer ever be taken to task for providing an unsafe workplace by requiring a winemaker to frequently taste and monitor wine?

No doubt more research needs to be done on this topic, and of special interest to the alcohol industry will be any effect of frequency of exposure as it may affect employees.

Workplace safety and employers' obligations

In Australia, state laws govern this situation, see www.vic.gov.au/safework for example. An employer's main responsibility is to make sure that the workplace is safe and that anyone working in or visiting the workplace is not exposed to hazards or harmed by the work. The following obligations are imposed on employers:

- Make sure that employees are aware of potential hazards.
- Consult and co-operate with health and safety representatives and other employees at the workplace.
- Inform employees about hazards in the workplace, and improve their understanding of safe work procedures (the information does not always have to be written – it can be spoken, or in the form of videos and tapes).
- Provide new employees with specialised induction training to help them become familiar with their new work environment, procedures, equipment and materials so they can do their job safely. Induction should be much more than having a chat with your supervisor, completing a few forms and being introduced to your workmates.

I would question if these guidelines are currently being followed regarding the risks of alcohol to wine professionals' health. Penalties can apply.

Conclusion

Has the subject of wine alcohol and health been adequately addressed by the Australian wine sector and its representative bodies? Certainly, increasing proportions of consumers are aware, reflected at present by a declining demand for wine globally.

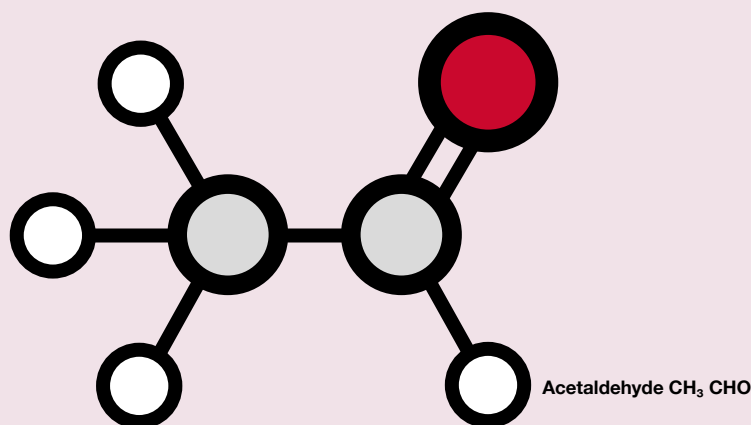
How might the sector respond? Will mandatory health labels on wine be welcomed or argued against by the Australian wine industry? Might a winery employer ever be taken to task for providing an unsafe workplace by requiring a winemaker to frequently taste and monitor wine? These are significant issues which might arise in the future. I have recently suggested to Wine Australia and Australian Grape & Wine that it would be useful if they surveyed industry personnel for any evidence of increased cancer risk among wine professionals compared to the general population.

My research on this topic suggests there may however be a relief to this situation. How about the possibility to take a pill to reduce the impact of acetaldehyde on the body?. This is possible, see www.getsunset.com. These pills will

apparently help avoid Asian flush, the allergic reaction to acetaldehyde among Asian people. Would it not be wonderful if wine professionals might be so protected in their daily work by taking a pill, and perhaps also for wine consumers enjoying a glass of wine before or during a meal.

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