



Stream 3.2: Consumer Health and Safety

1. Abstract:

The objective of this stream was to enable the Australian wine industry and its stakeholders to make evidence-based decisions about the making, marketing and distribution of wine, and work towards public health policies and associated regulations and strategies that are appropriate and balanced. This work was critical as a well-resourced anti-alcohol lobby was seeking to discredit the legitimate role of wine as part of a healthy diet and lifestyle, and applying pressure on government to curtail all alcohol consumption. The objective was achieved through the collection, collation, evaluation, interpretation and communication of information on wine and health issues. In addition, collaborations with credible relevant medical researchers addressed identified gaps in knowledge such as the specific role of wine and wine-derived phenolic compounds in reducing the risk of cardiovascular disease, colorectal cancer and cognitive decline.

The information consistently showed that the regular and moderate consumption of wine can significantly reduce the risk of cardiovascular disease, certain cancers and cognitive decline and associated dementia; three of the leading causes of mortality in the world. This supports the World Health Organisation (WHO) view that moderate wine consumption has a legitimate role in a balanced diet and lifestyle.

This information was instrumental in ensuring that revised Australian government guidelines on alcohol/wine consumption and diet, public health policy and strategies, continued to recognise the health benefits of moderate wine consumption in Australian society and target harmful, rather than all, wine consumption. It also formed the cornerstone of the Winemakers' Federation of Australia (WFA) Health & Social Responsibility Strategy 2011-2014 and subsequent Wine and Health Action Plan (further information about these documents available from WFA on request), and its activities and communication.

2. Executive summary:

The stream was developed to provide balanced, credible information on wine and health issues to enable evidence-based decision making by industry, government, health and allied health professionals as well as consumers.

In particular, work undertaken since the commencement of this stream was required by the Australian wine industry to inform and support its strategy *Wine Australia: Directions to 2025* (WFA 2007) and the subsequent Wine and Health Core Policy and Wine and Health Action Plan (further information about these documents available from WFA on request). The objective was to effectively position wine as having a legitimate role in a healthy diet and lifestyle in accordance with the growing population and clinical data. This was critical as a well-resourced anti-alcohol lobby was actively seeking to discredit the legitimate role of wine as part of a healthy diet and lifestyle, and applying pressure on government to introduce restrictive policies and strategies to curtail all alcohol consumption.

Issues and gaps in knowledge were identified by ongoing communication and consultation with key stakeholders, and the information to fill those gaps was generated by literature reviews and by the undertaking of projects with credible external medical researchers.

The research projects undertaken considered the controversial disease states of cardiovascular disease, cancer, cognitive decline and dementia, where the relationship with wine consumption was not clearly understood. These diseases account for 40%, 30% and 6%, respectively, of all Australian deaths and disabilities, and research on reducing their risk factors such as diet and lifestyle are national priorities. Funds for research were sought from external sources such as the Australian Wine Foundation, Cancer Australia, Foundation for Alcohol Rehabilitation and Education, and the State Government of South Australia.



The information and data generated to date support a role for the phenolic compound, resveratrol, delivered in red wine, in modulating the development and presence of biological risk factors for, and symptoms of, cardiovascular disease, certain cancers, cognitive decline and Friedreich Ataxia disorder. Resveratrol was identified as having potential cardio- and cancer-protective properties and anti-neurodegenerative effects. Subsequent studies to be addressed in Project 2.2.3 of the AWRI's R,D&E plan 2013-2018) will build on the results of these pilot studies to understand better the role of moderate wine consumption as part of a healthy diet and lifestyle.

The information was made available to stakeholders through a variety of platforms, including articles in popular industry journals, peer-reviewed manuscripts, booklets, website and other electronic media, interviews, lectures, presentations at conferences, meetings and seminars, as well as by submissions to government on behalf of or in conjunction with industry.

AWRI submissions to government have had a tangible impact on government guidelines, policy and strategies, which enable the government to continue to state that moderate wine consumption can have beneficial health effects and that the chemical composition of wine can differentiate these effects from those of beer and spirits. In addition, it has enabled wine to be differentiated from beer and spirits in the amount consumed and the patterns of consumption.

It is important that the Australian wine industry continues to be aware of, and understands the key wine and health issues. This knowledge is required to balance and counter the continuous proposals to increase alcohol taxation, restrict alcohol advertising and promotion, and introduce blanket health warning labels and other measures that might result in a reduction of per capita wine consumption.

Understanding wine and health issues is also vital for industry to effectively and responsibly communicate with its stakeholders, to forge and maintain good working relationships with government and allied government organisations, as well as to credibly and accurately respond to any allegations of impropriety by the industry.

Table 1. Funds sourced from external parties for collaborative projects.

Source	Support description
Cancer Australia	Funding for project 'Resveratrol in the chemoprevention of colorectal neoplasia'
National Wine Foundation	Funding for pilot project 'Study on the effect of resveratrol in red wine on the cognitive function in older adults'
Foundation for Alcohol Rehabilitation and Education	Funding for pilot project 'Determination of the beneficial cardiovascular effects of red wine and resveratrol and its metabolites in humans'
State Government of SA	Funding for project 'Tracking the metabolome of grapes into wine'
Kyle Bryant Translational Research Award from the Friedreich Ataxia Research Alliance	Funding for pilot project 'An open label proof of the principle study of resveratrol as a treatment for Friedreich Ataxia disorder'

3. Background:

The strategy document for the Australian wine industry entitled *Wine Australia: Directions to 2025* (Winemakers Federation of Australia 1996), recognised that social and health considerations were becoming significant and increasingly important as Australian and international public health advocates began to shift their focus from tobacco to alcohol (both of which had been identified as two of the five most important risk factors for non-communicable disease in the top ten leading risks to



human health by the World Health Organisation [WHO]).

The requirement for the provision of balanced and credible wine and health information by the Australian and international wine industry was expected to increase over the next decade as governments continued to consider the WHO's Global Status Report on Alcohol (2004), WHO's Global Status Report on Alcohol Policy (2004) and the WHO's Global Strategy on Diet, Physical Activity and Health (2004). The WHO's Global Status Report on Alcohol Policy focused on reducing per capita alcohol consumption worldwide and made minimal differentiation between the patterns of use and abuse as well as the supply and marketing of the different alcoholic beverages. It was also cautious in accepting that moderate consumption of any alcoholic beverage could have benefits to human health despite the substantial epidemiological data and increasing clinical data showing that moderate consumption of wine can reduce the risk of death from cardiovascular disease and certain cancers in many population groups by up to 40% (Prescott et al. 1999; Grønbaek et al. 2000; Briggs et al. 2002; Pedersen et al. 2003; Barstad et al. 2005; Klatsky et al. 2005; Tolvanen et al. 2005; Strandberg et al. 2007; Sutcliffe et al. 2007; Zell et al. 2007; Bessaoud and Daurès 2008; Streppel et al. 2009; Chao et al. 2010; Li et al. 2010; Brien et al. 2011; Hansen-Krone et al. 2011; Levantesti et al. 2011; Ronksley et al. 2011; Chiva-Blanch et al. 2013) .

Information was, therefore, required to balance and counter the continuous proposals to increase alcohol taxation; restrict alcohol advertising and promotion; include general health warning labels on the containers of alcoholic beverages similar to that on tobacco packaging; and other measures that might result in a reduction of per capita consumption. The information was further required to differentiate the consumption, diet and lifestyle patterns of wine consumers from that of beer and spirits, and accordingly position wine as integral to a healthy diet and lifestyle as per the Winemakers' Federation of Australia (WFA) strategy.

4. Stream objectives:

The objectives were to enable the Australian wine industry and its stakeholders to make evidence-based decisions about the making, marketing and distribution of wine, and work towards public health policies and associated regulations and strategies were appropriate and balanced. To achieve this involved the collection, collation, evaluation, interpretation and communication of information on the beneficial and harmful effects of alcohol and wine on human health, specifically for:

- the Australian wine industry and in particular the Winemakers' Federation of Australia (WFA), and stakeholders such as government, to support and enable informed, evidenced-based decision-making and policies on wine and health issues;
- researchers, to direct and influence relevant research projects on wine and health issues; and
- consumers, to enable them to make informed decisions regarding the appropriate amount and pattern of wine consumption that minimises the harmful effects of wine while maximising any of its potential benefits to human health.

5. Methodology:

Current and emerging issues on wine and health were identified through the maintenance of effective relationships with industry, government and researchers, both national and international. The identification of these issues enabled the AWRI to assist the industry to be proactive and prepared to address and positively influence any wine/health issues that could potentially negatively impact on its operating environment. To facilitate this, the AWRI gained membership of industry and other relevant boards and committees such as the WFA's Wine and Health Working Group (formerly the Wine and Social Responsibility Committee), which enabled the two-way flow of information on these issues. Issues were also identified from enquiries received through the AWRI helpdesk.

Literature reviews were undertaken on current and emerging wine/health issues to capture existing knowledge and to determine gaps in knowledge. Knowledge was also captured by the attendance at relevant conferences, seminars and symposia. Where gaps in knowledge were determined, where



possible, research projects were developed, funding secured from external sources, and the projects duly undertaken with credible, relevant research providers.

Balanced and credible information on wine and health issues was regularly disseminated to industry and stakeholders through:

- AWRI helpdesk (more information is provided in Stream 2.5).
- Submissions.
- Commentaries, position papers and reports.
- Publications – both popular industry and peer-reviewed, including book chapters.
- Presentations – conference, lecture, roadshow, seminar, symposium and workshop .
- AWRI website.
- Booklets and fact sheets.
- Triennial workshops at the 13th and 14th Australian Wine Industry Technical Conferences (with one planned for the 15th).
- Media interviews.
- Expert advice provided on request to government and industry stakeholders.

6. Results and discussion:

Information provision

Wine and health issues were identified and information collected, evaluated and disseminated through a range of delivery mechanisms such as: AWRI booklets; databases and website; published articles; position papers and submissions; and board, committee and working group membership. For example, from the literature reviews that were conducted, 14 separate submissions were made to State and Commonwealth Departments of Aged Care and other national and international government agencies and departments, either on behalf of, or in conjunction with the Winemakers' Federation of Australia (WFA). The AWRI was also invited to make three submissions relating to reduced alcohol content and production practices. These submissions were made to ensure that the final guidelines and/or public health policies were balanced, evidence-based and factual, for example:

- The potential benefits of moderate alcohol consumption have been maintained in the 2009 National Health and Medical Research Council's *Guidelines to reduce the risks from drinking alcohol*. These Guidelines are adopted and/or deferred to by all state and Australian government documentation, guidelines, policies and strategies related to alcohol consumption in Australia, as well as by health and allied health professionals. This was the result of using the evidence provided in a 90-page submission to the National Health and Medical Research Council's (NHMRC) review of the *Australian Alcohol Guidelines: health risks and benefits* of 2001, which was prepared on behalf of the National Alcohol Beverage Industry Council (NABIC) in 2007/2008. http://wfa.org.au/assets/submissions/pdfs/2007/2007_Lo_Risk_Drinking.pdf
- The unique chemical composition of wine, which differentiates its potential health benefits from that of beer and spirits, has been recognised in the 2013 *Australian Dietary Guidelines*. This was a result of evidence provided in a 12-page submission on the NHMRC's *Draft for Public Consultation Alcohol Dietary Guidelines*. http://wfa.org.au/assets/submissions/pdfs/2011/AWRI_dietary_guidelines_Dec2011.pdf
- From evidence contained provided by the AWRI in two submissions (49-page and 60-page) to Food Standard Australia New Zealand (FSANZ) and the Australian government's *Food labelling law and policy review*, the adoption of blanket or general health warnings on alcohol labels similar to that on tobacco packaging has been reconsidered by government. The evidence suggested that general warnings are not effective at changing consumer behaviour, although specific warnings in conjunction with other specific and targeted education campaigns and programs might be more effective. Initiatives such as voluntary, non-prescribed health warning labelling aimed at pregnant women together with point-of-sale education materials for consumers



where alcohol is sold, which was developed by DrinkWise Australia, were instead encouraged by government but not mandated.

<http://www.foodstandards.gov.au/code/applications/Pages/applicationa576label3785.aspx>
(FSANZ) and

<http://www.foodlabellingreview.gov.au/internet/foodlabelling/publishing.nsf/Content/submissions-public>

In addition, in 2011, a 30-page referenced commentary was prepared in response to the tabloid headline *Myth busted: red wine no magic remedy for heart disease* which emanated from the Alcohol Policy Coalition Position Statement entitled *Cancer, cardiovascular disease and alcohol consumption* that sought to provide rationale for alcohol policy reform in Australia, <http://www.wfa.org.au/responsible/wine-and-health/>. The commentary highlighted that the relationship between alcohol consumption and wine is not necessarily linear where any alcohol consumption increases the risk of any cancer. Instead, the risk of only certain cancers increases linearly; that there are thresholds for cancers such as colorectal and liver; and that diet and lifestyle, pattern of consumption and concomitant tobacco smoking all influence risk. In contrast, there is a j-shaped relationship for cardiovascular disease and alcohol consumption, where the risk of cardiovascular disease increases only when more than 20-30 g alcohol/day are consumed.

A confidential literature review of the role of alcoholic beverages in short and long-term health and societal harms including cancer and cardiovascular disease, and associated costs in Australia was then undertaken in 2012 with recommendations for research directions and projects provided for WFA's Wine and Health Action Plan. The review revealed that there was little analysis of wine's role in short and long-term harms and that the data focussed on alcohol *per se*. A comparison of the relative benefits and risks of wine compared to the other alcoholic beverages was recommended.

Research undertaken

Gaps in knowledge were identified from the literature reviews on the impacts of moderate wine consumption on human health, specifically on disease states associated with ageing such as cardiovascular disease, certain cancers such as colo-rectal cancer, cognitive decline and associated dementia as well as Friedreich Ataxia disorder. A reduced risk of these diseases has been shown in population studies to be associated with moderate wine consumption. Grapes and wine are a major source of the phenolic compound, resveratrol, which was identified as having potential cardio- and cancer-protective properties as well as anti-neurodegenerative effects. The following research projects were initiated by the AWRI or external providers, after seeking and securing external funding, in order to determine whether resveratrol delivered in red wine had therapeutic effects. The role of the AWRI in these projects included: preparing funding proposals and submissions; initiating and coordinating the studies; ensuring objectives were aligned with industry needs; advising on project methodology and interpretation of results; and participating in the preparation of reports, peer-review articles and other publications.

- **Study: resveratrol and colorectal cancer.** This project which was funded by Cancer Australia entitled 'Resveratrol in the chemoprevention of colorectal neoplasia' is being undertaken at the Royal Melbourne Hospital in conjunction with Professor Finlay Macrae of the Department of Colorectal Medicine and Genetics. The project has investigated whether grape-derived resveratrol, administered in a moderate amount of red wine, reaches the proposed sites of action and reduces the risk of developing colorectal or bowel cancer in 120 human subjects. Bowel cancer has the second highest incidence of all cancers in Australia. The effect of resveratrol on proteins and cell mechanisms involved in controlling cell growth and thus cancer potential is being measured from blood samples and from tissue samples taken from the bowel. The results to date show that resveratrol delivered in de-alcoholised red wine is absorbed but is rapidly broken down in the liver to metabolites which are measureable in plasma. Lack of absorption and availability of resveratrol to the proposed sites of action was always a concern in previous research. Now it is proven resveratrol is bioavailable.



- **Pilot study: resveratrol and cardiovascular disease.** This pilot project which was initially funded by the Foundation for Alcohol Rehabilitation and Education entitled ‘Determination of the beneficial cardiovascular effects of red wine containing the wine-derived phenolic compound resveratrol and its metabolites in humans’ was undertaken with Professor Arduino Mangoni formerly of the University of Aberdeen, Scotland. Cardiovascular disease accounts for 40% of all deaths in Australia. The results to date trend to the conclusion that resveratrol delivered in red wine improves vascular outcomes such as blood pressure, endothelial function and augmentation index, which is a measure of arterial stiffness and central aortic pressure. These vascular outcomes are all associated with an increased risk of cardiovascular disease, in subjects at increased risk of cardiovascular disease, such as subjects with diabetes.
- **Pilot study: resveratrol and cognitive function.** This pilot project which was funded by the National Wine Foundation was undertaken with Professor Andrew Scholey of the Centre for Human Psychopharmacology at Swinburne University, Melbourne, entitled ‘Effect of resveratrol in red wine on cognitive function in older adults – a preliminary study’. Declining cognitive function and dementia account for 6% of disabilities in Australians aged over 65 years. The results show that resveratrol is absorbed and available to the proposed sites of action, confirming that red wine is a candidate vehicle for the delivery of resveratrol in older adults. Resveratrol delivered in red wine improved cognitive function during more demanding cognitive processing. Conversely, red wine alone was superior in terms of performing an attentional task. These results are promising and show for the first time that acute doses of resveratrol delivered in red wine can modulate cognitive functioning.
- **Pilot study: resveratrol and Friedreich Ataxia disorder.** This pilot project entitled ‘An open label clinical pilot study of resveratrol as a treatment for Friedreich Ataxia (FRDA)’ was undertaken with Professor Martin Delatycki and Dr Eppie Yiu of the Murdoch Children’s Research Institute, Melbourne. FRDA, a rare inherited disease that causes nervous system damage and movement problems, is caused by a defect (mutation) in a gene labelled *FXN*, resulting in a deficiency of the mitochondrial protein frataxin, resulting in a loss of mitochondrial DNA, apparently due to oxidative stress free radicals generated by excess iron. There is no cure or treatment for this disease. Resveratrol was identified to increase frataxin expression in cellular and mouse models of FRDA, and has anti-oxidant properties. This clinical study evaluated the effect of two different doses (1 g and 5 g/day) of resveratrol on lymphocyte frataxin levels over a 12-week period in subjects with FRDA, as well as the effect of resveratrol on *FXN* mRNA, oxidative stress markers and clinical measures of disease severity. Although lymphocyte frataxin levels did not change in either dosage group, in the high dose group there was a significant decrease in the oxidative stress marker plasma F2-isoprostanes and improvement in ataxia was also evident in the high-dose group including the hearing and speech of individuals. This study thus provides evidence for high-dose resveratrol as a potential disease-modifying therapy for FRDA.
- **Study: tracking the metabolome of grapes into wine.** This project which was funded by the State Government of South Australia entitled ‘Tracking the metabolome of grapes into wine’ is being undertaken at the AWRI together with Professor Fulvio Mattivi of the Edmund Mach Foundation, Italy, which aims to identify, quantify and potentially characterise compounds in grapes that are transferred to wine which might have therapeutic effects in humans in order to demonstrate the role of wine as part of a healthy diet and lifestyle. Grape samples from three varieties, Shiraz, Cabernet Sauvignon and Pinot Noir were collected during the 2012 vintage period, and small-scale wines were made from these grapes. The matching grape and wine pairs were subjected to reverse phase profiling using liquid chromatography time-of-flight mass spectrometry (LC-MS-MS), which revealed upwards of 400 features. While some of the features could be identified using reference materials, a number of these features are likely to be phenolic compounds that have not been considered in previous wine and health studies, and accordingly might be additional candidates for the observed therapeutic effects of grapes and wine.



Publications

Australian wine industry personnel, researchers and other stakeholders such as consumers have been regularly kept up-to-date on recent developments regarding wine and health. This is through the publication during the investment agreement of 37 papers in industry journals and 11 papers in peer-reviewed journals, as well as the publication of six book chapters.

7. Outcome and Conclusion:

The collation and generation of credible, relevant and reliable data on the impact of wine on human health outcomes has provided timely, evidence-based information to the Australian wine industry, government, consumers and other stakeholders to enable informed decision-making.

The provision of balanced wine and health information has, for example:

- been used to facilitate and guide research projects to fill identified knowledge-gaps such as pilot studies on the impact of wine and wine-derived phenolic compounds such as resveratrol on diseases such as cancer, cardiovascular disease, cognitive decline and dementia, and Friedreich Ataxia disorder. Proof of a concept can then be used as the basis of subsequent studies with larger subject numbers to confirm the observations of the initial pilot study. The pilot study on resveratrol and cognitive function has, for example, formed the basis of a study with larger subject numbers recently submitted to the NHMRC;
- had a tangible impact on government guidelines, policy and strategies that continue to incorporate that moderate wine consumption can have beneficial health effects, and that the chemical composition of wine can differentiate these effects from those of beer and spirits. In addition, it has enabled wine to be differentiated from beer and spirits in the amount consumed and the patterns of consumption; and
- informed the WFA Health & Social Responsibility Strategy 2011-2014, WFA Wine and Health Action Plan and core policy and support strategies, communication and activities that position moderate wine consumption as an integral part of a healthy diet and lifestyle.

This information has enabled industry to continue to operate without significant societal, regulatory and economic imposts, and to demonstrate its duty of care to its consumers enabling them to make informed decisions regarding their wine consumption and health.

Overall, the stream and its associated activities provide a strong foundation for the industry to continue to confidently interact with government and key stakeholders on wine and health issues.

8. Recommendations:

The well-resourced anti-alcohol lobby is increasing its campaign to impose the restrictive public health policies and strategies that were effective on reducing tobacco use in Australia, in order to reduce per capita alcohol (and hence wine) consumption. Therefore it is imperative that the industry continues to counter the campaign and provide evidence-based recommendations of alternative, effective tailored practices and strategies to reduce harmful alcohol consumption, while maintaining the potential health benefits from regular and moderate alcohol consumption for the majority of the adult Australian population. This can only be achieved by effectively communicating the key research findings of wine and health research to stakeholders, in order to forge and maintain good working relationships with government and allied government organisations. This can also be used to accurately respond to increasing allegations of impropriety by the industry, (to be addressed in Project 2.2.3 and 2.2.4 of the AWRI's R,D&E plan 2013-2018)

Results to date from the clinical research projects provide evidence for the key phenolic compound, resveratrol, when delivered in red wine as a potential disease-modifying or reducing therapy. Placebo-controlled clinical research projects with increased subject numbers are, however, required to assess



its benefits further, and accordingly to provide definitive data for government to include in alcohol and dietary guidelines, and for medical practitioners to make recommendations to patients about an appropriate amount and pattern of wine consumption. Research needs to be conducted to either substantiate or debunk these findings. Indeed in Australia, cardiovascular disease and cancer currently account for 34% and 30%, respectively, of all deaths, and cognitive decline and associated dementia account for 6% of disabilities in Australians aged over 65 years. Given the anticipated ageing of Australians over the next 20 to 30 years, research on reducing risk factors for these diseases has become a national priority and diet is a significant source of variation in risk of these disease states. These research projects will corroborate if there is a legitimate role for wine as part of a healthy diet and lifestyle to reduce the risk of these and other disease states and alleviate the already overburdened Australian healthcare system, (to be addressed in Project 2.2.3 in the AWRI's R,D&E plan 2013-2018).

As identified in the gap analysis of the role of wine in alcohol-related health and societal harms and associated costs in Australia, population research projects should also be investigated and instigated. It has been estimated that alcohol consumption costs the Australian community about \$15.3 billion in 2004–2005, when factors such as crime and violence, treatment costs, loss of productivity and premature death were taken into account (Collins and Lapsley 2008), and these contestable estimates have been used as the basis of the proposed restrictive practices, regulations and strategies by public health advocates. In addition, a critical analysis of the specific health and social benefits of moderate wine consumption should also be instigated, including the biological mechanisms underlying each benefit, in order to provide an irrefutable evidence base for each benefit and how it relates to a measurable reduction in disease states, (to be addressed in Project 2.2.3 in the AWRI's R,D&E plan 2013-2018).

Other gaps identified and projects that should be initiated include wine's role in youth binge drinking in Australia, and correspondingly the price sensitivity of consumers such as youth and other 'at risk of harm' consumers identified by the government such as women aged over 50 years and men aged over 65 years. These data would all be useful in further differentiating wine from the other alcoholic beverages by amount and pattern of consumption as well as for informing and supporting evidence-based policy positions for WFA, the wider wine industry and its stakeholders, (to be addressed in Project 2.2.3 in the AWRI's R,D&E plan 2013-2018).



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