

## COMMITTEE ON CARCINOGENICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT

### Proposed Strategy for discussion of Alcohol and Cancer Risk.

#### Background

1. Public Health England (PHE) and the Department for Health (DH) often receive requests for information on alcohol and cancer risk. The DH are currently reviewing their alcohol guidelines using an evidence based review (health and behavioural) of alcohol and intend to publish their findings in Jan 2014. Both PHE and DH agree that a review of alcohol and cancer by COC is timely and the subsequent statement will be helpful to both organisations.
2. The COC reviewed the carcinogenicity of alcoholic beverages in 1995 as part of the health input to the Interdepartmental Working Group on the Sensible Drinking Message. In 2004, the COC published a statement on alcohol and breast cancer and concluded it prudent to assume that drinking alcoholic beverages may result in breast cancer in women (<http://www.iacoc.org.uk/statements/alco04full.pdf>). The research considered by the Committee concluded that approximately 6% (between 3.2% and 8.8%) of breast cancers reported in the UK each year could be prevented if drinking was reduced to a very low level (ie less than 1 unit/week). The evidence suggested that the risk of breast cancer associated with drinking alcoholic beverages accumulates with prolonged consumption of alcohol. The statement also provided an evaluation of the cumulative risk of breast cancer with additional units of alcohol consumed per day above the national average of 1 unit/day.
3. The COC considered the possible quantitative relationship between alcohol and oesophageal cancer in 1995 as part of the review of alcohol and cancer. Several studies indicated that there was a quantitative relationship between alcohol intake and squamous cell carcinoma (SCC) of the oesophagus but a threshold level could not be defined. In 2005, COC conducted a review of new data (post 1995) on the quantitative relationship between alcohol and SCC of the oesophagus (<http://www.iacoc.org.uk/papers/documents/cc0520.pdf>). At the time, Members considered that the new data strengthened the overall picture, with an increased risk apparent at intakes above 30 g/day. However, it was not possible to identify a lower level of consumption below which there is no increase in risk.
4. Following discussion in 2011 of a paper by Schutze et al (2011) on alcohol's attributable burden on cancer incidence and the recent discussion at the November 2012 horizon scanning on alcohol and cancer risk, it was agreed that the Committee should review alcohol and cancer in light of the recent publications and produce a statement, to make its position clear on the subject.

5. Members are asked to consider this introductory paper and to advise on the strategy proposed with the aim of focusing the COC's deliberations on this issue. A more indepth discussion of each proposed topic is scheduled for the forthcoming meetings.

## **Strategy for review**

### 6.1 Exposure to alcohol

#### *a) Alcohol consumption and trends in UK and Europe*

The PHE Toxicology Unit will prepare a review of alcohol consumption in the UK and Europe. The availability of information on the trends and habits of alcoholic beverage consumption in the UK and Europe has increased markedly over the past decade. This has been due to efforts of the UK government, and other organisations like the European Commission and the WHO to conduct general population surveys to obtain such information. A review of this data may benefit the Committee's discussion on comparative changes and consequences of alcohol consumption to cancer risk.

#### *b) Composition of alcohol beverages*

In addition to ethanol and water, alcoholic beverages may also contain a multitude of other compounds derived from fermentation, contamination and the use of food additives or flavours. In terms of this review, should the focus be on the effect of alcoholic beverage consumption per se and cancer or do members feel a review of the individual carcinogens present in alcoholic beverages and their effect on cancer is needed at this time?

### 6.2 Cancers

#### *a) Review of epidemiological studies*

In 2007 (published IARC 2010), IARC reviewed the epidemiological evidence on the possible association between alcoholic beverage consumption and cancer at 27 anatomical sites (Cancers of the oral cavity and the pharynx, larynx, oesophagus, liver, breast stomach, colon and/or rectum, pancreas, lung, urinary bladder, endometrium, ovary, uterine cervix, prostate, kidney, lymphatic and haematopoietic system, testis, brain, thyroid, melanoma and other female cancers (vulva and vagina)). They re-affirmed their previous conclusion (IARC, 1988) that cancers of the upper digestive tract (oral cavity, pharynx, larynx, oesophagus) and the liver are causally related to the consumption of alcoholic beverages. In addition, IARC considered that there is sufficient evidence to conclude that cancer of the colorectum and female breast cancer are causally related to the consumption of alcoholic beverages (IARC, 2007). Following the IARC review in 2009 (IARC 2012), IARC reported an association between alcohol consumption and cancer of the pancreas. The IARC working group also concluded that acetaldehyde, also present in alcoholic beverages, is carcinogenic to humans (Group 1) and confirmed the Group 1 classification of alcohol consumption and of ethanol in alcoholic beverages. Members will be provided with the IARC epidemiological reviews for each of these specific cancers causally linked to alcohol. Table 1 provides an outline of the evaluation by IARC and outlines the carcinogenic evidence available for each cancer site. The PHE Toxicology Unit will prepare and provide an update review of the

epidemiological literature on alcohol consumption and each of the specific cancers published since the IARC reviews. Studies which will be considered in the review will be divided into pooled/meta-analysis type studies, cohort studies, case-control studies. Would members like any other cancer site considered?

*b) Cancer Risk Associated With interaction of Alcohol and Smoking*

The effect of combined exposure to alcohol and tobacco on the risk of certain cancers appears to be multiplicative e.g. laryngeal cancer. The COC previously examined the mechanisms contributing to the synergism of alcohol and tobacco in human lung cancers <http://www.iacoc.org.uk/papers/documents/cc0810.pdf> and although a number of possible mechanisms were identified, the COC was unable to reach any clear conclusions. An update review of the literature will be compiled on the interaction of alcohol and tobacco for each of the cancer sites.

### 6.3 Excess Burden of Cancer

While it is acknowledged that a proportion of cancer incidences across a number of cancer sites, can be attributed to genetic risk factors, lifestyle factors such as smoking, alcohol use, diet and obesity impact significantly upon cancer incidence and are considerably more important. The scientific evidence relating alcohol drinking to an increased risk of cancer continues to grow as does the contribution of alcohol drinking to the global cancer burden. Recent publications highlight the effect alcohol consumption contributes to the burden of cancer. A review of these publications will be provided to members.

### Questions for Committee

What are member's views on the proposed strategy?


Apart from the aforementioned cancers, would members like any other cancer site considered?


Would members like to consider any other interactions with alcohol that they consider of importance?

Does the Committee have any further suggestions?

PHE Toxicology Unit  
September 2013

### References

IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Alcohol consumption and ethyl carbamate . IARC Monographs on the Evaluation of Carcinogenic Risks in Humans 2010;96:3-1383.

IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. Personal habits and indoor combustions. Volume 100 E. A review of human carcinogens.  IARC Monographs on the Evaluation of Carcinogenic Risks in Humans 2012;100(Pt E):373-472.

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**Table 1. IARC evaluation of alcohol consumption and Cancer**

IARC Classification			
Alcoholic beverages	Carcinogenic to humans		Group 1
Ethanol in alcoholic beverages	Carcinogenic to humans		Group 1
Acetaldehyde associated with alcoholic beverages	Carcinogenic to humans		Group 1
Evidence for carcinogenic effects of alcoholic beverage consumption on the risk for each cancer site as determined IARC Working Group			
	IARC Vol 44 1998	IARC Vol 96 2010	IARC Vol 100e 2012
Cancer of the oral cavity and the pharynx	Sufficient	Sufficient	Supported previous conclusion reached in 2010
Cancer of the larynx	Sufficient	Sufficient	
Cancer of the oesophagus	Sufficient	Sufficient	
Cancer of the liver	Sufficient	Sufficient	
Female Breast Cancer		Sufficient	
Cancer of the colon and/or rectum		Sufficient	
Cancer of the pancreas		Not strong evidence	An association was observed
Male Breast Cancer		Inconsistent	Inconsistent
Cancer of the stomach		Inconsistent	Data difficult to interpret
Cancer of the lung		Available data were inadequate	Available data were inadequate
Cancer of the urinary bladder		Inconsistent	No association was observed
Cancer of the endometrium		Inconsistent	Inconsistent
Cancer of the ovary		Sparse and inconsistent	Little evidence of an association
Cancer of the uterine cervix		Sparse	Weak and difficult to draw any conclusions
Cancer of the prostate		Inconsistent	Little evidence for an association
Cancer of the kidney		No increased risk	No causal association
Cancers of the lymphatic and haematopoietic system		Evidence suggesting lack of carcinogenicity in humans for alcoholic beverages and non Hodgkin lymphoma (NHL)	Most forms of lymphomas and leukaemias have shown no or inverse associations with consumption of alcoholic beverages
Other Cancers (testis, brain, thyroid, Melanoma, other female cancers (vulva and vagina)		Sparse and inconsistent	Not possible to draw any conclusions