



Public Health
England

Protecting and improving the nation's health

Alcohol-attributable fractions for England: An update

Appendix 3: Comparison between 2013 and 2020 alcohol attributable fractions

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing and reduce health inequalities. We do this through world-leading science, research, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

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Alcohol consumption in England

A comparison between the 2013 and 2020 alcohol attributable fractions

The alcohol attributable fractions (AAFs) published in the 2013 report (Jones & Bellis, 2013) have been compared to the AAFs estimated in this report. A summary of these differences is shown in Table 1. There were differences observed across all the updated AAFs and these are likely to be related to one or more of the following differences:

- the updated relative risks extracted from the literature review
- changes in the alcohol consumption rates between GLS2010 and HSE2016
- a change in the level of upshifting applied to the alcohol consumption data. Alcohol consumption in this study has been upshifted by 40% and in the 2013 report alcohol was upshifted by 59% (Jones & Bellis, 2013)
- additional assumptions that were used in the AAF calculations that were not explicitly stated in the 2013 report

In this section, diseases where there were large differences in the AAFs between the two sets of results have been highlighted and the differences summarised. For tuberculosis a reduction in the AAFs was observed in all the male age groups. For the younger age groups, this is likely to be linked with the reduction in alcohol consumption observed between GLS2010 and HSE2016, which could account for these differences. In addition, the RRs extracted from the literature review are more granular and lower than the RR used in the 2013 report. For females an increase in the AAFs was observed across all age groups and this increase was greatest in the older females (≥ 65 years old). This could be related to the updated RR for former drinkers versus life-time abstainers. In the 2013 report this RR was equal to 1.44 however; the most recent evidence reported a RR of 5.3. This large increase in the RR would have a considerable impact on this population as approximately 20% of females within this age group (≥ 65 years old) are former drinkers.

The type 2 diabetes AAFs have decreased for males across all age groups. This most likely relates to the lower levels of alcohol consumption (based on the reduction

in upshifting and the change in consumption between GLS2010 and HSE2016) and that the updated RR for former drinkers was 1 compared to 1.18 which was used in the earlier report. An increase in the AAFs for type 2 diabetes has been observed for females. This could be related to the updated RRs. The updated RRs for females who consume 24 g/day were reported to have a RR equal to 0.8 in comparison to a RR equal to 0.6 that was used in the 2013 report. Therefore, for individuals consuming 24 g/day the effect of alcohol consumption on type 2 diabetes was considered to be less protective and may have contributed to the increase in the AAFs.

A reduction in the AAF for females was observed for hypertensive diseases. This may be related to the reduction in alcohol consumption as a result of the reduction in the level of upshifting that has been applied to the consumption data. In addition, the RRs extracted from the most recent literature were lower than the RRs used in the 2013 report. Moreover, this decrease in the AAF could also be related to the assumptions used to calculate the AAFs for hypertensive diseases in females. A J-shaped dose response curve was used in the 2013 report although it was not possible to reproduce the estimates for these AAFs based on the information that was provided in the report.

A reduction was observed in the AAFs for ischaemic heart disease across all age and sex groups which were potentially related to the reduction in alcohol consumption as a result of using a lower upshift and more recent data, as the same RRs and dose response curves were used.

An increase in the AAFs for malignant neoplasm of liver and intrahepatic bile ducts in males aged between 35 and 74 years was observed in this study. The mean alcohol consumption rates used to calculate the 2020 AAFs were lower than the rates used in the 2013 report. However, the updated RRs extracted from the literature were much higher than the RRs used in the previous report. This appears to have a greater impact on the AAFs than the lower alcohol consumption rates. For example, for individuals who consume 100 g/day the RR used in the 2013 report was 1.81 compared with 5.43 which was used in this study.

For the majority of the unintentional and intentional injuries excluding road/pedestrian accidents a reduction in the AAFs has been observed across all the

age and gender groups. There were no updates for these RRs and the RRs from 2013 were used in this analysis. This is likely to be related to changes in the alcohol consumption rates between GLS2010 and HSE2016, the different upshifting coefficient used in this analysis and the assumptions used in the 2013 report to approximate the dose response function. It was not possible to exactly replicate the 2013 AAFs for these acute conditions because the dose response functions for the RRs were not provided.

Table 1: The differences between the AAFs published in 2013 report and the AAFs estimated in this study. Each figure represents the change in PAFs between the 2013 and 2020 reports. A positive value indicates an increase in the PAFs between 2013 and 2020. AAFs that have decreased since the last report have been highlighted in green, those that have remained constant in yellow and those that have increased in orange. New values are highlighted in blue and values for which AAFs are not applicable are highlighted in grey.

Condition ¹	Age/Gender Group															
	16-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Infectious and parasitic diseases																
<i>Tuberculosis</i>	-0.31	0.10	-0.22	0.08	-0.11	0.06	-0.09	0.11	-0.02	0.14	-0.05	0.23	-0.09	0.28	-0.33	0.28
Malignant neoplasm of:																
<i>Lip, oral cavity and pharynx</i>	-0.19	-0.17	0.00	-0.11	0.06	-0.12	0.05	-0.04	0.08	-0.04	0.11	-0.05	0.14	-0.04	0.02	-0.13
<i>Oesophagus</i>	-0.19	-0.22	-0.13	-0.18	-0.09	-0.18	-0.09	-0.09	-0.06	-0.11	-0.06	-0.13	-0.06	-0.12	-0.15	-0.22
<i>Colon</i>	-0.07	-0.06	-0.06	-0.06	-0.04	-0.06	-0.05	-0.04	-0.03	-0.04	-0.03	-0.05	-0.02	-0.06	-0.05	-0.08
<i>Rectum</i>	-0.07	-0.06	-0.06	-0.06	-0.04	-0.06	-0.05	-0.04	-0.03	-0.04	-0.03	-0.05	-0.02	-0.06	-0.05	-0.08
<i>Liver and intrahepatic bile ducts</i>	0.01	-0.06	0.08	-0.05	0.17	-0.01	0.19	0.07	0.24	0.04	0.21	-0.02	0.12	-0.06	-0.01	-0.10
<i>Larynx</i>	-0.16	-0.13	-0.13	-0.09	-0.09	-0.11	-0.10	-0.06	-0.07	-0.07	-0.05	-0.06	-0.03	-0.06	-0.10	-0.11
<i>Breast</i>	N/A	-0.04	N/A	-0.03	N/A	-0.02	N/A	0.02	N/A	0.01	N/A	-0.01	N/A	-0.03	N/A	-0.07
Diabetes mellitus																
<i>Diabetes mellitus (type II)</i>	-0.07	0.08	-0.08	0.08	-0.06	0.09	-0.06	0.09	-0.06	0.08	-0.06	0.07	-0.08	0.03	-0.10	0.05

¹ See Table 1 in main report for ICD-10 code(s) used for each condition

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Condition ¹	Age/Gender Group															
	16-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Diseases of the nervous system																
<i>Epilepsy and Status epilepticus</i>	-0.14	-0.11	-0.10	-0.07	-0.07	-0.09	-0.08	-0.04	-0.05	-0.04	-0.04	-0.04	-0.01	-0.05	-0.08	-0.09
Cardiovascular disease																
<i>Hypertensive diseases</i>	-0.12	-0.27	-0.11	-0.17	-0.10	-0.28	-0.11	-0.24	-0.10	-0.20	-0.07	-0.08	-0.02	0.05	-0.05	0.04
<i>Ischaemic heart disease</i>	-0.05	-0.13	-0.08	-0.18	-0.08	-0.16	-0.08	-0.12	-0.08	-0.16	-0.07	-0.17	-0.07	-0.20	-0.07	-0.14
<i>Cardiac arrhythmias</i>	-0.02	-0.02	0.01	-0.01	0.03	0.00	0.03	0.02	0.05	0.02	0.05	0.00	0.05	-0.03	0.00	-0.06
<i>Heart failure</i>	New	New	New	New	New	New	New	New	New	New	New	New	New	New	New	New
<i>Haemorrhagic stroke - Mortality²</i>	-0.10	-0.22	-0.08	-0.17	-0.06	-0.17	-0.06	-0.08	-0.06	-0.11	-0.04	-0.12	-0.04	-0.10	-0.08	-0.13
<i>Haemorrhagic stroke - Morbidity³</i>	-0.07	0.19	-0.04	0.24	-0.03	0.23	-0.03	0.25	-0.01	0.26	0.00	0.26	0.00	0.23	-0.05	0.20
<i>Ischaemic stroke - Mortality⁴</i>	0.01	0.10	0.00	0.15	0.01	0.10	0.00	0.10	-0.01	0.12	0.02	0.17	0.02	0.15	0.02	0.15
<i>Ischaemic stroke - Morbidity⁵</i>	0.10	0.12	0.13	0.15	0.15	0.15	0.15	0.18	0.15	0.18	0.17	0.15	0.14	0.12	0.11	0.09

² I60-I62

³ I69 (x.0 to x.2 only)

⁴ I63-I66

⁵ I69 (x.3 to x.4 only)

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Condition ¹	Age/Gender Group															
	16-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<i>Oesophageal varices - Mortality</i>	-0.18	0.00	-0.10	0.06	-0.07	0.05	-0.07	0.09	-0.04	0.11	-0.01	0.12	0.06	0.07	-0.08	-0.07
<i>Oesophageal varices - Morbidity</i>	-0.61	-0.40	-0.50	-0.46	-0.37	-0.30	-0.37	-0.16	-0.29	-0.23	-0.31	-0.40	-0.37	-0.61	-0.67	-0.73
Respiratory infections																
<i>Pneumonia</i>	-0.07	-0.05	-0.07	-0.04	-0.05	-0.05	-0.06	-0.02	-0.04	-0.03	-0.04	-0.02	-0.03	-0.02	-0.06	-0.03
Digestive disease																
<i>Unspecified liver disease - Mortality</i>	-0.18	0.03	-0.10	0.06	-0.07	0.05	-0.07	0.09	-0.04	0.11	-0.01	0.12	0.06	0.07	-0.08	-0.07
<i>Unspecified liver disease - Morbidity</i>	-0.61	-0.40	-0.50	-0.46	-0.37	-0.30	-0.37	-0.16	-0.29	-0.23	-0.31	-0.40	-0.37	-0.61	-0.67	-0.73
<i>Cholelithiasis (gall stones)</i>	0.24	0.16	0.27	0.16	0.27	0.18	0.29	0.18	0.29	0.17	0.26	0.15	0.20	0.13	0.20	0.13
<i>Acute and chronic pancreatitis</i>	-0.07	-0.01	-0.02	0.05	0.03	0.04	0.01	0.11	0.05	0.11	0.09	0.09	0.15	0.05	0.05	-0.02
Pregnancy and childbirth																
<i>Spontaneous abortion</i>	N/A	0.01	N/A	0.02	N/A	-0.01	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>Low birth weight</i>	N/A	-0.04	N/A	-0.01	N/A	0.00	N/A	0.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unintentional injuries																

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	16-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<i>Road/pedestrian traffic accidents - Mortality</i>	-0.30	-0.23	-0.24	-0.19	-0.08	-0.17	-0.08	-0.13	0.10	-0.08	0.08	-0.06	0.04	-0.03	-0.05	-0.03
<i>Road/pedestrian traffic accidents - Morbidity</i>	-0.20	-0.15	-0.16	-0.13	-0.05	-0.12	-0.05	-0.09	0.06	-0.05	0.05	-0.04	0.03	-0.02	-0.04	-0.02
<i>Poisoning - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Poisoning - Morbidity</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
<i>Fall injuries - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Fall injuries - Morbidity</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
<i>Fire injuries - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Fire injuries - Morbidity</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
<i>Drowning - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Drowning - Morbidity</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
<i>Other unintentional injuries - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Other unintentional injuries</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
Intentional injuries																
<i>Intentional self-harm - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04

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Condition ¹	Age/Gender Group															
	16-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<i>Intentional self-harm</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
<i>Event of undetermined intent - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Event of undetermined intent</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02
<i>Assault - Mortality</i>	-0.25	-0.16	-0.25	-0.15	-0.20	-0.17	-0.22	-0.13	-0.18	-0.10	-0.14	-0.07	-0.07	-0.04	-0.12	-0.04
<i>Assault - Morbidity</i>	-0.11	-0.07	-0.12	-0.07	-0.09	-0.08	-0.10	-0.05	-0.08	-0.04	-0.06	-0.04	-0.03	-0.02	-0.05	-0.02

Bibliography

Jones, L., & Bellis, M. A. (2013). Updating England-specific alcohol-attributable fractions.