Public Health England

Protecting and improving the nation's health

Consultation on proposed changes to the calculation of alcohol-related mortality and hospital admissions

Contents

Reader information

Document purpose

To set out proposed changes to the attributable fractions used in the calculation of alcohol-related mortality and hospital admissions.

Title

Consultation on proposed changes to the calculations of alcohol-related mortality and hospital admissions.

Target audience

Users of official and national statistics on alcohol-related mortality and hospital admissions.

Circulation list

Public consultation,

Description

A consultation to obtain views on our proposal to update the alcohol attributable fractions that are used in calculating alcohol-related mortality and hospital admissions.

Action required

None required but responses invited.

Timing

None required but responses invited.

About the document

Definitions

Alcohol-attributable fractions (AAF)

When calculating statistics for alcohol-related conditions, a fraction of the deaths or admissions is used based on the latest academic evidence about the contribution alcohol makes to each condition. These fractions are called alcohol-attributable fractions (AAF). More specifically, an AAF is a function of the prevalence of drinking and the relative risk of each alcohol-related condition. It is an estimate of the proportion of cases of a disease or type of injury that may be attributed to the consumption of alcohol.

Relative risk

A relative risk is the ratio between one risk and another. The relative risk is the ratio of the probability of an outcome in an exposed group to the probability of an outcome in an unexposed group. For the calculation of AAFs the exposure is alcohol consumption applied to a range of alcohol-related conditions.

Detail of the formula used to calculate AAFs based on the RRs sourced from the academic evidence is presented in Appendix B.

Alcohol-related indicators

AAFs are used by Public Health England to calculate a range of Official Statistics as published in the Local Alcohol Profiles for England (LAPE):

- alcohol-related mortality
- years of life lost due to alcohol-related mortality
- admission episodes for alcohol-related conditions (Narrow)
- admission episodes for alcohol-related conditions (Broad)
- admission episodes for alcohol-related conditions broken down by age group, cause, and so on

These indicators are published as directly standardised rates (DSRs). The following terms are used throughout the consultation to refer to different types of alcohol DSRs published.

Alcohol-specific mortality

Deaths from conditions wholly caused by alcohol. This definition is also used by the Office of National Statistics in their annual UK data release. The AAF is equal to 1 for all these conditions.

Alcohol-related mortality

Deaths from conditions which are wholly or partially caused by alcohol. For partially attributable conditions, the AAFs are used to estimate the contribution alcohol makes to the condition.

Years of life lost to alcohol-related conditions

The number of years of life lost up to the age of 75 for individuals who died aged under 75 of an alcohol-related cause.

There are 2 measures of alcohol-related hospital admissions used in LAPE: the Broad and the Narrow measure.

Alcohol-related hospital admissions (Broad definition)

A measure of hospital admissions where either the primary diagnosis (main reason for admission) or one of the secondary (contributory) diagnoses is wholly or partially caused by alcohol. This represents a Broad measure of alcohol-related admissions but is sensitive to changes in coding practice over time.

Alcohol-related hospital admissions (Narrow definition)

A measure of hospital admissions where the primary diagnosis (main reason for admission) is wholly or partially caused by alcohol. This represents a Narrower measure. Since every hospital admission must have a primary diagnosis it is less sensitive to coding practices but may also understate the part alcohol plays in the admission.

In general, the Broad measure gives an indication of the full impact of alcohol on hospital admissions and the burden placed on the NHS. The Narrow measure estimates the number of hospital admissions which are primarily due to alcohol consumption and provides the best indication of trends in alcohol-related hospital admissions.

Background

Alcohol consumption is a significant risk factor for many major chronic diseases (for example, coronary heart disease and stroke). In 2018 there were around 24,720 alcohol-related deaths and during 2018/19 approximately 357,660 hospital admissions in England related to alcohol (Narrow measure). The latter represents 2.1% of total hospital admissions, 62% of which were among males and over half (57%) were among those aged between 45 and 74 years old (1).

The estimated risks for developing diseases associated with drinking alcohol, compared to the risks for those who do not drink (relative risk), currently used to produce the AAFs for indicators in LAPE have recently been updated but not yet used to produce statistics. Public Health

England published ‘Alcohol-attributable fractions for England: An update’ (2), the purpose of which was to identify the most recent and robust evidence on the relative risks of disease associated with alcohol consumption, and the proportion of disease cases that can be attributed to alcohol. This updates the AAF estimates that were last published in 2013 (3). See Appendix B. for more detail regarding the formula used.

Public Health England is proposing to move to using these updated AAFs for its next publication of alcohol-related mortality and admissions, currently planned for 2021. This would include a historical series of a number of years’ data. This consultation therefore presents analysis showing the impact of changing to the updated AAFs on the rates of alcohol-related mortality and hospital admissions as currently published. Specific questions are asked regarding the proposal to update the fractions and Official Statistics publications, as well as any other comments or points that you would like us to consider.

This is a public consultation and anyone is welcome to contribute.

Ways to respond

If you have concerns or comments that you would like to raise on the process itself, please write to:

Clare Griffiths
Public Health England
7th Floor, Wellington House
Waterloo Road
London SE1 8UG
e-mail: lape@phe.gov.uk

After the consultation

We will publish a summary of the comments made after the consultation closes, together with our response on the way forward.

Confidentiality and data protection

PHE may contact you in the future to discuss your response regarding this consultation or to contact you about other consultations. Please let us know if you do not want to receive these communications by emailing lape@phe.gov.uk

We would like to know as much as possible about what you think of our proposals. We aim to be as open and transparent as possible, so we will publish a summary of the responses to this consultation – comments will not be attributed to specific organisations or individuals. We will list all of the organisations that participated in this consultation. All responses to consultations are subject to release under the Freedom of Information Act, although no personal information will be released in such instances.

Quality assurance

This consultation has been carried out in accordance with the government's consultation principles, available here.

Reasons for changes

The relative risks and alcohol attributable fractions (AAFs) used in the publication of indicators in LAPE have recently been updated to reflect the latest evidence. This important new evidence is not being taken into account in current publications, resulting in figures that may misrepresent the potential burden of alcohol on mortality and hospital admissions (and other statistics related to these).

The newly calculated AAFs published by the UK Health Forum and Public Health England (4) provide a robust update of the potential burden of alcohol on mortality and hospital admissions; as such, we are here proposing to update key indicators impacted by this change to improve the accuracy and relevance of published statistics.

Proposed changes

The updated AAFs for chronic and acute conditions are listed in Table 1.

PHE currently uses AAFs produced by Jones and Bellis (5) to calculate alcohol-related mortality and hospital admissions. The aim of the recent update was to replicate the Jones and Bellis analysis. A detailed comparison between the updated AAFs and those estimated by Jones and Bellis is provided in Appendix 3 of the UK Health Forum and Public Health England report.

In these updated AAFs in Table 1, psoriasis is excluded because the rapid review confirmed that the causality between alcohol and this condition is still unclear. In the Jones and Bellis report separate mortality and morbidity AAFs were calculated for haemorrhagic stroke, ischaemic stroke, unspecified liver disease and all acute conditions.

Table 1. AAFs for chronic and acute conditions
Table presenting the complete set of updated alcohol-attributable fractions for both chronic and acute conditions, by age and gender.

Condition	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
Wholly attributable conditions																
Alcohol-induced pseudo-Cushing's syndrome	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mental and behavioural disorders due to use of alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Degeneration of nervous system due to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Condition	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
Alcoholic polyneuropathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcoholic myopathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcoholic cardiomyopathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcoholic gastritis	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcoholic liver disease	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcohol-induced chronic pancreatitis	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ethanol poisoning	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Methanol poisoning	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Toxic effect of alcohol, unspecified	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Accidental poisoning by and exposure to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Intentional self-poisoning by and exposure to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Poisoning by and exposure t alcohol, undetermined intent	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Alcohol-induced acute pancreatitis	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Condition	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
Fetal alcohol syndrome (dysmorphic)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Excess alcohol blood levels	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Evidence of alcohol involvement determined by blood alcohol level	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Evidence of alcohol involvement determined by level of intoxication	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Infectious and parasitic diseases																
Tuberculosis	-0.01	0.29	0.11	0.25	0.23	0.27	0.26	0.33	0.33	0.34	0.26	0.37	0.13	0.39	-0.11	0.39
Malignant neoplasm of:																
Lip, oral cavity and pharynx	0.34	0.21	0.44	0.24	0.50	0.30	0.51	0.39	0.55	0.36	0.51	0.26	0.43	0.20	0.31	0.11
Oesophagus	0.39	0.27	0.48	0.30	0.52	0.35	0.54	0.44	0.57	0.40	0.54	0.32	0.46	0.26	0.37	0.16
Colon	0.09	0.05	0.12	0.06	0.14	0.07	0.14	0.10	0.16	0.09	0.14	0.06	0.11	0.05	0.08	0.03
Rectum	0.09	0.05	0.12	0.06	0.14	0.07	0.14	0.10	0.16	0.09	0.14	0.06	0.11	0.05	0.08	0.03
Liver and intrahepatic bile ducts	0.16	0.05	0.25	0.06	0.34	0.11	0.37	0.20	0.42	0.16	0.37	0.08	0.24	0.05	0.11	0.01
Larynx	0.19	0.12	0.26	0.14	0.30	0.17	0.31	0.23	0.34	0.20	0.31	0.15	0.25	0.11	0.18	0.06
Breast	N/A	0.08	N/A	0.10	N/A	0.12	N/A	0.17	N/A	0.15	N/A	0.11	N/A	0.08	N/A	0.04
Diabetes mellitus																

Condition	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
Diabetes mellitus (type II)	-0.11	-0.12	-0.12	-0.13	-0.10	-0.13	-0.10	-0.13	-0.09	-0.14	-0.10	-0.13	-0.11	-0.12	-0.13	-0.10
Diseases of the nervous system																
Epilepsy and Status epilepticus	0.18	0.11	0.25	0.13	0.28	0.15	0.29	0.21	0.32	0.19	0.29	0.14	0.23	0.10	0.16	0.06
Cardiovascular diseases																
Hypertensive diseases	0.10	-0.01	0.14	0.00	0.15	0.02	0.16	0.07	0.17	0.05	0.16	0.01	0.13	-0.01	0.10	-0.02
Ischaemic heart disease	-0.15	-0.23	-0.18	-0.26	-0.18	-0.26	-0.18	-0.22	-0.18	-0.25	-0.18	-0.24	-0.17	-0.22	-0.17	-0.16
Cardiac arrhythmias	0.13	0.08	0.18	0.10	0.20	0.12	0.21	0.15	0.23	0.14	0.21	0.10	0.17	0.08	0.12	0.05
Heart failure	0.08	-0.03	0.11	-0.04	0.13	-0.05	0.13	-0.07	0.15	-0.06	0.13	-0.04	0.11	-0.03	0.08	-0.02
Haemorrhagic stroke – Mortality (6)	0.08	0.03	0.12	0.05	0.14	0.10	0.15	0.20	0.16	0.15	0.15	0.07	0.11	0.03	0.07	0.00
Haemorrhagic stroke – Morbidity (7)	0.13	0.08	0.18	0.10	0.20	0.12	0.21	0.15	0.23	0.14	0.21	0.10	0.17	0.08	0.12	0.05
Ischaemic stroke – Mortality (8)	0.02	0.01	0.02	0.01	0.03	0.01	0.03	0.02	0.03	0.02	0.03	0.01	0.02	0.01	0.02	0.01
Ischaemic stroke – Morbidity (9)	0.10	0.06	0.14	0.08	0.16	0.09	0.17	0.12	0.18	0.11	0.17	0.08	0.13	0.06	0.10	0.03
Oesophageal varices - Mortality	0.52	0.64	0.63	0.68	0.67	0.73	0.69	0.78	0.72	0.77	0.69	0.70	0.61	0.64	0.47	0.50
Oesophageal varices – Morbidity	-0.17	-0.09	-0.03	-0.05	0.11	0.08	0.13	0.24	0.21	0.18	0.13	0.02	-0.04	-0.10	-0.34	-0.22

Condition	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
Respiratory infections																
Pneumonia	0.05	0.02	0.07	0.02	0.09	0.03	0.09	0.06	0.11	0.05	0.09	0.03	0.07	0.01	0.04	0.00
Digestive diseases																
Unspecified liver disease - Mortality	0.52	0.64	0.63	0.68	0.67	0.73	0.69	0.78	0.72	0.77	0.69	0.70	0.61	0.64	0.47	0.50
Unspecified liver disease - Morbidity	-0.17	-0.09	-0.03	-0.05	0.11	0.08	0.13	0.24	0.21	0.18	0.13	0.02	-0.04	-0.10	-0.34	-0.22
Cholelithiasis (gall stones)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
Acute and chronic pancreatitis	0.28	0.16	0.37	0.19	0.43	0.24	0.44	0.32	0.48	0.29	0.44	0.21	0.35	0.15	0.25	0.08
Pregnancy and childbirth																
Spontaneous abortion	N/A	0.09	N/A	0.10	N/A	0.10	N/A	0.11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Low birth weight	N/A	0.01	N/A	0.02	N/A	0.05	N/A	0.09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unintentional injuries																
Road/pedestrian traffic accidents - Mortality	0.12	0.02	0.22	0.03	0.31	0.05	0.33	0.10	0.38	0.06	0.24	0.01	0.10	0.00	0.01	0.00
Road/pedestrian traffic accidents - Morbidity	0.08	0.02	0.15	0.02	0.21	0.03	0.22	0.06	0.25	0.04	0.16	0.01	0.07	0.00	0.00	0.00
Poisoning - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Poisoning - Morbidity	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Fall injuries - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00

Condition	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
Fall injuries - Morbidity	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Fire injuries - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Fire injuries - Morbidity	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Drowning - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Drowning - Morbidity	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Other unintentional injuries - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Other unintentional injuries	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Intentional injuries																
Intentional self-harm - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Intentional self-harm	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Event of undetermined intent - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Event of undetermined intent	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00
Assault - Mortality	0.07	0.02	0.12	0.02	0.17	0.03	0.18	0.06	0.20	0.04	0.12	0.01	0.05	0.00	0.00	0.00
Assault - Morbidity	0.03	0.01	0.05	0.01	0.07	0.01	0.08	0.03	0.09	0.02	0.06	0.00	0.02	0.00	0.00	0.00

Source: Alcohol-attributable fractions for England: An update, UK Health Forum and Public Health England, 2020.

Comparison with previous estimates

The results of the UK Health Forum and Public Health England update report are in line with Jones and Bellis. In summary:

- alcohol continues to contribute to the increased risk of a large number of chronic and acute diseases
- alcohol consumption has the greatest impact on morbidities such as cancer and digestive diseases, compared with other morbidities
- the majority of the updated AAFs are smaller then previous estimates - this is mainly due to changes in reported prevalence of alcohol consumption in the English population
- evidence suggests the risk of type 2 diabetes and hypertensive disease for females is lower for low risk drinkers than abstainers
- there were age and sex differences in AAFs for all diseases - differences in alcohol consumption level, number of current drinkers, and variation in relative risks explain these differences
- for all diseases, except for tuberculosis and unspecified liver disease mortality across all age groups and haemorrhagic stroke mortality for some age groups, the AAFs for males are larger than those for females – likely because proportion of drinkers and drinking quantity is higher in males

In more detail, 75% of all the updated AAFs (acute and chronic) are smaller than Jones and Bellis, while 2% have remained constant, and 23% are larger. The key differences include the new morbidity AAFs for malignant neoplasm of the liver being significantly higher than previous for all male age groups, but for females, the new AAFs are slightly lower for most age groups. The new morbidity AAFs for hypertensive diseases for males and females are much lower than previous for all age groups except for the 75 to 84 female age group. For ischaemic heart disease, the new morbidity AAFs for males and females are lower than previous for all age groups.

For chronic conditions, 64% of the updated AAFs are smaller than in the Bellis and Jones report, while 3% have stayed the same and 33% are larger. The main reason for these differences is related to the reduction change in prevalence of the proportion of drinkers in each age and gender group and the mean alcohol consumption in these groups. A lesser impact is due to a difference in the percentage upshift that has been applied to account for underreporting. In the original report, a 59% upshift was applied, based on a methodology that analysed the gap between data on alcohol purchased and alcohol reported to be consumed, adjusting for waste. In this updated report an upshift of 40% has been applied, using the same methodology but based on more recent underreporting data.

For acute conditions, 98% of AAFs are smaller, while 2% are larger. This is due to reductions in the prevalence of alcohol consumption and binge drinking. Excluding chronic

and acute conditions which are wholly attributable to alcohol consumption, the new results show that alcohol has the greatest impact upon cancers, digestive diseases, and road/pedestrian traffic accidents which consistent with results in Jones and Bellis.

For some diseases, the updated AAFs have different patterns across the age groups. For example, the original AAFs for most cardiovascular and liver diseases stayed at a relatively consistent level across all age groups, whilst in the update, AAFs for most diseases, except for tuberculosis, increase from age group 16 to 24, reaching their peak value at age group 55 to 64 for males and 45 to 54 for females and decrease thereafter. This is explained by changes in the age distribution of reported alcohol consumption. The alcohol consumption prevalence used in the original report was based on the General Lifestyle Survey 2010 and was consistent across all age groups for males and females. In contrast, the update is based on reported alcohol consumption in Health Survey for England 2016. Here, prevalence is shown to increase from age 16 to 24, reaching its peak value at age 55 to 64 for males and 45 to 54 for females and decreases thereafter. This is reflected in the updated AAFs and differs from the AAFs used currently (10).

Lower risk of disease among people who consume low amounts compared with no alcohol could be due to other factors not considered in the updated study. For example, abstainers could have underlying conditions or compounding factors (for example. deprivation, or other behavioural risk factors) that could explain a higher risk of disease. Furthermore, the analysis used the average risk levels of each group, which may mask variation in the risk levels within each group.

This update does not account for the effect of drinking in previous years on current disease burden; that is, for those chronic diseases influenced by drinking prevalence many years ago. As such, the AAF figures could be an under-estimate of the true proportion of disease burden in the population that is caused by alcohol. There are also methodological differences between the updated estimates and the previous estimates (for example, relying on different sources for consumption data) as well as to alternative approaches that can be taken when calculating AAFs; the latter are outlined in Appendix A.

In conclusion, for many diseases the proportion of disease which is caused by alcohol is lower than estimated in 2013. In general, this is because people report drinking less, not because the harm alcohol causes to individuals has reduced.

Impact of the changes

We have assessed the impact of changing to the updated AAFs on the rates of alcohol-related mortality and hospital admissions.

The following are provisional statistics and may not match the finalised published figures.

The following Official Statistics published in LAPE will be affected by this change:

- alcohol-related mortality
- years of life lost due to alcohol-related mortality
- admission episodes for alcohol-related conditions (Narrow)
- admission episodes for alcohol-related conditions (Broad)
- admission episodes for alcohol-related conditions broken down by age group, cause, and so on

Alcohol-specific mortality and alcohol-specific admissions are not affected by the changes as the wholly attributable causes these indicators are based on have not been updated as part of the review.

The following results are based on analyses that exclude all negative fractions, that is, where the data suggests that alcohol lowers the risk of the condition. This follows the standard methodology of all previously published indicators.

Mortality

Alcohol-related mortality

Using the updated AAFs will lower the value of alcohol-related mortality compared with the published measure based on the 2013 fractions.

Implementing the 2020 AAFs will lower the estimate of alcohol-related deaths across England that are included in the directly standardised rate (DSR) by around 5,700. This equates to around 23% of deaths currently included in the 2018 DSR. This will reduce the all age persons DSR from 46.5 (per 100,000) – as currently published in LAPE – to 35.8 (per 100,000). Table 2 shows how the change will impact upon the indicator for males and females separately.

Table 2. Alcohol-related mortality (persons)

Table showing comparative directly standardised rates for alcohol-related mortality between 2016 and 2018 based on the current and updated alcohol-attributable fractions. Table shows over 5,000 fewer deaths per year will be included in the calculation if the updated fractions are adopted.

	No. of deaths	DSR (per 100,0000)	Lower 95% confidence limit	Upper 95% confidence limit
Based on 2020 AAFs				
2016	18,374	35.6	35.1	36.1
2017	18,772	35.9	35.4	36.4
2018	18,980	35.8	35.3	36.4
Based on 2013 AAFs				
2016	23,839	46.0	45.5	46.6
2017	24,208	46.2	45.6	46.7
2018	24,720	46.5	46.0	47.1
Relative difference				
2016	-5,465	-10	-10	-10
2017	-5,435	-10	-10	-10
2018	-5,740	-11	-11	-11

Source: Annual Death Extract Public Health Mortality File, Office for National Statistics 2020; Mid-year population estimates, Office for National Statistics, 2020.

Table 3. Alcohol-related mortality (male, female)

Table showing comparative directly standardised rates for alcohol-related mortality between 2016 and 2018 based on the current and updated alcohol-attributable fractions, by gender. Table shows over 2,500 fewer deaths per year for each gender will be included in the calculation if the updated fractions are adopted.

Males					Females				
Year	**No. of deaths**	**DSR (per 100,0000)**	**Lower 95% confidence limit**	**Upper 95% confidence limit**	**Year**	**No. of deaths**	**DSR (per 100,0000)**	**Lower 95% confidence limit**	**Upper 95% confidence limit**
Based on 2020 AAFs									
2016	13,067	54.7	53.7	55.6	2016	5,307	19.5	19.0	20.0
2017	13,376	55.1	54.2	56.1	2017	5,397	19.6	19.1	20.1
2018	13,599	55.2	54.2	56.1	2018	5,381	19.3	18.8	19.8
Based on 2013 AAFs									
2016	15,751	66.3	65.3	67.4	2016	8,088	28.8	28.2	29.4
2017	16,034	66.5	65.5	67.6	2017	8,174	28.8	28.1	29.4
2018	16,465	67.2	66.2	68.3	2018	8,255	28.7	28.1	29.3
Relative difference									
2016	-2,684	-12	-12	-12	2016	-2,781	-9	-9	-9
2017	-2,659	-11	-11	-12	2017	-2,777	-9	-9	-9
2018	-2,866	-12	-12	-12	2018	-2,873	-9	-9	-9

Source: Annual Death Extract Public Health Mortality File, Office for National Statistics 2020; Mid-year population estimates, Office for National Statistics, 2020.

Implementation of the 2020 AAFs will lower the estimate of the number of alcohol-related deaths in all age groups but the difference is greatest in the very old age groups (85+). This is impacted by the fact that the updated AAFs are based on alcohol consumption prevalence data broken down for the oldest age groups up to 90 and above, whereas the 2013 AAFs only included prevalence data up to those aged 75 and above. Also, the youngest age group for the updated AAFs is 16 to 24 whereas the 2013 AAFs included the 0-15 age group which accounts for some of the difference in the 15 to 19 group. The latter will also be impacted by the fact that alcohol consumption over recent years has beed reducing in younger age groups at a faster pace than older groups.

Table 4. Number of alcohol-related deaths 2018 (male, female, persons)
Table presenting comparative number of alcohol-related deaths in 2018 based on the current and updated alcohol-attributable fractions, by age and gender. The table shows that if the updated fractions are adopted, for 2018, there will be fewer deaths for every age group included in the calculation.

	Male			Female			Persons		
Age group	Based on new 2020 AAFs	Based on old 2013 AAFs	Difference	Based on new 2020 AAFs	Based on old 2013 AAFs	Difference	Based on new 2020 AAFs	Based on old 2013 AAFs	Difference
0-14	0	0	0	0	0	0	0	0	0
15-19	26	92	-66	6	25	-19	32	117	-85
20-24	76	222	-146	9	35	-26	85	257	-172
25-29	153	314	-161	35	68	-33	188	382	-194
30-34	250	442	-193	84	123	-39	334	565	-232
35-39	423	580	-157	154	215	-61	577	795	-217
40-44	616	795	-179	233	305	-72	849	1,100	-251
45-49	925	1,177	-252	463	522	-59	1,389	1,699	-311
50-54	1,213	1,453	-239	590	651	-60	1,804	2,103	-300
55-59	1,381	1,519	-137	600	672	-72	1,981	2,190	-210
60-64	1,479	1,599	-120	672	768	-96	2,152	2,368	-216
65-69	1,572	1,639	-67	560	706	-147	2,132	2,345	-213
70-74	1,757	1,854	-96	587	792	-205	2,345	2,646	-301
75-79	1,205	1,272	-67	440	700	-261	1,645	1,973	-328
80-84	1,225	1,323	-98	453	800	-347	1,678	2,123	-445
85-89	704	1,175	-471	247	883	-636	952	2,058	-1,107
90+	592	1,008	-417	247	988	-741	839	1,997	-1,158
All ages	13,599	16,465	-2,866	5,381	8,255	-2,873	18,980	24,720	-5,740

Source: Annual Death Extract Public Health Mortality File, Office for National Statistics 2020.

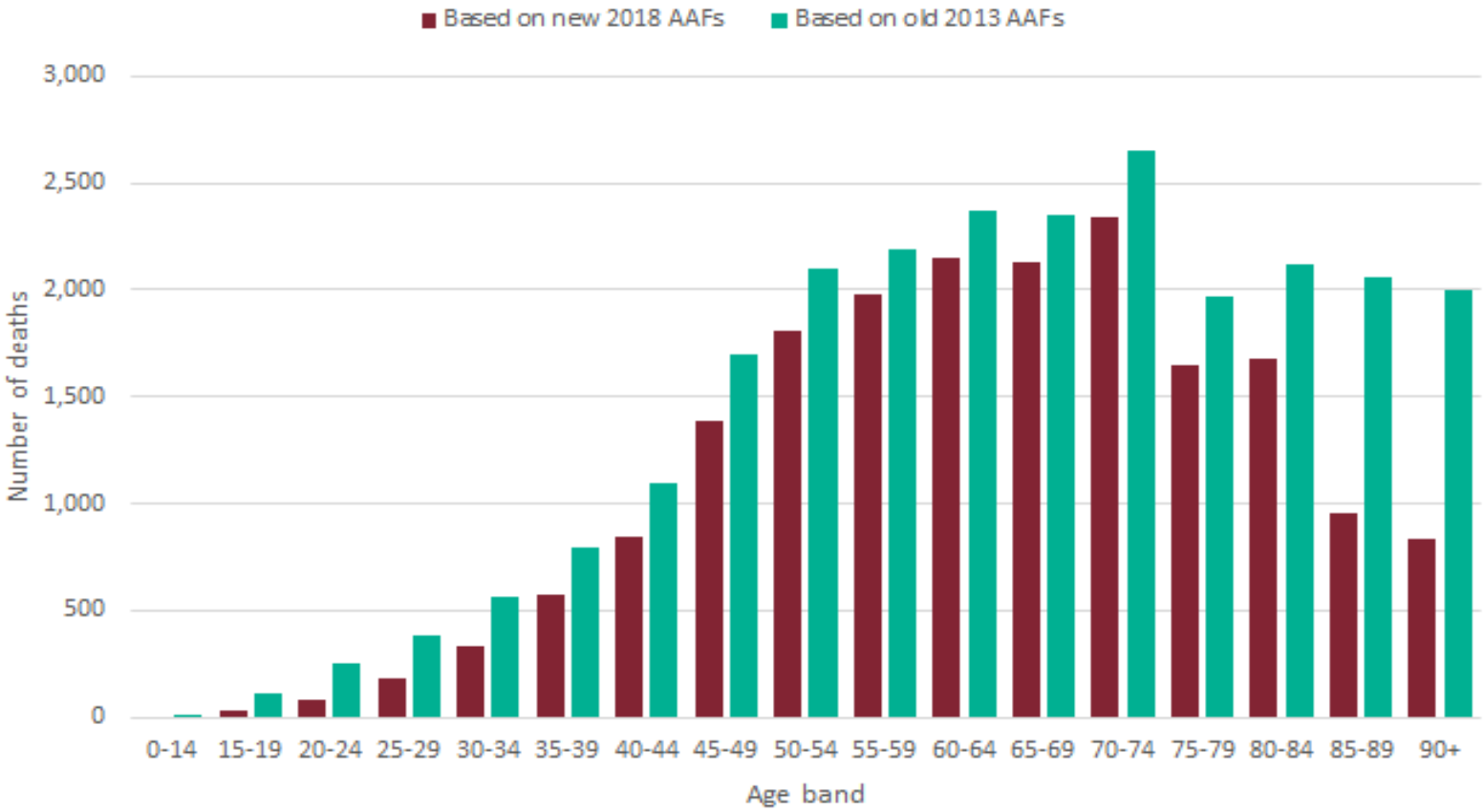
Table 5. Number of alcohol-related deaths 2018 (male, female, persons)
Table presenting comparative number of alcohol-related deaths in 2018 based on the current and updated alcohol-attributable fractions, by age and gender. The table shows that if the updated fractions are adopted, for 2018, there will be fewer deaths for every age group included in the calculation.

	Male			Female			Persons		
Age group	Based on new 2020 AAFs	Based on old 2013 AAFs	Difference	Based on new 2020 AAFs	Based on old 2013 AAFs	Difference	Based on new 2020 AAFs	Based on old 2013 AAFs	Difference
0-14	0	0	0	0	0	0	0	0	0
15-19	26	92	-66	6	25	-19	32	117	-85
20-24	76	222	-146	9	35	-26	85	257	-172
25-29	153	314	-161	35	68	-33	188	382	-194
30-34	250	442	-193	84	123	-39	334	565	-232
35-39	423	580	-157	154	215	-61	577	795	-217
40-44	616	795	-179	233	305	-72	849	1,100	-251
45-49	925	1,177	-252	463	522	-59	1,389	1,699	-311
50-54	1,213	1,453	-239	590	651	-60	1,804	2,103	-300
55-59	1,381	1,519	-137	600	672	-72	1,981	2,190	-210
60-64	1,479	1,599	-120	672	768	-96	2,152	2,368	-216
65-69	1,572	1,639	-67	560	706	-147	2,132	2,345	-213
70-74	1,757	1,854	-96	587	792	-205	2,345	2,646	-301
75-79	1,205	1,272	-67	440	700	-261	1,645	1,973	-328
80-84	1,225	1,323	-98	453	800	-347	1,678	2,123	-445
85-89	704	1,175	-471	247	883	-636	952	2,058	-1,107
90+	592	1,008	-417	247	988	-741	839	1,997	-1,158
All ages	13,599	16,465	-2,866	5,381	8,255	-2,873	18,980	24,720	-5,740

Source: Annual Death Extract Public Health Mortality File, Office for National Statistics 2020.

Figure 1. Number of alcohol-related deaths 2018 (persons)

Figure displaying comparative number of alcohol-related deaths in 2018 based on 2020 and 2013 alcohol-attributable fractions, by age. Figure shows that for 2018, for each age band, fewer alcohol-related deaths will be included in the calculation if the 2020 alcohol-attributable fractions are adopted in comparison to the 2013 alcohol-attributable fractions.



Source: Source: Annual Death Extract Public Health Mortality File, Office for National Statistics 2020.

Table 6. Number of attributable deaths only 2018 (persons)

Table 6 shows the number of alcohol-related deaths estimated for 2018 based on the 2013 and 2020 fractions by key disease areas. The table is based on the underlying cause code of each death and excludes all wholly attributable deaths (which are not affected by the change). With the exception of some types of cancer and digestive diseases, most disease areas show a lower estimate, which is mostly due to the lower levels of alcohol consumption included in the 2020 AAFs compared with the 2013 version. In addition, some conditions have been removed in the 2020 update; for example, C19/C21 (types of colorectal cancer).

Cause	ICD-10 code(s)	No. of deaths		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Partially attributable conditions - Acute conditions		**1,529**	**4,059**	
Injuries		**1,529**	**4,059**	
Intentional and unintentional injuries	$ (11)	1,529	4,059	
Partially attributable conditions - Chronic conditions		**11,259**	**14,058**	
Cardiovascular disease		**1,989**	**2,794**	2020 AAFs exclude I85
Cardiac arrhythmias	I47-I48	586	735	
Haemorrhagic stroke	I60-I62	637	1,381	
Heart failure	I50-I51	347	0	2013 AAFs do include I50-I51 but all fractions are 0.0
Hypertensive diseases	I10-I15	400	633	
Ischaemic heart disease	I20-I25	0	0	
Ischaemic stroke	I63-166	3	30	
Oesophageal varices	I85	16	16	
Diabetes		**0**	**0**	E11 are negative fractions, excluded from the calculation
Diabetes mellitus (type II)	E11	0	0	
Digestive disease		**1,381**	**1,292**	
Acute and chronic pancreatitis	K85, K86.1	242	185	
Cholelithiasis (gall stones)	K80	0	0	
Unspecified liver disease	K73, K74	1,139	1,107	
Diseases of the nervous system		**151**	**202**	
Epilepsy and Status epilepticus	G40-G41	151	202	

Cause	ICD-10 code(s)	No. of deaths		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Infectious and parasitic diseases		**42**	**41**	
Tuberculosis	A15-A19	42	41	
Cancer		**6,873**	**7,835**	2020 AAFs exclude C19 and C21
Breast	C50	946	1,189	
Colon	C18	660	1,029	
Larynx	C32	170	211	
Lip, oral cavity and pharynx	C00-C14	1,001	899	
Liver and intrahepatic bile ducts	C22	975	623	
Oesophagus	C15	2,801	3,424	
Rectum	C20	321	459	
Respiratory infections		**822**	**1,895**	
Pneumonia	J10.0, J11.0, J12-J15, J18	822	1,895	

Source: Source: Annual Death Extract Public Health Mortality File, Office for National Statistics 2020.

Years of life lost

This indicator is based on the same selection criteria applied to deaths as alcohol-related mortality. Therefore, the same number of cases as above are multiplied by the years of life lost up to the age of 75 summed to give total years lost due to alcohol-related conditions. Therefore, the difference and pattern will be similar to that observed for the alcohol-related mortality indicator.

Admissions

Admission episodes for alcohol-related conditions (Narrow)

Using the updated AAFs will lower the value of the number of admissions compared with the published measure based on the 2013 fractions.

Implementing the 2020 AAFs will lower the estimate of the number of Narrow alcohol-related admissions across England that are included in the DSR by around 83,000. This

equates to around 23% of admissions currently included in the 2018/19 DSR (similar to the reduction observed in mortality) and will reduce the all age persons DSR from 664 (per 100,000) – as currently published in LAPE – to 512 (per 100,000) following the proposed revision.

Table 7. Alcohol-related admissions: Narrow (persons)
This table sows how the change will impact upon the indicator by sex.Table showing comparative directly standardised rates for alcohol-related admissions (narrow) between 2016/17 and 2018/19 based on the current and updated alcohol-attributable fractions. Table shows over 78,000 per year fewer narrowly defined admissions will be included in the calculation if the updated fractions are adopted.

Year	No. of admissions	DSR (per 100,0000)	Lower 95% confidence limit	Upper 95% confidence limit
Based on 2020 AAFs				
2016/17	258,903	492	490	494
2017/18	259,174	488	486	490
2018/19	274,580	512	510	514
Based on 2013 AAFs				
2016/17	337,113	638	636	640
2017/18	337,867	634	631	636
2018/19	357,659	664	662	666
Relative difference				
2016/17	-78,210	-146	-146	-146
2017/18	-78,693	-146	-145	-146
2018/19	-83,079	-151	-151	-152

Source: Hospital episode statistics (HES), NHS Digital, 2020; Mid-year population estimates, Office for National Statistics, 2020.

Table 8. Alcohol-related admissions: Narrow (male, female)

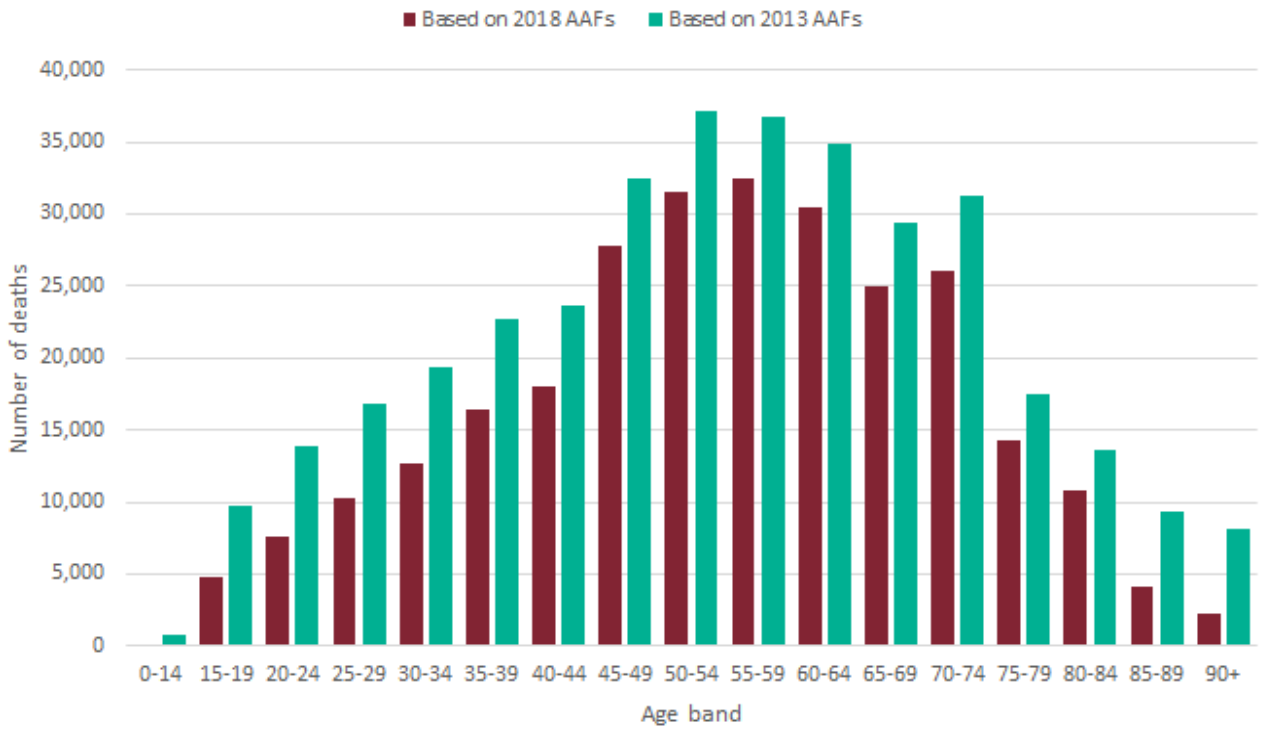
Table presenting comparative directly standardised rates for alcohol-related admissions (narrow) between 2016/17 and 2018/19 based on the current and updated alcohol-attributable fractions, by gender. Table shows fewer male than female narrowly defined alcohol-related admissions per year will be included in the calculation if the updated fractions are adopted.

Males					Females				
Year	**No. of admissions**	**DSR (per 100,0000)**	**Lower 95% confidence limit**	**Upper 95% confidence limit**	**Year**	**No. of admissions**	**DSR (per 100,0000)**	**Lower 95% confidence limit**	**Upper 95% confidence limit**
Based on 2020 AAFs									
2016/17	166,911	662	659	665	2016/17	91,992	340	338	342
2017/18	166,714	654	651	657	2017/18	92,460	339	337	341
2018/19	177,378	687	684	690	2018/19	97,202	354	352	356
Based on 2013 AAFs									
2016/17	207,823	823	820	827	2016/17	129,290	473	471	476
2017/18	207,664	814	810	817	2017/18	130,203	473	470	476
2018/19	220,682	851	847	854	2018/19	136,977	494	492	497
Relative difference									
2016/17	-40,912	-161	-161	-162	2016/17	-37,298	-133	-133	-134
2017/18	-40,950	-160	-159	-160	2017/18	-37,743	-134	-133	-135
2018/19	-43,303	-164	-163	-164	2018/19	-39,775	-140	-140	-141

Source: Hospital episode statistics (HES), NHS Digital, 2020; Mid-year population estimates, Office for National Statistics, 2020.

Implementation of the 2020 AAFs will reduce the number of Narrow alcohol-related admissions in all age groups but this difference is greatest in the very old age groups. Again, the youngest age group for the updated AAFs is 16-24 whereas the 2013 AAFs included the 0-15 age group which accounts for the difference in the 0-14 and 15-19 age groups. The difference in the 0-14 group was not as apparent for mortality as there were no recorded deaths in this age group but there are typically admissions, though relatively few compared to other age groups.

Figure 2. Number of alcohol-related admissions: Narrow 2018/19 (persons)
Figure showing comparative number of alcohol-related admissions (narrow) in 2018/2019 based on 2020 and 2013 alcohol-attributable fractions, by age. Figure shows that for 2018/19, for each age band, fewer narrowly defined alcohol-related admissions will be included in the calculation if the 2020 alcohol-attributable fractions are adopted in comparison to the 2013 alcohol-attributable fractions.



Source: Hospital episode statistics (HES), NHS Digital, 2020.

Table 9. Number of alcohol-related admissions: Narrow 2018/19 (male, female, persons)
Table presenting comparative directly standardised rates for alcohol-related admissions (narrow) in 2018/19 based on the current and updated alcohol-attributable fractions, by age and gender. The table shows that if the updated fractions are adopted, for 2018/19, there will be fewer narrowly defined alcohol-related admissions for every age group included in the calculation.

	Male			Female			Persons		
Age group	Based on 2020 AAFs	Based on 2013 AAFs	Difference	Based on 2020 AAFs	Based on 2013 AAFs	Difference	Based on 2020 AAFs	Based on 2013 AAFs	Difference
0-14	0	255	-255	0	499	-499	0	754	-754
15-19	2,401	5,258	-2,857	2,393	4,505	-2,112	4,793	9,763	-4,970
20-24	4,100	8,100	-4,000	3,478	5,846	-2,368	7,579	13,946	-6,368
25-29	6,371	10,470	-4,098	3,889	6,343	-2,454	10,261	16,813	-6,552
30-34	8,023	11,984	-3,962	4,682	7,390	-2,708	12,705	19,374	-6,670
35-39	10,357	13,213	-2,856	6,109	9,486	-3,377	16,466	22,699	-6,234
40-44	11,185	13,870	-2,685	6,897	9,831	-2,935	18,082	23,702	-5,619
45-49	15,555	19,008	-3,453	12,206	13,525	-1,318	27,761	32,532	-4,771
50-54	18,035	22,049	-4,014	13,524	15,090	-1,566	31,559	37,140	-5,581
55-59	20,657	23,177	-2,520	11,820	13,630	-1,810	32,477	36,807	-4,330
60-64	20,255	22,740	-2,485	10,256	12,184	-1,928	30,511	34,924	-4,413
65-69	17,879	19,556	-1,678	7,076	9,838	-2,762	24,955	29,395	-4,440
70-74	19,094	21,021	-1,927	6,962	10,245	-3,284	26,055	31,266	-5,211
75-79	10,445	11,043	-597	3,796	6,479	-2,682	14,242	17,521	-3,279
80-84	8,116	8,621	-505	2,730	4,953	-2,224	10,845	13,575	-2,729
85-89	3,233	5,808	-2,575	865.24	3,522	-2,657	4,098	9,330	-5,232
90+	1,672	4,508	-2,835	518.54	3,610	-3,092	2,191	8,118	-5,927
All ages	177,378	220,682	-43,303	97,202	136,977	-39,775	274,580	357,659	-83,079

Source: Hospital episode statistics (HES), NHS Digital, 2020.

As with mortality, some conditions have been removed in the 2020 update and the most significant changes are seen in the intentional/unintentional injuries. However, within cardiovascular disease codes I60-I62 have been removed from haemorrhagic stroke, and most significantly, admissions are now captured for I50-I51 heart failure – the 2013 AAFs did include these codes but all AAFs were 0.0.

Table 10. Number of attributable admissions only: Narrow 2018/19 (persons)
This table shows the number of Narrow alcohol-related admissions estimated for 2018/19 based on the 2013 and 2020 AAFs by main disease area. The table excludes all wholly attributable admissions. Most disease areas show a lower estimate based on the 2020 AAFs, which is mostly due to the lower levels of alcohol consumption included in the 2020 AAFs than the 2013 version.

Cause	ICD-10 code(s)	Number of admissions		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Partially attributable conditions - Acute conditions		**32,256**	**94,747**	
Intentional injuries		**3,464**	**11,995**	
Assault	X85-Y09, Y87.1	1,335	4,148	
Event of undetermined intent	Y10-Y34, Y87.2	62	194	
Intentional self-harm	X60-X84, Y87.0	2,068	7,653	
Unintentional injuries		**28,792**	**82,752**	
Drowning	W65-W74	8	21	
Fall injuries	W00-W19	7,158	24,661	
Fire injuries	X00-X09	71	197	
Other unintentional injuries	Rest of 'V' series §§	17,502	49,959	
Poisoning	X40–X49	716	2,261	
Road/pedestrian traffic accidents	$ (12)	3,336	5,653	
Partially attributable conditions - Chronic conditions		**140,215**	**159,478**	
Cardiovascular disease		**37,329**	**29,342**	2020 AAFs exclude I85
Cardiac arrhythmias	I47-I48	20,280	17,892	
Haemorrhagic stroke	I69.0-I69.2	0	2,509	2013 AAFs also included I60-I62 in this group
Heart failure	I50-I51	5,640	0	2013 AAFs do include I50-I51 but all fractions are 0.0
Hypertensive diseases	I10-I15	1,733	4,090	
Ischaemic heart disease	I20-I25	0	293	
Ischaemic stroke	I69.3-I69.4	8,474	4,557	2013 AAFs also included I63-I66 in this group

Cause	ICD-10 code(s)	Number of admissions		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Diabetes		**0**	**0**	E11 are negative fractions, excluded from the calculation
Diabetes mellitus (type II)	E11	0	0	
Digestive disease		**10,385**	**11,132**	
Acute and chronic pancreatitis	K85, K86.1	9,641	7,922	
Cholelithiasis (gall stones)	K80	0	0	
Unspecified liver disease	K73, K74	743	3,211	
Diseases of the nervous system		**6,472**	**8,784**	
Epilepsy and Status epilepticus	G40-G41	6,472	8,784	
Infectious and parasitic diseases		**441**	**532**	
Tuberculosis	A15-A19	441	532	
Cancer		**73,800**	**83,200**	2020 AAFs exclude C19 and C21
Breast	C50	28,252	28,751	
Colon	C18	14,897	23,428	
Larynx	C32	1,297	1,593	
Lip, oral cavity and pharynx	C00-C14	11,284	10,197	
Liver and intrahepatic bile ducts	C22	3,167	1,783	
Oesophagus	C15	14,903	17,449	
Rectum	C20	0	0	
Respiratory infections		**11,789**	**21,217**	
Pneumonia	J10.0, J11.0, J12-J15, J18	11,789	21,217	

Source: Hospital episode statistics (HES), NHS Digital, 2020.

Admission episodes for alcohol-related conditions (Broad)

Using the updated AAFs will lower the value compared with the published measure based on the 2013 fractions.

Implementing the 2020 AAFs will lower the estimate of the number of Broad alcohol-related admissions across England that are included in the DSR by around 320,000. This equates to around 25% of admissions currently included in the 2018/19 DSR (similar proportion to that observed above for mortality and Narrow admissions) and will lower the all age persons DSR

from 2,367 (per 100,000) – as currently published in LAPE – to 1,766 (per 100,000) following the proposed revision. Table 11 shows how the change will impact upon the indicator by gender.

Table 11. Alcohol-related admissions: Broad (persons)

Alcohol-related admissions: Broad (persons): Table showing comparative directly standardised rates for alcohol-related admissions (broad) between 2016/17 and 2018/19 based on the current and updated alcohol-attributable fractions. Table shows over 320,000 broadly defined admissions excluded from the calculation from the year 2018/19 if the updated fractions are adopted.

Year	No. of admissions	DSR (per 100,0000)	Lower 95% confidence limit	Upper 95% confidence limit
Based on 2020 AAFs				
2016/17	841,761	1,624	1,620	1,627
2017/18	870,083	1,657	1,654	1,661
2018/19	938,625	1,766	1,762	1,769
Based on 2013 AAFs				
2016/17	1,135,709	2,187	2,183	2,191
2017/18	1,171,253	2,226	2,222	2,230
2018/19	1,261,907	2,367	2,363	2,372
Relative difference				
2016/17	-293,948	-563	-563	-564
2017/18	-301,170	-569	-568	-569
2018/19	-323,282	-602	-601	-602

Source: Hospital episode statistics (HES), NHS Digital, 2020; Mid-year population estimates, Office for National Statistics, 2020.

Table 12. Alcohol-related admissions: Broad (male, female)

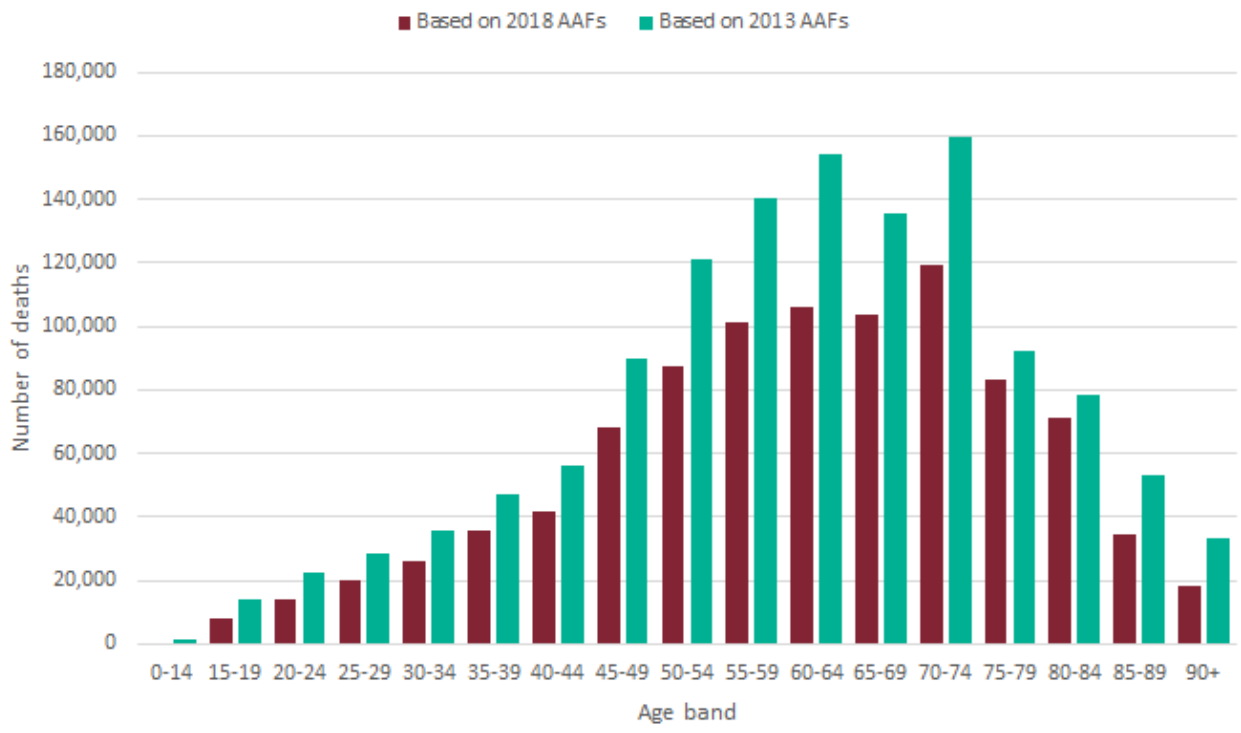
Table showing comparative directly standardised rates for alcohol-related admissions (broad) between 2016/17 and 2018/19 based on the current and updated alcohol-attributable fractions, by gender. Table shows that more female than male broadly defined alcohol-related admissions per year will be excluded in the calculation if the updated fractions are adopted.

Males					Females				
Year	**No. of admissions**	**DSR (per 100,0000)**	**Lower 95% confidence limit**	**Upper 95% confidence limit**	**Year**	**No. of admissions**	**DSR (per 100,0000)**	**Lower 95% confidence limit**	**Upper 95% confidence limit**
Based on 2020 AAFs									
2016/17	614,053	2,525	2,519	2,532	2016/17	227,708	840	837	844
2017/18	635,065	2,574	2,568	2,581	2017/18	235,018	858	855	862
2018/19	685,916	2,737	2,731	2,744	2018/19	252,709	915	911	918
Based on 2013 AAFs									
2016/17	732,787	3,008	3,001	3,015	2016/17	402,922	1,485	1,480	1,489
2017/18	755,770	3,057	3,050	3,064	2017/18	415,483	1,513	1,508	1,518
2018/19	816,252	3,246	3,239	3,253	2018/19	445,655	1,608	1,603	1,612
Relative difference									
2016/17	-118,734	-483	-482	-483	2016/17	-175,214	-645	-643	-645
2017/18	-120,705	-483	-482	-483	2017/18	-180,465	-655	-653	-656
2018/19	-130,336	-509	-508	-510	2018/19	-192,946	-693	-692	-694

Source: Hospital episode statistics (HES), NHS Digital, 2020; Mid-year population estimates, Office for National Statistics, 2020.

Implementation of the 2020 AAFs will reduce the number of Narrow alcohol-related admissions in all age groups but this difference is greatest in the very old age groups. Again, the youngest age group for the updated AAFs is 16-24 whereas the 2013 AAFs included the 0-15 age group which accounts for the difference in the 0-14 and 15-19 age groups. The difference in the 0-14 group was not as apparent for mortality as there were no recorded deaths in this age group but there are typically admissions, though relatively few compared to other age groups.

Figure 3. Number of alcohol-related admissions: Broad 2018/19 (persons)
Figure showing comparative number of alcohol-related admissions (broad) in 2018/19 based on 2020 and 2013 alcohol-attributable fractions, by age. Figure shows that for 2018/19, for each age band, fewer broadly defined alcohol-related admissions will be included in the calculation if the 2020 alcohol-attributable fractions are adopted in comparison to the 2013 alcohol-attributable fractions.



Source: Hospital episode statistics (HES), NHS Digital, 2020.

Table 13. Number of alcohol-related admissions: Broad 2018/19 (male, female, persons)

Table presenting comparative number of alcohol-related admissions (broad) in 2018/19 based on the current and updated alcohol-attributable fractions, by age and gender. The table shows that if the updated fractions are adopted, for 2018/19, there will be fewer broadly defined alcohol-related admissions for every age group included in the calculation.

	Male			Female			Persons		
Age group	Based on 2020 AAFs	Based on 2013 AAFs	Difference	Based on 2020 AAFs	Based on 2013 AAFs	Difference	Based on 2020 AAFs	Based on 2013 AAFs	Difference
0-14	0	455	-455	0	724	-724	0	1,179	-1,179
15-19	4,243	7,581	-3,338	3,658	6,425	-2,767	7,900	14,006	-6,105
20-24	8,210	12,673	-4,463	6,005	9,495	-3,490	14,214	22,168	-7,954
25-29	12,646	17,172	-4,526	7,390	11,135	-3,745	20,036	28,307	-8,271
30-34	17,020	21,709	-4,689	9,265	13,794	-4,529	26,285	35,503	-9,218
35-39	23,048	27,083	-4,035	12,701	20,250	-7,549	35,749	47,333	-11,584
40-44	27,572	32,402	-4,830	14,167	23,805	-9,638	41,740	56,207	-14,467
45-49	42,122	50,426	-8,304	26,234	39,123	-12,889	68,355	89,549	-21,194
50-54	55,450	68,010	-12,559	31,807	52,933	-21,126	87,257	120,943	-33,686
55-59	70,672	84,994	-14,322	30,307	55,374	-25,066	100,979	140,367	-39,388
60-64	76,613	94,205	-17,592	29,428	60,167	-30,739	106,041	154,372	-48,331
65-69	83,086	98,114	-15,028	20,467	37,218	-16,751	103,553	135,332	-31,779
70-74	96,832	115,089	-18,257	22,576	44,527	-21,951	119,408	159,616	-40,208
75-79	68,778	70,993	-2,215	14,583	21,300	-6,717	83,361	92,293	-8,932

80-84	57,902	58,487	-586	13,535	19,727	-6,191	71,437	78,214	-6,777
85-89	28,006	37,170	-9,164	6,179	16,233	-10,054	34,185	53,403	-19,218
90+	13,717	19,690	-5,973	4,408	13,428	-9,021	18,125	33,118	-14,994
All ages	685,916	816,252	-130,336	252,709	445,657 (13)	-192,948	938,625	1,261,909	-323,284

Source: Hospital episode statistics (HES), NHS Digital, 2020.

Table 14. Number of attributable admissions only: Broad 2018/19 (persons)

The table shows the number of Broad alcohol-related admissions estimated for 2018/19 based on the 2013 and 2020 AAFs by main disease area. The table excludes all wholly attributable admissions. Most disease areas show a lower estimate using 2020 AAFs, which again is mostly due to the lower levels of alcohol consumption applied to the 2020 AAFs compared to the 2013 version.

As mentioned above, some conditions have been removed in the 2020 update and as with Narrow admissions cardiovascular disease is significant due to the removal of I60-I62 from haemorrhagic stroke, more admissions being counted as I47-I48 cardiac arrhythmias and admissions are now captured for I50-I51 heart failure – the 2013 AAFs did include these codes but all AAFs were 0.0.

Cause	ICD-10 code(s)	Number of admissions		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Partially attributable conditions - Acute conditions		**20,844**	**63,944**	
Intentional injuries		**2,545**	**9,456**	
Assault	X85-Y09, Y87.1	991	3,235	
Event of undetermined intent	Y10-Y34, Y87.2	45	148	
Intentional self-harm	X60-X84, Y87.0	1,510	6,073	
Unintentional injuries		**18,298**	**54,488**	
Drowning	W65-W74	3	11	
Fall injuries	W00-W19	3,641	13,577	
Fire injuries	X00-X09	52	152	
Other unintentional injuries	Rest of 'V' series §§	11,166	34,186	
Poisoning	X40–X49	479	1,641	
Road/pedestrian traffic accidents	$ (14)	2,956	4,921	
Partially attributable conditions - Chronic conditions		**583,445**	**852,576**	
Cardiovascular disease		415,554	**639,114**	2020 AAFs exclude I85
Cardiac arrhythmias	I47-I48	151,767	92,220	

Cause	ICD-10 code(s)	Number of admissions		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Haemorrhagic stroke	I69.0-I69.2	599	2,357	2013 AAFs also included I60-I62 in this group
Heart failure	I50-I51	10,300	0	2013 AAFs included I50-I51 but all fractions were 0.0.
Hypertensive diseases	I10-I15	243,960	544,348	
Ischaemic heart disease	I20-I25	0	0	
Ischaemic stroke	I69.3-I69.4	7,738	189	2013 AAFs also included I63-I66 in this group
Diabetes		**0**	**0**	E11 are negative fractions, excluded from the calculation
Diabetes mellitus (type II)	E11	0	0	
Digestive disease		**20,022**	**35,925**	
Acute and chronic pancreatitis	K85, K86.1	16,208	12,085	
Cholelithiasis (gall stones)	K80	0	0	
Unspecified liver disease	K73, K74	3,814	23,840	
Diseases of the nervous system		**49,810**	**62,742**	
Epilepsy and Status epilepticus	G40-G41	49,810	62,742	
Infectious and parasitic diseases		**1,010**	**1,011**	
Tuberculosis	A15-A19	1,010	1,011	

Cause	ICD-10 code(s)	Number of admissions		Notes
		Based on 2020 AAFs	Based on 2013 AAFs	
Cancer		**89,271**	**96,421**	2020 AAFs exclude C19 and C21
Breast	C50	34,730	33,113	
Colon	C18	13,021	22,231	
Larynx	C32	1,754	2,139	
Lip, oral cavity and pharynx	C00-C14	14,676	13,196	
Liver and intrahepatic bile ducts	C22	4,481	1,506	
Oesophagus	C15	20,609	24,236	
Rectum	C20	0	0	
Respiratory infections		**7,778**	**14,327**	
Pneumonia	J10.0, J11.0, J12-J15, J18	7,778	14,327	

Source: Hospital episode statistics (HES), NHS Digital, 2020.

Impact on trends

Introducing the updated AAFs into the calculation of the statistics published on LAPE results in a lower estimate of the level of mortality and hospital admission rates. As illustrated in Figures 4, 5, and 6 the data points for 2016 will be lower than the rates currently published on LAPE. As the updated AAFs are based on the most recent academic evidence and alcohol consumption prevalence this change represents a correction in the currently published data.

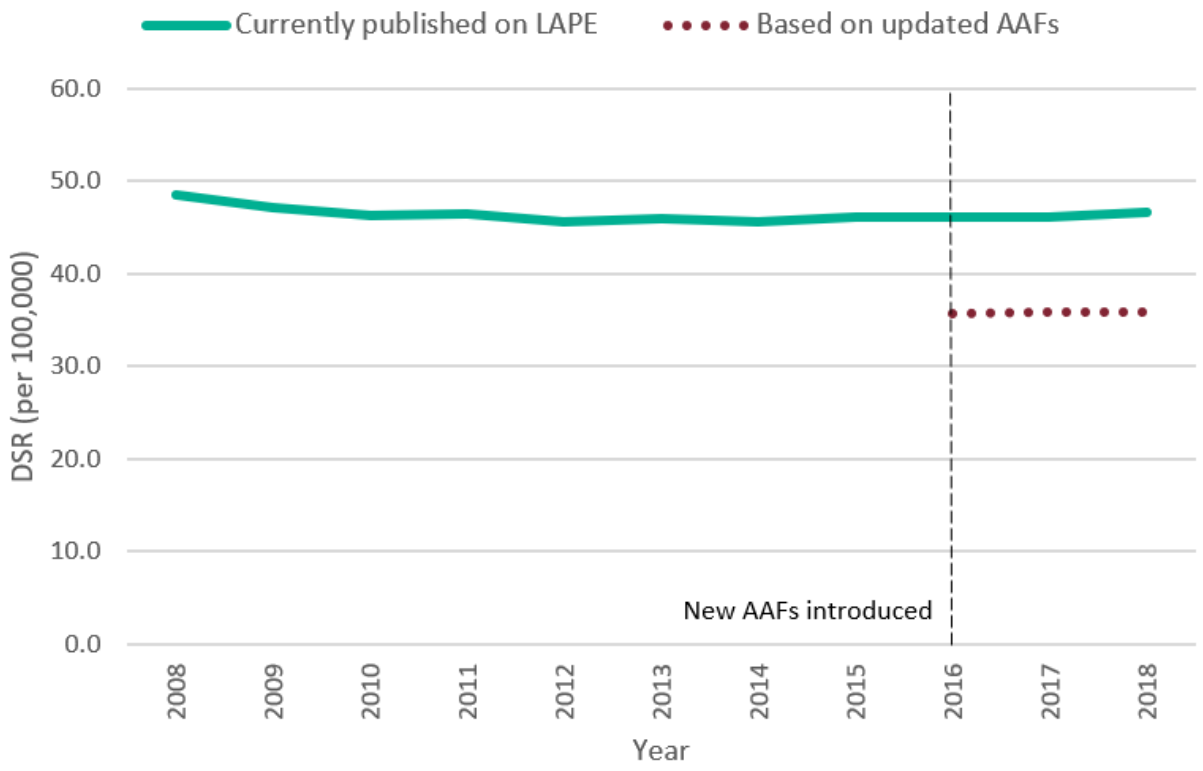
The rates for 2016 onwards cannot be compared with the rates for previous years due to this change in methodology. As the level of alcohol consumption has declined, it is likely that some of the reduction in burden up to 2016 is real but as this coincided with the change in methodology it is not possible to determine how much of the change is real or when this change took place.

The revised trend rates from 2016 onwards are a more accurate reflection of the burden of alcohol on the population, meaning the currently published rates are too high and if LAPE were to continue producing statistics using the older AAFs then this inaccuracy would continue and indeed worsen over time.

It is important to note that the direction of the trend in rates since 2016 for mortality, Narrow admissions, and Broad admissions remains unchanged, showing the stasis in mortality and the increase in admissions evident before the revision.

Figure 4. Age standardised rate (DSR) of alcohol-related mortality: Persons (2008-2018)

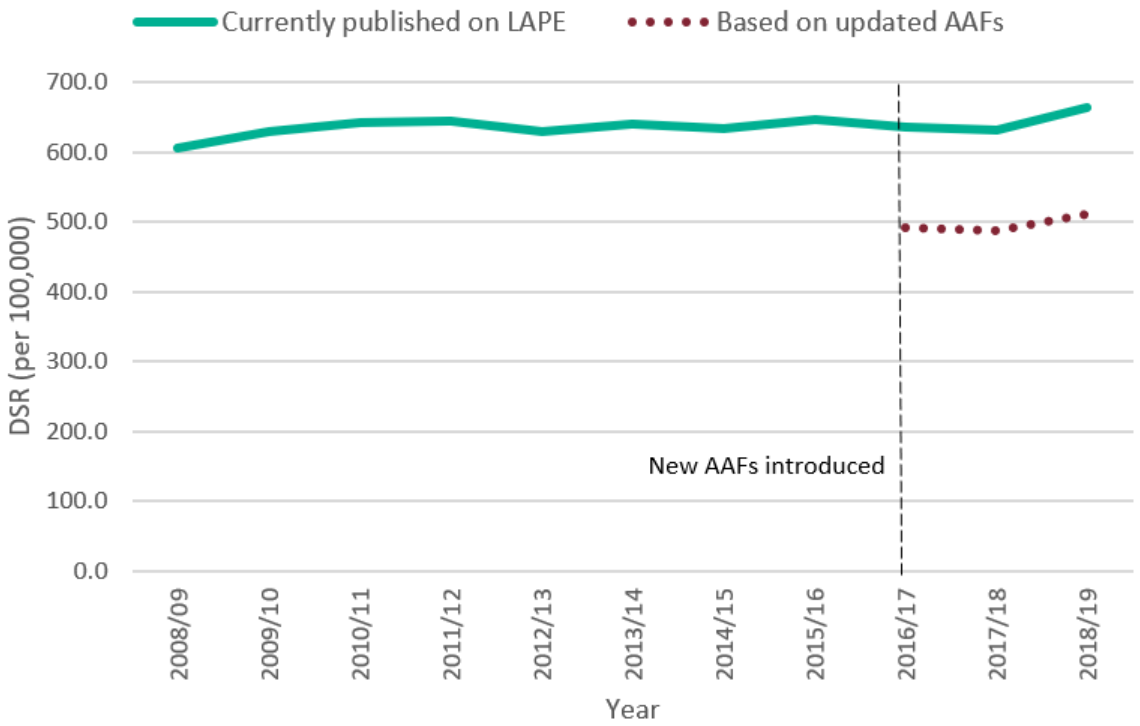
Figure displaying comparative standardised rates of alcohol related mortality from 2008 to 2018 based on those currently published on LAPE and the updated alcohol-attributable fractions. The figure shows that the age standardised rate of alcohol-related mortality based on the updated alcohol-attributable fractions will be lower than that currently published on LAPE for the years of 2016 to 2018. The rates as currently published on LAPE and as based on the updated alcohol-attributable fractions has followed a similar trend.



Source: Local Alcohol Profiles for England (LAPE); Annual Death Extract Public Health Mortality File, Office for National Statistics 2020; Mid-year population estimates, Office for National Statistics, 2020.

Figure 5. Age standardised rate (DSR) of alcohol-related admissions (Narrow): Persons (2008/09-2018/19)

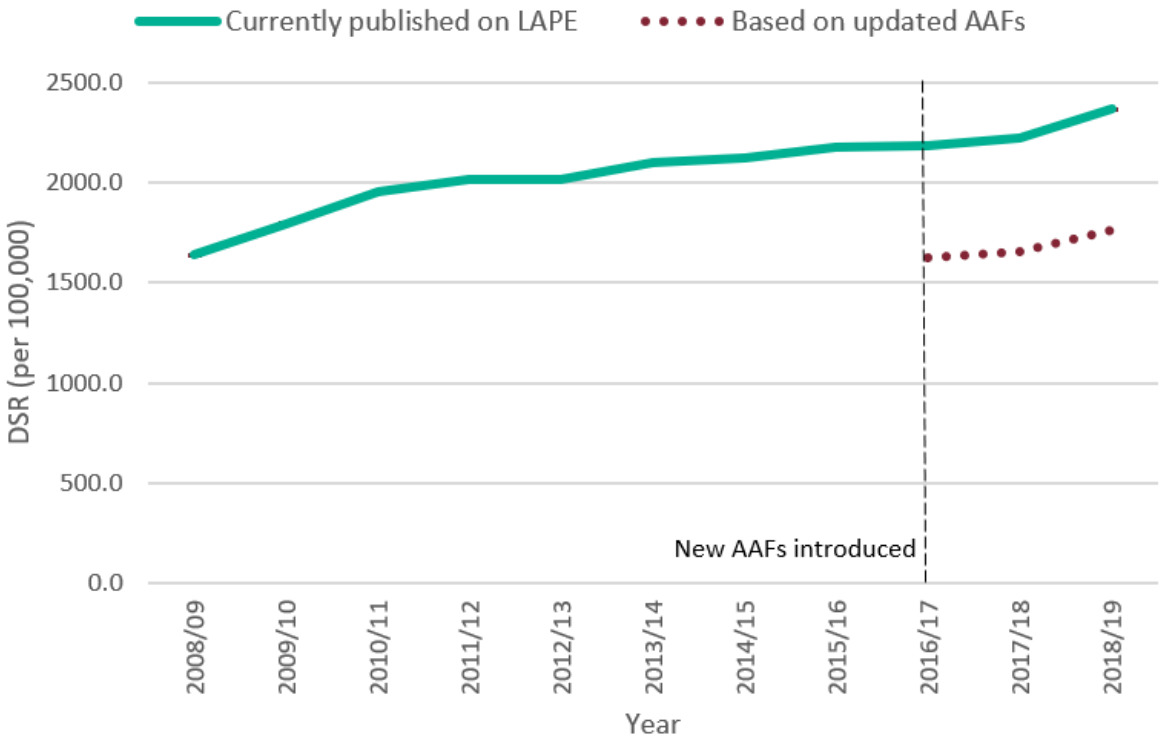
Persons (2008/09-2018/19): Figure displaying comparative standardised rates of alcohol-related admissions (narrow) from 2008/09 to 2018/19 based on those currently published on LAPE and the updated alcohol-attributable fractions. The figure shows that the age standardised rate of narrowly defined alcohol-related admissions based on the updated alcohol-attributable fractions will be lower than that currently published on LAPE for the years of 2016/17 to 2018/19. The rates as currently published on LAPE and as based on the updated alcohol-attributable fractions has followed a similar trend.



Source: Local Alcohol Profiles for England (LAPE); Hospital episode statistics (HES), NHS Digital, 2020; Mid-year population estimates, Office for National Statistics, 2020.

Figure 6. Age standardised rate (DSR) of alcohol-related admissions (Broad): Persons (2008/09-2018/19)

Figure displaying comparative standardised rates of alcohol-related admissions (broad) from 2008/09 to 2018/19 based on those currently published on LAPE and the updated alcohol-attributable fractions. The figure shows that the age standardised rate of broadly defined alcohol-related admissions based on the updated alcohol-attributable fractions will be lower than that currently published on LAPE for the years of 2016/17 to 2018/19. The rates as currently published on LAPE and as based on the updated alcohol-attributable fractions has followed a similar trend.



Source: Local Alcohol Profiles for England (LAPE); Hospital episode statistics (HES), NHS Digital, 2020; Mid-year population estimates, Office for National Statistics, 2020.

In summary

The most significant changes to LAPE indicators following revision according to the 2020 AAFs will be:

- the estimate of the level of alcohol-related mortality, years of life lost, Narrow and Broad alcohol-related admissions will be lower than those currently published
- overall, around a quarter of deaths/admissions are removed from the calculations
- reduction in alcohol consumption between 2010 and 2016 is the main driver of the lower estimates for the alcohol-related indicators from 2016 onwards

- when the change is implemented LAPE will introduce a new data series and discontinue the old set of indicators – the revised indicators and the trend from 2016 is a correction and the current direction of travel for mortality and admissions over recent years will remain.

Questions raised

1. Do you agree with the proposal to update the AAFs in this way?
2. The change will improve the accuracy of published statistics but will result in a break in the data series at the date the correction is implemented. Is this an acceptable scenario for you?
3. Is the proposed date of introduction (2016) to align with the alcohol consumption prevalence data used appropriate?
4. Do you think your stakeholders and partners will readily understand and accept that the reduction is a result of a change in methodology and not necessarily a real reduction in the harm alcohol causes to individuals?
5. Based on the latest evidence, the new AAFs changed the upshift (the extent to which people in surveys may underestimate their drinking) down to 40% from the 59% used previously. Is this your preferred approach?
6. Do you have any other comments or points that you would like us to consider?

Implementation

Subject to the responses received, Public Health England will update the alcohol attributable fractions used in the calculation of alcohol related mortality and hospital admissions in 2021. This will impact on the following indicators in the Local Alcohol Profiles for England (LAPE):

- alcohol-related mortality
- years of life lost due to alcohol-related mortality
- admission episodes for alcohol-related conditions (Narrow)
- admission episodes for alcohol-related conditions (Broad)
- admission episodes for alcohol-related conditions broken down by age group, cause, and so on

A back series to 2016 will be produced to accompany this.

NHS Digital also publish alcohol attributable mortality and hospital admissions in their publication Statistics on Alcohol in England. Agreement will be sought with NHS Digital as to the most appropriate publication to include the changes adopted.

Conclusion

Pubic Health England have proposed to include updated alcohol attributable fractions to calculate alcohol-related mortality and hospital admissions, based on the recently published UK Health Forum and Public Health England report. We plan to implement the proposed changes in our releases from 2021 subject to the feedback we receive. We welcome your views on the proposed changes and their implementation.

Appendix A.

Comparison with other possible methods

There are a number of possible ways of calculating and using AAFs. We have compared the method used by Jones and Bellis and updated by UK Health Forum and Public Health England with that produced by Sheffield Alcohol Research Group (ScHARR) (15). This raises a number of methodological considerations which are outlined below.

Data used: There are differences across the studies in the way the data has been used to create the AAFs:

- UK Health Forum and Public Health England used Health Survey (HSE) for England 2016 data for the following age groups by sex, 16 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 to 84, and 85 and over
- Bellis and Jones used General Lifestyle Survey 2010 (GLS) for the following age groups by sex, 16 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, and 75 and over.
- ScHARR has used HSE 2015 and 2016 data for the following age groups by sex and IMD, 16 to 17, 18 to 24, 25 to 34, 35 to 49, 50 to 64, 65 to 74 and 75 to 89.

Chronic diseases: ScHARR do not separate out the non-drinkers into abstainer and former drinkers, whereas UK Health Forum and Public Health England use the equation from the more recent Bellis and Jones report from 2013 (16). Also, when computing the AAF for each condition UK Health Forum and Public Health England used a greater level of granularity for alcohol consumption (0.5 grams per day as opposed to 1 grams day).

Acute diseases: ScHARR used a new approach which incorporated height and weight from HSE data with the rate at which liver clears BAC (blood alcohol content). This will have an impact on the AAFs for injuries (for example, fire injuries,

drowning). UK Health Forum and Public Health England applied the method which was used in the Bellis and Jones 2013 report.

Relative risks <1: ScHARR computed a set of AAFs with and without the inclusion of conditions with RRs <1. This is particularly relevant for diabetes, ischemic heart disease and ischemic stroke which had negative AAFs in both the ScHARR and UK Health Forum and Public Health England results when these conditions were included.

Impact of upshifting: Different upshifting rates were used by UK Health Forum and Public Health England (40%) and Bellis and Jones (59%). ScHARR did not apply an upshift.

Other issues in application of AAFs: The alcohol consumption data applied to the relative risks when calculating AAFs in UK Health Forum and Public Health England is from HSE 2016. This is several years behind the admissions and deaths to which they will be applied in the creation of indicators. However, for smoking attributable admissions and deaths the relative risks are not updated as frequently but the consumption figures that are applied are updated annually from local figures and aggregated to England.

There are also other small differences, but these are not discussed here as they have negligible impact on the figures.

Appendix B.

Calculation of Alcohol Atributable Fractions

The following is taken from the UK Health Forum and Public Health England report (17). and reproduced here for information.

AAFs for a specific age and gender groups were calculated using the following continuous approach:

$$AAF = \frac{P_{abs}RR_{abs} + P_{former}RR_{former} + P_{current}\left(\int_{>0}^{150} p(x)rr(x)dx\right) - 1}{P_{abs}RR_{abs} + P_{former}RR_{former} + P_{current}\left(\int_{>0}^{150} p(x)rr(x)dx\right)}$$

This equation uses the proportion of lifetime abstainers, P_{abs}, former drinkers, P_{former}, current drinkers, $P_{current}$, and the probability distribution of drinkers, $p(x)$, where x refers to the levels of alcohol consumption in grams per day and dx refers to an infinitely small range in alcohol consumption (18). P_{abs} and P_{former} were estimated directly by extracting the proportion of abstainers and former drinkers from the HSE 2016 dataset. Exposure is capped at 150g of alcohol per day to provide a conservative estimate in line with the international literature and the previous report (19). The probability distribution of current drinkers, $p(x)$, was sampled at 0.5 gram/day discrete intervals, dx. between 0 and 150g/day, ie, the proportion of the population consuming between 0 and 0.5 g/day; the proportion of the population consuming between 0.5g/day and 1g/day, and so on. The term $rr(x)$ is the relative risk of disease associated with consuming x grams of alcohol per day. In general, the relative risk for lifetime abstainers, RR_{abs}, is assumed to be 1. Although this was driven by the evidence available and in some cases the relative risk associated with lifetime abstainers was higher than individuals who consume very low levels of alcohol for instance, in the case of heart disease. The equation also uses the relative risks for former drinkers, RR_{former}. If $RR_{former}$was not available, we set its value equal to 1 and assumed it was associated with the same risk as abstainers. In the literature abstainers tended to be the reference group (therefore $RR_{abs} = 1$). Further technical details are provided in Appendix 2 of the UK Health Forum and Public Health England report.

Alcohol attributable fractions for acute conditions

To calculate the morbidity AAFs for acute conditions (AAF_{injury}) the combination of the results from equations (2) and (4) were used (20).

$$AAF_{injury} = \frac{(1 - P_{binge}) + P_{binge}\left(\int_{>0}^{150} p(x) rr_{binge}(x) dx\right) - 1}{(1 - P_{binge}) + P_{binge}\left(\int_{>0}^{150} p(x) rr_{binge}(x) dx\right)}$$

where

$$1 = P_{abs} + P_{former} + P_{nonbinge} + P_{binge}$$

This first equation uses the proportions of lifetime abstainers, former drinkers, current drinkers who do not engage in binge drinking and current drinkers who do engage in binge drinking (the 4 terms on the right-hand side of (3) respectively). This also uses the probability of drinking at level x, $p(x)$. The relative risk for the acute condition at a binge drinking level x was adjusted for the time at risk in order to calculate the risk ratio, $rr_{binge}(x)$. These adjustments require the time at risk per drinking occasion for each quantity of alcohol (1 drink (21) = 30 minutes; 3 drinks = 2 hours; 5 drinks = 3 hours; 7 drinks = 4.8 hours). An upper level (or cap) for alcohol consumption was set to 150g to remain consistent with the previous report.

$$AAF_{injury} = \frac{P_{abs} + P_{former} + P_{nonbinge} + P_{binge}RR_{binge} - 1}{P_{abs} + P_{former} + P_{nonbinge} + P_{binge}RR_{binge}}$$

This second equation is much simpler than the first, as all binge drinkers are given a fixed RR_{binge}. However, it should be noted that the relative risk in this equation has been adjusted for both time at risk and number of drinking occasions. The statistical analysis was performed using R statistical software. Further technical details are provided in Appendix 2 of the UK Health Forum and Public Health England report.

Adjustment for mortality

To calculate the mortality AAFs for acute conditions, AAF_{death}, we used the scaling discussed in Rehm et al (22). For road/pedestrian accidents, the ratio of AAF for morbidity is set as two-thirds of the AAF for mortality. The ratio for other kinds of injury is lower, set conservatively as four-ninths (or two-thirds of the ratio for road/pedestrian accidents). This gives the following formula for road/pedestrian accidents:

$$AAF_{death} = \frac{3}{2}AAF_{injury} \tag{5}$$

And for other kinds of injury:

$$AAF_{death} = \frac{9}{4}AAF_{injury} \tag{6}$$

Based on the reported AAFs published in Jones and Bellis, we have assumed that the ratio between mortality and morbidity for acute conditions used this scaling (subject to rounding) – although it is not explicitly referenced, the author mentions the use of a scaling decided through personal communication with Rehm and colleagues, thus we assume this to be the case and have proceeded with this method.

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3. Jones, L. and M. Bellis (2013) Updating England-specific alcohol-attributable fractions
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5. Jones, L. and M. Bellis (2013) Updating England-specific alcohol-attributable fractions
6. I60-I62
7. I69 (x.0 to x.2 only)
8. I63-I66
9. I69 (x.3 to x.4 only)
10. For tuberculosis, the update applies the relative risks of former drinkers against lifetime abstainers in the AAF calculation
11. Denotes a range of ICD-10 codes too numerous to list here. See 'Alcohol-attributable fractions for England: An update, UK Health Forum and Public Health England, 2020'
12. Denotes a range of ICD-10 codes too numerous to list here. See 'Alcohol-attributable fractions for England: An update, UK Health Forum and Public Health England, 2020'
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14. Denotes a range of ICD-10 codes too numerous to list here. See 'Alcohol-attributable fractions for England: An update, UK Health Forum and Public Health England, 2020'
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Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000

www.gov.uk/phe
Twitter: @PHE_uk
www.facebook.com/PublicHealthEngland

Prepared by: Claire Griffiths
Tel: 020 7654 8308
Email: lape@phe.gov.uk

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