



# Prevalence and characteristics of co-occurrence of smoking and increasing-and-higher-risk drinking: A population survey in England

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## ABSTRACT

**Background:** Smoking and drinking alcohol both significantly contribute to mortality and morbidity, and there is a need to characterise the sociodemographic and health-related characteristics (e.g. mental distress) of people who do both in order to target resources. This study reports the prevalence and characteristics of adults in the general population in England who both drink alcohol at increasing-and-higher-risk levels and smoke.

**Methods:** We used cross-sectional data from a monthly, nationally representative survey of adults in England (n = 37,258; April 2020–March 2022). Weighted data were used to report prevalence and unweighted data were used to report descriptive statistics for sociodemographic and health-related characteristics.

**Results:** The prevalence of both smoking and increasing-and-higher-risk drinking was 4.6% (95% CI = 4.4–4.9; n = 1,574). They smoked a mean of 10.4 (SD = 8.86) cigarettes per day and had a mean AUDIT score of 12.8 (SD = 5.18). Nearly half (48.2%, n = 751) were trying to cut down on their smoking and 28.0% (n = 441) on their drinking. A quarter (25.3%, n = 397) had received General Practitioner advice on smoking while 8.7% (n = 76) had received advice on their drinking. Nearly half (48.6%, n = 745) reported experiencing psychological distress in the past month and 44.6% (n = 529) had a diagnosed mental health condition, both of which were higher than among all adults (28.1% and 29.1%, respectively).

**Conclusion:** In England, from April 2020 to March 2022, the prevalence of both smoking and increasing-and-higher-risk drinking was 4.6%. This group appears to experience high rates of mental health problems and targeted support is needed.

## 1. Introduction

Tobacco smoking and drinking alcohol are both significant contributors to mortality and morbidity, as well as health inequalities (Jha et al., 2006; di Cesare et al., 2013; Public Health England, 2016; Griswold et al., 2018; Reitsma et al., 2017). Each behaviour has negative short- and long-term consequences (Griswold et al., 2018; Reitsma et al., 2017) and there is a multiplicative effect on the risk of cancer, psychiatric comorbidity, and adverse cardiovascular effects when combined (Talamini et al., 2002; Pelucchi et al., 2006; Le Strat et al., 2010; Benowitz et al., 1986). The proportion of the general population in England who drink alcohol at increasing-and-higher-risk levels (17.7%) and who smoke (14.6%) are regularly reported (West et al., 2022; Brown et al., 2022), though the prevalence of those who combine these

behaviours and their sociodemographic and health-related characteristics are often not reported. Given the high disease burden of these two behaviours, understanding the prevalence of this group and their characteristics is important for targeting and providing the necessary support.

The prevalence of smoking and of drinking alcohol among adults in England is reported on a monthly basis by the Smoking and Alcohol Toolkit Studies (S/ATS) (West et al., 2022; Brown et al., 2022). Increasing-and-higher-risk drinking is defined as posing a significant risk of harm to physical and mental health and may have negative social and financial consequences (Institute, 2010), and can be operationalised as an Alcohol Use Disorders Identification Test (AUDIT) score of 8 or more (Babor et al., 2001). The 3-month moving average was 14.6% for smoking prevalence and 17.7% for increasing-and-higher-risk drinking

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prevalence in March 2022 (West et al., 2022; Brown et al., 2022). While there are some data available on the prevalence of smoking among increasing and higher drinkers (or vice versa) (Garnett et al., 2022; Eastwood et al., 2021); the prevalence of those who combine these behaviours among the general population in England is not reported. This type of descriptive epidemiology – characterising the distributions of health among a population (Fox et al., 2022) – is important for understanding the ways in which historical and sociological context contributes to the patterns of health, and without it, can mean it is very difficult for good policy decisions to be made.

In our previous work, we compared smoking prevalence amongst drinkers at risk of dependence (AUDIT score = 20–40), drinkers but not at levels indicating risk of dependence (AUDIT score = 1–19) and non-drinkers between 2014 and 2021. Adults in England at risk of alcohol dependence had a mean past-year smoking prevalence of 63.3% compared with 18.9% amongst drinkers not at risk of dependence and 19% amongst non-drinkers. We also showed that smoking prevalence increased with the level of alcohol consumption (Garnett et al., 2022). However, our previous study had a focus on drinkers at risk of alcohol dependence rather than the larger group of increasing-and-higher-risk drinkers. Therefore, this current study will focus on increasing-and-higher-risk drinkers (estimated to be over 10 million people in England (Public Health England, 2018). Reducing alcohol consumption among this group is a priority (Beaglehole and Bonita, 2009) as their drinking poses a significant risk of harm to their physical and mental health, and may have negative social consequences (Institute, 2010).

Both alcohol and smoking contribute to health inequalities with the most deprived groups suffering the most harm. Therefore this group who both drink at increasing-and-higher-risk levels and smoke are an important target group for the UK government to reach their smokefree aim (smoking prevalence < 5% by 2030). Several policy and clinical documents outline the need to tackle smoking in disadvantaged and sub-populations in order to drive down tobacco-related health inequalities (Khan, 2022; Royal College of Physicians, 2021; Department of Health, 2017). However, there is limited, if any, mention of alcohol consumption or how to tackle alcohol-related harms among these policy and clinical documents focusing on smoking or health inequalities in terms of reducing health inequalities or considering the multiplicative health effects it has with smoking (England, 2023; NHS, 2019; Department of Health, 2020). There is also currently little available evidence characterising the sociodemographic makeup and health-related characteristics (e.g. mental illness and low income) of those who both drink at increasing-and-higher-risk levels and smoke. There is some evidence that it may be harder for people who consume high levels of alcohol to quit smoking and to sustain these attempts (Hughes, 2011; Kahler et al., 2010), meaning this group may need additional support. Thus identifying this population is crucial for providing targeted support and having a better understanding of the likely implications for public health.

Changes in drinking patterns and a sustained rise in increasing-and-higher-risk drinking prevalence since the start of the Covid-19 pandemic have been well documented (Oldham et al., 2021; Garnett et al., 2021; Jackson et al., 2021). Smoking prevalence has remained around 15% since 2019 (West et al., 2022). It is therefore likely that there may be a greater occurrence of people who are both drinking at increasing-and-higher-risk levels and smoking in England since the start of the pandemic. Therefore, this study aims to report the prevalence of adults in England who both drink at increasing-and-higher-risk levels and smoke for each year from 2014 to 2022 and to report the prevalences separately for data collected between April 2020 and March 2022 (to provide the most recent and relevant prevalence estimates to public health due to the ongoing effects of the pandemic).

## 2. Research questions

- (1) In England, for each year from 2014 to 2022, and as an average for the period April 2020 to March 2022, what is the:

- a. smoking prevalence among increasing-and-higher-risk drinkers?
- b. increasing-and-higher-risk drinking prevalence among smokers?
- c. prevalence of both increasing-and-higher-risk drinking and smoking among all adults?

- (2) What are the sociodemographic and health-related characteristics of adults in England between April 2020 and March 2022 who both drink at increasing-and-higher-risk levels and smoke?

## 3. Materials and methods

### 3.1. Study design

The S/ATS is an ongoing, monthly, population survey in England. It consists of cross-sectional household surveys of nationally representative samples of 1700–1800 adults in England (Fidler et al., 2011). The study sampling is a hybrid of random probability and simple quota – England is split into more than 170,000 areas (consisting of approximately 300 households each) stratified according to a geodemographic analysis of the population. Areas are then randomly allocated to interviewers who conduct interviews within that area until the quota is fulfilled.

From March 2014 to February 2020, data were collected through face-to-face computer-assisted interviews. No data were collected in March 2020 because of the COVID-19-related social distancing restrictions. From April 2020 onwards, data were collected via telephone using the same sampling and weighting approach. Diagnostic analyses indicate good comparability between collection modalities (Jackson et al., 2020).

The protocol was pre-registered on OSF (<https://osf.io/btfwc/>). In response to external peer-review, we added unplanned analyses to provide significance testing for both the trends in research question 1 and comparisons between groups in research question 2.

### 3.2. Sample

This study used data from March 2014 until March 2022 (the years that the relevant data are available) from adults aged 18 +.

For research question 1, the sample consisted of all adults aged 18 + from March 2014 to March 2022, inclusive.

For research question 2, the sample consisted of all adults aged 18 + from April 2020 to March 2022, inclusive, who reported drinking at increasing-and-higher-risk levels and currently smoking. Increasing-and-higher-risk drinking was defined as scoring 8 or more on the AUDIT. Current smoking was defined as responses a, b or c to the following question: “Which of the following best applies to you?”; a) “I smoke cigarettes (including hand-rolled) every day”, b) “I smoke cigarettes (including hand-rolled, but not every day)”, c) “I do not smoke cigarettes at all, but I do smoke tobacco of some kind (e.g. Pipe, cigar or shisha)”, d) “I have stopped smoking completely in the last year”, e) “I stopped smoking completely more than a year ago”, and f) “I have never been a smoker (i.e. smoked for a year or more)”.

### 3.3. Measures

Sociodemographic characteristics measured were: age (continuous and categorical; 16–24/25–34/35–44/45–54/55–64/65 + ); sex (female/male/in another way); social grade (AB/C1/C2/D/E); government office region (North/South/Central/London); ethnicity (white/black/mixed or multiple ethnic groups/Asian or Asian British/other ethnic group); working status (paid job or self-employed/student/unemployed/retired/not in paid work because of long term illness or disability or other reason), and education level (pre-16/post-16 educational qualifications).

Smoking and nicotine use characteristics measured were: use of

alternative nicotine products (nicotine replacement therapy or e-cigarettes for any reason [e.g. cutting down, temporary abstinence]; yes/no); cigarettes per day (continuous); time to first cigarette (within 5 min/6–30 min/31–60 min/more than 60 min); smoke roll-your-own cigarettes (yes/no); currently trying to cut down amount smoked (yes/no); strong motivation to quit smoking (yes/no); strong urge to smoke (yes/no); any serious past year attempt to quit smoking (yes/no); advice from General Practitioner (GP) on smoking (yes/no), and average weekly expenditure on smoking (cigarettes or tobacco; £1-5/£6-10/£11-15/£16-20/£21-30/£31 +).

Drinking characteristics measured were: AUDIT score (continuous and categorical: increasing risk (8–15)/higher risk (16–19)/at risk of alcohol dependence (20–40)); currently trying to restrict alcohol consumption (yes/no); strong motivation to cut down on drinking (yes/no); strong urge to drink (yes/no); any serious past year attempt to restrict drinking (yes/no); advice from GP on drinking (yes/no), and average weekly expenditure on own alcohol consumption (£1-5/£6-10/£11-15/£16-20/£21-30/£31 +).

Health characteristics measured were: experiencing past month symptoms of psychological distress (e.g. nervous, hopeless, that everything was an effort; yes/no); and diagnosis by a doctor or health professional since the age of 16 of:

- mental health condition (e.g. depression, panic disorder, psychosis, eating disorder; yes/no)
- drug use or dependence (yes/no)
- problem gambling (yes/no)
- alcohol misuse or dependence (yes/no)

Full details of the measures included are available in [Supplementary File 1](#).

### 3.4. Analyses

All analyses were conducted in R.

#### 3.4.1. Research question 1

For the prevalence estimates, data were weighted using the rim (marginal) weighting technique to match an English population profile on the dimensions of age, social grade, region, housing tenure, ethnicity, and working status within sex.

The prevalence and 95% confidence interval (CI) of adults in England was reported stratified by year from 2014 to 2022, and as an average over the period April 2020 to March 2022, for a) smoking prevalence among those who drink at increasing-and-higher-risk levels, b) increasing-and-higher-risk drinking prevalence among those who currently smoke, and c) prevalence of both smoking and increasing-and-higher-risk drinking among all adults.

To provide context, the prevalence and 95% CIs were also reported for each outcome (a and b) among all adults and among low-risk drinkers (AUDIT score  $\leq 7$ ) and non-smokers, respectively.

We conducted an unplanned trend analysis using a linear regression to test the association of survey year with the prevalence of a) smoking prevalence among those who drink at increasing-and-higher-risk levels, b) increasing-and-higher-risk drinking prevalence among those who currently smoke, and c) prevalence of both smoking and increasing-and-higher-risk drinking among all adults.

#### 3.4.2. Research question 2

Unweighted data were used to report the mean and standard deviation (SD) or % (n), where appropriate, for the sociodemographic, smoking, drinking and health characteristics of adults (from April 2020 to March 2022) who report drinking at increasing-and-higher-risk levels and currently smoking.

To provide context, the characteristics were also reported among i) smokers, ii) increasing-and-higher-risk drinkers, and iii) all adults.

We conducted a series of unadjusted linear regression (for continuous variables) and chi-squared tests (for categorical variables) to understand whether there were any differences in sociodemographic, smoking, drinking and health characteristics between adults who report drinking at increasing-and-higher-risk levels and currently smoking, and three unique groups i) adults who report drinking at increasing-and-higher-risk levels but not currently smoking, ii) adults who report currently smoking but not drinking at increasing-and-higher-risk levels and iii) adults who report neither currently smoking or drinking at increasing-and-higher-risk levels.

### 3.5. Governance and ethics

Ethical approval for the Smoking and Alcohol Toolkit Studies was granted by the UCL Ethics Committee (ID 2808/005) and for the change to telephone sampling (ID 0498/001). The data are not collected by UCL and are anonymised when received by UCL.

## 4. Results

158,603 adults aged 18 + in England responded to the survey between March 2014 and March 2022 (inclusive). Of these, 155,973 had complete data for AUDIT score (missing,  $n = 2,367$ ; 1.5%) and smoking status (missing,  $n = 345$ ; 0.2%).

The weighted characteristics showed that participants had a mean age of 47.9 (SD = 18.62), 51.0% ( $n = 79,620$ ) were women, 55.4% ( $n = 86,584$ ) were of higher social grade (ABC1) and 86.4% ( $n = 127,358$ ) were of white ethnicity. Current smoking prevalence was 17.5% ( $n = 27,311$ ) and 14.2% ( $n = 22,352$ ) were increasing-and-higher-risk drinkers. See [Supplementary Table 1](#) for weighted ( $n = 156,199$ ) and unweighted ( $n = 155,973$ ) characteristics.

#### 4.1. Research question 1: Smoking and increasing-and-higher-risk drinking prevalence among adults in England

In England, from 2014 to 2022, smoking prevalence among increasing-and-higher-risk drinkers was 34.9% (95% CI = 32.7–37.1) in 2014 and was 27.2% (95% CI = 23.7–30.7) in 2022, with an average of 26.5% (95% CI = 25.3–27.7) for the period April 2020 to March 2022, see [Fig. 1](#) and [Supplementary Table 2](#). There was a significant linear trend of smoking prevalence among increasing-and-higher-risk drinkers decreasing by year ( $B = -0.011$ ,  $p < .001$ ).

Increasing-and-higher-risk drinking prevalence among smokers was 24.1% (95% CI = 22.5–25.7) in 2014 and was relatively stable until 2020 when it was 27.8% (95% CI = 25.9–29.7), with an average of 28.7% (95% CI = 27.4–30.0) for the period April 2020 to March 2022, see [Fig. 2](#) and [Supplementary Table 3](#). There was a significant linear trend of increasing-and-higher-risk drinking prevalence among smokers increasing by year ( $B = 0.006$ ,  $p < .001$ ).

Prevalence of both smoking and increasing-and-higher-risk drinking among all adults was 4.6% (95% CI = 4.3–4.9) in 2014, 3.3% in 2019 (95% CI = 3.1–3.6) and 4.9% (95% CI = 4.1–5.6) in 2022. There was an average prevalence of 4.6% (95% CI = 4.4–4.9) for the period April 2020 to March 2022, see [Fig. 3](#) and [Supplementary Table 4](#). No linear trend was detected of the prevalence of both smoking and increasing-and-higher-risk drinking among all adults by year ( $B = -0.0002$ ,  $p = .403$ ).

#### 4.2. Research question 2: Sociodemographic and health-related characteristics of people who both drink at increasing-and-higher-risk levels and smoke

There were 37,258 adults in England between April 2020 and March 2022 who responded to the survey and 1,574 reported both drinking at increasing-and-higher-risk levels and currently smoking. The socio-demographic and health-related characteristics of this group are

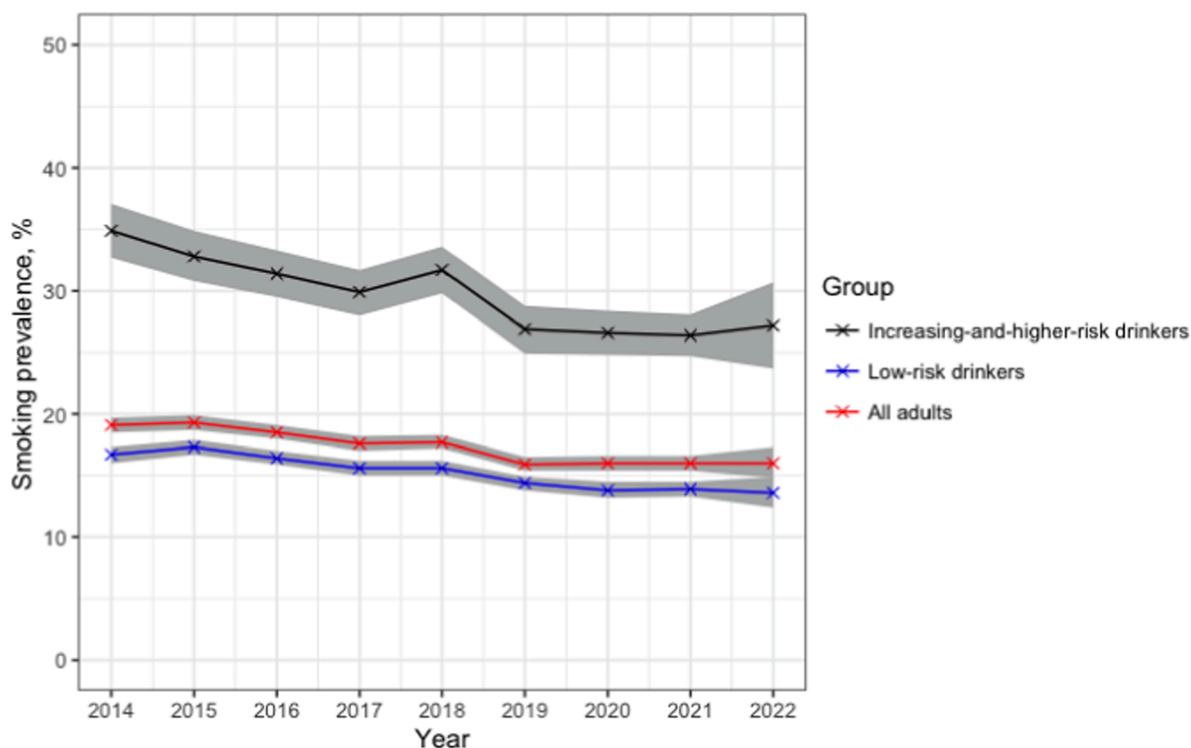


Fig. 1. Smoking prevalence.

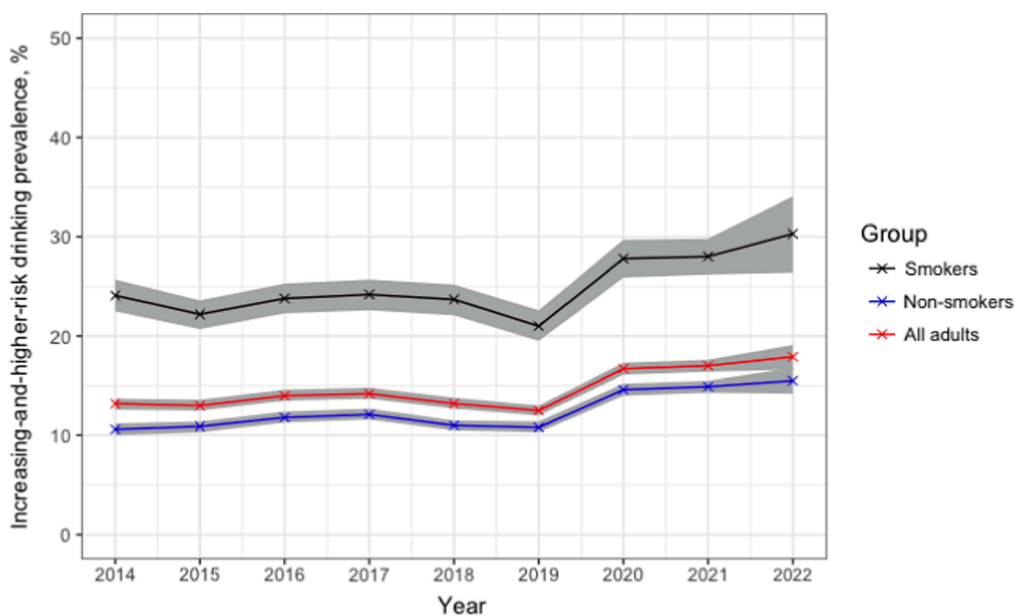


Fig. 2. Increasing-and-higher-risk drinking prevalence.

reported in Table 1. The group had a mean age of 38.1 (SD = 14.99), 61.7% (n = 971) were men, 61.3% were of higher social grade ABC1 (n = 964), and 74.2% had post-16 educational qualifications (n = 1,168). They smoked a mean of 10.4 (SD = 8.86) cigarettes per day, 56.2% (n = 823) smoked their first cigarette within 60 min of waking up, 23.1% (n = 354) had strong urges to smoke and 57.5% (n = 776) smoked roll your own cigarettes. They had a mean AUDIT score of 12.8 (SD = 5.18) and 13.6% (n = 212) reported strong urges to drink.

Nearly half (48.2%, n = 751) were currently trying to cut down on smoking and 15.3% (n = 235) had a strong motivation to quit smoking, compared with 28.0% (n = 441) currently trying to cut down on their

alcohol consumption and 14.1% (n = 213) having a strong motivation to cut down on drinking. Of this group, a quarter (25.3%, n = 397) had received GP advice on smoking while only 8.7% (n = 76) had received GP advice on their drinking.

Nearly half (48.6%, n = 745) reported experiencing psychological distress in the past 30 days and 44.6% (n = 529) had had a mental health condition diagnosed. About 7% had been diagnosed with drug use or dependence (n = 81) and with alcohol misuse or dependence (n = 82) with 1.3% having been diagnosed with problem gambling (n = 15).

The characteristics of adults who both drink at increasing-and-higher-risk levels and smoke, and how these compare with three

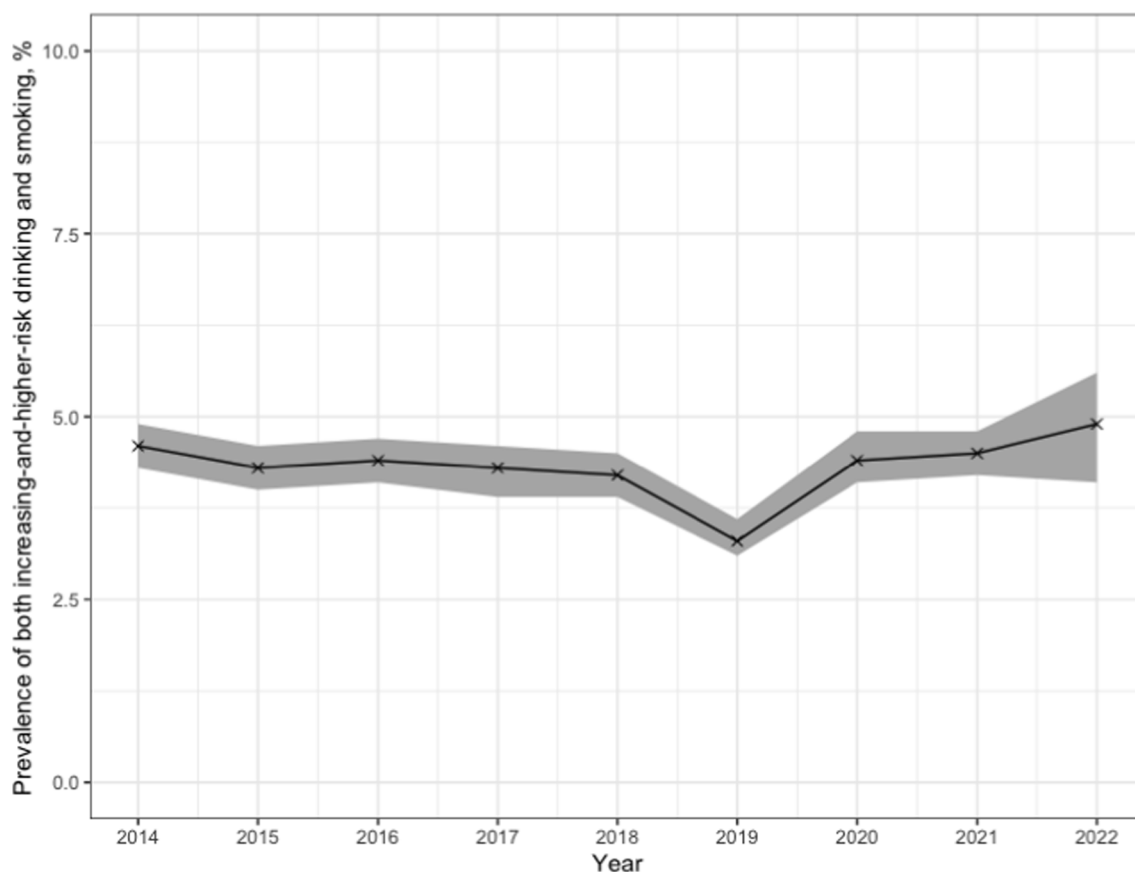


Fig. 3. Prevalence of both increasing-and-higher-risk drinking and smoking.

independent groups i) adults who report drinking at increasing-and-higher-risk levels but not currently smoking, ii) adults who report currently smoking but not drinking at increasing-and-higher-risk levels and iii) adults who report neither currently smoking or drinking at increasing-and-higher-risk levels, has been reported in [Supplementary Table 5](#).

Adults who both drink at increasing-and-higher-risk levels and smoke, compared with adults who drink at increasing-and-higher-risk levels but do not smoke, were significantly younger, had a higher proportion of women and people with pre-16 educational qualifications, and had a lower proportion of high social grades and people of white ethnicity. They also had a significantly higher mean AUDIT score, a higher proportion had strong urges to drink and a higher proportion had received advice from their GP though a lower proportion reported currently trying and having a strong motivation to cut down on their drinking and making a serious attempt to cut down. In terms of mental health characteristics, they also had a significantly higher proportion who had experienced psychological distress in the last month, and had been diagnosed with a mental health condition, drug use or dependence, alcohol misuse or dependence and problem gambling.

Adults who both drink at increasing-and-higher-risk levels and smoke, compared with adults who smoke but do not drink at increasing-and-higher-risk levels, were significantly younger, and had a higher proportion of men, high social grades and people with post-16 educational qualifications. No differences were detected between groups in terms of cigarettes smoked per day and the proportion using alternative nicotine products, with a strong motivation to quit smoking, strong urges to smoke. Adults who both drink at increasing-and-higher-risk levels and smoke, compared with adults who smoke but do not drink at increasing-and-higher-risk levels, had a higher proportion who smoked roll your own cigarettes though a lower proportion were currently trying to cut down on smoking and a lower proportion

received GP advice on their smoking. They also had a significantly higher proportion who had experienced psychological distress in the last month, and had been diagnosed with a mental health condition, drug use or dependence, and alcohol misuse or dependence.

Compared with adults who do not smoke or drink at increasing-and-higher-risk levels, adults who do both are significantly younger, higher proportion of men, those of white ethnicity, and with post-16 educational qualifications. They also had significantly higher proportions of adults experiencing psychological distress in the past month, and with diagnoses of mental health conditions, drug use/dependence, alcohol misuse/dependence and problem gambling.

## 5. Discussion

### 5.1. Summary of findings

This study used data from a representative survey of adults in England and showed that smoking prevalence among increasing-and-higher-risk drinkers was 34.9% in 2014 and 27.2% in 2022. Increasing-and-higher-risk drinking prevalence among smokers was 24.1% in 2014 and was relatively stable until 2020 when it was 27.8% and 30.3% in 2022 (compared with 15.5% among non-smokers). The prevalence of both smoking and increasing-and-higher-risk drinking among all adults was 4.6% in 2014 and 4.9% in 2022. It has been well documented that increasing-and-higher-risk drinking prevalence has risen since the start of the Covid-19 pandemic ([Oldham et al., 2021](#); [Garnett et al., 2021](#); [Jackson et al., 2021](#)). These findings indicate that these changes in increasing-and-higher-risk drinking prevalence are also seen among a subgroup of smokers, as well as seeming to drive a rise in the prevalence of both smoking and increasing-and-higher-risk drinking. This is line with previous research that increases in alcohol consumption during the pandemic have been greatest in vulnerable groups such as

**Table 1**  
Characteristics (April 2020 to March 2022).

Characteristic, % (n) unless otherwise stated	Among adults who both drink at increasing-and-higher-risk levels and smoke (n = 1,574)	Among smokers (n = 5,537)	Among increasing-and-higher-risk drinkers (n = 6,405)	Among all adults (n = 37,258)
Age (years), mean (SD)	38.1 (14.99)	44.0 (17.47)	45.0 (16.45)	51.0 (18.67)
Age, banded				
18–24	23.9% (376)	15.7% (871)	15.1% (968)	10.2% (3,801)
25–34	25.1% (395)	22.7% (1,257)	17.0% (1,086)	14.4% (5,369)
35–44	18.3% (288)	16.1% (894)	15.9% (1,018)	13.6% (5,063)
45–54	17.0% (267)	16.4% (907)	21.9% (1,402)	17.6% (6,553)
55–64	10.3% (162)	13.6% (752)	16.7% (1,072)	17.0% (6,321)
65+	5.5% (86)	15.5% (856)	13.4% (859)	27.2% (10,151)
Sex				
Men	61.7% (971)	50.6% (2,803)	64.3% (4,121)	47.1% (17,537)
Women	37.0% (583)	48.4% (2,681)	35.0% (2,242)	52.4% (19,531)
In another way	1.3% (20)	1.0% (53)	0.7% (42)	0.5% (190)
Social grade				
AB	18.2% (286)	15.7% (868)	26.8% (1,717)	24.0% (8,926)
C1	43.1% (678)	37.6% (2,083)	43.4% (2,781)	41.1% (15,321)
C2	19.9% (313)	19.4% (1,075)	16.9% (1,081)	16.3% (6,059)
D	10.2% (161)	12.7% (705)	7.3% (468)	8.6% (3,205)
E	8.6% (136)	14.6% (806)	5.6% (358)	10.1% (3,747)
Region				
North	31.4% (494)	28.5% (1,579)	32.9% (2,110)	27.9% (10,396)
Central	27.0% (425)	30.0% (1,660)	27.5% (1,760)	30.0% (11,192)
South	27.2% (428)	26.5% (1,468)	24.9% (1,592)	26.6% (9,921)
London	14.4% (227)	15.0% (830)	14.7% (943)	15.4% (5,749)
Ethnicity				
White	89.7% (1,114)	88.3% (3,853)	92.7% (4,581)	88.0% (25,575)
Black	2.5% (31)	2.7% (116)	1.9% (96)	3.8% (1,098)
Mixed or multiple ethnic groups	4.2% (52)	3.6% (159)	2.8% (140)	2.4% (697)
Asian	2.8% (35)	4.2% (183)	1.8% (87)	4.7% (1,351)
Other ethnic group	0.8% (10)	1.2% (53)	0.7% (36)	1.1% (327)
Unknown	332	1,173	1,465	8,210
Working status				
Paid job or self-employed	73.6% (1,156)	62.1% (3,423)	71.5% (4,574)	57.3% (21,311)
Student	6.9% (108)	4.2% (232)	5.5% (354)	4.2% (1,574)
Unemployed	5.1% (80)	5.4% (297)	2.9% (186)	3.0% (1,110)
Retired	6.7% (106)	16.4% (903)	15.2% (971)	28.3% (10,518)
Not in paid work	7.7% (121)	12.0% (660)	4.9% (312)	7.2% (2,668)
Unknown	3	22	8	77
Education level				

**Table 1 (continued)**

Characteristic, % (n) unless otherwise stated	Among adults who both drink at increasing-and-higher-risk levels and smoke (n = 1,574)	Among smokers (n = 5,537)	Among increasing-and-higher-risk drinkers (n = 6,405)	Among all adults (n = 37,258)
Post-16	74.2% (1,168)	66.4% (3,676)	78.1% (5,001)	71.1% (26,486)
Pre-16	25.8% (406)	33.6% (1,861)	21.9% (1,404)	28.9% (10,772)
Current smokers	100.0% (1,574)	100.0% (5,537)	24.6% (1,574)	14.9% (5,537)
Use of alternative nicotine products	29.9% (471)	29.0% (1,606)	8.9% (570)	5.1% (1,903)
Cigarettes per day, mean (SD)	10.4 (8.86)	10.6 (8.59)	10.3 (8.70)	10.7 (8.69)
Unknown	190	765	4,791	31,727
Time to first cigarette				
>60 min	43.7% (640)	39.2% (2,019)	44.8% (759)	39.9% (2,363)
30–60 min	18.1% (265)	20.4% (1,050)	17.9% (303)	20.0% (1,186)
6–30 min	24.7% (362)	28.4% (1,461)	24.1% (409)	27.9% (1,653)
<=5 min	13.4% (196)	12.0% (620)	13.2% (224)	12.1% (714)
Unknown	111	387	4,710	31,342
Smokes roll your own	57.5% (776)	51.5% (2,389)	55.5% (872)	49.9% (2,679)
Unknown	224	898	4,834	31,887
Currently trying to cut down on smoking	48.2% (751)	50.5% (2,765)	48.2% (751)	50.5% (2,765)
Unknown	16	63	4,847	31,783
Strong motivation to quit smoking	15.3% (235)	15.6% (838)	15.3% (235)	15.6% (838)
Unknown	36	178	4,867	31,899
Strong urges to smoke	23.1% (354)	22.4% (1,189)	20.9% (371)	20.3% (1,238)
Unknown	40	228	4,630	31,158
Receipt of GP advice on smoking	25.3% (397)	28.2% (1,553)	24.3% (440)	27.5% (1,735)
Unknown	6	26	4,595	30,954
Weekly expenditure on smoking				
£1-5	17.8% (253)	13.3% (654)	17.8% (253)	13.3% (654)
£6-10	14.8% (210)	13.8% (681)	14.8% (210)	13.8% (681)
£11-15	12.2% (173)	12.7% (626)	12.2% (173)	12.7% (626)
£16-20	11.7% (166)	13.7% (677)	11.7% (166)	13.7% (677)
£21-30	16.7% (237)	17.1% (843)	16.7% (237)	17.1% (843)
£31+	26.9% (383)	29.4% (1,451)	26.9% (383)	29.4% (1,451)
Unknown	152	605	4,983	32,326
AUDIT score, mean (SD)	12.8 (5.18)	5.5 (5.70)	11.4 (4.06)	4.2 (4.21)
AUDIT risk zone				
Low risk	0.0% (0)	71.6% (3,963)	0.0% (0)	82.8% (30,853)
Hazardous	78.7% (1,238)	22.4% (1,238)	87.8% (5,624)	15.1% (5,624)
Harmful	10.9% (172)	3.1% (172)	7.3% (466)	1.3% (466)
At risk of alcohol dependence	10.4% (164)	3.0% (164)	4.9% (315)	0.8% (315)

(continued on next page)

Table 1 (continued)

Characteristic, % (n) unless otherwise stated	Among adults who both drink at increasing-and-higher-risk levels and smoke (n = 1,574)	Among smokers (n = 5,537)	Among increasing-and-higher-risk drinkers (n = 6,405)	Among all adults (n = 37,258)
Currently trying to cut down on alcohol consumption	28.0% (441)	21.6% (521)	34.4% (2,202)	26.6% (3,289)
Unknown	0	3,125	0	24,878
Strong motivation to cut down on drinking	14.1% (213)	10.3% (236)	16.2% (995)	11.8% (1,387)
Unknown	65	3,241	253	25,465
Strong urges to drink	13.6% (212)	9.6% (229)	10.9% (690)	7.0% (856)
Unknown	11	3,142	50	24,961
Serious attempt to restrict drinking in past year	13.0% (205)	9.6% (231)	16.1% (1,030)	11.9% (1,468)
Unknown	0	3,125	0	24,878
Receipt of GP advice on drinking	8.7% (76)	6.4% (84)	6.9% (271)	4.0% (302)
Unknown	697	4,231	2,502	29,774
Weekly expenditure on alcohol				
£1-5	11.2% (157)	16.3% (347)	8.5% (484)	13.8% (1,506)
£6-10	13.8% (194)	18.5% (394)	16.6% (947)	24.8% (2,700)
£11-15	10.7% (151)	11.4% (243)	14.2% (810)	15.7% (1,708)
£16-20	16.1% (226)	16.9% (359)	18.2% (1,038)	16.9% (1,838)
£21-30	18.1% (255)	15.0% (320)	19.0% (1,086)	14.2% (1,541)
£31+	30.2% (425)	21.9% (465)	23.6% (1,345)	14.5% (1,582)
Unknown	166	3,409	695	26,383
Experienced psychological distress in past 30 days	48.6% (745)	41.6% (2,238)	33.5% (2,107)	28.1% (10,230)
Unknown	42	159	111	863
Mental health condition diagnosed	44.6% (529)	41.7% (1,732)	34.0% (1,593)	29.1% (8,008)
Unknown	387	1,382	1,723	9,721
Drug use/dependence diagnosed	6.8% (81)	4.6% (190)	2.6% (122)	1.2% (320)
Unknown	387	1,382	1,723	9,721
Alcohol misuse/dependence diagnosed	6.9% (82)	3.7% (153)	3.9% (181)	1.4% (394)
Unknown	387	1,382	1,723	9,721
Problem gambling diagnosed	1.3% (15)	0.9% (39)	0.7% (33)	0.4% (101)
Unknown	387	1,382	1,723	9,721

already heavier drinkers (Angus et al., 2022) with evidence-based policy recommendations being made to minimise the increased disease, health and economic burden in England as a result of these changes in drinking patterns (Institute of Alcohol Studies, 2022).

From April 2020 to March 2022, the prevalence of both smoking and increasing-and-higher-risk drinking among all adults was 4.6%. This group had a mean age of 38.1 years and 62% were men, which was substantially younger than either all smokers or all increasing-and-

higher-risk drinkers. The majority of this group were of higher socioeconomic status, which is counter to the patterning seen among all smokers where the majority are of lower socioeconomic status. This is likely driven by a positive association of socioeconomic status with alcohol consumption (70% of all increasing-and-higher-risk drinkers of higher socioeconomic status) though a negative association with alcohol-related harm (Bellis et al., 2016).

The smoking characteristics of this group indicate moderate levels of dependence and no differences were detected in terms of cigarettes smoked per day or urges to smoke with the group of smokers who did not drink at increasing-and-higher-risk levels. This study found that among the group of both smokers and increasing-and-higher-risk drinkers, the level of alcohol consumption and proportion at risk of alcohol dependence was significantly higher than among increasing-and-higher-risk drinkers who do not smoke, which is important given the intensification of risk at higher consumption levels.

Concerningly, only 28% of this group reported currently trying to cut down on their alcohol consumption which was significantly lower than among increasing-and-higher-risk drinkers who do not smoke. In contrast, nearly half were currently trying to cut down on smoking and this was also significantly lower than among adults who smoke but do not drink at increasing-and-higher-risk levels. Previous research has found that drinkers at risk of alcohol dependence did not differ in terms of their likelihood to make a smoking cessation attempt compared with drinkers not at risk, but that their rates of quit success were lower (Garnett et al., 2022). This evidence points towards needing to provide targeted support for this group of smokers and increasing-and-higher-risk drinkers so that their rates of making an attempt and their success with any attempts they do make are as high as among all smokers or all drinkers. This is particularly important given the multiplicative health harms of smoking and drinking combined (Talamini et al., 2002; Pelucchi et al., 2006; Le Strat et al., 2010; Benowitz et al., 1986). The higher rates of trying to cut down on smoking compared with drinking among this group may be related to the different policy environment for alcohol and tobacco in the United Kingdom, differing levels of understanding about the health risks of each among the public (Buykx et al., 2016; Sanderson et al., 2009), the higher rates of advice on smoking (25%) compared with on drinking (9%) from GPs, and the differing likelihood of peer support with the attempt. There are also differences in terms of social perceptions around smoking and drinking, as well as smoking being less common (and less of a social norm) than drinking, which may contribute to the difference in rates of trying to cut down.

The figures for those experiencing psychological distress (49%), having had a mental health condition (45%) and diagnoses of drug use or dependence and alcohol misuse or dependence (7%) among those who both drink at increasing-and-higher-risk levels and smoke were significantly higher than among all other groups. About 1% of this group had been diagnosed with problem gambling, which was significantly higher than the group of adults who drink at increasing-and-higher-risk levels but do not smoke and the group of adults who do neither. This is in line with what we would expect based on previous research showing that smoking prevalence is much higher among those with a mental health condition compared with those without (Richardson et al., 2019).

## 5.2. Implications for practice and policy

This study has important implications for policy as this group of adults in England who both drink at increasing-and-higher-risk levels and smoke are a particularly important group to target because of the multiplicative effect of both smoking and drinking (Talamini et al., 2002), and because less of this group are trying to cut down on their smoking or drinking compared with smokers who do not drink at increasing-and-higher-risk levels and increasing-and-higher-risk drinkers who do not smoke, respectively. This group also has high rates of psychological distress and mental health conditions, which are known to be negatively associated with successfully quitting smoking

(Richardson et al., 2019) and therefore may benefit from targeted and linked support for their drinking, smoking and mental health. Particularly given that there is evidence that smoking cessation is associated with small to moderate improvements in mental health (Taylor et al., 2021). Drinking alcohol and smoking cigarettes often occurs in tandem so future research should investigate the best way to provide targeted support to this group, whether that is a multi-behavioural intervention addressing both behaviours simultaneously, either face-to-face or digital, or always following one type of intervention with another, and linking these in their delivery.

### 5.3. Strengths and limitations

This study is the first to report the prevalence of both smoking and increasing-and-higher-risk drinking among adults in England using a nationally representative survey. To the authors' knowledge, there are no equivalent reports from other countries to be able to compare these findings with.

A limitation of this study is that population survey research tends to exclude certain populations, which introduces biases. For example, people who are homeless are often excluded from such research and they tend to consume more alcohol and have a higher smoking prevalence (Dawkins et al., 2019), along with higher rates of mental health conditions. Furthermore, people currently in hospital would not be able to take part in this survey research. This suggests that this study may have underestimated both the prevalence of drinking at increasing-and-higher-risk levels among smokers and the prevalence of both drinking at increasing-and-higher-risk levels and smoking (Rehm et al., 2021), as well as the rates of psychological distress and mental health conditions.

Another limitation is that there was a change in the modality of data collection from face-to-face (up to February 2020) to telephone (from April 2020). However, previous diagnostic analyses comparing the representativeness of the sample suggested that comparisons were reasonable (Jackson et al., 2020), and this study reports the prevalence after the change in survey separately, and similarly focuses on the survey waves from April 2020 for the sociodemographic and health-related characteristics. Furthermore, the comparisons between groups do not allow us to infer any causality as to why the differences occur, only to detect whether there were any differences between groups.

## 6. Conclusions

In a representative sample of adults in England between April 2020 and March 2022, the prevalence of both smoking and increasing-and-higher-risk drinking was 4.6% and this group has high rates of psychological distress and mental health conditions, which is known to be negatively associated with successfully quitting smoking. This group also had higher levels of alcohol consumption and risk of alcohol dependence though a significantly lower proportion were trying to cut down on their drinking and had a strong motivation to do so compared with increasing-and-higher-risk drinkers who do not smoke. Both smoking and drinking alcohol has a multiplicative effect on the risk of cancer and this group of both smokers and increasing-and-higher-risk drinkers need targeted support to increase the proportion making an attempt to cut down on their drinking or smoking, and the likely success rates of these attempts.

## 7. Dissemination

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## 9. Contributors

All authors designed the study. CG drafted the protocol and all authors contributed to and approved the protocol. CG conducted the statistical analysis and wrote the first draft of the manuscript. All authors have contributed to and approved the final manuscript.

## CRediT authorship contribution statement

**Claire Garnett:** . **Melissa Oldham:** . **Leonie Brose:** . **Hazel Cheeseman:** Conceptualization, Writing – review & editing. **Sharon Cox:** .

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: CG and MO are paid scientific consultants for the behaviour change and lifestyle organisation 'One Year No Beer'. LB, HC and SC have no conflicts to declare.

## Data availability

Data will be made available on request.

## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.addbeh.2023.107928>.

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