



Adult Consequences of Late Adolescent Alcohol Consumption: A Systematic Review of Cohort Studies

Background

Alcohol is responsible for a significant portion of the global burden of disease. There is widespread concern reported in the media and other sources about drinking trends among young people, particularly heavy episodic or “binge” drinking. Prominent among policy responses, in the UK and elsewhere, have been attempts to manage antisocial behaviour related to intoxication in public spaces. Much less attention has been given to the longer term effects of excessive drinking in adolescence on later adult health and well-being. Some studies suggest that individuals “mature out” of late adolescent drinking behaviour, whilst others identify enduring effects on drinking and broader health and social outcomes in adulthood.

If adolescent drinking does not cause later difficulties in adulthood then intervention approaches aimed at addressing the acute consequences of alcohol, such as unintentional injuries and anti-social behaviour, may be the most appropriate solution. If causal relationships do exist, however, this approach will not address the cumulative harms produced by alcohol, unless such intervention successfully modifies the long-term relationship with alcohol, which seems unlikely. To address this issue a systematic review of cohort studies was conducted, as this approach provides the strongest observational study design to evaluate evidence for causal inference.

Methods

A systematic review was undertaken of the available literature using relevant on-line databases and standard systematic review literature search techniques. The search parameters included database articles from 1964 to 2008. This approach was supplemented through the use of hand searching of key journals, citation searching and contact with the primary authors of relevant studies. A data collection protocol was developed and the entire process was undertaken independently on two occasions by different researchers. All subsequent study tasks were also duplicated. Only peer-reviewed published data were used and further unpublished information was not sought from authors.

Studies of drinking behaviour were included if they collected data on at least two points in time, were at least 3 years apart, and from the same cohort. Cohorts formed from general population sources, including college students and military



conscripts, were included. Studies based on selected or special populations such as children of alcoholics, mental health patients, and offenders were excluded.

We evaluated the strength of causal inference possible in these studies by assessing whether all possible contributing factors (confounders) had been taken into account. We also gave greater weight to studies that had follow-up rates of 80% or greater, and which had sample sizes of 1,000 participants or more.

Results

Fifty-four studies were eligible for inclusion in this review. Approximately half of all reports (n = 26) were from US studies, ten were from Sweden, eight from Britain, four from New Zealand, three from Australia, two from Finland, and one from the Netherlands. More than half (n = 30) originated from school-based cohorts. Birth cohorts were more likely to be the subject of multiple studies (n = 11/14). Nineteen (35%) studies, based on eight different cohorts, were assessed as having stronger capacity for causal inference), and we focussed primarily on these studies.

The main results were as follows -

- The majority of the studies provided evidence for a link between adolescent drinking and drinking behaviour in later adulthood.
- All studies assessing alcohol problems or dependence in adulthood found statistically significant associations with late adolescent drinking.
- Mortality was examined in only one cohort; the Swedish Conscript Study. It found that late adolescent heavy drinkers were twice as likely to have died compared to moderate drinkers by the mid-thirties. The majority of these deaths were due to car crashes and suicides. The risk of death due to alcohol specific causes (e.g. alcohol intoxication, liver cirrhosis) was also higher for this group.
- One study found no effect of adolescent drinking on court convictions or property offences by age 21, however one other study found that adolescent alcohol problems were predictive of official recorded criminal convictions by the mid-thirties.



- There was no effect of adolescent drinking on any of the mental health outcomes included in the studies, apart from the study noted above which did find that heavier adolescent drinkers had a higher risk of suicide in adulthood.
- One of the studies identified a small but significant effect of adolescent alcohol use on later tobacco use, however a similar relationship was not observed in other studies once confounding factors present in late adolescence were controlled.
- The majority of studies found that there was no association between adolescent drinking and drug use or dependence, after controlling for confounding.
- One study found a link between adolescent drinking at age 16 and educational attainment at age 42, however this effect was only evident in men.

Discussion

This systematic review investigated whether late adolescent alcohol consumption is a time-limited activity without significant longer term consequences or whether it impacts upon adult health and well being. It is clear that the evidence base on long-term consequences is not as extensive nor as compelling as it could be. There is a large evidence base attesting to the ongoing impacts of late adolescent drinking on adult drinking behaviours, though most studies cannot strongly support causal inferences because of their designs. There is robust evidence from one US National school cohort that apparent effects on later alcohol consumption persist beyond the age of 30, which is longer than had previously been understood. Possible effects on subsequent alcohol problems including dependence are somewhat more complex than effects upon subsequent alcohol consumption per se. Evidence from multiple well-designed cohort studies indicates that other factors indicative of heightened psychosocial risk more broadly are also implicated. It is nonetheless striking that effects on alcohol problems assessed at ages in the mid 30s appear to have been produced by elevated consumption in late adolescence. Findings from a rigorous New Zealand birth cohort study on nonalcohol outcomes, however, demonstrate that many apparent effects of late adolescent drinking are actually due to other factors. Certainty about the long-term consequences of late adolescent drinking is thus not easily achieved.



Notwithstanding the limitations of the evidence base and of this review, and attenuations over time in the strength of the direct effects, late adolescent alcohol consumption appears a probable cause of increased drinking well into adulthood, through to ages at which adult social roles have been achieved. Heavier drinking seems most likely, however, to be only one component in a complex causal process. The contribution of adolescent drinking has probably been overestimated in previous studies through not taking account of other possible explanations. There are also uncertainties induced by self-reported data. The importance of these findings is highlighted in the context of work showing strong stability of drinking patterns through the fourth and fifth decades of life. A wide range of health and other harms, such as liver cirrhosis, are caused by alcohol at middle and older ages. Late adolescent drinking, by virtue of its probable effect on long-term adult alcohol consumption is likely to contribute to the burden of alcohol-related disease. Continuities from adolescence to adulthood in drinking patterns have been observed across a range of measures including frequency of consumption and heavy drinking.

In this study it seems that alcohol consumption confers additional risk of alcohol problems both on those who are already more vulnerable in various ways to poorer health and psychosocial outcomes, and strikingly also among those who are not otherwise vulnerable. Possible effects on adult alcohol problems and dependence including hospitalisation identified here result from heavier drinking in adolescence without necessarily involving problems at younger ages. If these effects are confirmed, there are two important implications: (1) Reducing late adolescent alcohol consumption in the general population may be expected to make a long-term contribution to reducing the incidence of adult alcohol problems; (2) In more vulnerable populations, late adolescent drinking may be one cause among many of later difficulties, and its effects may be more severe and long-lasting than for other groups. Having relatively secure psychosocial resources may somewhat buffer these risks, and their consequent potential for adverse effects, but it does not remove them. These statements should be read with some caution given studies of mediators and moderators of these effects are lacking, limiting our understanding of their nature. Nevertheless, this systematic review affords more secure inference of the likely existence of these effects than has been possible previously. It is possible that relationships with alcohol forged dur-



ing late adolescence may have cumulative lifetime drinking related consequences that are also simply not well captured by the existing literature.

In addition to making both alcohol and heavy drinking less available, less acceptable, and more expensive, these findings indicate a need for policy makers to encourage young people to be more cognisant of the long-term risks to adult health and well-being, and to act on this awareness in their decision making about whether and how much to drink. This encouragement requires much more than the provision of accurate information about risks if it is to have any real prospect of influencing actual behaviour. Alcohol harm reduction has largely been concerned with reducing various risks inherent in drinking situations and their immediate aftermaths. This study demonstrates the need to develop a longer term perspective on harm reduction.

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For further information

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ALCOHOL INSIGHTS

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