

# PHYSICAL AVAILABILITY RESTRICTIONS



IARD Policy Reviews cover the evidence on the impact of policy measures on drinking patterns and outcomes. They offer an overview of the key literature and provide the reader with an extensive bibliography that refers to original research on each topic. IARD Policy Reviews attempt to present the balance of the available evidence. They do not necessarily reflect the views of IARD or its sponsoring companies.

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## Background

The physical availability of alcohol refers to the ease and convenience with which consumers can access alcohol in their local environment. Regulatory frameworks are in place everywhere alcohol is sold to prevent illegal and irresponsible trade, and to minimize the potential for harm. The following measures may be used by governments to regulate the availability of beverage alcohol:

- ▶ **Restrictions** on the type, density and location of retail outlets
- ▶ **Restrictions** on hours and days when alcohol may be sold
- ▶ **Restrictions** on the type of alcohol that can be sold in particular outlets
- ▶ **Government monopolies** that regulate the production, distribution, and/or sale of alcohol beverages

This review provides an overview of the available evidence on physical availability policies and their impact on consumption and alcohol-related outcomes. It will not address restrictions of physical availability that target particular groups, for example, through legal age limits for purchasing or drinking alcohol, or through regulations of sales to intoxicated individuals.



# Summary of the evidence

## OUTLET DENSITY

One approach to limiting the availability of alcohol is regulating the number of legal outlets within a particular jurisdiction that sell it. Density regulation may limit the concentration of outlets in a specific area or place a cap on the number of permitted outlets. The density of retail outlets, both on- and off-premise, is usually regulated through licensing or zoning restrictions.

## CONSUMPTION AND HEAVY DRINKING

**Studies have found an association between the density of alcohol outlets within a particular geographic area and alcohol consumption among the population that lives in that area. However, there is inconsistency in the evidence around the size, nature, and specifics of this relationship [1].**

- ▶ Some reviews and studies show positive associations between outlet density and alcohol consumption, where higher density of outlets is associated with higher average consumption across the population [2-4].
- ▶ However, other reviews and studies have shown that increases in outlet density are not always associated with increases in consumption levels [1, 5-9].
- ▶ Some studies have found a positive relationship between outlet density and consumption to hold only for average consumption volume across the study population, and not for heavy drinking [8, 10], while one study from New Zealand found the opposite [11].
- ▶ While some studies have found a positive relationship between on-premise outlets specifically and consumption [10, 12, 13], others have found that increased consumption associated with increased density of outlets only holds for binge drinking and its relationship to the density of off-licenses, and not other outlet types [11, 14].
- ▶ Studies conducted in Australia, New Zealand, and California have found outlet density to be associated with youth drinking [15-17] and heavy drinking by youth [17-19].
- ▶ Gender differences have also emerged. Two studies found an association between outlet density and more frequent or heavy drinking among women, but not among men [20, 21]. Another study found a positive association between outlet density and heavy episodic drinking among men, but not among women [9].

**The available evidence indicates that various elements affect the relationship between outlet density and consumption, including prevailing social [22-24], socioeconomic conditions [21, 25-27], and other factors such as diversity of commercial outlets (including alcohol outlets) [9].**

- ▶ Recent studies have highlighted the important and complex associations between neighborhood socioeconomic status (SES) and the impact of outlet density on consumption of alcohol, but with contrasting findings.
  - ▷ Areas with high densities of commercial outlets (including alcohol outlets) have been shown in some studies to be areas with high levels of social deprivation or disadvantage [25, 28]. Research has shown the density of alcohol outlets to be higher in economically disadvantaged urban areas than in more affluent areas [15, 19, 28-31].
  - ▷ However, other studies have found higher proportions of drinkers in higher-SES areas, despite lower density of outlets [29, 32].

- ▶ Other studies report no association between heavy drinking and neighborhood deprivation measures [8, 9, 33, 34], while a study comparing adult twins reports an association between hazardous drinking and neighborhood SES, but not outlet density [35].

## AMPHORA PROJECT

Several studies that use empirical evidence to examine the impacts of specific availability restrictions following their implementation are reviewed in this document, but it is also worth pointing to one of the largest studies conducted on the impact of policies on drinking and alcohol-related harm.

The Alcohol Measures for Public Health Research Alliance (AMPHORA) Project, funded by the European Commission, included a large study of 12 European countries between the 1960s and the 2000s [36]. While the study did not differentiate between individual policy measures around availability, it found that restrictive availability policies were associated with decreases in consumption in some countries (Poland, Spain, Sweden, and Switzerland) and increases in others (i.e. Hungary\* and the U.K.\*). Similarly, it found that permissive availability policies were associated with increases in total alcohol consumption in some countries (Hungary, Poland, and Finland) and decreases in consumption in others (the U.K., the Netherlands, Norway, and Sweden). These findings point to the importance of the national context and other factors that can influence the effectiveness of policy measures.

## OUTCOMES

**Although the evidence on outlet density and its relationship with health outcomes is limited, some studies have found that areas with higher densities of outlets have higher rates of hospitalization for certain health outcomes.**

- ▶ Studies have found that greater outlet density is correlated with an increased risk of alcohol use disorders [23, 37].
- ▶ In six U.S. states (California, Florida, Louisiana, New Jersey, North Carolina, and Pennsylvania) and two metropolitan areas (Atlanta and Detroit), above-average outlet density was found to be associated with increased risk of liver disease mortality among retired persons, but non-significant for liver cancer incidence [38].
- ▶ Studies from the U.K. found that outlet density was positively associated with hospital admissions [4, 39].
- ▶ A study in the U.S. state of South Carolina found that living in a neighborhood with higher outlet density was positively associated with acute pancreatitis hospitalizations among those admitted to a hospital [40].
- ▶ A study in New Zealand found that outlet density was associated with people reporting a greater number of negative consequences for work, relationships, and finances related to their own drinking [33]; another study in Denmark, which reported results by gender, found the same association to hold only for women and not men [7].

**Findings on the effect of outlet density on drink driving are mixed.**

- ▶ Evidence from the United States suggests that traffic crashes are more likely to happen in areas with greater outlet density [41-45]; one study shows that crashes are less likely in areas with higher restaurant density [42].

\*The AMPHORA project looks at policies and policy changes over a number of years and in countries such as Hungary, U.K., and Sweden, there have been a series of policies that have been both restrictive and permissive in nature.

- ▶ Other research has shown the relationship between crashes and outlet density to be highly dependent on the extent to which local and highway traffic passed through the community studied [45, 46].
- ▶ Recent research in Perth, Western Australia found that when other predictors were controlled for, alcohol-related crashes were more likely to occur further from the central business district, than in the central business district itself, which had higher outlet density [47].

**Some research has identified associations between outlet density and negative outcomes, such as suicide [48, 49], violence [27, 50-53], assault [27, 52, 54], and homicide [27, 55]. Studies on injury and violence generally find positive associations with outlet density, however the size and type of these associations varies [1, 56].**

- ▶ Studies have found a positive association between outlet density and violence, with some of these finding stronger effects for off-premise outlets [27, 43, 57-60], and others finding larger effects for on-premise outlets [53, 61-64].
- ▶ Within some studies, the association with violence or assault rates is positive for some types of outlets and negative for others [65, 66].
- ▶ Furthermore, some studies suggest that crime and aggravated assault cluster around commercial districts, where there are also more alcohol outlets, partially accounting for the effect [67, 68].
- ▶ Characteristics of alcohol outlets may be more important than simply the number of outlets. Studies show that venues with poor serving practices are more likely to have a positive association with local crime rates than those with responsible practices [1, 27, 67, 69].

**Studies on domestic violence outcomes have found inconsistent results.**

- ▶ One group of researchers found conflicting results across three studies of off-premise density effects in California, finding positive [70], negative [71], and non-significant results [72].
- ▶ Another group of researchers found that the association with intimate partner violence (IPV) against women was not significant when outlets were simply counted per geographic unit [73]. When outlet density was divided into categories (low, medium, high density), physical but not sexual IPV was positively associated with high density (that is, a neighborhood with more than eight alcohol outlets per square kilometer) compared to low density (fewer than one per square kilometer). There was no association between either type of IPV and neighborhoods with medium or low density (fewer than eight outlets per square kilometer) [74].
- ▶ A study in Melbourne, Australia found that density of outlets licensed for both on-premise and off-premise sales is positively associated, density of on-premise only outlets is negatively associated, and density of off-premise outlets is not associated with domestic violence [75].
- ▶ A study in Washington D.C. found that density of off-premise outlets was associated positively, and density of on-premise outlets negatively, with calls to the police about domestic violence [76]. Similarly, a study in a city in the U.S. state of Indiana found a positive association between off-premise outlet density and intimate partner violence and no significant relationship for on-premise outlet density [77].

## LIMITATIONS AND METHODOLOGICAL ISSUES

The authors of a recent systematic review argue that the range of methodological issues in studies on the effects of outlet density is so fundamental that attempts to summarize them into a single conclusion should be “abandoned” [1]. Such issues include:

- ▶ **Type of outlet.** Many studies do not differentiate among licensed outlets, regardless of size or type (for example, a supermarket or a bar) [78] which conceals important differences in how alcohol is consumed in different social environments [54, 67, 69].
  - ▷ Different types of drinkers may choose certain types of outlets [28, 79]. In Canada, for example, bars and pubs are more likely to be associated with young, unmarried men of lower SES, while older, more educated, and more affluent women are more likely to frequent restaurants [80].
  - ▷ In Perth, Western Australia, associations between outlet density and consumption apparent for small off-premise stores did not apply to larger stores [81].
- ▶ **Location of purchase, consumption, and outcomes.** Most studies to date cannot differentiate between where alcohol was bought, where it was consumed, and where the outcomes of interest occurred. Most studies assume that all three things happen within the same, often small, geographic area [47, 54, 56, 78, 82], but it is unclear if the people making alcohol purchases in an area are the same as those experiencing harms [1, 27, 56].
- ▶ **Crime hotspots.** Crimes often occur in “hotspots” [1, 83] and different theories have emerged to explain this phenomenon [84]. However, some researchers have argued that measures of alcohol outlet density are poorly linked to this theoretical background [78], meaning that results can be difficult to interpret.
- ▶ **Supply and demand.** Current research has not adequately explored the idea that the availability of outlets is led by demand, rather than the density of outlets leading to changes in demand [25, 28, 39].
  - ▷ A study from New Zealand found that changes in outlet density were associated with demographic changes among residents [85].
- ▶ **Confounding.** There are many potential confounding factors involved in testing the relationship between outlet density and outcomes, which are not always controlled for in the literature [1, 86]. Many outcomes are correlated with socioeconomic disadvantage [75, 87, 88], income [8, 21], poverty [21, 40], unemployment [21], and access to public transportation [1].
  - ▷ Studies of alcohol outlet density do not always test for relationships between it and other variables like neighborhood deprivation, which can influence results [1, 15, 54, 86].

# Operating hours and days

Where alcohol is legally traded and served, regulation of retail outlets usually involves restrictions on the hours during which alcohol may be sold. However, the same restrictions may not always apply to both on- and off-premise outlets. In some jurisdictions, alcohol trade may be restricted on certain days of the week, such as Sundays.

## CONSUMPTION AND HEAVY DRINKING

**The relationship between licensing hours and consumption is often studied in so-called “natural experiments” following changes in regulations. Changes to permitted hours and days of operation have been associated with different effects in different places.**

- ▶ A recent international meta-analysis using studies from Sweden, the U.S., and Canada, found that where regulators permitted an additional day of sale, this change was associated with a 3.4% increase in alcohol consumption when results were pooled across studies [3]. An earlier systematic review concluded that increasing alcohol trading hours is associated with increased consumption in on-premise outlets [89].
  - ▷ Studies examining changes in days of sale in U.S. states have found mixed results on consumption, with some reporting increases, and others no change [90, 91]. In some states, different effects on sales were reported by beverage type [90].
  - ▷ Studies have found an increase in alcohol sales and self-reported consumption following the repeal of bans on Saturday alcohol sales in Sweden [92, 93].
- ▶ In the U.K., relaxing licensing hour restrictions in 2003 was not found to be associated with changes in alcohol consumption [94].
- ▶ Research shows that there was no increase in overall consumption when Sunday sales were allowed in Canada. Although drinking increased on Sundays, there was an equivalent drop in Saturday drinking [95]. In outlets where alcohol is consumed on-premise, drinking is often concentrated around closing time. When closing hours are extended, a shift has been observed in the concentration of drinking to coincide with the new closing time [96, 97].

## OUTCOMES

**The evidence surrounding the effect of changes in licensing hours and days varies substantially by country.**

- ▶ A recent systematic review of policies regulating alcohol trading hours and days concluded that there is evidence suggestive of an effect of longer hours on injuries, homicides, and crimes, but noted that the evidence regarding assaults or violence and traffic fatalities is less compelling [98]. An earlier systematic review concluded that increasing alcohol trading hours during night time is likely associated with increased violence [89].
- ▶ Two studies from Colombia [99, 100] and one from Peru [101] found that restrictions on alcohol outlet opening hours were linked to decreases in homicide and road-traffic mortality.
- ▶ A study of extending days of sale in Sweden found associations with increased crime, though not with violence [93]. A different study in Sweden found that an intervention which included extending nightclub opening hours was associated with decreased violence [102]
- ▶ A recent study from Germany found that restricted opening hours did not decrease violence rates in towns with high violence rates. They found an opposite effect in towns with low levels of violence, suggesting that overall crime rates may impact the effectiveness of policy interventions [103].

- ▶ Evaluation of the effect of relaxing licensing hours under the Licensing Act (2003) by the U.K. Government found no changes in the incidence of violence [94]. A separate study focusing only on the U.K. city of Manchester showed similar results [104].
  - ▷ A recent systematic review of fifteen studies around the U.K. found little evidence that relaxing licensing had a marked effect on violence rates [105].
  - ▷ However, a study in South Yorkshire found an overall increase in emergency department admissions related to alcohol after implementation of the new policy, with two hospitals showing significant increases, one showing a decrease, and another showing no significant change [106].
- ▶ The relaxation or repeal of weekend-day bans on the sale of alcohol were found to have no effect on drink-driving offenses in both a U.S. state [107] and in Sweden, despite a small increase in sales of alcohol beverages [92]. No, or very small, effects on crash fatalities were found in several U.S. states [108-110].
- ▶ Evidence on the impact of extended trading hours on overall drink driving is mixed, with studies in Ontario, Canada and Scotland finding no effect [96, 111, 112], while studies in Iceland and Australia have found increases in suspected cases of drink driving and crashes, respectively [113, 114].

Notably, research on licensing hours and days has focused more on on-premise outlets than off-premise outlets, and much of the literature is restricted to high-income countries such as Australia and the U.S. [115].

## Retail monopolies and privatization

State-run retail monopolies of some or all types of alcohol beverages are in place in a number of countries. In some jurisdictions, retail outlets have been privatized, offering the opportunity for natural experiments to study impact.

### CONSUMPTION AND HEAVY DRINKING

**Privatization of retail outlets has been shown to affect consumption of particular beverage types, however this does not always lead to changes in total alcohol consumption volume.**

- ▶ A 2012 systematic review of studies in a number of developed countries found that privatization of alcohol sales was associated with increases in average consumption of the privatized beverage type and minimal effects on the beverage types that were not privatized [116]. However, variation in the size of this effect across studies was substantial.
- ▶ Privatization of the sale of domestic and imported wine in 1978 and 1983, respectively, in the Canadian province of Quebec was followed by an initial rise and a subsequent leveling off in wine sales [117]. There was no appreciable impact on total alcohol sales, or on beer and spirits sales [118, 119].
- ▶ Research on the partial privatization of off-premise outlets in the Canadian province of British Columbia showed that alcohol sales were higher in areas with higher densities of private outlets [120]. However, evidence from British Columbia also showed that increases in consumption associated with the privatization of off-premise outlets were lower than increases in consumption for Canada as a whole over the same period [1].
- ▶ The privatization of wine sales in several U.S. states was associated with an increase in wine sales and total alcohol sales [121], without significant effects on beer and spirits sales [122].

- ▶ Recent research found that the privatization of spirits retailers in 2012, in the U.S. state of Washington, was associated with a decrease in spirits consumption. However, it had no effect on overall alcohol consumption; the survey respondents' frequency of drinking increased while quantities consumed per occasion decreased [123].
- ▶ Earlier research in the U.S. state of Iowa showed no impact of sales privatization on the number of heavy or problem drinkers among the general population [124].
- ▶ Some research carried out in the United States has suggested a relationship between retail monopolies and reduced consumption and heavy episodic drinking by young people [125, 126].
- ▶ In Norway, increases in the number of monopoly retailers only had an impact in municipalities that already had at least one monopoly shop, and the effect was increased consumption of recorded spirits coupled with a reduced consumption of unrecorded spirits [127].

## OUTCOMES

**Links between privatization and outcomes are not clear. Natural experiments have found varied results [1].**

- ▶ Following partial privatization of alcohol retail outlets in the Canadian province of British Columbia, the resulting higher density of private outlets was correlated with increases in alcohol-related deaths [128].
- ▶ A study in Sweden found that re-monopolization of medium-strength beer was associated with decreases in hospital admission rates for a range of alcohol-related conditions, but an increase in assaults [129]. Conversely, in the U.S. city of Seattle, a natural experiment examining the impact of the privatization of alcohol distribution and sales found that increases in the number of on- and off-premise outlets correlated with increased aggravated and non-aggravated assaults [130].
- ▶ Another study in Iceland found differences between sexes, with privatization related to increases in health problems among men but not women, including chronic liver disease rates, alcohol-related liver disease rates, and mental and behavioral disorders [131].
- ▶ Evidence from Quebec, Canada indicated no impact of spirits sale privatization on fatal road-traffic crashes [119].
- ▶ A study on the effect of re-monopolization of medium-strength beer in Sweden, on the other hand, showed an association with a decrease in motor-vehicle crashes [129].
- ▶ A study from the United States found an association between monopolies and fewer incidents of alcohol-impaired driving and deaths among those below the legal drinking age of 21 [125].

## LIMITATIONS AND METHODOLOGICAL ISSUES

**When considering the effectiveness of physical availability policies as public health intervention tools, certain limitations should be taken into account.**

- ▶ **Confounding by other policies introduced.** Many studies do not control for other policies that may have been implemented around the time of availability restrictions to address the outcomes of interest, which can affect the results [54, 123] and makes it difficult to gauge the impact of any single measure [49, 54, 132]. For example, changes in trading hours often occur in combination with other interventions (for example, traffic safety enforcement) [99, 133].
- ▶ **A lack of intervention or control studies.** Much of the literature relies on cross-sectional studies which are not sufficient to show causality [54].



- ▶ **Study setting.** A majority of studies have been conducted in high income countries, notably the U.S., Canada, U.K., Finland, Sweden, Norway, Iceland, New Zealand, and Australia [1, 78].
- ▶ **Methodological variation.** Variability in study design makes it difficult to synthesize conclusions across studies because:
  - ▷ Gender differences are not often considered in systematic reviews [134]. More recent studies have found both similarities [60] and differences in effects by gender [7, 60]. These findings warrant further research.
  - ▷ Many studies measure short-term impact [78, 135], making it difficult to know if the effects seen are short-term spikes, or sustained changes in outcomes.



## Glossary

**Off-premise outlet:** establishments licensed to sell alcohol beverages only for consumption away from their premises, like a liquor store.

**On-premise outlet:** establishments licensed to sell alcohol beverages for consumption on their premises, including bars, restaurants, and clubs.

**Positive association/positive correlation:** a relationship between two variables in which an increase in one corresponds with an increase in the other

**Negative association/negative correlation:** a relationship between two variables in which an increase in one corresponds with a decrease in the other

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