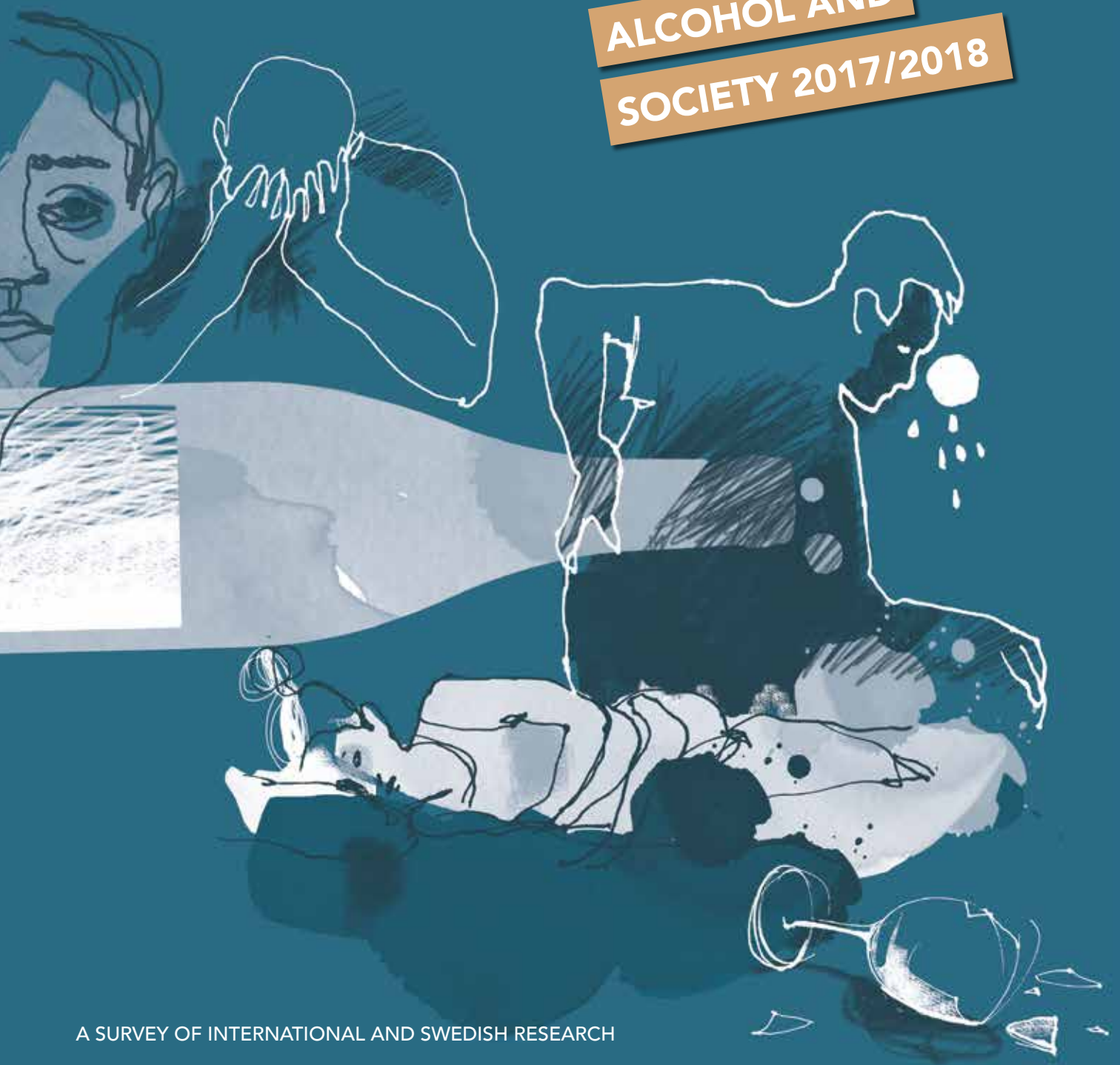
Alcohol and violence

ALCOHOL AND SOCIETY 2017/2018



A SURVEY OF INTERNATIONAL AND SWEDISH RESEARCH

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IOGT·NTO

Svenska Läkaresällskapet

STIFTELSEN ANSVAR FÖR FRAMTIDEN

Alcohol a factor strongly linked to acts of violence

Violence generates enormous costs for society and causes great suffering for affected individuals, both physically and mentally. There are many factors which contribute towards violent behavior. Alcohol's detrimental effect on the brain is an undisputed fact and this can in turn contribute to an increased risk of aggressive behavior, leading to acts of violence occurring.

Research on the subject of alcohol-related violence proves difficult for ethical reasons. When looking at the Swedish statistics for murder and violent-conduct over the past 160 years, it demonstrates violent acts of crime rises in likelihood as alcohol consumption increases. Studies also show an increase in alcohol consumption of an average of one litre per person causes a seven percent increase in the number of violent attacks.

In this research report we indentify different forms of violence, how alcohol affects our behavior and how violence can affect our health in both short and long term. This report presents alcohol policy and local violence prevention initiatives which are aimed at reducing alcohol consumption and therefore reducing violence.

The Swedish Medical Association, Center for Addiction Research (CERA) and IOGT-NTO, with the financial support of the Foundation responsible for the Future, publishes the research report Alcohol and Society annually, with the aim of shedding light on harmful effects of alcohol consumption on both individuals and society. This year's topic is Alcohol and Violence.

This report is presented by a group comprising of some of the leading international alcohol researchers, led by Harold Holder. The researchers collectively examine facts based on aggregated international studies with which to derive conclusions and measures focussing on Sweden and the other Nordic countries. In previously produced studies, the report has touched on topics such as alcohol and its impact on young adults, the effects of low dose consumption, alcohol's secondary injuries and alcohol-related cancer. These and earlier reports can be read on our respective websites.

We would like to wish you good reading! We hope this report will engage you and provide valuable information regarding alcohol research!



Claudia Fahlke
director,
CERA, University of Gothenburg



Stefan Lindgren
chair,
Swedish Society of Medicine



Johnny Mostacero
chair,
IOGT-NTO

Executive Summary

Violence is one of the great scourges of humanity and alcohol fuels much of it.

Alcohol is a contributing cause of many violent incidents in Sweden that is often overlooked and under-reported. Official records show that the rates of homicides and assaults in Sweden since the 1850s have closely tracked the population rate of alcohol consumption (see Figure 1). In this report we discuss evidence for alcohol having a direct causal contribution to violence and we also highlight effective but under-utilised strategies to reduce alcohol-related violence. While the World Health Organization (WHO) identifies public policies on alcohol as a 'best-buy' for violence prevention, such strategies have been mostly overlooked in Swedish violence prevention strategies.

We present evidence that alcohol use contributes to violence affecting people across the whole life-course and in many situations, including: violence between family members, intimate partners, friends, acquaintances and strangers, child maltreatment, youth violence, sexual violence and elder abuse. Evidence from different types of studies shows that while alcohol does not provide a motive or excuse for violence, alcohol impairment can increase the probability that there will be a violent response to inter-personal conflict, frustration or a perceived threat. Furthermore, people are more likely to be victims of aggression when they are intoxicated.

Many violent incidents are never reported. Furthermore, alcohol's contribution to violence tends to be invisible or ignored. In anonymous surveys, however, 2.5% of Swedish men and 1.5% of women reported being physically assaulted in the previous year and, further, 0.3% of males and 1.8% of females reported a sexual assault. While about 80% of the victims of public violence (e.g., assaults) are male, more females are victims of domestic and sexual violence. Furthermore, domestic violence victims, who are more likely to be women and children, may be more likely to under-report violence, and less likely to seek care for violence-related injuries.

A recent World Health Organization report identified many types of harm arising from violence beyond the immediate traumatic injuries. Serious longer term effects impact physical, psychological, reproductive and sexual functioning in adults and deprivation or neglect in children. For instance, individuals who had experienced severe physical or sexual violence during their lifetime were about three times more likely to be diagnosed with heart disease. In general, female victims appear to be especially vulnerable to longer-term health consequences of violence.

Reviews of international studies indicate that alcohol has been consumed prior to assaults by between one-third and one-half of perpetrators of violence. In Sweden, based on survey data for 2015, 57% of perpetrators of physical assault and 31% of victims were intoxicated. With an estimate of 317 000 cases of physical assault in 2015, this corresponds to 180 000 alcohol-related assaults in that year. For all types of violence in Sweden the perpetrator is male in 9 times of 10. The victims of physical assaults are mostly male while the victims of sexual assaults are predominantly female.

The evidence for a causal relationship between alcohol and violence was studied by triangulating the findings from three main research approaches: (a) human and animal laboratory experiments, (b) studies of alcohol

use and violence in the general population, and (c) studies of interventions where alcohol consumption has been affected by either stricter or more relaxed alcohol policies. Human and animal experimental studies suggest that the pharmacological effects of alcohol cause changes in thinking, emotions, and physiology that increase the likelihood of aggressive behaviour (e.g., feeling overconfident, becoming angry with relatively minor provocation) and violence victimization (e.g., not recognizing unsafe situations, being less able to defend against, of flee from, attack). Biomedical evidence also suggests that alcohol counteracts the inhibitory functions of the brain which suppress aggressive impulses. There is also evidence that learned beliefs about alcohol and aggressive behavior (e.g., the belief that when ones drinks it is 'normal' to be more aggressive) can shape violent behavior after alcohol consumption, although the pharmacological or physiological effects of alcohol on the brain are more powerful determinants.

In the "real world" where experiments about violence are unethical or impractical, epidemiological studies of the general population demonstrate significant associations between alcohol consumption and violence. Intervention studies provide powerful tests of causal relationships by demonstrating that abrupt changes in general population drinking patterns predict changes in rates of violence.

The level of alcohol use in the general population is an important risk factor for violence. Swedish studies have found that a 1 litre increase in consumption is associated with a 7% increase in assaults all other factors being equal. Evidence that alcohol is a risk factor for violence is also strengthened by the consistency of the relationships observed across different types of violence, including intimate partner violence, elder abuse and child maltreatment.

Alcohol policy changes related to the price of alcohol (e.g., taxes), trading hours (i.e., hours of alcohol sales), minimum legal purchase age and the number of liquor outlets have all been found to be related to rates of violent incidents. Greater restrictions on these are associated with reductions in violence while loosening of restrictions are associated with increasing rates of violence in Sweden and in other countries. Government alcohol monopolies, such as Sweden's Systembolaget, can help resist commercial pressures to increase alcohol availability and affordability.

Violence can also be reduced through multi-component community level interventions. Successful examples of such interventions in Sweden include responsible beverage service (RBS), particularly when RBS training is combined with community mobilization and stricter enforcement of licensing laws. Examples of community interventions in Sweden include the reduction of violence among young people attending graduation parties and policing of alcohol use in public places by young people.

Nearly everyone decries violence, at least publicly, and yet the difficulty lies in adopting meaningful interventions to actually reduce it. While many causes of violence are difficult to change (e.g. genetic, personality and cultural factors) this report finds that alcohol as a cause of violence stands out as being highly amenable to change through changes in alcohol policies.



Studies shows that alcohol impairment can increase the probability that there will be a violent response to inter-personal conflict.

Authors



Sven Andreasson

Karolinska Institutet, Department of Public Health Sciences, Stockholm, Sweden



Tanya Chikritzhs

Curtin University, National Drug Research Institute, Perth, Australia



Frida Dangart

Sahlgrenska Academy and University Hospital, The Queen Silvia Children´s Hospital – Paediatric Clinical Physiology, Gothenburg, Sweden



Harold Holder

Senior Scientist Emeritus and former Director of Prevention Research Center, Pacific Institute for Research and Evaluation, Berkely, CA, USA



Timothy Naimi

Boston Medical Center, Section on General Internal Medicine, Boston, MA, USA



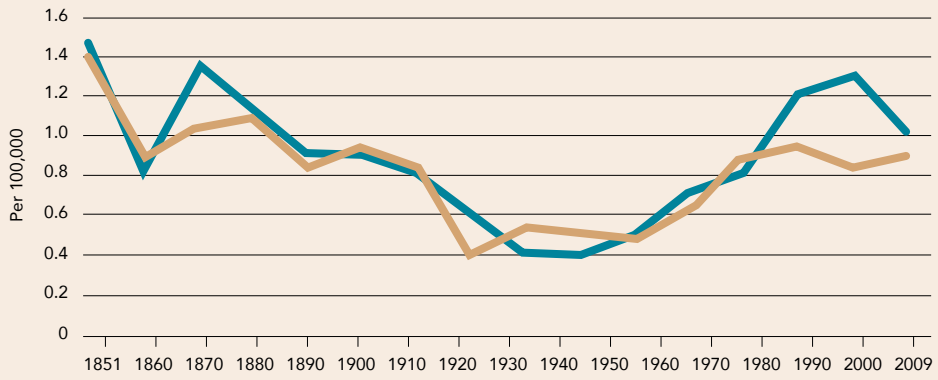
Tim Stockwell

Dept of Psychology – Centre for Addictions Research of BC, University of Victoria, BC, Canada

1 Alcohol-Related Violence – Introduction

In this report we will discuss evidence from many sources that alcohol use is an important contributing but preventable cause of violence. A close connection between alcohol use and violence has been documented throughout Swedish history. As shown below, official national records show that rates of both homicide (Figure 1) and assault (Figure 2) closely followed rates of per capita alcohol consumption over the years from 1851 to 2009. Examining the figures below shows that, for example, when the Bratt-system alcohol rationing system was introduced in Sweden in 1917, both homicides and assault decreased by more than 50% over the following few years, closely following the marked decline in alcohol consumption. Indeed the author of this historical analysis[1] observe that changes in violence only appeared to be associated with changes in the alcohol control system and were mostly unrelated to other major social changes and world events. We will also present evidence from laboratory studies of aggressive-type behaviour and from "real world" general population and intervention studies that point to a strong causal relationship between alcohol use, intoxication and violence.

FIGURE 1 Close covariation between alcohol use and violence



Homicide. Number of persons killed according to vital statistics, 1851–2009. Per 100,000

Registered alcohol consumption (litre per capita 15 years and older, scale adjusted, divided by 8), 1851–2009, 5-year average*

** Values on Y-axis (0–1.6) for alcohol consumption have been divided by 8 in order to use the same scale for both lines. For the brown line the value 1 means 8 litre alcohol per person per year.*

From: von Hofer, H. (2011). Brott och straff i Sverige 1750–2010 (Crime and punishment in Sweden 1751–2010), 4:e uppl. Kriminologiska institutionens rapportserie, nr 2011:3. Stockholm: Stockholms universitet.

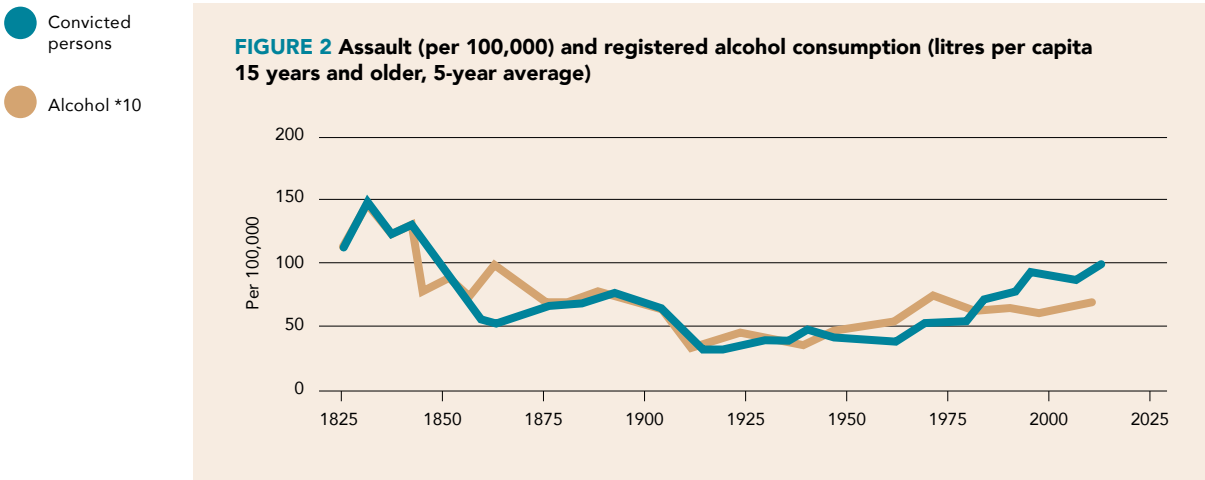


FIGURE 2 Assault (per 100,000) and registered alcohol consumption (litres per capita 15 years and older, 5-year average)

From: von Hofer, H. (2011). Brott och straff i Sverige 1750–2010 (Crime and punishment in Sweden 1751–2010), 4:e uppl. Kriminologiska institutionens rapportserie, nr 2011:3. Stockholm: Stockholms universitet.

1 of 5 girls and 1 of 13 boys have suffered from childhood sexual abuse.

1.1 Violence: an international perspective

In this report we focus on alcohol's contribution to interpersonal violence i.e. violence between family members, friends, acquaintances and strangers, and includes child maltreatment, youth violence, intimate partner violence (IPV), sexual violence and elder abuse. This report will not, however, address the important role of alcohol in self-directed violence (e.g., suicide) or collective violence (e.g., wars, civil unrest).

Regardless of its cause, experiencing violence can result in many types of harm, not only traumatic injuries but also longer term effects on physical, psychological, reproductive and sexual functioning in adults and deprivation or neglect in children.[2] Violence represents a serious problem throughout the world affecting males and females of all ages as illustrated by data from the World Health Organization[2] and the UNODC.[3]

- 8 out of every 10 homicide victims are male but women accounted for the large majority of domestic violence fatalities[4]
- Men are mostly killed by someone they don't know, while almost half of all female victims are killed by someone close to them[3]
- 35% of women worldwide report experiencing physical and/or sexual violence at some point in their lives, mostly committed by an intimate partner[5]
- 4–6% of elderly are abused in some way in their homes[2]
- Nearly one-quarter of adults worldwide report physical abuse as a child, one-third emotional abuse and 1 of 6 physical neglect[4]
- The lifetime prevalence of childhood sexual abuse differs by gender – almost 1 of 5 for girls and 1 of 13 for boys.[4] Applying these figures to the population of children in Europe suggests that 18 million children have suffered from sexual abuse, 44 million from physical abuse and 55 million from mental abuse.[6]
- In Sweden during 2015, 2.5% of men and 1.5% of women aged 16–79 were assaulted and 3.0% of women and 0.4% of men report being sexually assaulted.[7]

It is estimated that 1 billion children globally – over half of all children aged 2–17 years – have experienced emotional, physical or sexual violence in the past year. Globally self-reported child sexual abuse has been found to be 30 times higher and physical abuse 75 times higher than official reports would suggest. Perpetrators of sexual violence against girls are pre-

dominantly males. Girls are also more likely to experience either sexual or physical intimate partner violence (IPV), rape by acquaintances or strangers and genital mutilation/cutting.[8]

Elder abuse can take many forms including physical, psychological and sexual abuse, financial as well as exploitation, neglect and self-neglect, medication abuse, abandonment, scapegoating, and marginalisation of older people in institutions.[4,9]

Violence against women, against children, and elder abuse are all prone to underreporting in official death statistics, police reports and data on injuries treated in hospital emergency departments.[4]

1.2 Health effects of violence beyond physical injury

The immediate consequences of violence, namely physical injuries and deaths, are only a small fraction of the total burden from violence to society. There is also a wide spectrum of longer term negative behavioural, cognitive, mental health, sexual and reproductive health problems, chronic diseases and social effects that arise from exposure to violence, as illustrated in Figure 3. While all types of violence have been strongly linked to negative health consequences, violence against women and children contributes disproportionately to the burden. Victims of child maltreatment and women who have experienced IPV and sexual violence have more health problems, incur significantly higher health care costs, make more visits to health providers, have more hospital stays, are more likely to have sexually transmitted infections and unwanted pregnancies, and are more likely to smoke. Women exposed to IPV are almost twice as likely to have an alcohol use disorder, twice as likely to experience depression, and have a 4.5-fold increased risk of suicide attempts compared to women who have not been exposed to partner violence.[4,8]

Studies from Sweden also show that victims of violence are at greater risk of subsequent health problems. For example, a major survey of the Swedish population[10,11] found that victims of serious violence were over-represented among respondents who reported PTSD,

FIGURE 3 Consequences of violence



Physical

- Abdominal injuries
- Thoracic injuries
- Brain injuries
- Burns/scalds
- Fractures
- Lacerations
- Disability

Mental health and behavioural

- Alcohol and drug abuse
- Depression and anxiety
- Post-traumatic stress disorder
- Eating and sleep disorders
- Attention deficits
- Hyperactivity
- Externalizing behaviour
- Smoking
- Suicidal thoughts
- Suicidal behaviour
- Unsafe sex

Sexual and reproductive health

- Unintended pregnancy
- Pregnancy complications
- Unsafe abortions
- Gynaecological disorders
- Complex pain syndromes
- Chronic pelvic pain
- HIV
- Other sexually transmitted infections

Chronic disease

- Arthritis and asthma
- Cancer
- Cardiovascular disorders
- Diabetes
- Kidney problems
- Liver disease
- Stroke

Källa: WHO Global status report on violence prevention, 2014

depression, psychosomatic symptoms, self-harm behaviour, risky alcohol intake, low self-rated physical health and (among older respndents) heart attacks. Individuals who had experienced past psychological abuse were twice as likely to report current alcohol abuse. Using registry data, it was found that individuals who had experienced severe physical or sexual violence during their lifetime were about three times more likely to be diagnosed with heart disease.

1.3 Alcohol-related violence

Alcohol use is associated with significant proportions of each of the types of violence described above, and hence also with their ensuing health and social consequences. Here we discuss evidence on the extent of the association between alcohol and different types of violence, both internationally and in Sweden.

1.3.1 Association between alcohol and violence worldwide

Alcohol use by both perpetrators and victims is common in incidents of rape, assault, robbery with injury, and family violence.[12] European and U.S. studies find that drinking to the point of intoxication is especially associated with violence and aggression.[13,14] A review of 71 031 toxicology test results from 78 265 homicide victims across 13 countries found that 48% tested positive for alcohol and 33% were determined to be intoxicated using the 0.08 threshold.[15]



Other research from high-income countries shows that alcohol consumption by either or both victims and perpetrators of violence is associated with greater injury severity.[16] In a comprehensive worldwide review of studies on violence, alcohol was found in approximately 50% of both perpetrators and victims.[17] The review also concluded that alcohol was more closely linked to murder, rape, and assault than any other mood-altering substance, and was a contributing cause in most homicides arising from personal disputes or arguments. A WHO report concluded that prior to a violent incident alcohol is usually consumed by between one-third and one-half of perpetrators. Individual country estimates were USA 35%, South Africa 44%, England and Wales 45% and China 50%.[12]

Alcohol use is prevalent in different types of violence including child maltreatment, IPV, elder abuse and sexual violence. Estimates of alcohol-related IPV vary between countries with the percentage of perpetrators who are impaired by alcohol ranging from 48% to 87%.[18] In relation to elder abuse, many studies have found that perpetrators misuse psychoactive substances and are alcohol or drug dependent. In the United States, 44% of male and 14% of female abusers of parents (age 60 years and over) were dependent on alcohol or drugs, as were 7% of victims. In England, 45% of care-givers for older people receiving respite care admitted to committing some form of abuse, with alcohol consumption by caregivers being the most significant risk factor for physical abuse. In Canada, a national study of elder abuse case files from agencies found that drinking by the perpetrator were responsible for 14.6% of cases.[9] Finally, it is estimated that between one-third and three-quarters of sexual assaults involve alcohol consumption by the perpetrator, the victim, or both.[17] A study of victims of sexual assaults in Copenhagen, Denmark, 2001-2010, found that alcohol was involved in 60% of the cases.[19]

1.3.2 *Association between alcohol and violence in Sweden*

As shown earlier in Figures 1 and 2, since the 1850s rates of violent crimes in Sweden have closely followed population levels of alcohol consumption, regardless of whether the victims were male or female.[1] Based on survey data for 2015, 57% of perpetrators of physical assault were considered by the victim to have been intoxicated (73% for men, 32% for women), while 31% of victims (40% for men, 16% for women) also stated they were intoxicated.[7] With an estimate of 317 000 cases of physical assault in 2015, this corresponds to 180 000 alcohol-related assaults in that year. In relation specifically to homicides, 45% of perpetrators and 39% of victims have been estimated to have been intoxicated at the time of death, with a declining proportion since 1990.[20] In police-reported child sexual abuse cases involving perpetrators 5 or more years older than the victim, victims state that alcohol was involved in almost half of the cases.[21] In an analysis of police-reported IPV, victims estimated perpetrator to be intoxicated in 49% of cases and considered themselves to have been intoxicated in 16% of cases.[22] In the 11% of rapes where more than one perpetrator is involved, victims report they were intoxicated in more than 50% of cases. For this type of crime at least 43% of perpetrators are reported to have been drinking but studies are rare and this proportion may be higher.[23]

Swedish crime survey data summarised in Table 1 provide estimates of the percentages of perpetrators and victims estimated to have been intoxicated at the time of different types of violent incident.[24]

33%

A review of toxicology test results from nearly 80 000 homicide victims found that 33% were determined to be intoxicated.

TABLE 1 Percentages of perpetrators and victims who were intoxicated in different violent incidents, Sweden 2005 to 2013

		Assault	Threat	Robbery	Sexual offences
Perpetrator	Man	72 %	61 %	56 %	59 %
	Woman	45 %	45 %	45 %	55 %
Victim	Man	49 %	22 %	35 %	27 %
	Woman	22 %	7 %	14 %	32 %

From: Brå. (2015). Kortanalys - Alkohol- och drogpåverkan vid misshandel, hot, personrån och sexualbrott. (Alcohol and drugs in connection with assault, threats, robberies and sexual crime.)

For all types of violence above the perpetrator is male in 9 times of 10. However, the victims of physical assaults are mostly male (64%) while the victims of sexual assaults are predominantly female (83%).[24]

1.4 Social and economic costs of violence

A high prevalence of alcohol-related violence within a community can also affect quality of life by reducing community cohesion, increasing fear of crime thus preventing people from visiting public places such as city centres or using public transport, especially at night (WHO, 2006c).

The economic costs of alcohol-related violence include direct costs such as those to the healthcare system, the policing and legal/criminal justice services, and costs to support victims (e.g., providing refuge). Indirect costs include work and school absenteeism and lost productivity among those who continue to attend work and school. The burden of alcohol-related violence on public service provision and the economy can be immense. For health and criminal justice agencies, apprehending and treating offenders and victims of alcohol-related violence is financially costly and diverts resources from other health and crime issues. Furthermore, health and judicial staff can frequently be victims of alcohol-related violence themselves while at work, and this may encourage employees to consider alternative careers.

2 Evidence that Alcohol Causes Violence

Many factors contribute to violence at individual, small group, community and societal levels. Thus no single research approach or design is adequate to confirm that drinking causes violence. Different approaches are necessary to undertake causal attribution, each of which has its own particular strengths and limitations. Confirming a hypothesis using multiple types of scientific evidence and study designs increases our level of certainty and helps to eliminate possible counter-explanations. In this section we report evidence for causal relationships between alcohol use and violence across multiple settings and study designs.

For this brief research review, we identified three main research approaches that provide independent confirmation of alcohol's role in violence: (a) experimental laboratory studies of humans and animals, (b) epidemiological studies of the relationship between alcohol consumption and violence, and (c) epidemiological studies of policy interventions or natural experiments that result in changes to alcohol consumption. Laboratory studies can be conducted with both humans and animals under controlled conditions to determine if drinking alcohol contributes to an increase of the risk or frequency of aggressive behaviour. Laboratory studies provide a foundation for other research approaches by demonstrating the potential or feasibility of drinking to increase the likelihood of violence. The major limitation is whether these findings can be generalized to the real world outside of the laboratory.

Epidemiological studies or general population studies can be used to investigate if an association exists between drinking and violence in the "real world" where violence-related experiments are unethical or impractical. They can answer questions such as whether people who are heavy alcohol users are more or less likely to be involved in violence, whether the extent of their alcohol use predicts this and whether alcohol was used immediately before a violent incident. Epidemiological studies are naturalistic and can be both cross sectional (i.e. be conducted at just one point in time) or longitudinal by investigating whether changes over time in drinking behaviours predict changes in rates of violence. Longitudinal studies examine simultaneous or sequential changes in violence which can be appropriately attributed or associated with changes in drinking or alcohol consumption.

Intervention or natural experiment studies can provide strong evidence for causal associations, where changes in drinking due to planned interventions or natural experiment (e.g., a policy change) are compared to any observed changes in violence over time.



These studies investigate whether the effect of an alcohol prevention strategy or policy on alcohol consumption in a real world setting results in changes in violence. Undoubtedly such a purposeful intervention still requires examination of or adjusting for factors or competing explanations which might produce observed changes in violence. Evidence about the effect of individual alcohol policies are discussed below in section "Strategies to Reduce Alcohol-Related Violence: What works?".

2.1 Laboratory or experimental studies of alcohol and aggression and proposed mechanisms

Laboratory studies in which human subjects are given alcohol under controlled or experimental conditions have been utilized to investigate pathways or mechanisms by which alcohol use many cause or increase aggression. Such experimental research typically randomly assigns study participants to either receive alcohol at fixed doses (often two to four alcoholic drinks), a non-alcoholic drink and, ideally, also "placebo" drinks (i.e. non-alcoholic drinks that participants are led to believe contain alcohol). These types of designs enable the researchers to test whether increased aggressive behaviors are due to a pharmacological effect of the alcohol and/or a psychological "expectancy" effect. The main limitation of these types of studies is that they are not able to replicate real-world contexts where aggression might occur such as at a noisy crowded bar, or at a private party and they do not allow for social censure. Some involve placing participants in an artificial 'teacher-learner' situation in which the participant (teacher) delivers electric shocks (which are never actually delivered) to a fictitious 'learner' (a member of the research team) to

punish poor performance on a task. Another limitation is that typically only low doses of alcohol can be used as it would be unethical to study the effects of extreme intoxication. Similarly, it is also obviously necessary to only employ simulations of aggressive behavior or violence as it would be unethical to induce actual violence in a scientific experiment.



Intoxicated individuals tend to focus on more immediate situational cues than future consequences.

These laboratory studies have explored at least three possible pathways by which alcohol use may cause aggression. One pathway proposes that while humans possess an innate aggressiveness usually suppressed by inhibitory functions of the brain, alcohol overcomes this inhibitory effect.[25] This is based upon biological evidence that alcohol use impairs higher level brain functions including working memory, planning, response inhibition and the observation that intoxicated individuals tend to focus on more immediate situational cues than future consequences.[28] Such areas of the brain are vulnerable to damage from both the short and long term effects of alcohol which, in turn, may lead to aggression by reducing anxiety and increased acting-out in threatening circumstances. There is biomedical evidence that such impairment may also result in difficulties with interpreting facial and vocal expressions and lower empathy.[26] Even within the limited range of doses of alcohol permitted in these drinking experiments, dose-response effects have been demonstrated which further supports a causal relationship i.e., aggressive behavior is even more likely with higher doses of alcohol.[25]

A second pathway investigates whether learned beliefs (sometimes referred to as 'expectancies') about alcohol and aggressive behavior, rather than the pharmacological or physiological effects of alcohol on the brain, increase the likelihood of violent behavior. However, a review by Exum from 2006 of experimental studies which have manipulated both pharmacological and expectancy effects using balanced placebo designs suggest that expectancies per se have a small to negligent effect on aggression.[25]

Nevertheless, expectancies may work synergistically with pharmacological effects[27] to increase the likelihood of aggressive acts particularly in relation to sexual violence.[28] Some experimental drinking studies have investigated sexual aggression in the laboratory by using verbal vignettes, videotapes or audiotapes describing date rape scenarios. On the whole, these studies support the view that the pharmacological effects of alcohol on sexual aggression are real and are associated with misperceptions of sexual arousal, sexual cues and willingness of the victim. Individual characteristics of study participants also predict their responses such as sexual dominance and hostility towards women.[28,28] Some laboratory studies have investigated the effect of alcohol intake on women's vulnerability to sexual aggression. A review by Gidycz et al (2006)[30] found that when alcohol, placebo and no alcohol groups were compared, the alcohol groups perceived fewer negative outcomes of engaging in behavior with intoxicated males and gave less attention to cues that were indicative of sexual assault risk. Interestingly, women given placebos also anticipated that they would be more likely to engage in risky behaviors when drinking, suggesting an expectancy effect.

A third possible pathway or mechanism is that the pharmacological effects of alcohol cause additional cognitive, emotional and physiological changes[31] that are made more or less likely to result in aggression depending on external forces. This pathway or model views alcohol as an indirect stimulate rather than simply masking or inhibiting existing aggres-

sive tendencies. This perspective better allows for interactions between external factors such as provocation, frustration, conflict and individual differences (e.g. expectancies, level of intoxication, emotional state, impulsivity, brain chemistry). The consensus from reviews of laboratory studies is that the pharmacological effects of alcohol use are indeed an important contributing cause of aggression in humans, including sexual aggression, but that the effect is mediated by a range of emotional and contextual factors and is not inexorable.[25,26,28]

A causal relationship between the pharmacological effects of alcohol and aggression is also supported by findings from animal studies and includes evidence that alcohol can increase the risk of victimization. While there is considerable variation between animals in such studies, the positive effects are similar to those found in humans. Differences in testosterone levels, serotonin levels and baseline levels of trait aggression may explain the variation in findings across animal groups.[26]

2.2 Epidemiological studies of the alcohol-violence relationship

In addition to the evidence presented earlier that both perpetrators and victims of violence often have high blood alcohol levels at the time of an incident, a causal role for alcohol is further suggested by studies comparing the risks of violence at different levels of alcohol use. Levels of alcohol use in the general population have been shown to predict the risks of involvement in violence. For example, studies on trends in mean per capita consumption have found that a reduction in consumption of 1 litre of pure alcohol per capita per year in Europe was associated with a 7% reduction in homicides.[32] Similarly, Swedish studies found that a 1 litre increase in consumption was associated with a 7% increase in assaults from 1960–1994[33], and a 10.2% increase in assaults from 1987–2015.[34] A study from Norway from 1911 to 2003 found that an increase in alcohol consumption of 1 litre per year per inhabitant predicted a change of approximately 8% in the rate of violent crimes.[35]

In studies relying on individual-level rather than per capita consumption data, a study from the US using data from the National Survey on Drug Use and Health found that the risk of assault was 43% and 63% higher than baseline among participants who consumed 5+ drinks per day for 5–8 days per month and 9–30 days per month, respectively.[36] Studies in the general population show that lifetime alcohol consumption levels are positively correlated with the perpetration of aggressive acts, as well as the likelihood of being a victim of violence.[26,37,38] A study of 133 violent offenders in Sweden during 2002–03 found a 13-fold increase of risk of violence within 24 hours following alcohol consumption.[39]



Evidence of alcohol as a risk factor for violence is also strengthened by the consistency of the relationship across several violence-related outcomes including IPV, elder abuse and child maltreatment.

Among men, perpetration of IPV has consistently been linked to heavy drinking[40,41] and among women, past-year victimization is more likely among those with alcohol abuse or dependence.[42] A meta-analysis of adoles-



Among men, perpetration of IPV has consistently been linked to heavy drinking.

cents and young adults showed that alcohol use is positively associated with date violence perpetration among this age group.[43] Large international studies indicate that i) rates of IPV are higher among drinkers than nondrinkers, ii) rates of IPV are higher among people who drink more per occasion[44], iii) the risk of IPV is higher when one or both partners have alcohol problems[45], and iv) aggression severity is higher when one or both partners had been drinking during the incident.[46] There is also evidence that increased alcohol abuse and dependence over time are associated with an increased likelihood of IPV perpetration over time.[47]

Drinking behavior is associated with IPV even after accounting for other factors, such as age, socioeconomic or occupational status, race/ethnicity (e.g. [48,49]) and persists despite individual variations in hostility and antisocial behavior (e.g. [50,51]), normative views of aggression[52] and drug problems.[53] Even factors such as marital satisfaction[50,54] (see [55] for a review) and individual histories of previous domestic violence do not seem to account for the relationship between alcohol and IPV.[56,57,58]

With respect to elder abuse, alcohol use is a significant risk factor among both perpetrators and victims.[9,59]

A systematic review of studies on alcohol use and child maltreatment[60] found that increased alcohol use by mothers increased risk for child maltreatment. A relation to a father's consumption was also found but it was less straightforward than for a mother's. For individuals in social work or health care, parental alcohol use has been shown to be an important risk factor for child maltreatment.

2.3 Policy interventions studies

A causal relationship between alcohol consumption and violence is further supported by studies demonstrating that differences or changes in policy, which affect alcohol consumption or the context in which it's consumed, are in turn related to corresponding differences or changes in violence. The World Health Organization's reports on violence prevention[4,12,16] state that measures to reduce population alcohol consumption have been proven effective to reduce violence. Increases in violence have been linked with the following policy changes, each of which is expected to increase consumption in all countries regardless of income level: decreased alcohol prices[61,62,63]; extended trading hours (i.e., hours of sale)[64,65]; decreased minimum age to purchase alcohol; and increased alcohol outlet density[66,67,68] including both on- (e.g., taverns, hotels, bars, pubs, and clubs) and off-premise outlets (e.g., retail stores, off sales).[69] Conversely, studies of reduced availability (Kypri et al, 2013) and increased alcohol prices (Stockwell et al, 2015; 2017) have found evidence of reduced rates of violence. Specific policies will be discussed in greater detail in Chapter 4.

2.4 Environmental factors that influence the alcohol-violence causal relationship

Alcohol use does not by itself provide a motive or excuse for violence. However, the evidence reviewed here shows that, largely through its pharmacological properties, alcohol use can increase the likelihood that a person will engage in or be subjected to violence. Alcohol use may increase the risk of violence in situations where there is already the potential for violence. In general, such situations involve conflict between individuals or groups of individuals, the perception of a threat from others to act against individual or group interests, a situation that creates frustration or a desire to dominate or control another person. There are also strong social and cultural factors that affect whether violence will occur in response to conflict, frustration or a threat. In some settings violence is culturally embedded and tolerated or even encouraged (McAndrew and Eggerton; Graham and Homel). The availability of weapons which allow a person to swiftly eliminate a threat, vent frustration or resolve a conflict to their advantage (Monuteaux, M. C. et al. (2015) Firearm Ownership and Violent Crime in the U.S. American Journal of Preventive Medicine , Volume 49 , Issue 2 , 207 – 214) also increase the risk of violent action – whether proactively, pre-emptively or in self-defense.

Studies of public violence in bars illustrate some of these themes. In cities around the world, with Sweden no exception, violent incidents show peaks on Friday and Saturday nights and early into the following mornings. Incidents occurring in or near to bars and clubs increase in likelihood as the night wears on with peaks around closing times when intoxication levels are highest. They will also spill over into the streets and transport systems as people make their way home. Careful observational studies of bars have identified characteristics reliably associated with an increased risk of violence. These include a high ratio of males to females (thought to signify more social and sexual competition), overcrowding, no or poor quality entertainment and poorly trained security staff (Graham and Homel, 2008). While a crowded dance floor, for example, may be perceived as a non-stressful situation, large crowds queuing for access to bars and toilets or restricted traffic flow at exits and entrances may induce feelings of frustration which may trigger aggression (MacIntyre and Homel, 1997). Cheap alcohol and high intoxication levels also significantly add to such risk factors and further increase the likelihood of violent events (Graham and Homel, 2008).



Violent incidents occurring in or near to bars and clubs increase in likelihood as the night wears on with peaks around closing times when intoxication levels are highest.



3 Strategies to Reduce Alcohol-Related Violence: What Works?

There is no single understanding or solution to preventing violence involving alcohol. Prevention therefore must examine the 'system of variables' which increases the risk of alcohol-related violence as a means to select potentially effective strategies.

The World Health Organization's reports on violence prevention (e.g. (WHO, 2014)(WHO, 2006c) state that measures to reduce population alcohol consumption have been proven effective to reduce violence. This includes excise taxes on beer, wine and spirits; reduced hours or days of sale of alcoholic beverages; the minimum age for legal alcohol purchasing; and regulations on the number of alcohol outlets. These have proven effective in reducing levels of violence both in low-to middle-income and high-income countries. The WHO Global Status Report on Violence Prevention 2014 notes that "For decision-makers, acknowledging the importance of implementing policy measures … is an essential prerequisite to achieve societies and communities that are both safe and healthy."(WHO, 2014, p.35). Examples are findings from the United States that a 10% increase in the price of an ounce of pure alcohol would reduce the probability of IPV against women by 5.3%, and a 10% increase in the price of beer would reduce the number of college students involved in violence each year by 4%.

Policies can be implemented alone or in combination. In the former Soviet Union, a 1985 campaign reduced state alcohol production and the number of alcohol outlets, increased alcohol prices and raised the purchase age to 21, banned the use of alcohol in public places and at official functions, and increased enforcement of, and penalties for, the production and sale of home-made alcohol. Violent deaths reduced by 33% in 1985/1986[70,71] and boys born during the campaign period had significant improvements in height, immunization rates and chronic conditions.[72] (Sethi et al., 2013) There is also evidence that stronger policy environments are protective of some types of violence. For example, in the U.S. a 10 percentage point difference in the stringency of the alcohol policy environment as comprised of 29 policies was related to a 9 percent decrease in the odds that a homicide was alcohol-related.

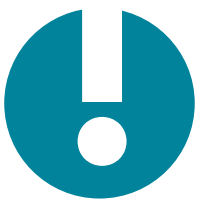
In the following we now proceed to review major policies identified in the research literature with respect to reducing alcohol consumption and excessive drinking generally, and violence in particular.

10%

A 10% increase in the price of beer would reduce the number of college students involved in violence each year by 4%.

3.1 Price and tax

There is an inverse relationship between alcohol taxes (and prices) and alcohol consumption, showing consistent beneficial effects of alcohol taxes and pricing on the sale and consumption of alcohol, including excessive drinking.[73,74] A systematic review found strong evidence that raising alcohol excise taxes is an effective strategy for reducing excessive alcohol consumption and related harms. A 10% increase in alcohol prices is associated with a 3 – 10% reduction in alcohol consumption, and there is good evidence that higher taxes and prices also reduce consumption among heavy drinkers and binge drinkers. With respect to violence-related outcomes, there is robust evidence of protection related to higher taxes and prices. Higher taxes and higher prices are associated with reductions in violent crime, self-reported perpetration of violence against children, rates of STIs, risky sexual behaviors, and criminal and violent behavior. Meta-analyses on a variety of alcohol-related outcomes found a strong inverse relationship between price and violence including sexual assault, child abuse, IPV, violence injury rates and robbery (Wagenaar et al 2009).



Most studies find that in relation to violence there is an association with alcohol outlet density.

There are other policy strategies related to price that are less common, or have been less commonly studied, than tax changes. However, to the extent they can manipulate price their effects should be similar to those of tax. These include wholesale price restrictions (e.g., restrictions on selling below the wholesale price), retail price restrictions (e.g., restrictions on happy hours) and minimum pricing policies. Some of these policies may be especially effective at reducing violence. For example, retail price restrictions would have their impact in on-premise establishments (bars and pubs) where alcohol-related altercations are common. Minimum pricing target those who drink a lot or who may have lower incomes, both of whom may be at greater risk for violence perpetration or victimization. For example, the introduction of minimum pricing in Saskatchewan, Canada increased the minimum price of alcohol by 9% and was associated with an 18% reduction in violent offenses. For British Columbia, minimum pricing increased minimum prices by 10% and was associated with a subsequent decrease of 9% in crimes committed against other persons.

3.2 Density of alcohol outlets

Overall there is consistent evidence that outlet density is significantly related to alcohol use and related harms (Campbell et al 2009). Most studies find that in relation to violence, including homicide, robbery, assault, IPV, sexual assault, and child maltreatment there is an association with alcohol outlet density (Fitterer et al 2015).

A review by Fone et al (2016) concluded that cross-sectional studies largely from the US concur that outlet density is positively associated with alcohol-related harm, particularly violence but that the literature on outlet density using longitudinal designs is less well developed. Gmel et al (2015) found that the literature is mostly dominated by cross-sectional studies. A CDC review concurred but concluded that nevertheless the "regulation of outlet density may be a useful public health tool for the reduction of alcohol consumption and related harms" (Campbell et al 2009 pp556).

The following are examples of longitudinal studies that relate outlet density to violence. Abolishing the alcohol retail monopoly in the US state of Washington 2012 increased the number of stores selling alcohol. An analysis of local areas in Seattle found that for each additional off-premises alcohol outlet in a given census block group increased aggravated assaults by 8% and non-aggravated assaults by 6%. Each on-premise outlet increase aggravated and non-aggravated assaults by 5%.[75]

A time-series analysis of density of restaurants and bars selling alcohol in Norway 1960 - 1995 found a significant relationship between the density and police-reported violent crimes.[76]

Increasing the availability of alcohol can increase consumption levels and related violence. Removal of the government



monopoly on off-licence beer sales in Finland 1968 was associated with a 46% increase in consumption and a corresponding increase in alcohol problems.[77]

A study of alcohol outlet density and domestic violence in Melbourne, Australia from 1996-2005 found a strong association between family violence and the density of off-licence (take-away) liquor outlets in an area. An increase in one off-premise licence per 1,000 residents was associated with a 28.6 % increase in the mean domestic violence rate. A smaller, but still positive association, between the densities of on-premises licenses was also found.[78]

3.3 Alcohol outlet opening (or trading) hours

There is strong and consistent international evidence that changes in trading hours, particularly for on-premises outlets (i.e. bars) influence levels of alcohol-related harms in communities. At least three international reviews concur that reducing trading hours for on-premises licensed venues, even by a few hours, should be considered a key strategy for reducing alcohol-related violence (Stockwell and Chikritzhs, CDC community guide, (Wilkinson, Livingston, & Room, 2016).

Much of the highest quality longitudinal evidence for impacts on violence of both decreases and increases in trading hours was conducted Australia (e.g. Kypri papers; Chikritzhs and Stockwell papers). Another high-quality study of 18 Norwegian cities found that for every one hour increase in on-premises trading hours there was a significant increase of 5 assaults per 100,000 inhabitants per quarter. (Rossow and Norstrom Norway on-premises small changes 2012). Bans on alcohol sales implemented for limited time during certain periods, such as football matches, may also be effective in reducing levels of assaults.[79] Unfortunately, however, the research evidence is less well developed for off-premises alcohol outlets (e.g. liquor stores) and requires further development to support policy change. There are also few studies of trading hour effects specifically on IPV which may be more related to off-premises alcohol purchases than on-premises drinking. [35] [35 – 44].[80]

3.4 Minimum legal drinking age laws

Early age of first alcohol use is related to increased risk of violence. Where laws exist, minimum legal age of alcohol purchase or consumption ranges from 15 (e.g. Slovenia) to 21 (e.g. USA) yet underage sales can be common.[81] Minimum legal drinking age (MLDA) laws reduce consumption and binge drinking among youth, and protect against alcohol-related problems among youth. In addition, MLDA's protective effects are associated with less binge drinking (Plunk et al., 2013) and a lower incidence of alcohol abuse and other drug use disorders (Norberg et al., 2009) in



Early age of first alcohol use is related to increased risk of violence.



Lowering the minimum alcohol purchasing age from 20 to 18 years increased weekend assaults resulting in hospitalization among young males.

adulthood. There is limited direct evidence about the relationship between MDLA laws and violence. In Canada, the MLDA is 18 years of age in Alberta, Manitoba and Québec, and 19 in the rest of the country. Nationally, in comparison to those slightly younger than the MLDA, those just older than the MLDA had sharp increases in both violent and nonviolent crime.[82] Lowering the minimum alcohol purchasing age in New Zealand from 20 to 18 years increased weekend assaults resulting in hospitalization among young males 15 to 19 years of age.[83] Grucza et al studied U.S. data from 1990 – 2004 and found an increased risk of homicide and suicide for adult women who were exposed to a lower MLDA and were legally permitted to drink at younger ages.

3.5 Responsible beverage service and multicomponent community intervention trials

Drinking venues that are poorly managed are associated with higher levels of violence.[84] It is reasonable to assume, therefore, that intervention strategies which seek to improve management and responsible service of alcohol may reduce violence in and around licensed venues. However, in a review of overservice and responsible beverage service (RBS) programs, Brennan et.al. (2011)[85] found mostly null results for consumption outcomes. Nevertheless, there is considerable variation in the focus, quality, training, implementation and enforcement of these programs and it appears that RBS may function best when part of a suit of strategies delivered at a community level (180). At least three large studies have demonstrated that multicomponent programmes combining RBS training with community mobilisation, house policies and stricter enforcement of licensing laws may be effective in reducing assaults, traffic crashes, and underage sales depending on the focus of the intervention.[86]



Of particular interest here, the Swedish STAD project implemented interventions such as RBS training for bar staff, house policies for licensed premises and increased enforcement of alcohol laws. Despite a low response rate (35%) the project resulted in a 29% reduction in violence (181, 182). The estimated cost savings of the system from reduced violence were considerable at € 31.314 million overall including savings to the judicial system, production losses and health care.[87] Following dissemination of the STAD program to 84 Swedish municipalities, a subsequent evaluation found that although few communities implemented all the parts of the program, an average reduction in assaults of 9% was achieved (Trolldal et al., 2013).

A similar programme in Finland (PAKKA) found reductions in alcohol service to 'drunk' actors, largely attributed to increased surveillance and sanctions (183). However, when the SALUTT programme was implemented in Oslo, Norway in an attempt to replicate the STAD program, no change in violence was detectable.[88] This null finding can to a large extent be explained by the failure to achieve any reduction in overserving in Oslo. In the absence of reduced heavy drinking it comes as no surprise that there was no reduction in assaults. A classic US study showed that while RBS may lead to small increases in refusal of service to intoxicated customers, law enforcement strategies can produce substantial reductions in over-service (McKnight and Streff, 1994).

Multicomponent trials may also be effective at reducing violence among young people specifically. In 2007, Swedish police reported

a marked increase in violence and binge drinking related to high school student graduation parties at restaurants. A community intervention project including RBS resulted in a 23% reduction in violence among young people.[89] In Trelleborg, Sweden a community-based intervention aiming to reduce excessive drinking resulted in a reduction of self-reported alcohol-related violence between 1999 and 2003 (OR 0.7, 95% CI 0.43-1.01).[90] Developed by local police, the Kronoberg model to reduce youth alcohol-related violence involved active police monitoring of youth drinking and confiscation of alcohol carried by underaged persons. An evaluation found that violent assaults in the intervention communities were reduced by 17%. (Swedish National Council for Crime Prevention (Brå), report no 2009:5).

Community trials outside of Scandinavia, particularly in the USA and Australia also support the conclusion that multi-component programmes may be an effective strategy for reducing violence (Homel, Carvolth, Hauritz, Mcilwain, & Teague, 2004; Holder et al., 2000).

3.6 Alcohol monopolies

Alcohol monopolies (wholesale, retail, or both) have the ability to concurrently control a range of policy strategies related to price, availability, marketing, adherence to minimum purchase age laws, and days and hours of sale. While the public health effect of a monopoly will depend on the extent to which its broad social purpose is to promote public health or just to raise revenues for government, in most cases state monopolies are associated with reduced alcohol consumption compared with fully privatized systems. A systematic review of 17 studies found that privatization was associated with a 44% increase in consumption of the privatized beverage compared with little change in consumption of non-privatized beverages, and concluded that there is strong evidence that privatization of retail alcohol sales leads to increases in excessive alcohol consumption. There is little direct evidence about the relationship between monopolies and violence. However, in modeling studies Norstrom et al (2010) and Stockwell et al (2017) estimated increases in the numbers of assaults based on proposed changes to eliminate or phase out the existing retail monopoly in Sweden.

3.7 Other potential or emerging strategies

There are a range of other strategies which may be useful for preventing alcohol-related violence but for which evidence is either inconclusive or insufficient, including: i) policies that restrict exposure to alcohol marketing (e.g. point-of-sale promotions and discounting) may decrease the demand for alcohol and reduce health and safety related consequences.(Lippy & DeGue, 2016); Room et al 2003; FARE, 2015); ii) restrictions on alcohol marketing and advertising which promote irresponsible or inappropriate links to alcohol and sexual success or behavior (Lippy & DeGue, 2016); iii) screening and brief intervention for alcohol problems may reduce levels of alcohol consumption and associated problems such as aggression, including IPV (WHO, 2006c[91]; Ward et al 2015); iv) intervention in families affected by alcohol problems or child maltreatment can be encouraged through education campaigns to raise awareness of the association between alcohol and child maltreatment, highlight effective ways to help, and promote services available to affected families.[92] (WHO, 2006a); v) While any direct effects on child maltreatment remain unmeasured, screening for alcohol misuse during pregnancy can reduce drinking levels and consequently risks of FAS or FAE.[93] (WHO, 2006a); vii) a considerable proportion of injuries from fights in bars involve the use of broken bottles or glasses as weapons. It has been recommended that shatterproof or plastic containers are used in late night venues with a high risk for violence (McLean et al, 1997); viii) For young people, opportunistic brief intervention (e.g. emergency departments) including motivational interviewing, skills training, role plays and referrals may decrease levels of aggression and reduce violence in the medium term.[94] WHO, 2015); and ix) Coupon-based alcohol rationing systems may reduce alcohol consumption and domestic disturbances[95] (WHO, 2006d).



There is strong evidence that privatization of retail alcohol sales leads to increases in excessive alcohol consumption.

4 Summary and Recommendations for Sweden

Alcohol makes a substantial contribution to violence in Sweden but its role is often overlooked and, as a consequence, opportunities for violence prevention are not fully realised. Consumption of alcohol on its own is not necessarily a sufficient cause or motivation (or excuse) for violence, however there is strong evidence that alcohol intoxication increases the risk that conflict, frustration or a perceived threat will be acted upon violently. Laboratory experiments in humans and animals support this conclusion. In epidemiological studies, individuals who drink more are more likely to experience violence, and populations who collectively consume more alcohol usually have higher rates of assault. Powerful evidence of alcohol's causal role in violence comes from studies in which rates of violence are reduced when policies are introduced that reduce alcohol use and binge drinking.

Nearly everyone decries violence, at least publicly, and yet the difficulty lies in adopting meaningful interventions to actually reduce it. Ultimately there may be a lack of political will to make change, or a lack of knowledge about how to do so. But the problem of alcohol-related violence remains stubbornly and awfully prevalent worldwide, even in developed countries like Sweden.

When considering interventions, one can try to change people directly, or to manipulate the environment in which they live to alter their behavior or to mitigate social contexts that are high-risk with respect to alcohol-related violence. It is our view, supported by extensive evidence across multiple domains of public health research, that systems approaches targeting environmental change are most likely to be effective for reducing alcohol-related violence.

With respect to alcohol, interventions can focus either on efforts to reduce drinking to the point of impairment (i.e., binge drinking), or on efforts to reduce the likelihood of violence perpetration and/or victimization after an individual is already impaired. In the context of alcohol-related violence, we would liken interventions to reduce binge drinking as primary prevention, and expect that such interventions would have a large impact for the population. While it is tempting to focus on alcohol policies related to sales and consumption in public places or in licensed establishments, it is important to remember that a large fraction of violence is experienced in private locations or public locations far from licensed establishments. In addition, the violence occurring in private locations may be severe, prolonged, repeated, or perpetrated on vulnerable populations such as women and children. Therefore, it is critically important to adopt effective interventions that reduce excessive consumption generally, in addition to those designed to reduce drinking to the point of impairment in bars, clubs and restaurants.

RECOMMENDATIONS

- **Adopt alcohol policy interventions** that have strong evidence of being protective against violence-related outcomes-specifically. These include raising alcohol prices (through taxation, minimum pricing, wholesale price restrictions, and retail price restrictions), limiting alcohol outlet density, limiting hours of sale for alcohol, and adhering to existing minimum purchase age laws or raising the minimum purchase age (e.g., to age 21 for public and private consumption).

- **Maintain and strengthen the Swedish alcohol monopoly.** A recent modeling exercise found that compared with a private system of alcohol sales, maintaining the monopoly results approximately 34% fewer police-reported assaults annually (Stockwell, et al, 2017).

- **The enforcement of policies that prevent illegal alcohol sales**, including alcohol sales to underage persons and alcohol sales to intoxicated persons in bars and restaurants, need to be strengthened in Sweden. In fact, selling to intoxicated persons in bars and restaurants is so common, and so rarely enforced, that many people are unaware that such laws even exist. Part of the solution here is also maintaining the Swedish monopoly, which has an exemplary track record of not selling alcohol to underage or intoxicated persons (Stockwell et al, 2017 sytembolaget).

- **To prevent underage sales,** important policies include (i) compliance checks (attempting purchases with underage or pseudo-underage persons with penalties for offending establishments), and (ii) adoption of house party and social host laws, which make adults who host underage drinking parties criminally liable for providing alcohol to minors other than their children (house party laws) and legally liable for consequences caused by those in attendance.

- **To prevent sales to intoxicated patrons**, important policies include liability laws that allow civil suits to recover financial losses from alcohol-related harms stemming from over-service, mandatory and effective responsible beverage service training, and stronger and more rapidly escalating penalties for over-service, particularly in the form of mandatory license suspensions and license revocation.

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GÖTEBORGS UNIVERSITET

CENTRUM FÖR UTBILDNING OCH FORSKNING KRING RISKBRUK, MISSBRUK OCH BEROENDE (CERA)

Göteborgs universitet
Box 100
405 30 Göteborg
Tel 031-786 00 00

IOGT·NTO

Box 12825
112 97 Stockholm
info@iogt.se
www.iogt.se

Svenska Läkaresällskapet

Box 738
101 35 Stockholm
sls@sls.se
www.sls.se

STIFTELSEN ANSVAR FÖR FRAMTIDEN

Hammarby Fabriksväg 25
120 30 Stockholm
www.ansvarforframtiden.se