

# Challenges in estimating population impacts of alcohol's harm to others

INGEBORG ROSSOW & MATS RAMSTEDT

## ABSTRACT

**BACKGROUND** – There is a renewed interest in alcohol's harm to others (AHTO), and survey studies in the general population are often used to estimate the extent of harm, to address the severity and variety of harms, and to identify the victims of such harm. While cross-sectional survey studies are attractive in several respects, they also entail several methodological challenges. **AIM** – We discuss some of these issues, paying particular attention to the problems of causal attribution, transferability, survey data collection and range of harms. **CONCLUSIONS** – We offer some suggestions for study design to enhance causal inferences from studies examining alcohol's harm to others.

**KEYWORDS** – Alcohol, harm to others, population surveys, causal attribution, study design, data collection

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## Introduction

Alcohol consumption affects the health and social well-being not only of the drinkers themselves, but also of other parties, such as family, neighbourhood and society at large. This fact has long been recognised (Room et al., 2010). Research literature shows that certain types of harm from others' drinking have been analysed more than others. Thus, the literature is fairly extensive with respect to harms to foetus (Henderson, Kesmodel, & Gray, 2007; Riley, Infante, & Warren, 2011); children of heavy drinkers/alcoholics (Johnson & Leff, 1999; Manning, Best, Faulkner, & Titherington, 2009); victims of drunk driving

(Taylor et al., 2010); and alcohol-related violence (McMurran, 2013). However, a range of (likely) harms from others' drinking is less well researched, and the total picture of AHTO is far from accomplished (Laslett et al., 2010; Room et al., 2010).

In recent years, there has been a renewed interest in alcohol's harm to others (AHTO), as can be seen from recently initiated research projects (Laslett et al., 2011; Lund et al., 2015; Ramstedt et al., 2015), international collaboration and thematic research meetings and numerous publications (Rossow, 2015). In particular, cross-sectional survey studies are often

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employed to assess the extent of AHTO, and many of these studies address also the severity and/or variety of harms and/or identify the victims of such harm (Rossow, 2015). Such cross-sectional survey studies are attractive in several respects. For instance, AHTO-related issues may be included among a broader range of topics, and data collection is relatively easy and inexpensive. However, these studies also entail several methodological challenges, which are, indeed, acknowledged in previous overview papers (Room et al., 2010; Rossow, 2015) and primary studies (Callinan & Room, 2014; Casswell, Harding, You, & Huckle, 2011; Connor, Gray, & Kypri, 2010; Connor, You, & Casswell, 2009; Karriker-Jaffe & Greenfield, 2014; Laslett, Ferris, Dietze, & Room, 2012; Mugavin, Livingston, & Laslett, 2014; Rossow & Hauge, 2004). Focusing primarily on survey studies and building on these previous considerations, we will in this paper pursue this topic further. In a previous article, Rossow (2015) discussed a range of problems and challenges in AHTO research, drawing on a sample of 18 primary studies with cross-sectional survey data. Our paper develops further the discussion of problems and challenges in survey research on alcohol's harms to others as presented in the previous article. Added focus will be on the following topics: i) inferences of causality; ii) harms that matter; iii) generalisability/transferability over time and across populations and drinking cultures; and iv) importance of characteristics of survey data collection. Beyond discussing these challenges, we will also offer some thoughts and suggestions for possible ways forward.

## **Inferring causality in studies of alcohol's harms to others**

The term AHTO implies itself a causal association: someone's drinking has led to harm in someone else. While obvious and trivial, the fact that the exposure (someone else's drinking) and the harm occur in different persons/parties inherently poses some difficulties, also in ordinary cross-sectional survey studies. The capacity of such surveys to obtain fairly sound estimates of causal effects of someone else's drinking is, in our view, likely to differ, and depends on several factors, including the type of harm, immediate versus long-term effects of drinking, the relationship between the drinker and the harmed person and who reports the drinking and the harm. Many cross-sectional survey studies on AHTO assess immediate effects of drinking events, such as being insulted or physically hurt, property damage and unwanted sexual advances (Rossow, 2015). We will in the following discussion of causal inferences first pay attention to these types of studies before turning to studies of long-term effects of others' drinking.

In most cross-sectional studies of immediate AHTOs, causal inferences are made simply and directly, either by the respondent or by the investigator/reader. In the first case, the respondents are typically asked whether they have experienced harm (such as being kept awake at night) because of someone else's drinking (Wilkinson & Livingston, 2012). Thus, respondents are asked to evaluate not only whether or not the perpetrator had been drinking, but also to evaluate whether or not the harm could be causally attributed to the perpetrator's drinking. In effect, this implies an ability to evaluate whether or

not the harm would have happened in the absence of drinking (Room et al., 2010). For some types of harm and in certain relationships between victim and offender, it is conceivable that respondents have the capacity for such evaluation. Types of such harm would, for instance, include harmful events that are frequently observed, both in the absence and presence of drinking (e.g. quarrels) and that occur in close long-term relationships between offender and victim (e.g. spouses). This assumption needs, however, to be empirically assessed in further studies. One possible way to do this could be to add qualitative interviews to survey reports of such types of acute harm attributed to the drinking of someone close. This is how Manton and co-workers (2014), for example, validated their survey data, following up survey respondents for clarification of the validity and meanings of survey measures. Notably, such causal attribution is found also in routine register data in health and social services, for instance when foetal alcohol syndrome is diagnosed (i.e. the attribution is built into the diagnostic system) (Room et al., 2010) or when child protection services decide to move children of substance abusers into foster homes (Dore, Doris, & Wright, 1995).

In the second case, when causal inferences are made by the investigator/reader, the respondents are typically asked whether or not they experienced harm (e.g. sexual assault) from someone who had been drinking (Connor et al., 2009) or by someone who was intoxicated (Huhtanen & Tigerstedt, 2012). Here, the respondents evaluate only whether or not the assailant had been drinking (to the point of intoxication). In several contexts and perpetrator–victim relationships, the respondents

are likely well capable of evaluating such exposure (e.g. when both parties had been drinking together). The problem is to assess whether, or to what extent, the experienced harm (e.g. violent injury) was caused by the drinking. It seems likely that some of these events would have occurred also in the absence of drinking, which implies that the observed prevalence exceeds the harm rate attributable to drinking by someone else. Thus, these two approaches – asking respondents to attribute harm to others’ drinking and asking just about the assailant’s drinking – can possibly make an important difference regarding observed prevalence rate and characteristics of harm victims. One possible way to enhance further understanding of whether or to what extent this is the case would be to include both types of questions within the same survey and compare the findings.

In the above-mentioned types of studies, the victim of harm reports both exposure (someone else’s drinking) and the experienced harm, whereas some studies ask respondents to report harms involving someone else (e.g. involvement in quarrels, fights) when under the influence of alcohol (Callinan & Room, 2014; Rossow, 1996). While authors are often careful not to make causal statements from such “alcohol-related” harm, it is important to obtain better assessments of whether, or to what extent, such harm is caused by others’ drinking. A similar approach as suggested above for harms reported by victim may also apply here.

Notably, the AHTOs considered above are typically acute/immediate harms, which may reflect that inferring causality is likely less problematic when exposure and harm are close in time. Assessment of

a causal association, is, however, probably much more complicated when it comes to harms that are not experienced as a direct and immediate consequence of drinking. The impact of long-term exposure to other people's drinking is explored in some survey studies using somewhat different approaches. One is to ask the respondents about the number of heavy drinkers in their current lives (Casswell, You, & Huckle, 2011; Dussaillant & Fernandez, 2015), another is to ask whether the parents had an alcohol problem while growing up (Anda et al., 2002; Dube et al., 2001). The first approach may cover exposure more broadly but may miss important exposure some time back (e.g. heavy-drinking ex-spouse). Irrespective of how long-term exposure is measured, the problem of confounding is significant. While previous studies have to some extent included co-variables in their modelling of such associations, analyses need to be guided by well-founded theoretical models of mechanisms and identification of important confounding factors.

Also long-term sequelae from exposure to others' heavy drinking (e.g. parents or intimate partner) may occur, or become evident, long after the exposure. There are, indeed, also examples of cross-sectional survey studies employing retrospective assessment of exposure to others' drinking (e.g. growing up with parental alcohol abuse) and current mental health problems (Anda et al., 2002; Kessler et al., 2010). These studies demonstrate an elevated risk of mental disorders among respondents reporting parental alcohol/substance abuse during childhood (Anda et al., 2002; Kessler et al., 2010). While the authors of both studies paid careful attention to avoiding any direct causal infer-

ence of the observed association, the latter study implied, arguably, causality by calculating population-attributable fractions (Kessler et al., 2010). However, in most cases, general population surveys with a cross-sectional study design seem to have a limited capacity for obtaining health and social harms that are attributable to others' drinking and especially those of significant importance to overall health and well-being.

### **Harms that matter**

Some harms have more impact than others. The types of harm typically addressed in survey studies of AHTO are also fairly prevalent (i.e. past year prevalence rates typically in the range from 2–3% to 20–30%) (Moan et al., 2015; Mäkelä et al., 1999; Rossow & Hauge, 2004). In most cases, these types of harm are, when they occur as single or infrequent events, likely of little or modest importance for health and social well-being (e.g. been kept awake at night, been insulted, had clothes/belongings destroyed). Even the low-prevalent and more severe types of harm typically addressed in AHTO surveys (e.g. been physically hurt) may not necessarily have important health or social consequences when, for example, medical attention has not been needed or sought and the harm has occurred only once. Correspondingly, highly severe harms with long-lasting effects on the individual and carrying significant costs to society, such as severe physical injuries and severe child abuse and neglect, are less frequently experienced and they are rarely covered in general population surveys. This is not to say that the issue of severity of harms has been neglected in survey studies. Indeed, sever-

al literature reviews and empirical studies have noted the large variability in severity of these harms and have in part offered approaches to address this aspect of harm (Rossow, 2015).

The limited extent to which survey studies have investigated severe and low-prevalent types of AHTO may have several explanations. One is limited statistical power, another is the validity of low-prevalent phenomena in survey studies. Regarding the latter, Skog (1992) has provided good arguments for paying attention not only to the problem of false negatives in self-reports, but also the problem of false positive responses, which may constitute a large fraction (e.g. the majority) of the observations when the “true” prevalence is around 1–2%. This implies that survey data on low-prevalent phenomena are likely much distorted by response errors, which hamper comparability across studies and bias estimates of association.

In some countries, as in the Nordic countries, survey data may be linked to register data, which may cover many low-prevalent outcome measures of interest in AHTO research, including morbidity and crime. One possible way forward is therefore to combine survey data on exposure/drinking behaviour in parents or spouse and register data on outcome in likely affected persons (children, spouse). This kind of study design does not seem to have been applied in previous studies, or at least in studies of parental drinking and possible harms to children (Rossow, Felix, Keating, & McCambridge, 2016), but it is proposed by Lund and co-workers (Lund et al., 2015) in a planned study of a possible impact of parental drinking on low-prevalent harms in children.

Another kind of harm that matters is the accumulation of numerous harmful events, which – each and by themselves – are not necessarily severe, but in sum they may impact substantially on mental health and well-being. Examples of such events are threats and verbal abuse, being ridiculed and breach of confidence and trust. When occurring in close relationships, such as between intimate partners and between parents and young children, such frequent experience of harms may seem inescapable. The burden of accumulated erosion of self-worth, trust and safety is likely chronic. Judging from recent cross-sectional survey studies on AHTO (Rossow, 2015), few general population survey studies have paid attention to this topic. A study by Casswell and co-workers (Casswell, You, et al., 2011) showed a correlation between exposure to heavy drinkers in one’s life and poor health and well-being. If this association to some extent reflects causality, possible underlying mechanisms may include accumulation of numerous minor harms, as described above. One possible way to further investigate this issue is to supplement survey data with qualitative studies, in line with Manton and co-workers (Manton, MacLean, Laslett, & Room, 2014).

### **Transferability of survey findings**

The question as to whether findings from survey studies are comparable over time and across cultures or populations is frequently considered in the discussion of population surveys of less complex nature, and there are some illuminating empirical examples of how comparability may be challenged. For instance, Nordlund (2008) illustrated how the concept

validity of a term may change over time and with changing drinking habits. Nordlund found that Norwegian respondents had changed their perception of the term “alcohol abuse” over several decades, concurrent with a substantial increase in total alcohol consumption. The more people drink, the more liberal views they have on “alcohol abuse”, and this applied both on individual and aggregated levels. In a similar vein, it is quite possible that our perception and tolerance of harms from others’ drinking also change over time.

Based on the total consumption model (Johnstone & Rossow, 2009), we could presuppose that when total consumption increases, so does the number of heavy drinkers and the number of heavy drinking occasions, which both raise the risk of harm from someone else’s drinking. However, during a period of a substantial increase in alcohol consumption in Norway – from 1994 to 2004 when total consumption increased by 32% – surveys from 1994, 1999 and 2004 did not show any clear increasing trend in harms related to others’ drinking, as might have been expected (Rossow, 2007). The prevalence rates of most of the reported types of harm were fairly stable or decreasing over time (Rossow, 2007); the increase in total consumption was not reflected in harm rates. The same types of harm related to others’ drinking were also included in a sum-score index of “nuisance from others’ drinking” used in a comparative analysis of drinking habits and related harms in the Nordic countries (Denmark, Finland, Norway and Sweden) (Mäkelä et al., 1999). The authors found that cross-country variation in this nuisance index did not reflect varied consumption levels. This may suggest that the

conception of AHTO is a relative construct and that tolerance for AHTO increases with an increasingly wet society. We may similarly assume that if perceptions of what qualifies as “harm” or as harm attributable to someone else’s drinking vary with drinking cultures and wetness of the society, estimates of AHTO over time and/or across countries and drinking cultures may not be directly comparable or transferable. This needs to be acknowledged in comparative studies of AHTO across countries and drinking cultures.

### **Importance of survey data collection**

Survey studies have employed various modes of data collection, including face-to-face interviews, postal questionnaires, telephone interviews and internet-based web panels. As questions about experiencing harms from others, particularly when they involve intimate partners or family members, may be sensitive and subject to response bias, it is likely that findings will differ across studies due to differences in the data collection mode. For instance, it seems plausible that response bias is more common when the interview situation is not anonymous, that is, in personal interviews and telephone interviews compared with postal and web surveys.

A recent Swedish study comparing two kinds of telephone interviews with a postal/web questionnaire gave no support to this idea and showed that the mode had a relatively limited impact on self-reported estimates of alcohol’s harm to others. Thus no differences between the various modes of data collection were found in reported harm from drinking of family and friends, whereas estimates of harm from strangers’

drinking were more frequent in telephone surveys than in a postal survey (Forskningscentrum för psykosocialhälsa, 2012). More research is however needed to establish a more comprehensive picture of the implications of using different survey modes in the area of harm to others.

A general observation in survey-based research is the falling response rates in general population surveys over the past two to three decades. It is assumed that non-response in surveys on alcohol and drug-related topics is systematically biased: heavy drinkers and socially marginal groups are more likely to be under-represented, which leads to underestimates of heavy drinking (and total consumption) and of problems typically occurring in marginalised groups. This could imply that AHTO is underestimated when reported by the drinkers themselves. Moreover, some sociodemographic groups are less likely to participate in surveys (such as young adults in telephone or face-to-face interviews and elderly people in web panels) and while weighting procedures are often employed to account for such sample biases, estimates may all the same be biased (Groves, 2006). So far, not many studies have addressed whether or to what extent the non-response rate affects AHTO estimates. However, a recent longitudinal study found that respondents reporting harm from others' drinking at baseline were more likely than others to take part in the follow-up (Sundin, Landberg, Raninen, & Ramstedt, 2015). This may suggest that personal interest in the survey topic may increase the likelihood of survey participation and thereby lead to an upward biased prevalence estimate. Such sampling bias may be more promi-

nent when respondents are recruited from web panels, where personal interests more strongly guide the decision to participate. To explore the extent of this potential problem, questions on AHTO could be imbedded in larger health surveys where alcohol is only one of several topics and then compare the outcome with findings in specific alcohol surveys. Still, we need to consider the trade-offs of taking this broader survey approach versus making more detailed studies of AHTO in stand-alone surveys, which make it possible to ask many more questions.

### **Considering ways forward**

Beyond the suggestions provided above, we will in the following discuss whether there are lessons to be learned from another, related area, namely tobacco smoking. Health harms from others' tobacco smoking (second-hand smoke) have eventually and to some extent been included in the Global Burden of Disease estimates. Notably, the estimated worldwide disease burden from exposure to second-hand smoke (Öberg, Jaakkola, Woodward, Peruga, & Prüss-Ustün, 2011) was based on several delimitations with regard to assessment of exposure and outcomes.

However, there is an important difference between harms from others' smoking and harms from others' drinking regarding underlying mechanisms. While most harms from second-hand smoke are due to the toxic (short-term and long-term) effects of chemical substances that also affect smokers themselves, second-hand harms from drinking are of a different nature in several respects. The harms are caused by the drinker's behaviour (in terms of words, actions, appearance, economic transac-

tions, etc.) and how this behaviour is perceived. Compared to harms from second-hand smoke, the mechanisms underlying AHTO are likely more diverse and, in many cases, also more complex due to social interaction between the drinker and the harmed person. Moreover, whereas the toxic effects of tobacco are fairly universal across population groups and cultures, the impact of other people's excessive drinking may vary substantially with a number of factors, such as relationship with the drinker, individual resources and the norm climate. Thus, the potential for learning from research on second-hand smoke appears to apply mainly to methodological rigour in study design. It seems to offer us less potential for understanding the underlying mechanisms.

Another promising way forward is to extend the use of data from prospective cohort studies, which is the study design in observation studies with the best capacity for causal inferences. A recent scoping review of such cohort studies addressing parental drinking (other than prenatal and alcohol use disorders) and adverse outcome in offspring identified 99 publications from a total of 66 individual cohort studies in 16 countries (Rossow et al., 2016). Only a third of these publications primarily focused on the possible effect of parental drinking on adverse outcomes in offspring, and very few studies addressed

outcomes other than substance use, such as morbidity or psychosocial maladjustment. This may suggest that there is a potential for further utilisation of existing prospective cohort studies to address AHTOs with regard to parental drinking. In a similar vein, prospective studies of family cohorts may provide valuable data sources for examining AHTOs in other types of family dyads, such as spouses and siblings.

### Concluding remarks

While alcohol's harm to others has long been recognised as an important topic, the research field may still be considered as being in its infancy or early childhood. We urgently need good estimates of the extent and severity of AHTOs to obtain better assessments of the overall harm attributable to alcohol (e.g. in the Global Burden of Disease estimates) and to inform policy makers and strengthen their foundation for alcohol policy making.

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**Ingeborg Rossow**, PhD

Norwegian Institute of Public Health

E-mail: [ingeborg.rossow@fhi.no](mailto:ingeborg.rossow@fhi.no)

**Mats Ramstedt**, PhD

Swedish Council for Information on Alcohol and Other Drugs

E-mail: [mats.ramstedt@can.se](mailto:mats.ramstedt@can.se)

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