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EMPTY GLASSES AND BROKEN BONES

Epidemiological studies on alcohol and injuries treated at an emergency department in Switzerland

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EMPTY GLASSES AND BROKEN BONES - Epidemiological studies on alcohol and injuries treated at an emergency department in Switzerland

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ABSTRACT

***Background*:** Injury-related deaths and Disability-Adjusted Life Year (DALY) represent an important share of the burden of disease worldwide. Acute – prior-to-injury – alcohol consumption is a known risk factor for injuries. Traffic- and violence-related injuries have received lots of attention in this regard, and intentional injuries consistently show higher figures for acute consumption compared to other "non-intentional" injuries. In addition, it was recently suggested that usual drinking patterns could play a role in the alcohol and injury phenomenon.

Objectives: The thesis aims to increase knowledge on alcohol use as an injury determinant and gives special attention to alcohol consumption as a *human* factor involved in the *pre-event* and *event* phases of injuries. The association of alcohol consumption with various injury factors is first examined, followed by the estimation of alcohol-related risks and attributable fractions. The validity of the alcohol consumption measurements used within the thesis is finally investigated in order to validate the presented findings.

Material: The thesis is built around five articles (*Articles I* to *V*) analyzing data collected within two different Emergency Department (ED) studies conducted at the Lausanne University Hospital in Switzerland (data collection: 2003-2004 and 2005-2006).

***Results*:** A considerable proportion of ED treated injuries occurred after the patient had been drinking (about 25% in the preceding 6 hours). Acute consumption was found to be associated with some typical injury circumstances (*Article I*) and showed marked variations across time (*Article II*). Specific usual drinking patterns showed similarly associations with certain injury circumstances (*Article I*). When deriving risk estimates for different mechanisms, natures of injury, and body regions, low levels of acute alcohol consumption showed to be a risk factor for almost all considered outcomes (*Articles III & IV*). Persistent dose-response effects between alcohol levels and risk estimates were observed. Whereas risk associations did not vary meaningfully by type of injury (natures and body regions; *Article IV*), they did vary when estimated for different injury mechanisms (interpersonal violence demarked consistently from other mechanisms; *Article III*). Also, it was estimated that 33.1% of interpersonal violence-related injuries, 19.7% of falls, 15.2% of injuries due to exposure to forces and other events, and 15.4% of transportation-related injuries could be attributed to alcohol consumption in the preceding 24-hour period (*Article III*). In addition, most of the total alcohol-attributable fractions for the three "non-intentional" mechanisms were associated with low levels of acute consumption. Finally, corroboration between self-reported and biological measures of acute alcohol consumption is observed in the study population (*Article V*).

***Discussion*:** The results described in the thesis highlight the strong implication of alcohol consumption in injuries treated in emergency departments in Switzerland. By suggesting associations of acute and usual drinking with specific and/or unspecific injury circumstances or characteristics, the findings present an original picture of the alcohol and injury phenomenon. The estimation of alcohol-related injury risks showed that individuals are at higher risk for injury "from the first drink" and that this (relative) risk increases with increasing levels of consumption. The derivation of alcohol-attributable fractions underlined that many injuries would have been avoided if patients had abstained from drinking "in the event".

***Conclusion*:** This thesis suggests that future interventions should not only target patients with at-risk drinking profiles. Since episodes of relatively low levels of alcohol consumption were responsible for the major share of alcohol-attributable injuries, these episodes should be targeted. Consequently, population-based approaches could be appropriate means to significantly reduce the alcohol-related injury burden in Switzerland.

LIST OF PUBLICATIONS

I. KUENDIG H, HASSELBERG M, GMEL G, DAEPPEN J-B, LAFLAMME L. Acute and usual drinking among emergency trauma patients: A study on alcohol consumption and injury patterns. *Injury Prevention*. Accepted for publication.

II. KUENDIG H, LAFLAMME L, GMEL G, DAEPPEN J-B, HASSELBERG M. Time of injury in light of acute and hazardous usual alcohol consumption – A study among emergency department patients. Submitted.

III. KUENDIG H, HASSELBERG M, LAFLAMME L, DAEPPEN J-B, GMEL G. Acute alcohol consumption and injury: Risk associations and attributable fractions for different injury mechanisms. *Journal of Studies on Alcohol and Drugs*. 2008; **69(2):**218-226.

IV. KUENDIG H, HASSELBERG M, LAFLAMME L, DAEPPEN J-B, GMEL G. Alcohol and non lethal injuries: A Swiss emergency department study on the risk relationship between acute alcohol consumption and type of injury. *The Journal of Trauma, Injury, Infection and Critical Care.* 2008; **65:**203-211.

V. GMEL G, KUENDIG H, AUGSBURGER M, SCHREYER N, DAEPPEN J-B. Do objective measures of blood alcohol concentrations make more sense than self-reports in emergency department studies? *Journal of Addiction Medicine.* 2008; **2(2):**96-102.

These articles will be referred in the text by their roman numerals (I-V).

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LIST OF FIGURES AND BOXES

LIST OF ABBREVIATIONS

AAF	Alcohol-Attributable Fraction
AIS	Abbreviated Injury Scale
AUD	Alcohol Use Disorder
BAC	Blood Alcohol Concentration
CF	Case Fraction
CHUV	Lausanne University Hospital
CI	Confidence Interval
DALY	Disability-Adjusted Life Year
ED	Emergency Department
EPBAC	Estimated Peak Blood Alcohol Concentration
FAC	Factorial Analysis of Correspondence
FOPH	Federal Office for Public Health (Switzerland)
HAC	Hierarchical Ascendant Classification
HED	Heavy Episodic Drinking
ICD	International Classification of Disease
ICD-10	International Classification of Disease, 10th Revision
ISS	Injury Severity Score
MVC	Motor Vehicle Crash
OR	Odds Ratio
RR	Relative Risk
SAB	Swiss Alcohol Board
SCI	Spinal Cord Injury
SIPA	Swiss Institute for the Prevention of Alcohol and Drug Problems
SNSF	Swiss National Science Foundation
TBI	Traumatic Brain Injury
WHO	World Health Organization

1 INTRODUCTION

With seasonal variations, long term trends, and socio-economic and geography-specific variations, injuries are characterized by epidemic distributions[1]. Grounded on this thought, research on injury epidemiology began in the 1940s[2]. Since that time, injury prevention and control strategies have been developed and have contributed to a substantial decline in the number of injury deaths[2]. Still, the Global Burden of Disease study reports that, in 2004, injury-related deaths represented 9.8% of the total number of deaths worldwide[3]. Injury-related Disability-Adjusted Life Year (DALY) as for it represented 12.3% of the total DALY. Accordingly, injuries are still a major part of the total burden of disease for our societies.

Alcohol consumption represents itself as a major risk factor for the global burden of disease. According to estimates based on data from 2000, 3.2% of all deaths and 4.0% of all DALYs could be attributed to alcohol worldwide[4]. Even so, these figures consider not only the detrimental effects of alcohol, but also beneficial effects such as in reduced cardiovascular disease. Using only the detrimental figures would thus show larger implications of alcohol in the overall burden of disease. In addition, geographical variations were reported, and European regions were shown to have a high level of alcohol attributable burden compared to the global average[5 6].

In Europe, it has been estimated that 12.2% and 1.4% of all DALYs for men and women, respectively, were attributable to alcohol in 2002[7]; a trend consistent with the fact that women consume less alcohol than men. In Switzerland – the country where the present thesis takes root – the proportions of 12.9% and 4.2% for men and women, respectively, were comparable in 2002 to the proportions for all of Europe[7]. It was also reported that in this country (Switzerland) about 20% of all alcohol-attributable deaths and DALYs encountered by men were related to injuries (unintentional or intentional). At 13%, estimates for women were slightly lower.

These figures highlight the important burden of disease and injury encountered by societies through both the injury and alcohol phenomena. They additionally suggest the coupling of these trends; coupling into the one I invite you to dive into in the following pages. Dive now, drink later…

2 BACKGROUND

Injuries are frequently considered as the sustaining of a physical trauma and are, for this reason, often reduced to the end point of an injury event. They are, in fact, the result of a chain of contributing factors or conditions leading to physical damage of human tissues. Researchers have developed models and knowledge highlighting the complexity of the injury phenomenon[1 2 8-15]. Injuries have hence been thought about as events for which underlying causes have preponderant roles in the etiology. These causes interact, and the interactions result in a transfer of physical energy (mechanical, thermal, electrical, chemical, or radiant). At the end point, and as a result of an energy transfer, the person, or "host" as it can be defined in an epidemiology perspective, is seen as "injured" in the way that, exposed to an energy transfer of an intensity too high for the resistance of some human tissues, he/she encounters damages[2]. Injury is, in this way, a multi-dimensional phenomenon for which agents and factors associated with different dimensions are involved.

2.1 INJURY: CONCEPTS, DIMENSIONS, ATTRIBUTES

As synthesized and described by William Haddon Jr. forty years ago[8], injury events can be considered through two main dimensions: the stages or *phases* of an event and the different *factors* associated with that event[1 14]. The *phases* refer to the process stages associated with an injury, whereas the *factors* refer to the different natures of factors imbedded in the injury[1 2 11 15].

As for diseases, the *phases* concern three different stages of an injury event: *pre-event* (referring to what happened before the injury), *event* (referring to the injury itself), and *post-event* (referring to what happened after the injury occurrence).
The *factors* refer to three different kinds of factors involved in an injury: the *human* (also called *host*; representing the human or individual factors of the event), the *vehicle* (alternatively called *agent* or *vector*; referring to factors imbedded in the energy transfer that result in tissue damages), and the *environment* (referring to the environmental condition in which the event takes place; these factors are sometimes divided into *physical* and *socio-cultural*).

The combination of these two dimensions is known as the so-called Haddon matrix[1], a landmark conceptual framework in injury research (see *Figure 2:1*). Using this matrix, an injury can be broken down into nine "*phase* X *factor*" combinations, each giving possibilities to identify specific contributing causes imbedded in the injury etiology and thus potential specific countermeasures.

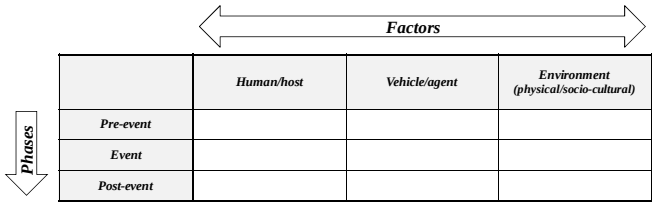

Figure 2:1 Haddon matrix

2.1.1 Injury circumstances and characteristics

Injury studies have considered the causes and context of injury occurrence as well as the characteristics of the sustained injury[16-20].

Causes and context of the injury

The causes and context of an injury concern several attributes describing the injury events. These are likely to be interrelated but are generally not interchangeable. As such, the causes and contexts of injury occurrences are commonly directed toward specific categorizations, as in the "External causes of morbidity and mortality" classification in the International Classification of Disease (ICD), 10th revision, Chapter XX[21]. The main coding scheme of this classification focuses on what is commonly called the *injury mechanism*, and indirectly refers to the *vehicle* or product implied in the energy transfer (as defined above; Section *2.1*) that results in tissue damages (*type of injury*; see below). The coding scheme starts by defining the injury mechanism (e.g. a fall or traffic-related) and further distinguishes, for a specific mechanism, different injury conditions. In the specific case of traffic injuries, the type of transportation vehicle and whether the injured person was the driver or passenger is then recorded. Using an arborescent coding scheme, this classification system permits, for instance, differentiating between specific injury conditions such as intentional (self-harm or assault) and unintentional causes or mechanisms.

Other important contextual attributes of injury events refer to the *activity* in which the injured person was engaging when the injury occurred and the *place of injury occurrence*. Both the *activity at time of injury* and the *place of occurrence* are objects of complementary coding schemes in the ICD-10 classification.

Sustained injury

The *type of injury* generally considers the nature of the sustained trauma and/or the body region injured[22]. The *nature of injury* refers to the type of tissue damage and makes distinctions between injuries of various natures, such as fractures, dislocations, blunt traumas, or penetrating traumas. The *body region* refers simply to the corporal area affected. As for the *injury mechanism*, these two elements of the *type of injury* are commonly considered through standardized categorizations of injuries, such as the ICD-10 sub-classification for "Injury, poisoning and certain other consequences of external causes", Chapter XIX[21].

Injury severity is another attribute of the sustained injury. It is, as the injury type and mechanism are, the object of specific coding schemes such as the Injury Severity Score (ISS), which is an anatomical scoring system that provides severity scores based on the Abbreviated Injury Scale[23 24] (AIS; another classification system for injury type).

2.1.2 Injury and injured patient: Other attributes of interest

In addition to these main injury attributes (*injury mechanism*, *activity*, *place of occurrence*, *nature*, and *body region*), specific research areas have considered very particular contextual factors – i.e. *environment*/*physical* factors – such as visibility[25], weather conditions[26], driving speed[27], and time of injury occurrence[28] in automotive

research. In addition, *vehicle/product*-related risk factors, such as motor vehicle designs or work-site characteristics, have been considered[29 30].

Another group of studies has considered injury determinants such as sex, age, and socio-economical status or related attributes[31-35]. These studies underlined the implication of such factors in injury etiology. In line with this, researchers have investigated the association of injuries with risk-taking behaviors such as impulsive and thrill-seeking behavior, unsafe road behaviors, sport activities, or drinking and drug taking practices[36]. Reviews on this matter support the idea that, in general, such behaviors are associated with increased risk of injuries[37]. At last, among the so-called risk-taking behaviors, alcohol consumption has been considered as a key attribute in many injury studies.

2.1.3 Alcohol consumption as an injury risk factor

Considering the Haddon matrix (*Figure 2:1*), there are three main ways in which alcohol consumption can be related to an injury. Factually, prior-to-injury or "acute" alcohol consumption – see *Box 2:1* for a definition of this terminology – is predominately a *human/host* factor that is potentially involved in all three injury phases of the matrix. In addition, it interacts with factors imbedded in both the *vehicle/agent* and *environment* stratums.

Acute alcohol consumption can be described as a *human* factor active in the *pre-event* phase. Alcohol consumption has been proven to be associated with risk-taking behaviors such as speeding when driving or propensity for aggressive behavior[38-40] and impairs cognitive aptitudes that are relevant for avoiding excessive risk exposure or hazardous situations[41 42] (e.g. cognitive processing or coordination).
Acute consumption also interacts with other factors involved in the *event* phase. The presence of alcohol in the blood impairs psychomotor aptitudes such as reaction time or vigilance[41 42] that, for instance, affect individual capacity to draw back and avoid being a subject to the energy transfer or to lower the impact intensity of it. Alcohol consumption might in addition be associated with non-use of protective devices (that are also potential factors involved in the *event* phase).
The presence of alcohol in the organism is also a *human* factor altering the clinical state of the "host" during the *post-event* phase. For instance, this can be due to the interaction of ethanol with drugs and anesthetic agents used during emergency care, excessive blood loss and exaggerated hypotension associated with vasodilatation, substantial body heat loss, or even to the potential masking of symptoms at the time of diagnosis[43-47].

Acute alcohol consumption also interacts with the *vehicle/agent* and *socio-cultural environment* factors. For instance, in the *pre-event* phase, it interacts with social norms imbedded in the *socio-cultural environment*. As such, drunken comportment has been conceptualized as "time out" behaviors for which a "within limits" clause operates according to a set of norms that can differ from society to society[48 49]. Also, when considering drunk driving behaviors, acute consumption interacts with legal issues[50]. Similarly, acute consumption will interact with a *vehicle/agent* factor in the case of the

presence of an alcolock[51], which is a device preventing a motor vehicle from starting if the driver's blood alcohol concentration (BAC) is higher than the legal limit.

Finally, even if not regarded as closely related to injury, it has been shown that usual alcohol consumption is also a factor or condition involved in the *pre-event* phase. As such, and as documented below (Section *2.2.2*), it appeared recently to interact with acute consumption in triggering injuries[52].

Alcohol consumption: Some definitions

Acute alcohol consumption: the consumption of alcohol "in the event"[53 54]. The word "acute" contrasts in this terminology with "chronic" that, in line with usual alcohol consumption, relates to the repeated intake of alcohol and potential "chronic" adverse consequences such as liver cirrhosis[55]. In line with injuries, acute alcohol consumption concerns "prior-to-injury" alcohol intake.

Usual alcohol consumption: concerns the way individuals consume alcohol over longer time periods. This terminology links with that of "usual drinking patterns". The two main dimensions of "usual alcohol consumption" – the average volume of drinking and the frequency of heavy episodic drinking (HED) – are commonly considered in alcohol research as they are the most important predictors of consequences of drinking[56 57], where volume of drinking is linked to adverse chronic consequences[6] and HED is linked to social and acute consequences such as injuries[6 58].

Hazardous alcohol consumption: pattern of usual alcohol consumption that increases the drinker's and other individuals' risk in regards to harmful consequences[59 60].

Box 2:1 Alcohol consumption: Some definitions

2.2 ALCOHOL AND INJURY: CORE KNOWLEDGE

The association between acute, prior-to-injury, alcohol consumption and injury has been studied for decades, and reviews of this research are available[17 61]. Even if neglected by researchers until recently[61], the investigation of the implication of usual drinking in injuries, and more generally of drinking patterns of injured patients, reveals interesting findings for interventions aimed at lowering the alcohol and injury burden.

2.2.1 Acute alcohol consumption

Studies have underlined the strength and consistency of the risk association between acute alcohol consumption and non-fatal injuries[16 17 61-64]. Acute alcohol consumption is also a documented risk factor of intentional fatal injuries such as suicide and homicide[65-67], and unintentional fatal injuries such as traffic-related death[68 69].

Studies on the association between alcohol and injuries have often focused on motor vehicle crashes (MVC)[63 68 69] or violence-related injuries[70 71], but there are reasons to observe such associations for other injury events. Even low and moderate doses of alcohol in the organism have been demonstrated to significantly impair cognitive and psychomotor aptitudes that are relevant to the risk of injury, such as reaction time, cognitive processing, coordination, and vigilance[41 42]. In addition, as these impairments

increase with an increasing blood alcohol concentration (BAC)[42], dose-response relationships between alcohol intake level and injury risk have been documented[54 62 72].

2.2.2 Usual alcohol consumption

The usual alcohol consumption and drinking patterns – see *Box 2:1* for a definition – of injured people have been studied less often than their acute consumption[61]. Studies have compared injured patients to non-injured patients or to the general population, with the injured groups showing generally a higher prevalence of hazardous drinking compared to the other groups[73 74].

Studies on the effect of usual drinking on injury risk are sparse, but there are indications that, up to a certain level of consumption, the latter (injury risk) increases with mean daily alcohol intake[75]. Also, individuals combining high average volume of consumption and frequent HED (heavy episodic drinking) have been reported to run a higher risk of traffic-related injuries than counterparts without such combination of hazardous drinking patterns[76]. Other studies have derived injury risk estimates for acute consumption with different usual drinking profiles[52 77]. Variations in estimates were observed when considering drinking profiles based on the volume of consumption and the frequency of HED[52], but similar relative risks were reported for patients with and without clinical diagnoses of alcohol use disorders (AUD)[77]. Finally, considering non-differentially the injured and non-injured patients treated in emergency departments, the patients reporting pre-admission alcohol consumption have shown higher proportions of occasional and frequent HED than the patients not reporting such consumption[78].

Alcohol consumption in Switzerland

Per capita consumption: With per capita alcohol consumption of about 9 liters of pure alcohol per year[79], Switzerland shows figure of overall consumption close to the neighboring countries of France (9.3 liters) and Germany (10.2 liters), but higher than that in Sweden (4.9 liters)[80]. National market data also reveal that wine represents 49% of total alcohol consumption (in pure alcohol), beer 32%, spirits 18%, and cider about 1%[79]. It is also estimated that about one third of the total alcohol consumed in Switzerland is consumed by women[81].

Usual alcohol consumption: It is estimated that more than 80% of the Swiss population has low-risk usual "drinking patterns" (abstinence or low volume drinking without heavy episodic drinking; population aged between 15 and 74). About 5% of the population consumes – high – amounts of alcohol putting them at risk for adverse chronic consequences (at-risk volume drinking)[82].

Box 2:2 Alcohol consumption in Switzerland: Main figures

2.2.3 Alcohol and other main injury attributes

Studies and reviews report alcohol involvement in a variety of injury events[16 72 83-95]. Some have been conducted considering injury mechanisms of various kinds[86 96], whereas others have focused on the activity at the time of injury[97-99], the place of occurrence [92 100], or the type of injury sustained[22 91].

Alcohol and mechanisms of injury

Results regarding the association between acute consumption and MVC or violence-related injuries are consistent[53 70 71 89 90 101 102]. However, as risk relationships are frequently not estimated due to the absence of control conditions, much less is known regarding other injury mechanisms (i.e. alcohol relatedness is thus often reported in terms of percentage of alcohol "positive" cases).

Also, comparisons of mechanisms have mainly focused on the differences between intentional and unintentional injuries[70 87 89]. Studies comparing intentional and unintentional injuries consistently report positive associations between acute alcohol consumption and violence-related injuries inflicted by another person, for example from assaults and fights[70 87 89] or self-inflicted, such as suicidal behaviors[53]. In a cross-national meta-analysis of emergency department (ED) studies, relative risks for positive BAC were reported to vary between 2.3 to 18.5 for violence-related injuries[102]. Other studies on intentional injuries similarly underline that risk associations vary greatly for different geographical regions and/or when different control conditions are used[71 89]. For example, when using U.S. data Vinson and colleagues report risk estimates (Odds Ratios; OR) that vary from 10 for case-control analyses to 34 for case-crossover analyses[89], Borges and colleagues report an OR of 34 in a comparable Mexican case-control study[71].

This emphasizes the difficulty in comparing alcohol-relatedness across different mechanisms if estimates come from different populations or if the results are derived using diverse study designs. To our knowledge, two studies investigated different injury mechanisms within the same population[86 96]. The first showed that violence-related injuries (vs. non-violence related ones) and falls (vs. non-falls) had greater associations with acute consumption than other injuries[86]. In contrast, the second study reports that mechanisms are not differentially distributed as a function of quantity of acute consumption[96]. However, no estimates of relative risk (sustaining vs. not sustaining injuries) were reported in this latter study due to the absence of a non-injured control condition.

Alcohol and activity at time of injury

The risk of sustaining an injury is known to vary according to the activity a person is involved in[103] and alcohol implication in injuries according to the activity at the time of event has received some attention. Such studies mainly focused on injuries encountered during recreational activities. With this regard, bicycling[98 104], skiing[97 105-107], snowboarding[108], and aquatic activities[109-111] have received attention. Other studies have focused on occupational activities[112 113] or sport activities in general[114]. Among these "activity" focused studies, few derived injury risk estimates for specific activities

due to, here again, the common absence of control conditions. Strong associations between alcohol exposure and injury, given specific activities, have nonetheless been reported[98 109 114], and variations in the implication of alcohol in injuries across activities are suggested. However, these figures stem from different studies and populations, and conclusive results are thus missing.

Alcohol and place of injury

Whereas alcohol and injury studies generally focus on mechanisms of injury, or occasionally on activities conducted, very few studies have explored the link between acute consumption and the place an injury occurs. A few studies have considered alcohol implications in injuries sustained "at home", but these have generally focused on very particular kinds of events such as violence-related injuries[115] or falls[116]. Only two studies considering simultaneously different locations of injury events could be identified[92 100]. Consistently, these studies report higher prevalence of acute alcohol consumption when injuries are encountered in restaurants or bars (as seen as public places) than when occurring on roads and streets (i.e. mainly road traffic injuries) or at home[92 100]. Events occurring at work and education sites have shown very low alcohol involvement.

Alcohol and time of injury

Another relatively unexplored factor known to be associated with alcohol consumption is the time of injury occurrence. Alcohol consumption is known to peak during evenings and weekends[117 118], and based on aggregated analysis, studies report positive correlations of such peaks with MVC[117], injuries sustained in alcohol-related MVC[119], and death due to alcohol intoxication[120].

The accumulation of alcohol-related fatal and non-fatal injuries during weekends, evenings, and nights were also reported when considering individual level (un-aggregated) data[121-125]. Interpersonal violence-related events also received attention with this regard, and a strong association of alcohol involvement with the time distribution of such events was reported[126]. Although a consistent association was repeatedly reported, there are indications that the strength of this association markedly varies in different populations and settings, as well as across injury circumstances[122].

Alcohol and type of injury

In contrast to studies focusing on causes and context of injury occurrence, fewer efforts have been employed to compare the association of acute alcohol consumption with different types of injury.

The role of acute consumption among trauma patients has been reported for different body regions and a variety of injury natures[127-136]. Marked variations seem to exist in terms of alcohol involvement across types of injury (e.g. a U.S. study showed that 81% of traumatic brain injuries (TBI) and 96% of spinal cord injuries (SCI) were alcohol-related[137]), but due to the common restriction to only one body region or nature of injury (e.g. head injuries only), or because of the lack of control groups, few studies report risk estimates or alcohol-related risk differences between types of injury[22 91 92].

A consistent association between acute alcohol consumption and head injuries (versus other types of injury) was reported in two studies[91 92]; one of which also reported that the risk for head injuries (versus other injuries) increased sharply with increasing BAC[91]. Conversely, the only study to simultaneously investigate both dimensions of

the type of injury (nature of injury and body region injured) found no differences in the relationships between acute consumption and specific outcomes[22]. Regrettably, none of these studies included a non-injured control group to determine injury risks for specific types of injury (versus not sustaining an injury at all).

2.2.4 Alcohol-attributable fractions for injuries

The common lack of risk estimates (sustaining an injury vs. not sustaining an injury) in studies comparing different injury characteristics implies that it is often impossible to derive alcohol-attributable fractions (AAF) across injury circumstances. Attributable fractions represent the proportion of events that can be attributed to the exposure of a specific risk factor[138], or the proportion of injuries that can be attributed to alcohol consumption as in the current case. In contrast to risk estimates, which provide information about risks encountered at an individual level, AAF estimates provide information about the magnitude of the implication of a risk factor in a more general perspective. Attributable fractions thus highlight the relative importance of risk factors at the societal level by estimating the proportion of events that would not have occurred in the absence of exposure to alcohol.

A few studies report AAFs with regard to injuries in general. In the U.S., it was reported that depending on the control condition considered (case-control or case crossover), between 8.6% and 10.6% of emergency department treated injuries could be attributed to alcohol consumption in the six hours preceding the injury event[72 138]. Using measurement of alcohol consumption over a similar time period (6 hours), a Swiss study shows that 17% of injuries sustained by men and 12% of those sustained by women were attributed to alcohol[99]; estimates considering a longer alcohol consumption time-frame (24 hours) and the interactive effect of hazardous drinking patterns were appreciably higher[52]. Considering "6 hours" measures of consumption, a cross-national analysis of emergency department studies – 7 countries, 14 studies – reports injury AAFs fluctuating between less than 1% and 16%, and between 0% and 12% when considering biological measurements[102]. This study[102] additionally reports that AAF for injuries related to violence were markedly higher than for all injuries aggregated (violence-related AAF varied across studies from 14% to 64%, based on self-reports); estimates based on U.S. data concurred with a previous comparable U.S. study on intentional injuries (violence-related injuries' AAFs=43%)[89]. Very few studies report AAFs for other specific injury mechanisms. A Greek study estimated that about 10% of MVC were attributable to alcohol when considering other trauma patients as the control group[139]. With control participants recruited on public roads, a study considering serious car crashes in New Zealand estimated a AAF of about 30%[140]. Finally, some studies have estimated AAFs for different mechanisms of injury using pooled estimate analyses with non-injured cases as the control condition[141 142]. One of these reports AAFs of 26% for road traffic injuries and of 34% for fall-related injuries[141]. Another estimates that 22% of falls among men and 14% among women could be attributed to alcohol when considering people younger than 65[142]. This study estimates that 25% of male driver and motorcyclist hospitalizations (11% of female) were attributable to alcohol.

2.2.5 Emergency Department studies on alcohol and injury

Various designs of study have been considered to collect data and develop epidemiological knowledge on alcohol and injury. Among the most commonly used, Emergency Department (ED) studies compete with prospective and retrospective cohort studies (e.g. register-based studies, secondary analyses of coroner reports or legal responsibility in road traffic accidents). Using a cross-sectional design, ED studies (also sometimes referred to as Emergency Room studies) have frequently been used since the early 1970s to assess the incidence of alcohol in non-fatal injuries. One of the main assets of such studies is, through the implementation of interviews in the emergency department, the opportunity to collect specific data on injury events. For this reason, such studies are a major source of data on various factors involved in the *pre-event*, *event*, and *post-event* phases of injuries[16 17 61]. ED studies give accordingly the researchers the opportunity to investigate a wide range of aspects of injury events.
Also, by collecting the data through direct interviews with injured patients, very detailed information on injury events is collected, which contrast with studies using register-based data that have more restricted data, often collected for administrative purposes only. In addition, researchers have the liberty in ED studies, by designing questionnaires for specific research projects and study settings, to select suitable assessment tools fitting the needs related to the investigation of specific research questions in a given population. In contrast, measurements considered when analyzing register-based data have not often been designed specifically for research on a precise phenomenon and are thus sometimes imprecise and can, in some circumstances, lack reliability. This is especially the case for measures on alcohol consumption, for which "protocols" for data collection can vary within an emergency department (e.g. such measurements are often discretionary and at will of the medical staff in charge[143]). Alternatively, register based studies and data sources stemming from medical monitoring systems might lack data on injury factors which are not "medically-relevant" (i.e. concerning the *pre-event* and *event* phases). However, such studies can be considered as fully representative. This is an obvious advantage over ED studies which generally lack patients with severe injuries due to the impossibility of conducting interviews with them.

ED studies have followed, by convention, cross-sectional designs and standard case-control conditions have been considered to determine the risk relationship between alcohol consumption and injury occurrence (controls selected from the general population, e.g. pair-matched controls, or for practical reasons contacted in a similar setting, e.g. patients visiting the emergency department for medical reasons and accordingly "free" of injury). Each specific control condition represents some pros and cons[144]. For this reason, and since a case can be considered to be the best control condition for itself, a trend in applying the case-crossover design in ED studies has been observed during the last decade. By allowing for different crossover conditions (measure of exposure to a risk/protective factor over a specific time period during which the patient did not encounter an injury), this kind of design however encounters problems due to recall bias; a phenomenon particularly important when assessing alcohol consumption over a long time period or for very specific time-windows[145].

2.2.6 Biological assessment or self-reports of exposure

Research addressing the acute effects of alcohol use – "acute" in contrast to "chronic" effects such as liver cirrhosis, cancers (pharynx, larynx, esophagus, or breast), hypertension, and stroke[55] – has considered two different types of measurement of exposure to alcohol. On the one hand, experimental studies on alcohol-related impairments and a substantial number of epidemiological studies have considered what is designated as biological measures of alcohol exposure. These studies accordingly consider measurements of ethanol presence in the organism based on biological analysis. In this perspective, the measure of blood alcohol concentration through blood sampling and analysis, and the analysis of ethanol concentration in expired air (breath alcohol testing) have often been used. In contrast, a large number of epidemiological studies have considered self-reports of consumption. Both perspectives imply specific strengths and weaknesses.

As such, biological assessments are free of bias due to subjective report or even to potential voluntary denial. However, they have the weakness of measuring the presence of alcohol in the organism at the time of biological sampling rather than at the time of injury occurrence. In particular, such delay in assessment might owe for total alcohol disappearance from the organism in injuries of low to mid-severity, for which patients are often not admitted to emergency departments in the immediate minutes and hours following the injury occurrence. In contrast, self-reported measurements have traditionally been accepted as the standard in ED studies as they permit addressing the actual consumption of alcohol immediately before the injury event, but they are not free from recall and desirability bias[145].

A few studies have compared both types of measurements in emergency department populations[146-152]. The overall validity of self-reports has generally been reported to be high when compared with biological assessments[152]. Studies on specific sub-groups of injuries, for example unintentional injuries[149] and serious traffic injuries[150], underlined – in parallel to the overall validity of these – the potential systematic underreporting of consumption for some sub-groups. A recent study has specifically questioned whether objective measures of BAC should be preferred to self-reports of consumption in ED studies[151]. It concludes on the higher accuracy of self-reported measurements regarding actual use in epidemiological perspectives. Nonetheless, other studies suggest that the validity "level" of such measurements varies across geographical regions[147] – in addition to varying across population sub-groups[149 150].

2.3 STATE OF KNOWLEDGE AND FURTHER NEED FOR EVIDENCE

Research has underlined the consistency of the association of acute alcohol consumption with injury outcomes. In nearly all studies deriving injury risk estimates, any level of alcohol consumption (relative to no consumption) has been associated with a higher risk of injury. Throughout the years, traffic- and violence-related injuries have received most of the attention, but other injury events or characteristics such as the place of occurrence, activity conducted, or type of injury have sometimes been considered. It has consistently been reported that intentional injuries show markedly higher figures for acute consumption than other "unintentional" events. Variations in

the implication of acute consumption according to different activities, place of occurrence, times or type of injury are also suggested, but figures generally stem from different studies and populations, making inferences hazardous. In addition, it was recently observed that usual drinking patterns could play a role in the alcohol and injury phenomenon.

In sum, the link between alcohol consumption and injuries has been studied for many years, but scientific evidence is still missing with regard to some important issues. These are organized for the purpose of this thesis into two main spheres or domains referring to *injury and injured people characteristics* and *injury risks and attributable fractions*. In addition, while self-reported measurements of acute alcohol consumption are commonly used in emergency department studies, whether they are appropriate in any study population is questionable. This represents the third domain of the thesis.

Injury and injured people characteristics

First, even if risk estimates associated with acute alcohol consumption have been derived under various injury circumstances, the relationship between acute consumption, usual drinking patterns, and injuries deserves deeper investigation.

Studies suggest large variations of alcohol involvement for different kind of injury events, but few have looked at implications by considering several attributes (injury mechanism, activity, place, time, type) at the same time and none has, to our knowledge, considered several of these attributes in a single framework. Investigating how alcohol consumption relates with typical injury circumstances should, in this way, focus on giving an innovative picture of the interweaving of these phenomena. Also, the time distribution of alcohol-related injuries has not yet been fully explored, but can be considered of high relevance in the perspective of interventions and case management of injured patients in emergency departments.

Injury risks and attributable fractions

The injury mechanism is often seen as the key attribute of injury events and has received a large focus when addressing the link between alcohol and injury. Still, this attribute deserves a deeper investigation as it has, for instance, been neglected in deriving estimates of alcohol-attributable fractions. Likewise, although several studies have paid attention to alcohol involvement for different types of injury, research has failed to provide consistent information about variation or the absence of variation in implications of acute consumption across injury natures and body regions. The investigation and comparison of alcohol effects on different natures and body regions of injury using a single dataset would ensure the comparability of figures on risk estimates.

Validity of "self-reported" measurements

Finally, self-reports of acute alcohol consumption have been recently investigated in terms of validity and compared to biological measures. Results from these investigations point to their accuracy in epidemiological studies. Whether these results apply to any study population can, however, not be asserted.

2.4 ALCOHOL AND INJURY: THESIS CONCEPTUAL FRAMEWORK

The framework in which the thesis considers the involvement of alcohol consumption in injury events is presented in *Figure 2:2*. Following Haddon's perspective in terms of the *phases* dimension (see Section *2.1*), the analysis conducted within the thesis focuses on the link between acute alcohol consumption, as a *human* factor, and other injury and injured patient characteristics involved in the *pre-event* and *event* phases.

Within this framework, various individuals' attributes – including usual alcohol consumption – are considered as *pre-event* conditions. These form the ground for injury factors (or underlying causes) interacting, with their interaction having the potential to lead to an injury. Acute alcohol consumption is thus considered within this conceptual outline as a *pre-event* factor for which associations to a variety of *pre-event* conditions and *event* characteristic are considered.

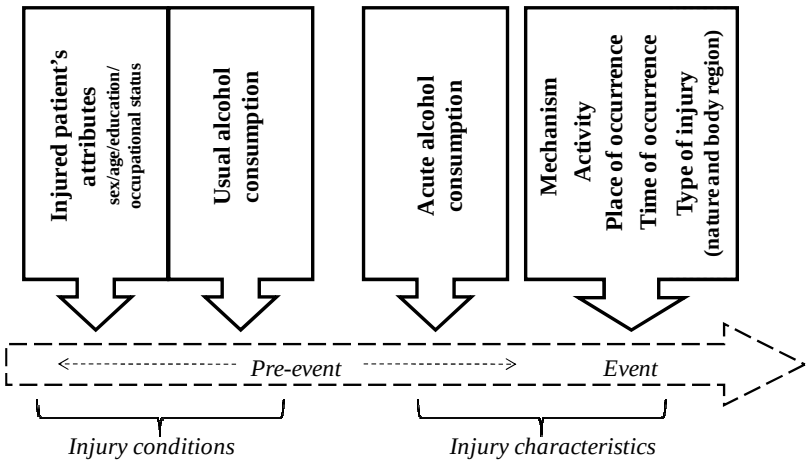

Figure 2:2 Thesis conceptual framework

3 AIMS AND RESEARCH QUESTIONS

3.1 AIMS

The overall aim of this research is to increase knowledge on alcohol use as an injury determinant. Considering the conceptual framework proposed (Section *2.4*), the thesis focuses specifically on acute alcohol consumption as a *human* factor involved in injuries' *pre-event* and *event* phases. It investigates first the association of alcohol consumption with other injury factors. Further, estimates of injury risk and attributable fractions in line with acute alcohol consumption are derived to investigate variations in associations between acute alcohol consumption and various injury mechanisms and types. It finally aims at assessing the validity of self-reported measurements of acute alcohol consumption in the study population in order to validate the findings presented.

The thesis addresses six research questions, structured through three main spheres or domains, using data collected within the Emergency Department of the Lausanne University Hospital in Switzerland.

3.2 RESEARCH QUESTIONS

Injury and injured people characteristics

- How do usual and acute alcohol consumption relate to one another among injured patients treated at a Swiss emergency department? (Article I)
- How do usual and acute alcohol consumption cluster with other injury and injured patient attributes? (Article I)
- Are alcohol-related injuries randomly distributed across time? (Article II)

Injury risks and attributable fractions

- Are there variations in the risk estimates and attributable fractions associated with acute alcohol consumption across injury mechanisms? (Article III)
- Does the risk relationship between acute alcohol consumption and injury vary by type of injury? (Article IV)

Validity of "self-reported" measurements

- Are self-reported measurements of acute alcohol consumption of relevance in emergency department studies on alcohol and injury in the study population? (Article V)

4 MATERIAL AND METHODS

To respond to the six research questions described above, the present thesis is built around five articles as presented in *Figure 4:1*.

The first two articles concentrate on injury and injured people characteristics. The first addresses two research questions and aims to give an overview of the implication of alcohol use in injuries by considering different aspects linked to alcohol consumption and injury and injured patients characteristics (*Article I*). The second article explores the temporal distribution of alcohol-related injuries (*Article II*).

Two other articles address the research questions concerning estimates of risk and attributable fractions. The first focuses on injury circumstances, addressing risk associations between acute consumption and injury mechanisms. It further derives mechanisms specific alcohol-attributable fractions (*Article III*). The second focuses on the sustained injury, or tissue damage, by exploring the risk relationship between acute consumption and the two main dimensions of injury type (natures and body regions of injury; *Article IV*).

Finally, the last article assesses the validity of self-reports of alcohol consumption within the study population by contrasting these self-reports with adjusted biological assessment of blood alcohol concentration (*Article V*).

These five articles are based on data collected within two different Emergency Department studies conducted in the same setting, i.e. in the Emergency Department of the Lausanne University Hospital (CHUV; in French, Centre Hospitalier Universitaire Vaudois) in Lausanne, Switzerland.

Figure 4:1 gives an overview of the context of the research. A description of the study setting, study population, and two specific data sources is given in the first part of the present chapter (*4.1*). Ethical considerations in line with the collection of data within an emergency care setting are discussed in Section *4.2*. Methodological considerations in line with the measurements used, the precision of the data, and its treatment are given in Section *4.3*. Descriptions of each of the five articles, and the adjustment strategies adopted, are given in the final part of this chapter (*4.4*).

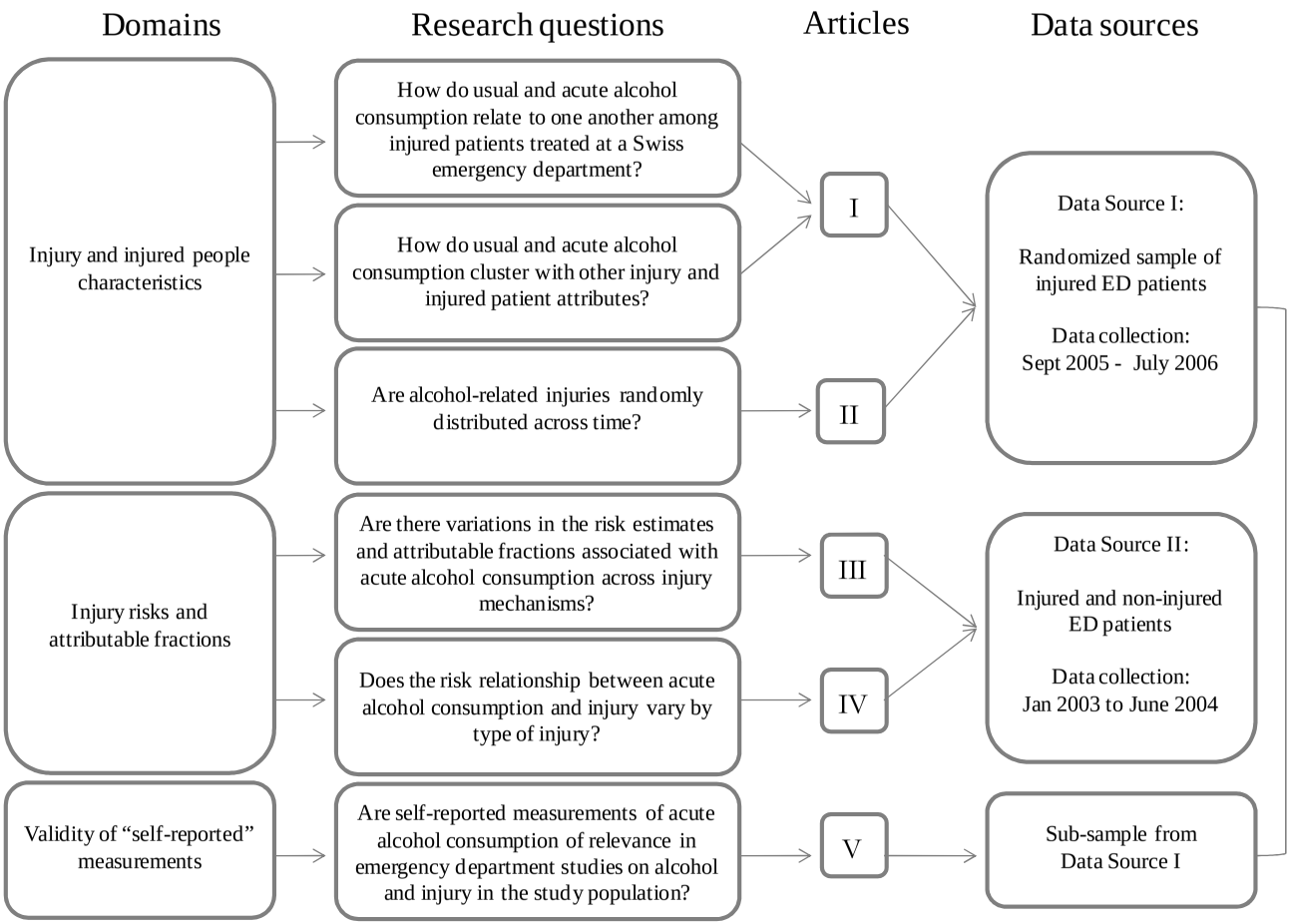

Figure 4:1 Overview of the research questions and overall research framework

4.1 STUDY SETTING AND DATA SOURCES

Study setting: Lausanne, Switzerland

Each of the five articles of the thesis analyzes data collected in the emergency department of the Lausanne University Hospital (CHUV) in Switzerland. The city of Lausanne is located approximately in the center of the French-speaking area of the country. The population of the Lausanne agglomeration (more than 300,000 inhabitants) lives in an urbanized environment and works mainly in the secondary and tertiary sectors, i.e. small or medium-size firms involved in the transformation of raw material, services like shops, public services, banks, insurances, and international companies.

The CHUV is the only public hospital in the Lausanne area and is thus expected to process the majority of injured patients. Alternative trauma care consists of private medical practices (independent medical doctors) and medical day care centers. Both of these alternatives are usually visited for medical reasons rather than trauma due to lacking infrastructures. Accordingly, all of the severe injuries and most of the less severe ones occurring in the area are expected to be diagnosed and/or treated at the Emergency Department of the CHUV. More generally speaking, due to its central position in the French-speaking region of the country, the Lausanne University Hospital is one of the main medical centers of the country. The CHUV services are supplemented by hospitals located all around the French-speaking region, which collaborate with it in relation to specific and specialized care. For this reason, most severely injured people, for example those needing transportation by helicopter, are transferred directly to the CHUV.

Switzerland in brief

Switzerland is situated in the central Alpine region of Europe and covers an area of 41,300 square kilometers (more than ten times smaller than Sweden) and had a population of about 7,600,000 inhabitants in 2007 (vs. 9,100,000 for Sweden)[153].

German, French, Italian, and Romansh are the four official languages of the country known for its neutrality, mountains, and watches. The French-speaking population represents about 25% of the Swiss population. A description of the key figures of alcohol consumption in Switzerland can be found in *Box 2:2*.

Other key-indicators[154]: Gross Domestic Product = 415.5 (billions US$, in 2007); Gross National Income per capita = 59,880 (US$, in 2007); Life expectancy at birth, total = 82 (years, in 2006).

Box 4:1 Key facts about Switzerland

Data Source I: Emergency Department case-crossover study

The data considered in *Articles I*, *II*, and *V* stems from a project entitled "Cannabis and traffic injury: A case-crossover study". As suggested by the original title of the project, data were gathered in the context of a case-crossover study aimed at investigating injuries with a special focus on alcohol and cannabis use[155]. A randomized sample of 488 injured patients was interviewed over five one-month periods from September 2005 to July 2006. Sample selection was based on a total of 270 randomly chosen four

hour time slots spread over every day of the week (7/7) and all hours of the day (24/24). Criteria for inclusion were to being sixteen years or older (legal age for buying fermented alcoholic beverages such as beer or wine in Switzerland), having a sufficient understanding of the French language (interviews were only conducted in this language), having arrived at the emergency department within 24 hours of the occurrence of injury (to avoid recall bias, see Section *6.2.1* with regard to such bias in self-reports of alcohol consumption), and not being admitted for follow-up care. In addition to these formal inclusion criteria, additional "temporary exclusion" criteria were applied, relating to temporary incapacity to give informed consent. Details on this procedure are given below (Section *4.2*).

The questionnaire used to gather information followed the protocol developed by the WHO Collaborative Study Group on Alcohol and Injuries[156], but was adapted for the study population and aims. The questionnaire (in French) can be found in the appendix.

The interviews were face-to-face and computer-assisted, conducted by medical students specifically trained for interviews in the ED. The length of the interviews varied from 5 to 25 minutes (e.g. someone without acute alcohol consumption and who did abstain from alcohol in the last 12 months had a notably reduced number of questions to answer). Once the core questions on injury circumstances, alcohol and other substance use, and socio-economic and demographic conditions were answered, participants were asked to participate in – if eligible – additional biological assessments of alcohol and substance use. The condition for this request was that the patient attended the emergency department in the 6 hours following the injury occurrence. The blood alcohol concentration of consenting patients was then estimated using a breath alcohol analyzer and/or analysis of blood sampling (patients additionally consenting for it).

Data Source II: Emergency Department case-control study

The data considered in *Articles III* and *IV* stem from the "Alcohol-related risks and attributable fractions for different injury types: An emergency room study in Lausanne", a secondary analysis of anonymized data collected within the "Brief intervention to at risk drinkers after injury-related emergency department admittance" project[157]. This study originally aimed to test the effectiveness of brief interventions for heavy drinkers among injured patients. Data were collected through face-to-face interviews between January 2003 and June 2004. Sampling took place every day of the week, and patients admitted to the emergency department between 11:00 am and 11:00 pm were screened for participation. According to administrative statistics, emergency department admission was low between 11:00 pm and 11:00 am, and carrying out interviews during this time period would not have been cost-efficient. It is estimated that about 25% of potential participants were lost because of this time restriction. In total, 5,121 trauma patients and 3,688 non-trauma patients aged 18 years and older were screened and included in the original survey. Interviews were conducted by trained psychologists who afterward conducted, with patients included in the intervention group of the original project, the brief alcohol interventions[157]. Non-trauma patients were considered as quasi-controls for injured patients and detailed data on injury characteristics and acute alcohol consumption were retrieved during a second stage in 2006 (see Sections *4.3* and *6.2.3*).

4.2 ETHICAL CONSIDERATIONS

Gathering data in emergency care settings implies study protocols designed for very specific and demanding conditions of data collection. People visiting an emergency department are often facing distress and demanding life circumstances. Ethical considerations appearing in such research settings are of primary importance. Both data collection processes received ethical clearances from the Ethics Committee for Clinical Research of the Lausanne University Medical School. Factually, in both studies, the "sine qua non" condition for the presence of interviewers in the emergency department was the solely priority of care over the study demands. In this way, interviewers had to minimize their interference with the care of patients and follow any demands by medical staff with this regard. Also, the ins and outs of the research projects were presented in detail to the participants who could freely decide whether to participate. Consent was requested, which resulted for instance, in the case of *Data Source I*, in the collection of triple written consent for patients willing to participate in interviews, breath alcohol testing, and blood sampling.

In the case of *Data Source I*, temporary exclusion criteria were applied to patients for whom the validity of informed consent could be questioned. As such, patients confused or intoxicated were considered as temporarily ineligible based on both observational evaluations (by the interviewer and medical staff) and screening test included in the questionnaire (an adaptation of the Mini Mental State Examination[158]). Patients considered as unable to give informed consent were contacted for participation later on.

4.3 METHODOLOGICAL CONSIDERATIONS

The validity of the general findings as extracted from *Articles I* to *IV* depends on the quality and validity of the data concerning injury circumstances and characteristics, as well as on the validity of self-reported measures of acute alcohol consumption, i.e. the main measure of exposure considered throughout this thesis. Hence, before presenting the results and main findings, a detailed presentation of the alcohol measurement tools applied within the two original studies must be given (headings "*Alcohol exposure: Measurement tools"*). Such a presentation is also of prime importance in the perspective of *Article V* since this article compares "self-reported" and biological measurements. The types of measurements, as well as the standardization and process used to study their concordance in *Article V* are thus presented in detail (headings "*Self-reports and biological assessments: Data treatment"*). Information on data treatment of the outcomes on which *Articles III* and *IV* focus is also given (headings "*Mechanisms and types of injury as outcomes of interest"*).

Alcohol exposure: Measurement tools

Within this thesis, two self-reported measurement tools are considered to assess acute alcohol consumption.

The first ED study (*Data Source I*) recorded acute alcohol consumption over the 6 hours preceding the injury event, using a very detailed beverage-specific type battery of questions (see questionnaire in the Appendix). The consumption of beer, wine,

champagne, aperitifs, spirits, alcopops (pre-mixed drinks of spirits with lemonade such as a Bacardi Breezer or Smirnoff Ice, which contains pure alcohol comparable to a small can of beer), and mixed drinks such as cocktails were recorded considering different container sizes. This type of measurement tool has been repeatedly used in recent ED studies and is part of the standard questionnaire developed by the WHO Collaborative Study Group on Alcohol and Injuries[156].

By contrast, the second study (*Data Source II*) used a recall diary type method and assessed, starting from the time of interview and using time slots of two hours, the patient's alcohol consumption in the 24 hours preceding the interview. Participants then had the possibility to describe their consumption of different alcoholic beverages and the size of the containers; this information was used to record their consumption in standard units of alcohol (each containing approximately 10 to 12 grams of pure alcohol).

Apart of the general acceptance of such self-reported assessments in ED studies, the measurement tool used for data collection in the second study (*Data Source II*; *Articles III* and *IV*) lead to some constraints that should be mentioned here. In *Article III*, due to the original measurement based on the 24 hours preceding the interview, the time frames used (consumption in the 6 and 24 hours prior to injury) are not covered for all cases included in the original survey. This results in the exclusion of cases without full coverage of one or both of the two time windows selected. In addition, as in the first phase of the study only the overall – and not the time period-specific – alcohol consumption was recorded in the database, *Article IV* analysis was conducted on acute alcohol consumption in the 24 hours preceding the emergency department visit. Detailed consumption was retrieved from questionnaires in a second phase in 2006. Accordingly, consumption occurring between the injury and admission might have been included in the total amount consumed, and would thus overestimate the consumption "before injury".
The single use of the 24 hour time frame has the additional weakness of not distinguishing between patients with high blood alcohol levels due to short periods of consumption and patients with regular consumption over the previous 24 hours. The effects of actual heavy alcohol levels are thus potentially confounded with the effect of an alcohol hangover or relatively low peak blood levels due to multiple drinking periods (e.g. with meals over the day). However, it can be mentioned that the use of the 24-hour time frame has been reported to be conservative in estimations of alcohol-related risk[54].

Self-reports and biological assessments: Data treatment
Data Source I contains information on the time of injury occurrence and other elements relevant for the standardization of self-reports and biological assessment in the perspective of their comparison. Information on the timing of alcohol consumption, such as when consumption began and ended, as well as the duration and quantity consumed between injury occurrence and emergency admission, were recorded. Together with the time of the interview, the time of blood sampling (if any), and the time of the breath sample (if any), this information made it possible to derive time intervals (and post-injury alcohol consumption) measures that were used to

standardized injured patients' self-reported acute consumption and biological measures of BAC for comparability purposes.

Objective BAC measures - For 272 patients, an objective BAC measure was available (from either breath tests or blood sampling). As more participants gave consent for breath tests (n=258) than for blood sampling (n=116), and due to a high correlation between both types of measurements, the BAC from breath tests were privileged. BAC values stemming from blood sampling were used for participants who did not take a breath test but did provide a blood sample (n=14).

Self-reported alcohol consumption – Alcohol consumption in the six hours before injury was measured in drinks of different container sizes for seven types of alcoholic beverages (as mentioned above). Total alcohol intake was summed across beverages after conversions into grams of pure alcohol based on official conversion rates of the Swiss Alcohol Board (SAB). Patients were also asked whether (and how much) they drank alcohol between injury occurrence and admission, this intake being taken into account in the comparisons of estimated peak BAC (EPBAC) derived from self-reports and objective BAC measures.

Calculations for estimated peak BAC (EPBAC) from self-reports - BACs from self-reports are calculated by means of the Widmark formula[159], which derives the blood alcohol concentration per mille by taking into account alcohol intake (in grams), and the weight of a person (in kg). It additionally applies a factor of "reduced body mass" representing the proportion of the body mass available for the distribution of alcohol that accounts, for instance, for differences in body water among men and women. Also taken into account in the computation is the alcohol disappearance associated with the metabolic process. Even if known to differ individually[160], the disappearance rate is commonly assumed to vary between 0.01 and 0.02 percent per hour[161]. An accepted midpoint of 0.015 percent per hour was accordingly applied in the calculations[162].

Mechanisms and types of injury as outcomes of interest

Articles III and *IV* consider acute alcohol consumption as exposure for which effects on two important injury attributes are assessed. *Article III* focuses on injury mechanisms whereas *Article IV* considers two separate dimensions of injury type (nature of injury and body region). In both articles, analyses are based on data referenced after medical assessment (final diagnosis) and recorded following the schemes of the ICD-10 classification[21].

Article III accordingly considers codes and categorizations stemming from the classifications for "External causes of morbidity and mortality", i.e. Chapter XX of the ICD-10 classification. As original codes are much too detailed, grouping was considered to ensure analyzing a sufficient number of cases in each category. This resulted in the creation of four general categories of mechanisms of injury that were defined as follows: a) transportation-related injuries (ICD-10 codes V01-V99); b) falls (W00-W19); c) exposure to forces and other events (e.g., striking against or being struck by objects, or contact with machinery [W20-W99; X00-X59; Y10-Y98]); and d) interpersonal violence (i.e., assaults or injuries inflicted by another person with intent to injure [X85-X99; Y00-Y09]). Accordingly, codes related to intentional self-harm (X60-

X84) were set apart and excluded from the analyses due to the relatively small size of this group of injuries and the radically different etiology of these when compared to other intentional events.

In *Article IV*, data on the type of injury was considered based on the coding schemes of the ICD-10 classification on "Injury, poisoning and certain other consequences of external causes" (chapter XIX). When medical diagnoses revealed multiple injuries, ICD codes for multiple injuries were used when available. In other cases, the most severe injury was recorded. Coded schemes for the type of injury are extremely detailed, and sub-categorizations based on the original directory structure were carried out. This resulted in the grouping of the injuries into 6 categories for the nature of sustained injury and into 11 categories for the body region injured.

The six categories representing the nature of injury were defined as follows: Superficial injury (S codes ending by 0 and T00 and T11.0); Open wound (S codes ending by 1 and T01 and T11.1, T13.1, and T14.1); Fracture (S codes ending by 2 and T02, T08, T10, T12, and T14.2); Dislocation-sprain and strain (S codes ending by 3 and T03 and T11.2, and T13.2); Injury of muscle and tendon (S codes ending by 6 – excepted S06 and S36 – and T11.5 and T13.5); and Infrequent and other injuries (All other ICD codes).
The body region injured was considered through the following categories (11): Head (S00-S09); Neck (S10-S19); Thorax (S20-S29); Abdomen-lower back-lumbar spine and pelvis (S30-S39); Shoulder and upper arm (S40-S49); Elbow and forearm (S50-S59); Wrist and hand (S60-S69); Hip and thigh (S70-S79); Knee and lower leg (S80-S89); Ankle and foot (S90-S99); and Unspecified body parts (T00-T99).

4.4 DATA ANALYSIS

As presented in *Figure 4:1*, the six research questions of the thesis are investigated in five articles. The articles' specific data treatments and analytical frameworks are described here.

4.4.1 Article I – Injury Patterns

Article I addresses the two first research questions. It examines how usual and acute alcohol consumptions are related and explores the way in which these two dimensions of alcohol consumption cluster with other injury event characteristics (see *Figure 4:2*). This is done by deriving typical injury circumstances based on alcohol consumption, injured patients attributes, and injury characteristics using data drawn from the "Cannabis and traffic injury: a case-crossover study" (see above *Data Source I*).

The association between usual and acute alcohol consumption is examined using a chi-squared ($\chi 2$) test for independence. Usual alcohol consumption considers both the volume of drinking (assessed by a quantity-frequency instrument) and the frequency of HED (consumption of five or more standard drinks for men, and of four or more for women, on a single occasion) in the last 12 months. Acute alcohol consumption is

defined, based on patients' self-reports, as the consumption of any amount of alcohol in the six hours preceding the injury.

The way alcohol consumption fits with injury circumstances is investigated through a cluster analysis called Hierarchical Ascendant Classification[163-165] (HAC). This statistical approach, which is most suitable for the treatment of categorical data, divides the injuries into classes so that every event belongs to one and only one class. By minimizing intra-class variance (compactedness) and maximizing inter-class variance (separateness), the criterion used to classify the cases (and classes) is ascending order according to their proximity. The HAC is here applied after a Factorial Analysis of Correspondence[164 165] (FAC).

Besides a drinking type variable combining acute and usual alcohol consumption, categorical variables regarding six injury characteristics (activity and place of occurrence, mechanism of injury, nature of injury, involvement of other persons, day of the week and time of day) and four individual attributes (sex, age, educational achievement, and occupational status) are considered.

This is performed using the SPAD software package, version 6.5[166] on the first six factors of the initial FAC – representing cumulatively 30.3% of the variance of the core data (11 variables; 49 categories; 486 individuals).

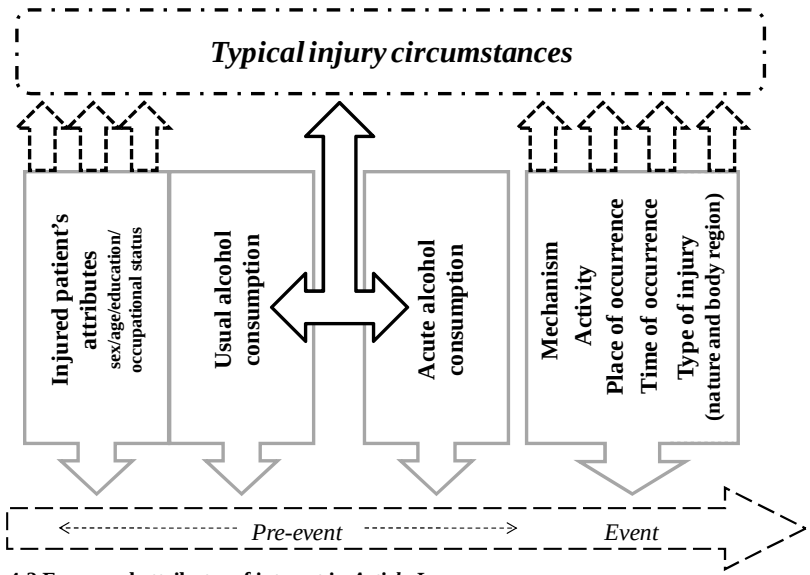

Figure 4:2 Focus and attributes of interest in *Article I*

4.4.2 Article II – Time of Injury

Article II addresses the temporal distribution of alcohol related injuries both in terms of correlates with acute alcohol consumption and of hazardous usual drinking patterns. This is done using data from the "Cannabis and traffic injury: a case-crossover study" (*Data Source I*).

The timing of injury occurrence is considered through two temporal sub-dimensions: the day of the week and the time of day. Acute alcohol consumption is based on the self-report of any alcohol consumption in the six hours preceding the injury. Hazardous usual alcohol consumption is considered through both risky volumes of usual consumption – defined as a daily consumption of more than one/two standard drink(s) for women/men – and frequent episodes of HED – defined as the monthly consumption of four or more/five or more standard drinks (women/men) on one single occasion.

Assessment of the association between time of injury and these three alcohol-related measures is based on multivariate analysis (binary logistic regressions). Acute consumption (yes=1, no=0), risky volume of consumption (yes=1, no=0), and frequent HED (yes=1, no=0) are regressed on time of day and day of week (both categorical), adjusted for participants' sex and age. Interaction effects between time and day are examined in additional models to assess for effect modifications. These analyses were conducted using the software program SPSS 15.0.1[167] and Wald tests and odd ratios (with 95% confidence intervals, CI) are reported.

4.4.3 Article III – Mechanisms of Injury

Article III – see *Figure 4:3* – assesses the strength of the risk association between acute alcohol consumption and injury, considering on the one hand different injury mechanisms and, on the other hand, different levels of alcohol consumption (acute). Based on these risk estimates, it derives for each mechanism the proportion of injuries that is attributable to acute alcohol consumption (Alcohol-Attributable Fractions; AAF).

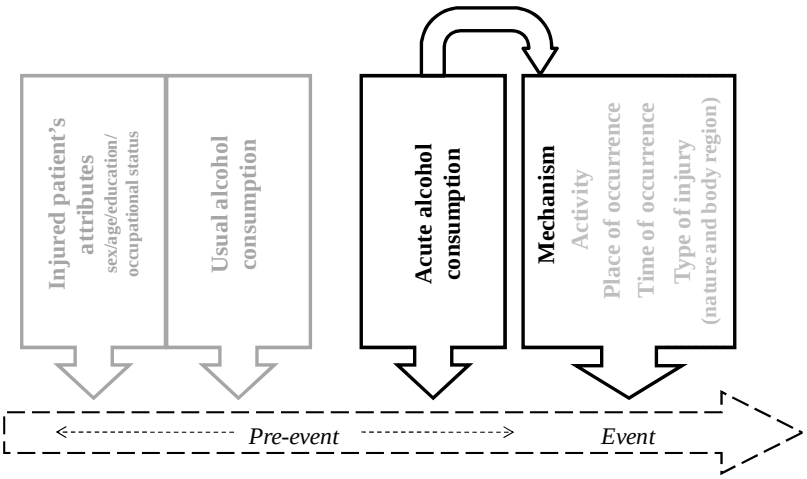

Figure 4:3 Focus and attributes of interest in *Article III*

Data considered stems from the "Alcohol-related risks and attributable fractions for different injury types – an emergency room study in Lausanne" (*Data Source II*) in which exposure to alcohol before injury event was measured by a self-reported beverage-specific diary-type questionnaire. The original questionnaire asked about alcohol consumption in the 24 hours before admission. This information, with the time of injury, was used to determine alcohol consumption before injury. Acute consumption was derived for 6 and 24 hours preceding injury. Amounts consumed within these time-frames are split into four levels of consumption: no consumption; low consumption (one unit or less of alcohol for women or two units or less for men); medium consumption (more than one but fewer than four units for women or more than two units but fewer than five for men); and high consumption (four or more units for women and five or more units for men).

Risk relationships between acute alcohol consumption and the different mechanisms of injury are estimated using multinomial logistic regression models with non-injured cases as quasi-controls. The four injury mechanisms categories considered are transportation-related, falls, exposure to forces and other events, and interpersonal violence (precisions on the categorization can be found above, Section *4.3*). These estimates were adjusted for sex, age, day of the week, and usual drinking patterns (defined by volume of drinking and HED, see Section *4.4.6*).

Alcohol attributable fractions (AAFs) for different mechanisms of injury are calculated according to a standard formula based on the distribution of exposure in cases[168 169]:

$$AAF_p = \sum CF_e \times (RR_e - 1) / RR_e$$

where AAF_p is the total AAF for mechanism p, CF_e is the proportion of cases exposed to the e risk group (the level-of-consumption group) for the specific mechanism, and RR_e is the relative risk of the exposure group (approximated, with "non acute drinkers" as the reference group). Each term of the equation represents the AAF of one of the exposure groups; the sum in the equation gives the total AAF.

The analyses are run on the data of 3,592 (6 hour) and 3,538 (24 hour) patients with trauma diagnoses, and 3,489 non-injured patients (quasi-controls) using the SPSS 15.0.1 software[167 170].

4.4.4 Article IV – Types of Injury

Article IV assesses the magnitude of alcohol effects on the type of injury. It studies the association of different levels of consumption with various natures of injury and body regions injured using data from *Data Source II* (see *Figure 4:4*).

Exposure to alcohol was considered as the consumption in the 24 hours before attendance (see Section *4.3*, headings "*Alcohol exposure: measurement tool*"). Here again four levels of acute alcohol consumption are considered (same categories and levels as in *Article III*).

Risk relationships between acute alcohol consumption and categorical injury-related outcomes – 6 categories for the nature of injury and 11 for the body region that is injured; see Section *4.3* – are estimated using multinomial regression models with non-injured cases as quasi-control condition. Analyses were run using the statistical software package SPSS 14.0.2[170] [171] and adjusted for sex, age and usual drinking pattern (see Section *4.4.6*).

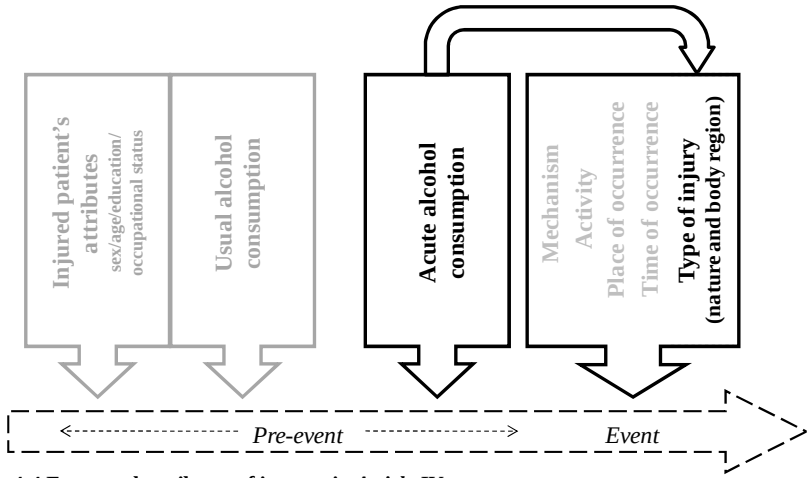

Figure 4:4 Focus and attributes of interest in *Article IV*

4.4.5 Article V – Validity

Article V explores the reliability of self-reported measures of acute alcohol consumption in our study population. This is done, using data from the "Cannabis and traffic injury: a case-crossover study" (see above *Data Source I*), by comparing the reports of the interviewed patients to their BAC as derived by biological assessments.

Among the 488 injured patients interviewed for this study, those stating that the injury occurred less than six hours before their admission (n=359) were approached for biological assessment. Of these, 272 agreed to take a breath and/or a blood test (75.8%).

Self-reported derived BAC measures are compared to objective BAC measures; the former being calculated by means of the Widmark formula[159], a "gold standard" that has been used for this purpose since the 1930s (for more details, see Section *4.3*).

The increase in blood alcohol concentration following consumption after injury occurrence was taken into account for comparisons between the estimated peak BAC (EPBAC) from reported consumption and objective BAC measures. Ethanol disappearance due to the time elapsed between a) the beginning and the end of the consumption episode; b) between the end of the consumption and the injury occurrence; and c) between injury occurrence and biological assessment were considered for adjustment during the comparison.

A first comparison of objective and self-reported (derived) BAC measures focuses on binary status (positive or null BAC level) and inconsistencies are tested by McNemar's chi-square test. After this, multiple regressions are used to predict the estimated peak BAC for individuals with objective BAC values greater than 0. This model includes the different disappearance rates factors (to adjust for the different time intervals presented above). Finally, the ethanol disappearance rates of patients with reported alcohol consumption but null objective BACs are calculated to examine whether these rates could explain the apparent inconsistencies between objective and self-reported measures.

4.4.6 Potential confounding effects and adjustments

Studies have underlined that factors such as sex, age, and usual drinking patterns have the potential to confound or modify the effect of acute alcohol consumption as predictors of injury risk[54 135 172]. The regression models estimated when deriving injury risks estimates (*Articles III* and *IV*) were accordingly adjusted for these potential confounding factors.

In *Articles III*, risk relationships between acute alcohol consumption and the different mechanisms of injury are also estimated and adjusted by the day of the week. Usual drinking patterns are considered through both the intake of alcohol (volume of drinking) and HED. These are considered once they are combined in a single variable ensuring to control for both main and interactive effects as evidence suggests that the two interact[52 173] and independently predict the negative consequences of drinking[56 57]. In *Articles III*, logistic regressions models were additionally estimated separately for each outcome to determine whether interaction effects between acute consumption and usual drinking patterns could be observed. None of the eight estimated models – four mechanisms multiplied by two time frames – was significant. Therefore, the main effects of usual consumption should be sufficient to control for potential differences in the distribution of drinkers across different mechanisms and between injured and non-injured patients.

In *Article IV*, risk relationships between acute consumption and type of injury are estimated adjusted for sex, age and usual drinking pattern (considered here only through volume of drinking). Preliminary multinomial regression models (which are not presented in the manuscript) have been estimated to determine whether sex and age did interact with acute alcohol consumption in determining specific injury components. This was done as the effect of acute alcohol consumption on injury type might vary across sex and age groups since episodes of heavy level of consumption (e.g. 4 or more drinks for women and 5 or more drinks for men) have been shown to be more frequent among young adults and men than among older groups of populations and women[174 175]. As overall interaction effects were observed, a logistic regression model was run for each outcome to determine which particular types of injury were affected by such interaction effects. Whereas no significant interaction effect was observed for the body region injured, the nature of injury was found to be significantly affected by the interaction term between acute consumption and age. Among the six logistic regression models consequently estimated to highlight which outcome(s) was/were affected, only three showed significant results. As discussed in *Article IV*, no clear trends could be

identified for the observed interactions; these appear to be specific to particular combinations of age and intake levels, and might be partly spurious due to commonly low consumption levels among the elderly in Switzerland (and thus to small number of participants combining specific injury types with moderate or high acute intake of alcohol).

5 RESULTS

How do usual and acute alcohol consumption relate to one another among injured patients treated at a Swiss emergency department? *– Article I*

Article I reports that almost one fourth (24.7%) of the people interviewed had been drinking alcohol within the six hours preceding the occurrence of the treated injury. Regarding their usual drinking habits, 7.7% were abstainers (in the last 12 months), 13.1% were risky volume drinkers (i.e. drank more than one/two standard drink per day for women/men), and 33.3% reported frequent HED (i.e. drank high amounts of alcohol in a single occasion at least once a month).
The proportion of acute alcohol consumption varied across usual drinking groups ($\chi 2=45.6$; df=3; $P<0.001$; after exclusion of abstainers). It was more common among those with high levels of usual consumption: 53.3% of the high-volume drinkers and 60.4% of the risk accumulators (i.e. patients combining high-volumes and frequent HED) reported an acute consumption.

How do usual and acute alcohol consumption cluster with other injury and injured patient attributes? *– Article I*

Considering data in relation to injury characteristics and patients drinking profile and attributes, the Hierarchical Ascendant Classification (HAC) derived in *Article I* revealed six injury clusters. Distribution of these as well as the categories of variables contributing significantly ($p<0.05$) to their formation are given in *Figure 5:1*. Presentation of the overall and of cluster specific distributions of each characteristic can be found in *Table 1*.

Five clusters concerned the circumstances of very specific injuries. These represented injuries typically sustained through interpersonal violence (*Cluster 1*), that were traffic-related (*Cluster 2*), that concerned older people (*Cluster 3*), or that were sustained at work (*Cluster 4*) or during sport activities (*Cluster 5*). The last cluster concerned, by contrast, events that happened under less specific circumstances (*Cluster 6*; characteristics typical of these injuries can be found in *Figure 5:1*).

Injured people's drinking type (i.e. a typology combining acute and usual drinking) varied across the six clusters. Injuries in *Cluster 1* – typically interpersonal violence-related – showed an over-representation of patients combining an acute consumption and at risk usual drinking patterns (i.e. high volume and/or frequent HED). Similarly, but to lower extents, both the drinking profiles combining acute alcohol consumption with low- and high-risk usual drinking were overrepresented in *Cluster 6*, the cluster of events grouping injuries with miscellaneous patterns of occurrence.
In contrast, events in *Clusters 2*, *3*, and *4* – typical of traffic injuries, of injuries among older people, and of work-related injuries – showed some slight over-representations of abstainer or low-volume drinkers who did not report consumption of alcohol

***Table 1*:** Total and cluster specific distribution of injury circumstances, individual attributes, and drinking types - categories marked in italics are those contributing significantly to the formation of each cluster in the HAC (p<.05).

		Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Total
	%	9.7%	19.1%	16.9%	17.1%	19.3%	17.9%	
	n	47	93	82	83	94	87	486
Drinking type	Non- and low-volume with no acute	21.3	***67.7***	***68.3***	***63.9***	53.2	29.9	53.1
	High-volume with no acute*	-	2.2	2.4	2.4	-	1.1	1.4
	RSOD with no acute	6.4	22.6	4.9	24.1	***38.3***	14.9	20.0
	Low-risk with acute	12.8	5.4	18.3	3.6	4.3	***25.3***	11.3
	High-risk with acute	***55.3***	2.2	4.9	3.6	4.3	***27.6***	13.0
	missing*	4.3	-	1.2	2.4	-	1.1	1.2
Sex	Male	***87.2***	67.7	39.0	***80.7***	***83.0***	58.6	68.3
	Female	12.8	32.3	***61.0***	19.3	17.0	***41.4***	31.7
Age	16 to 19 yrs.	***29.8***	***23.7***	6.1	7.2	21.3	10.3	15.6
	20 to 24 yrs.	25.5	18.3	6.1	8.4	17.0	***33.3***	17.7
	25 to 34 yrs.	25.5	21.5	2.4	19.3	23.4	24.1	19.1
	35 to 44 yrs.	6.4	19.4	7.3	***27.7***	***25.5***	11.5	17.3
	45 to 64 yrs.	12.8	16.1	11.0	***37.3***	12.8	19.5	18.5
	65 yrs. and older	-	1.1	***67.1***	-	-	1.1	11.7
Educational achievement	Compulsory	25.5	26.9	***35.4***	31.3	17.0	20.7	25.9
	Apprenticeship	42.6	33.3	32.9	***45.8***	23.4	21.8	32.3
	Upper-secondary	23.4	18.3	14.6	12.0	22.3	***29.9***	20.0
	University level	4.3	21.5	14.6	10.8	***37.2***	26.4	20.8
	missing*	4.3	-	2.4	-	-	1.1	1.0
Occupational status	Not active	40.4	19.4	***91.5***	2.4	33.0	34.5	36.0
	Part-time employment	2.1	9.7	3.7	6.0	12.8	***34.5***	12.3
	Full-time employment	53.2	***71.0***	3.7	***91.6***	54.3	29.9	50.8
	missing*	4.3	-	1.2	-	-	1.1	0.8
Day of injury	Sunday	***27.7***	14.0	7.3	2.4	***24.5***	9.2	13.4
	Monday	6.4	16.1	15.9	19.3	11.7	3.4	12.6
	Tuesday	4.3	14.0	11.0	9.6	7.4	16.1	10.9
	Wednesday	4.3	22.6	***29.3***	19.3	9.6	4.6	15.6
	Thursday	8.5	10.8	14.6	***22.9***	3.2	14.9	12.6
	Friday	17.0	12.9	6.1	15.7	7.4	***29.9***	14.6
	Saturday	31.9	9.7	15.9	10.8	***36.2***	21.8	20.4
Time of injury	0h00 to 7h59	***63.8***	24.7	9.8	6.0	-	21.8	17.5
	8h00 to 11h59	4.3	14.0	26.8	***50.6***	9.6	3.4	18.7
	12h00 to 15h59	8.5	25.8	***37.8***	19.3	25.5	8.0	21.8
	16h00 to 19h59	12.8	24.7	19.5	19.3	***45.7***	14.9	24.1
	20h00 to 23h59	10.6	10.8	6.1	4.8	19.1	***51.7***	17.9
Nature of injury	Fracture	14.9	18.3	***46.3***	15.7	20.2	11.5	21.4
	Sprain	19.1	25.8	28.0	28.9	***66.0***	21.8	33.1
	External	12.8	8.6	6.1	19.3	-	***35.6***	13.6
	Contusion	29.8	***31.2***	11.0	19.3	8.5	27.6	20.6
	Vital organs	***23.4***	16.1	8.5	16.9	5.3	3.4	11.3
Mechanism of injury	Traffic-related (driver)	-	***74.2***	-	2.4	-	2.3	15.0
	Interpersonal violence	***78.7***	1.1	-	1.2	1.1	5.7	9.3
	Falls	12.8	9.7	***85.4***	54.2	***56.4***	41.4	45.1
	Other mechanism	8.5	14.0	13.4	***42.2***	***42.6***	***49.4***	30.0
	missing*	-	1.1	1.2	-	-	1.1	0.6
Activity/place of occurrence	Work	8.5	4.3	-	***86.7***	2.1	1.1	17.1
	Transportation	10.6	***88.2***	18.3	3.6	5.3	14.9	25.3
	Sport activities	-	1.1	-	-	***63.8***	6.9	13.8
	Leisure time	***53.2***	1.1	7.3	1.2	***22.3***	16.1	14.0
	Other at own home	6.4	-	***50.0***	7.2	4.3	***40.2***	18.3
	Other	19.1	5.4	***23.2***	1.2	2.1	***20.7***	11.1
	missing*	2.1	-	1.2	-	-	-	0.4
Involvement of other persons	No	14.9	40.9	***97.6***	***94.0***	78.7	***83.9***	72.0
	Other acquaintance	***27.7***	1.1	1.2	4.8	13.8	10.3	8.4
	Other unknown	***57.4***	***57.0***	1.2	1.2	7.4	5.7	19.3
	missing*	-	1.1	-	-	-	-	0.2

Remark: * used as "passive" in the analysis; Drinking type: No acute consumption with non/low-volume drinking (no more than one/two standard drink/s per day for women/men); No acute consumption with high-volume drinking (risky volume drinkers, i.e. more than one/two standard drink/s per day for women/men, without frequent heavy episodic drinking); No acute consumption with risky single occasion drinking (RSOD; moderate drinker with frequent heavy episodic drinking); Acute consumption with low-risk drinking; Acute consumption with high-risk drinking (high volume or frequent heavy episodic drinking).

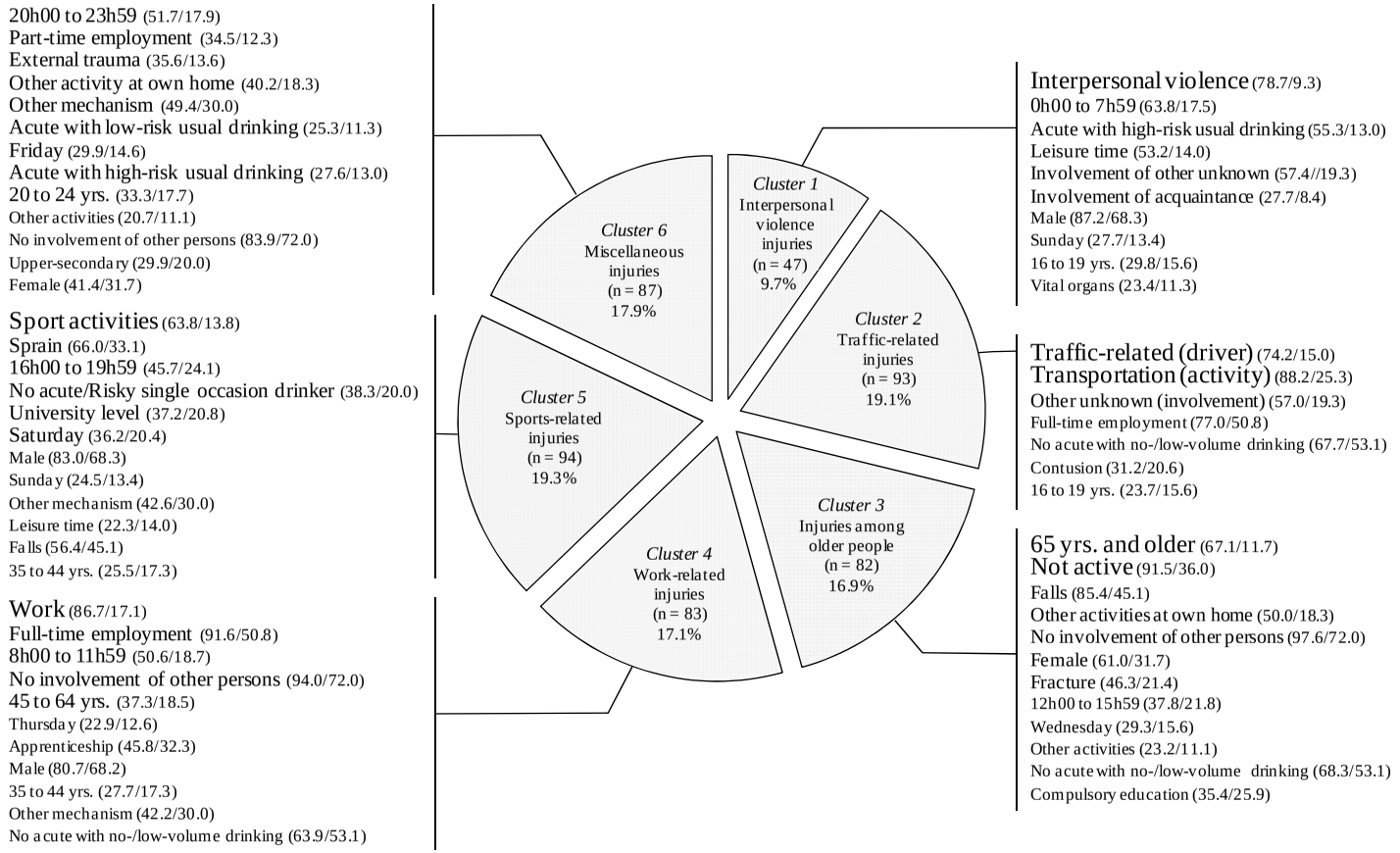

Figure 5:1 Share of injury clusters as derived by the HAC-FAC method
Remark: Outcomes representative of each cluster (6 clusters); cluster specific % and overall % in brackets

before the event. Finally, in the same line of over-representation of injuries occurring without direct link to alcohol consumption (in the event), *Cluster 5* – typical of sport-related injuries – was found to concern more often than all injuries aggregated individuals who did not report an acute consumption but who were risky single occasion drinkers (i.e. combined low-levels of usual consumption with frequent HED).

The following key-points summarize the main results of *Article I:*

- About one-fourth of trauma patients treated at an emergency department reported any alcohol consumption (acute) in the six hours preceding the injury
- Acute consumption was more common among injured people with high levels of usual consumption
- Acute consumption was more typical of some injury clusters than others – in particular of the one typical of interpersonal violence-related injuries and of the one of injuries occurring under miscellaneous circumstances
- Frequent heavy episodic drinkers who did not report having consumed alcohol before the event were over-represented among a cluster of injuries sustained typically during sport activities

Box 5:1 Results' key-points: *Article I – Injury Patterns*

Are alcohol-related injuries randomly distributed across time? *– Article II*

Article II reveals that more than half (51.8%) of all night-time injuries and more than four out of five (82.6%) injuries occurring between Friday night and Saturday morning (0h00 to 7h59) occurred after alcohol consumption (acute).
Regression models revealed significant associations of acute consumption with both time of day and day of week of injury (Wald tests significant at $p<0.05$ for day of week and $p<0.001$ for time of day). Weekend days ($OR_{Saturdays}=2.85$; 95% CI=1.19;6.82; $OR_{Sundays}=2.59$; 95% CI=1.01;6.66, reference period: Monday) and night-time injuries (OR=3.08; 95% CI=1.75;5.43, reference period: 16h00-23h59) were positively associated with acute consumption, whereas day-time injuries were negatively (OR=0.27; 95% CI=.15;.48). Interaction terms between time and day revealed no effect (at a 5% level of significance).

Article II: additional results of interest – Injury sustained by people with frequent HED (at least monthly) peaked on Saturday, something not observed for people with risky volume of consumption for whom the proportion did not vary markedly during the week. This proportion neither varied markedly across different periods of the day (between 12.3% and 15.5%). This was confirmed by the regression models. Only one overall association between time of injury and the two hazardous "usual" alcohol consumption measures was revealed. It concerned frequent HED that was shown to be associated with day of week (Wald tests significant at $p<0.05$). Injuries occurring on Saturday showed increased odds for HED compared to those occurring on Monday (OR=2.69; 95% CI=1.26;5.76). By contrast, neither day of week nor time of day was

associated with risky volume of alcohol consumption. Finally, neither of these two outcomes was associated with the interaction terms between time of day and day of week.

The following key-points summarize the main results of *Article II:*

- More than one out of two night time injuries and 80% of those sustained during the night from Friday to Saturday occurred after alcohol consumption (acute)
- Implication of acute alcohol consumption in injury varied significantly across time of the day and day of the week (but no interaction effect was observed)
- Proportion of injured patients with frequent HED peaked on Saturday – a statistical association confirmed in regression models – but injuries sustained by patients with risky volumes of usual consumption showed no variations across time

Box 5:2 Results' key-points: *Article II – Time of Injury*

Are there variations in the risk estimates and attributable fractions associated with acute alcohol consumption across injury mechanisms? *– Article III*

Depending on the mechanism of injury considered, *Article III* reports that between 34.6% and 46.1% of trauma patients had consumed alcohol in the 24 hours preceding their injury. High levels of acute consumption (four or more units for women, five or more for men) varied from 4.5 to 6.3% for transport, falls, and exposure to forces and other events, but reached 17.7% for injuries sustained through interpersonal violence. Similar patterns were observed when considering the consumption within the six hours preceding the event. Injuries sustained through interpersonal violence showed the highest prevalence of high levels of consumption (10.5%) and the least absence of consumption (60.8%).

Acute alcohol consumption as risk factor for different injury mechanisms - The multinomial logistic regression models estimated revealed that acute consumption was in general a significant risk factor for injuries and the specific risk estimates (OR) were significant across all levels of consumption and for all mechanisms, independently of the time-frame considered (6 or 24 hours). *Figure 5:2* shows these for the 24 hours time-frame.

Risk estimates: variations across mechanisms? - Variations in terms of magnitude of the effect at different level of alcohol could be observed across mechanisms. Risk estimates derived for transport-related injuries, falls, and exposure to force and other events showed to be of similar magnitude when compared at similar levels of consumption. By contrast, risk estimates for interpersonal violence showed to be markedly higher; the difference becoming striking at high levels of consumption ($OR_{24hours}$ = 9.78, 95% CI = 5.02-19.07; OR_{6hours} = 83.76, 95% CI = 27.23-257.65).

Alcohol-attributable fractions - Figure 5:3 presents the alcohol-attributable fractions (AAFs) for each of the considered mechanism and for both exposure time-frames. It was estimated that 33.1% of injuries related to interpersonal violence, 19.7% of falls, 15.2% of injuries due to exposure to forces and other events, and 15.4% of the transportation-related ones could be attributed to alcohol consumption in the preceding 24 hours. With the exception of interpersonal violence that showed slightly higher figures, AAFs estimated through the 6-hour window demonstrate between one-third and one-fourth smaller fractions.

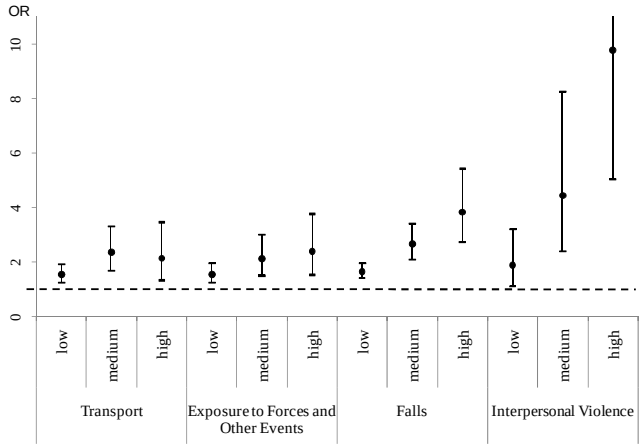

Figure 5:2 Risk estimates for injury mechanisms
Remark: based on acute alcohol consumption using the 24 hours time-frame; OR and 95% Confidence Intervals; Reference category: non-trauma/no consumption; "low" ≤1 unit (women), 2≤ (men); "medium" >1 but <4 units (women), >2 but <5 (men); "high" 4≥ units (women), ≥5 (men)

Share of alcohol-attributable fractions across consumption levels – For falls, exposure to forces and other events, and transportation, the largest share of the total AAF was associated to low consumption levels (*Figure 5:3*), suggesting a preventive paradox (for a definition see Section *6.1.2*, headings "*Preventive paradox in the alcohol-injury phenomenon*").

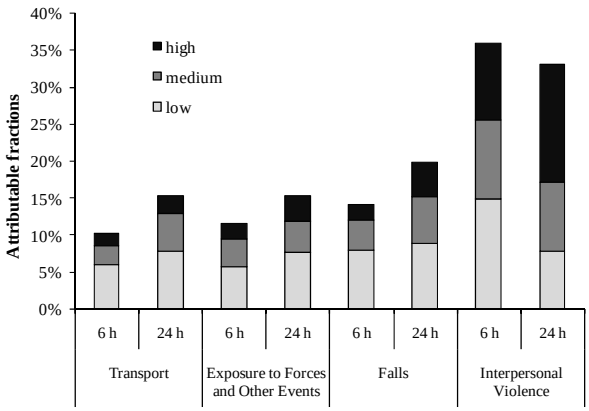

Figure 5:3 Injury mechanisms' alcohol-attributable fractions
Remark: (based on 6- and 24-hours acute consumption); "low" ≤1 unit (women), 2≤ (men); "medium" >1 but <4 units (women), >2 but <5 (men); "high" 4≥ units (women), ≥5 (men)

Article III: additional results of interest – Estimated risks for acute consumption in the six hours preceding the injury were higher than for the 24 hours consumption time window. In contrast, AAFs for the later time window were higher for the three injury mechanisms of falls, transportation, and exposure to forces and other events.

The following key-points summarize the main results of *Article III:*

- Already low levels of acute alcohol consumption showed to be a risk factor for injuries sustained through any of the considered mechanisms
- Risk estimates appeared to vary across mechanisms of injury: interpersonal violence demarking markedly from other mechanisms
- 33.1% of interpersonal violence-related injuries, 19.7% of falls, 15.2% of injuries due to exposure to forces and other events, and 15.4% of transportation-related ones could be attributed to alcohol consumption in the preceding 24 hours
- Low levels of acute consumption were associated with the most of the total alcohol-attributable fractions for three injury mechanisms

Box 5:3 Results' key-points: *Article III – Mechanisms of Injury*

Does the risk relationship between acute alcohol consumption and injury vary by type of injury? *– Article IV*

Alcohol consumption prior to injury was generally associated with higher risks of injury sustained on all (eleven) body regions (log likelihood ratio $\chi2$= 309.7, df = 33, p<.001) and all (six) natures of injury (log likelihood ratio $\chi2$= 274.5, df = 18, p<.001). With the exception of injuries to the muscles and tendons at low and moderate levels of consumption (OR_{low}= 1.70, 95% CI=0.87-3.34; $OR_{moderate}$= 1.30, 95% CI=0.38-4.47), the risk estimates for specific natures of injury were significant for all alcohol consumption levels (*Figure 5:4*). Similarly, but with the exception of the neck (OR_{heavy}= 1.57, 95% CI=0.72-3.41) and unspecified body parts ($OR_{moderate}$= 1.44, 95% CI=0.55-3.75), each level of alcohol consumption was significantly related to a higher risk of injury for all body regions (*Figure 5:5*).

Risk estimates: variations across injury types? – The magnitude of risk estimates for acute consumption at different levels appeared not to vary meaningfully across injury types. No statistical difference regarding risk estimates could be observed for the different natures of injury (*Figure 5:4*), and only few – and relatively small – could be found when comparing risk estimates for different regions of the body. As shown in *Figure 5:5*, risk estimates for head injuries at heavy levels of consumption (OR = 8.38, 95% CI = 5.58-12.60) was significantly higher than the ones derived for three of the other body regions (OR_{Neck} = 1.57, 95% CI = 0.72-3.41; $OR_{Hip\ and\ thigh}$ = 2.38, 95% CI = 1.03-5.48; $OR_{Ankel\ and\ foot}$ = 3.50, 95% CI = 2.29-5.33). At moderate levels of consumption, risk for thorax injuries (OR = 5.83, 95% CI = 3.86-8.81) showed to be higher than for some other body regions (OR_{Neck} = 2.03, 95% CI = 1.19-3.44; $OR_{Ankel\ and\ foot}$ = 2.47, 95% CI = 1.73-3.53; $OR_{Unspecified\ body\ parts}$ = 1.44, 95% CI = 0.55-3.75).

Article IV: additional results of interest – Whereas, 38.1% of trauma patients reported alcohol consumption in the 24 hours prior to emergency admission, only 21.7% of the non-trauma ones did. Among trauma patients, significant statistical differences emerged for the association between acute consumption and sex ($\chi 2 = 123.8$, df = 3, $p < .001$) and age ($\chi 2 = 69.9$, df = 6, $p < .001$): men appeared more likely than women to report acute alcohol consumption, and young people to report heavy levels of consumption. Finally, seven body regions showed a clear dose-response relationship between levels of alcohol consumption and the injury risk (i.e. odds ratios increased with the amount of alcohol consumed). Such a dose-response relationship was found for the five natures of injury associated with all alcohol levels.

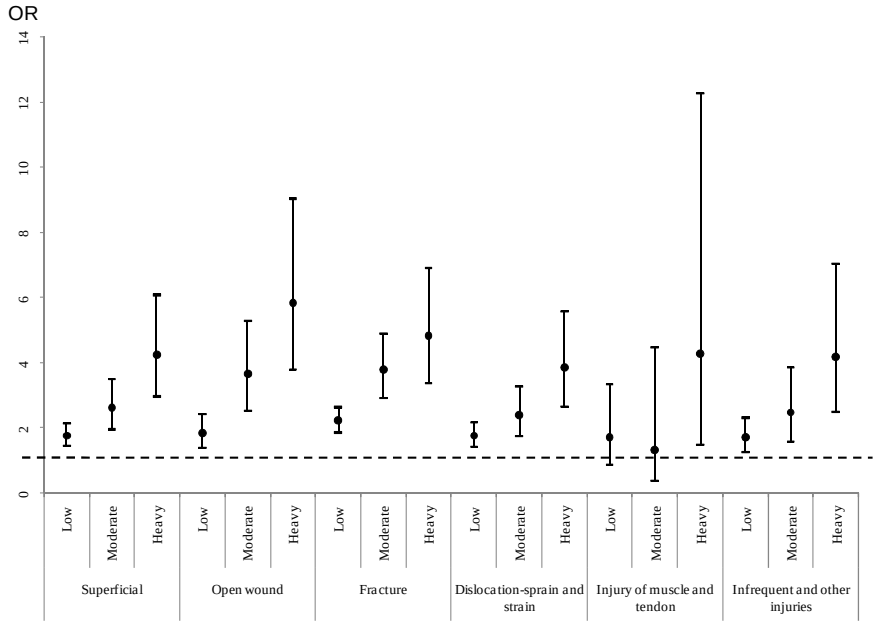

Figure 5:4 Risk estimates for injuries of different nature
Remark: OR with 95% CI; Reference category: non-trauma/no consumption; "low" ≤1 unit (women), 2≤ (men); "medium" >1 but <4 units (women), >2 but <5 (men); "high" 4≥ units (women), ≥5 (men)

The following key-points summarize the main results of *Article IV:*

- Low and moderate levels of acute alcohol consumption commonly showed significant associations with injuries of different natures and body regions
- The magnitude of the risk association between acute consumption and injury appeared to not vary meaningfully across types of injury
- A dose-response effect between alcohol levels and risk estimates was observed for almost all injury types

Box 5:4 Results' key-points: *Article IV – Types of Injury*

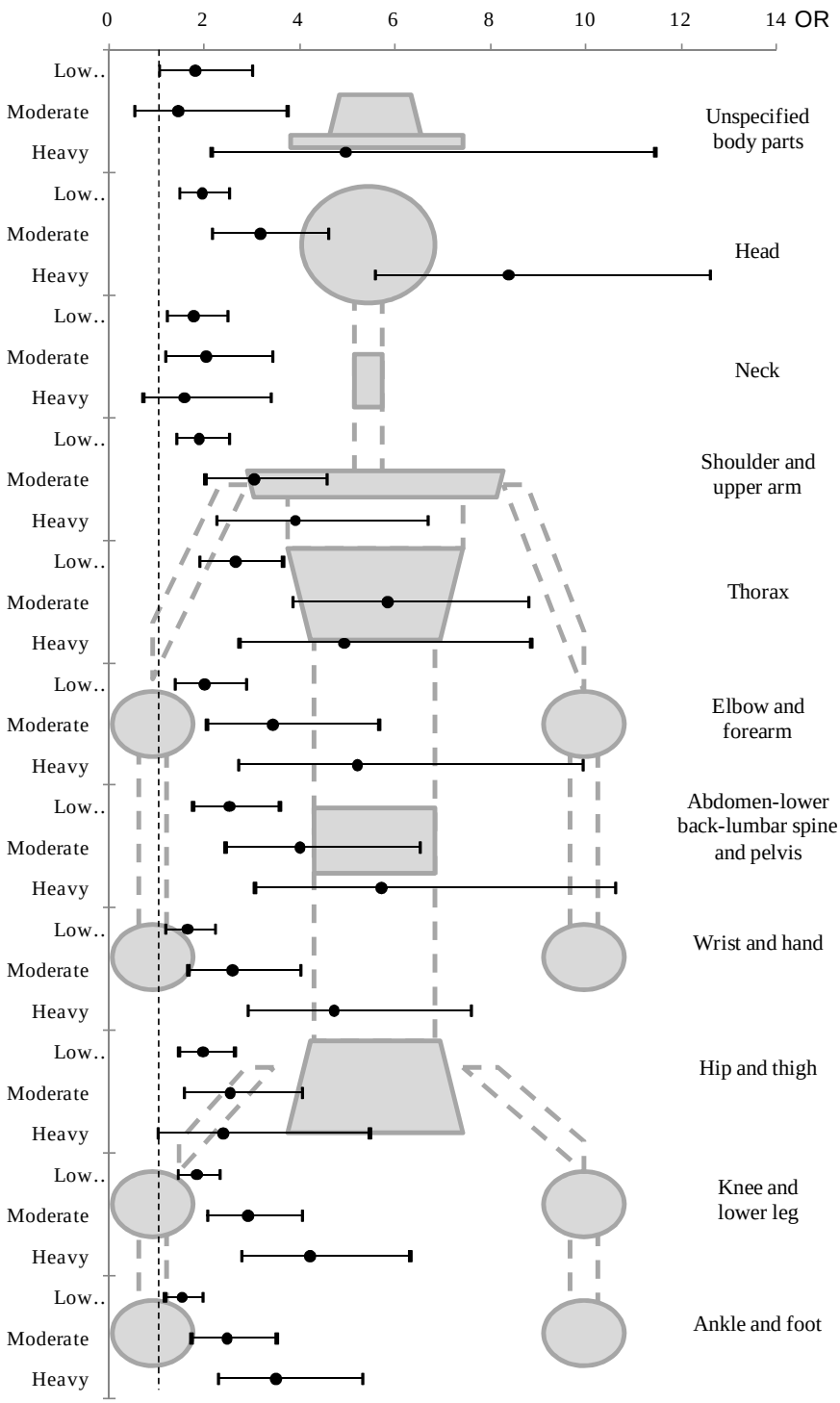

Figure 5:5 Risk estimates for injuries to different body regions
Remark: OR with 95% CI; Reference category: non-trauma/no consumption; "low" ≤1 unit (women), 2≤ (men); "medium" >1 but <4 units (women), >2 but <5 (men); "high" 4≥ units (women), ≥5 (men)

Are self-reported measurements of acute alcohol consumption of relevance in emergency department studies on alcohol and injury in the study population? – *Article V*

When comparing objective and self-reported BAC measures in terms of binary status – positive or null BAC level –, 32 of the 272 patients (11.8%) had inconsistent information (McNemar chi-square for inconsistent cases = 19.53, df=1, $p < 0.001$). On the one hand, three participants indicated absence of consumption in the six hours preceding injury occurrence but had positive objective BACs; two of them were injured in the morning (between 8:00am and 9:00am) and were likely to have had six hours of sleep between their last alcohol intake and injury. On the other hand, 29 participants indicated an acute consumption but had a null BAC measure through biological assessment. With an average metabolisation rate of 0.15‰ per hour, and considering the time between injury and the BAC measure, the time between the last drink and injury, and the time of drinking during the six hours before injury, only two (out of the 29) should still have had a measurable BAC (one if a higher disappearance rate, i.e. 0.20‰ per hour, is used).

Estimated peak BAC (EPBAC) derived from participants' self-reports was modeled based on the objective BAC and the various time intervals. After the exclusion of two outliers, objective BAC was significantly associated with EPBAC when considered as single predictor ($R=0.68$, $b=0.83$, $p > 0.001$). Yet, the effect of objective BAC was reduced when the time variables were included in the model and unexpectedly, was not anymore significant and added then little to the model's fit (multiple $R = 0.904$ including the BAC measure, 0.902 excluding it). The time intervals predicted self-reported EPBACs in the expected directions and the most important factor from the perspective of standardized regression weights (beta) was the time spent drinking.

Article IV: additional results of interest – Results from *Article V* also show that women and participants who reported having consumed alcohol prior to injury were less willing to provide a BAC test. In addition, participant consenting to biological assessments were significantly younger and reported higher amounts of acute consumption (when considering solely the ones reporting consumption).

The following key-points summarize the main results of *Article V*:

- In about nine out of ten patients consenting to biological assessment, self-reports concurred with objective measures when considered as binary (positive vs. null)
- Among inconsistent cases, the large majority could be explained by alcohol disappearance rate, and only few could potentially be due to voluntary concealment
- Objective BAC measure appears to have little information value beyond that of self-reports

Box 5:5 Results' key-points: *Article V - Validity*

6 DISCUSSION

Taken together, the results highlight the strong implication of alcohol consumption in the injuries treated in Switzerland's emergency departments. Findings in line with the research questions, or that are of further relevance in terms of knowledge within the alcohol and injury field, are presented in the first part of the discussion (Sections *6.1.1* to *6.1.3*). The strengths and weaknesses of the thesis and of specific articles are discussed in the second part (*6.2*). Finally, potential implications for interventions, patient management, and research are presented in the last section (*6.3*).

6.1.1 Injury and injured people characteristics

The first domain of interest of the thesis, related to characteristics of injuries and of injured people, was covered through three research questions.

How do usual and acute alcohol consumption relate to one another among injured patients treated at a Swiss emergency department?

When answering the question of the relationship between acute and usual alcohol consumption in the study population, *Article I* revealed that these two dimensions were clearly related. Patients reporting levels of usual consumption exceeding common guidelines for "safe" or "low risk" drinking (i.e. an average of one/two drinks per day for women/men[176-178]) were more often injured after acute alcohol consumption than their counterparts with safer drinking patterns. This finding concurs with observations in other study populations[179].

How do usual and acute alcohol consumption cluster with other injury and injured patient attributes?

When investigating the association between alcohol consumption and various injury attributes, five out of six of the derived injury clusters – or typical injury circumstances – highlighted injury situations that have previously been described (e.g. traffic-related injuries). The formation of some of these clusters was driven by very discriminating attributes (e.g. injury mechanisms in *Interpersonal violence-related* and *Traffic-related injuries*) and that of others by different ones (e.g., activity/place of occurrence, in *Work-related* and *Sport-related injuries*, or individuals' socio-demographic/economic backgrounds in the cluster of *Injuries sustained among older people*). The clustering of injury characteristics highlights both the interrelations between characteristics and the fact that these are not interchangeable. In addition, the simultaneous consideration of several injury attributes brought to light a cluster of events that happened under less specific circumstances.

When considering the association of alcohol consumption with other injury characteristics, two interesting phenomena appeared.
First, the proportion of consumption profiles involving acute consumption varied across clusters. In line with previously reported findings[70 87 89], injuries typically sustained through interpersonal violence showed higher figures of acute consumption than on average (also in line with the results of *Article III*, see *Box 5.3*). More unexpectedly, the

cluster of injury events that occurred under "miscellaneous circumstances" similarly presented a clear over-representation of acute alcohol consumption. This suggests that acute consumption can also be associated with relatively unspecific injury circumstances, a phenomenon that has apparently never been reported in the alcohol and injury literature. This observation also highlights, in terms of added informational value, the relevance of considering within a single analytical framework various injury and injured patients' characteristics to give a broader picture of the association between alcohol and injury.

Also, and like acute alcohol consumption, usual drinking patterns appeared to vary across typical injury circumstances. In particular, injured patients with frequent consumption of high amounts of alcohol (but who were not injured after having consumed alcohol) were over-represented in injuries sustained typically during sports activities. Even if this particular finding confirms an earlier study on sports injuries[114], the causal pathway between usual drinking patterns and specific injury circumstances is intriguing and deserves investigation.

Are alcohol-related injuries randomly distributed across time?

Not surprisingly, results from *Article II* underline that alcohol-related injuries are not randomly distributed across time. These clustered in the evenings and over the weekend, a finding in line with previous emergency department[122 125] and mortality studies[121]. Yet, the remarkably high figures of "positive" alcohol attendances during night and weekend periods – more than 80% of injuries from Friday to Saturday night occurred after alcohol consumption – underlining the importance of this phenomenon in the study population.

Injury and injured people characteristics

Findings emerging from the first domain of interest of the thesis consistently highlight the important implication of alcohol consumption "in injury events." By suggesting relationships between both acute and usual drinking and specific and/or unspecific injury circumstances or characteristics, these findings draw an original picture of the alcohol-injury phenomenon and highlight the complexity of the association between alcohol consumption and injury.

Box 6:1 Main findings: Injury and injured people characteristics

6.1.2 Injury risks and attributable fractions

Are there variations in the risk estimates and attributable fractions associated with acute alcohol consumption across injury mechanisms?

As shown by the results of *Article III*, risk associations tend to vary across mechanisms of injury. Injuries resulting from interpersonal violence showed a clearly stronger association with acute consumption than other mechanisms, which is consistent with the literature comparing these to other events pooled together[70 87 89]. Similarly,

estimates of alcohol-attributable fractions appeared to vary markedly. Compared to other mechanisms, interpersonal violence showed between 70% and 120% higher attributable fractions when considering the more conservative risk estimates (i.e. derived based on 24 hours consumption).

Does the risk relationship between acute alcohol consumption and injury vary by type of injury?

Even if a few small differences in risk estimates were observed when comparing specific injury natures or body regions, results from *Article IV* support the idea of absence of overall variations of effect of acute alcohol consumption across types of injury (natures and body regions)[22].

At higher risk for injury from the first drink…

As mentioned in the background chapter, risk associations between acute alcohol consumption and specific injury mechanisms or type of injury have often not been derived due to lack of control condition in studies. Results from *Articles III* and *IV* revealed that significant increased risks for injury exist already after the consumption of a single alcoholic drink, whatever the mechanism, body region, or (but with one exception) injury nature under consideration is. In addition, the documented dose-response effect between consumption level and injury risk[54 62 72] was also consistent across mechanisms and types of injury (even if a few outcomes have to be considered as exceptions with either risk leveling once reaching "moderate" amounts of alcohol or following a typical "J" shape).

Important alcohol-related injury burden

An estimated 15% of transport-related injuries and of injuries due to exposure to forces and other events were attributable to acute alcohol consumption. About 20% of falls and more than 30% of interpersonal violence-related injuries can be attributed to acute consumption in the study population.

These figures highlight the important injury burden that could be targeted in interventions[4 7]. They also call attention to the role of alcohol in interpersonal violence. Violence is a major threat to health worldwide[180], but also a phenomenon whose impact can be reduced if not prevented[181]. It is proposed that violence is the result of the interplay of individual, relational, social, cultural, and environmental factors[181]; alcohol consumption being one of the factors implicated in this interplay. Consequently, the link between acute consumption and violence-related injuries is very complex[182]. For instance, whereas acute consumption is a trigger for violent behavior among people with high dispositional aggressiveness[183], it has been highlighted that alcohol is sometimes consumed as a means of coping with experiencing or witnessing violence[182 184].

It can also be stated that although interpersonal violence showed the larger alcohol-attributable fractions in *Article III*, these events were reported by only about 4% of the patients interviewed (*Data Source II*). Even if the original sampling frame of the study might have affected these figures (see below *6.2 Overall strengths and weaknesses of the studies*), these events represent a small burden when compared to falls. As such, even if only about 20% of these events (injuries sustained in falls) are attributable to acute consumption, they represent more than 50% of all injuries in our sample. This

relativizes the contribution of interpersonal violence in the total alcohol-related injury burden in the study population.

In contrast to the large fractions derived for interpersonal violence injuries, transport-related injuries showed "attributable" figures close to those of other "unintentional" injuries. Conceptually, risk for traffic injury is considered as a function of four elements[30]: a) factors influencing exposure to risk (e.g. economic and demographic factors); b) factors influencing crash involvement (e.g. excessive speed, fatigue, or acute alcohol consumption); c) factors influencing crash severity (e.g. amount of kinetic energy, or non-use of protective devices); and d) factors influencing severity of post-crash injuries (e.g. delayed emergency care). Within this framework, alcohol consumption is a key factor in the risk of a crash. In contrast with estimates derived in *Article III*, greater injury risks and higher attributable fractions due to acute consumption have been reported in the literature[140 185]. Concerted efforts have been made to decrease drunk driving in Switzerland in the last decade[186]. It could thus be argued that stricter regulations – i.e. the lowering of the legal limit of drunk driving, the implementation of systematic roadside police controls, and more severe punishment of offenders – have had positive effects. However, another possible explanation for this low association between alcohol and traffic-related injuries is that the injuries studied in this thesis are not as directly associated with acute consumption, since they are not as severe as those covered in prior studies[140 185] (see the discussion of limitations in line with *injury severity*, Section *6.2.1*).

Preventive paradox in the alcohol-injury phenomenon

To consider the share of attributable fractions associated with different consumption levels brings to light another important finding. A phenomenon of "preventive paradox" acts in the alcohol and injury interweaving. The "preventive paradox" states that, even if hazardous drinker groups show higher risks for alcohol-related consequences, at the population level most of the "burden" affects less detrimental alcohol consumers as they represent a larger group of the population[187 188]. This paradox accordingly applies here in the way that low levels of acute consumption are associated with the most of the total alcohol-attributable fractions for injuries due to falls, transportation, and exposure to forces and other events.

Representing about 95% of the injury burden in our sample, these three mechanisms showed alcohol-attributable fractions from 15% to 20%; and about 80% of these estimates were due to low and medium levels of acute consumption ("preventive paradox").

This rough picture of the implication of different levels of acute consumption across mechanisms demonstrates that it is not sufficient to influence the alcohol consumption of high risk drinkers (heavy episodic drinkers). To target less harmful drinking profiles would be needed in order to significantly reduce the alcohol-related burden of injury.

Injury risks and attributable fractions

Marked variations in estimates were observed across injury mechanisms, which was not the case across types of injury. It was additionally observed that people are at higher risk for injury "from the first drink", and that this (relative) risk consistently increases in a "dose-response" way with increasing levels of acute consumption.

To consider the picture of the implication of different levels of consumption in various injury mechanisms suggests that injuries associated with low and moderate levels of acute alcohol consumption represent a very large share of the total alcohol-related injury burden.

Box 6:2 Main findings: Injury risks and attributable fractions

6.1.3 Validity of "self-reported" measurements

The last domain of interest of the thesis is the validity of self-reported acute alcohol consumption. This was addressed in *Article V*.

Are self-reported measurements of acute alcohol consumption of relevance in emergency department studies on alcohol and injury in the study population?

Investigations in relation to the last research question of the thesis support the idea of considering patients' self-reports in epidemiological studies on alcohol and injury in the study population.
For about nine out of ten patients consenting for biological assessment of blood alcohol concentration, the self-reports concurred with objective measures if these were considered as binary (positive vs. null). Of the inconsistencies observed (n=32) the large majority could be explained by alcohol disappearance rate (n=29; patients reporting a consumption but with a "null" biological assessment), and only a few could be attributed to potential voluntary concealment in self-reports (concealment refers here to the potential denial of prior-to-injury alcohol consumption, i.e. patients with positive BAC but no report of consumption). Clues to potential concealment were thus found for only about 1% of all participants, which is consistent with observations made in other studies[147]. It could nonetheless be expected that the absence of concealment only concerns participants who consent to BAC testing. However, no consistent indication of such concealment was found among patients who refused the biological assessments; these were more inclined than their counterparts to "self-report" alcohol consumption prior to sustaining their injury.

Considering all of these observations, *Article V* does not support the hypothesis of large effect of patient concealment in self-reports of acute consumption in the study population. In addition, such "self-reports" are likely to be of even higher relevance for cases with low levels of BAC at the time of injury. This can be expected as metabolic processes might lead for them to total alcohol disappearance before to be admitted to the emergency department (resulting in null biological measure of BAC).

These results are in line with observations made in other study settings[151] and suggest that figures for acute consumption presented in *Article I* and *II* should be relatively unbiased.

In addition, when attempting to model peak blood alcohol concentrations based on biological measures, it was highlighted that many parameters have to be correctly assessed to obtain estimates that are more reliable and valid than self-reported consumption. Yet, the results of this "modeling" revealed that objective BAC measure had little information value beyond that of self-reports, pointing to the relevance of using such self-reports to study alcohol and injury association in our study population.

Potential bias in studies considering biological assessments of alcohol consumption
Article V suggests that participants who consent to are different from those who refuse a biological assessment in terms of age and sex; women and older participants are less predisposed to accept a biological assessment. This finding, in combination with other concordant ones[151], raises questions about representativeness of emergency department samples considering only participants who consent to a biological assessment.

Validity of "self-reported" measurements

Self-reported measurements of prior to injury exposure to alcohol can be considered, for epidemiological matters, as satisfactory proxy of blood alcohol concentration at the time of injury in the study population. Additionally, in a more general perspective, bias regarding sample representativity might be induced by the use of "intrusive" biological measures in emergency department studies.

Box 6:3 Main findings: Validity of "self-reported" measurements

6.2 STRENGTHS AND LIMITATIONS

To conduct interviews in emergency departments, and in general the consideration of interview-based material, has some shortcomings that are introduced below (*6.2.1*). The two datasets analyzed within the thesis have additional limitations that have to be discussed in terms of potential bias (*6.2.2*). Finally, shortcomings specific to articles are presented (*6.2.3*).

6.2.1 Interview-based data and Emergency Department studies

By collecting the data through direct interviews of injured patients, Emergency Department (ED) studies give the opportunity to gather specific data on injury events and are, for this reason, a remarkable source of data on the factors involved in the *pre-event*, *event*, and *post-event* phases of an injury (see the description of ED studies in Section *2.2.5*). In contrast, given the specificity of the study population (i.e. injured patients), and the design or data collection process, two main potential sources of bias are implied in such studies. The first one relates to potential bias due to the use of self-reports (as in any interview-based study). The second one relates to the impossibility of

including seriously injured patients in the sample (because most of them could not be interviewed).

Bias in self-reported alcohol consumption

The use of interview-based data and the consideration of self-reports might imply bias, particularly in the case of alcohol consumption[145 189]. This point has been treated in *Article V*. It was then shown that significant bias should not be expected in our sample (see Section *6.1.3* for the discussion of main findings of *Article V*). Also, considering that recall bias in reports of alcohol consumption generally imply underreports[190], the figures and estimates presented within the thesis should be conservative.

Regarding measures of "usual" alcohol consumption, both data sources contained measurements based on items and criteria frequently used in epidemiological studies. As reported in the literature, the validity of such measurement tools can be regarded as high in epidemiological studies[191-193].

Injury severity

An inherent limitation of studies that require interviews of patients is that individuals that are too seriously injured to be interviewed must be excluded[194]. The results and findings presented concern thus only injuries of low to medium severity. With regard to potential bias due to this limitation, traffic-related injuries might be particularly affected by the non-inclusion of the most severe injuries. Those injuries being often severe[30], an important part of the patients not included for a "severity" reason might have been injured in traffic-related circumstances. This might in turn alter the alcohol consumption figures for this specific injury mechanism.

Alcohol and injury severity

The injury severity is, with the type of injury, one of the main attributes of injury in terms of tissue damage (see Section *2.1.1*). It appears controversial whether or not acute alcohol consumption is associated with the injury severity[195]. Conflicting results can be found in the literature. On the one hand, studies suggest that the degree and clinical outcome of injury is not significantly affected by the presence of alcohol in the body at the time of injury[196]. On the other hand, other studies indicate that increased injury severity is associated with it[197 198].

Box 6:4 State of research on alcohol and injury severity

6.2.2 Data sources' strengths and weaknesses

Due to the use of a questionnaire designed specifically for studying the link between alcohol and injury, the first dataset (*Data Source I*) contains a wide range of data on injury *pre-event* and *event* circumstances. This makes it optimal for studying *injury and injured people characteristics*. In contrast, with a much larger sample size, *Data Source II* gave opportunities for deriving reliable *injury risks and attributable fractions* estimates for different conditions.

Data Source I: Emergency Department case-crossover study

In the first study (*Data Source I*), information on injury and injured patients characteristics, including their alcohol consumption, were gathered through interviews. Medical data were recorded based on the preliminary medical diagnosis. The former are known for implying some potential desirability bias and voluntary denial (as discussed above); the latter to be sometimes inaccurate[199]. These potential sources of bias can be discussed and counterbalanced by noticeable strengths.

For instance, the richness of the core data is of high relevance (i.e. individual and injury characteristics are often not available from medical records or from coding schemes stemming from classifications used for monitoring injuries). In addition, the potential bias caused by an inaccurate preliminary medical diagnosis is factually restricted due to the broad categorization used when gathering and analyzing the data.

In addition, following a randomized selection of time-slots covering every day of the week and all 24 hours of the day, the sampling frame used in *Data Source I* ensures its sample to be representative over time. To account for seasonal variations, the study was additionally conducted over five one-month periods covering all periods of the year. This should cover all injuries related to summer activities, such as water sports-related injuries, and injuries occurring typically during winter, such as skiing injuries. Accordingly, this sampling frame can be considered as one of the key strengths of *Data Source I*.

Finally, an element that can be seen as important potential weakness of the dataset used in *Articles I*, *II*, and *V* is its relatively small sample size. With fewer than 500 participants, the original study did not reach the number of inclusions that would have permitted it to cover all of its original aims (i.e. due to lack of statistical power). Even so, within the present thesis, the sample size did not appear to have a marked effect on the validity of the results.

Data Source II: Emergency Department case-control study

With a data collection taking place over a year and a half, the second dataset (*Data Source II*) is to our knowledge one of the largest in term of the number of patients interviewed within a single study setting/site in alcohol and injury research. It is thus among the few available datasets that ensure satisfactory reliability when comparing effects of exposure of alcohol on different injury mechanisms and types. Such comparability is hardly ensured in most of previous studies, which were based on relatively small samples or that compared results from diverse settings.

As presented above (Section *4.3 "Mechanisms and types of injury as outcomes of interest*"), data regarding the type of injury were gathered from the patients' medical files, ensuring better data precision on diagnoses as this was done after the injury had been treated.

Unlike *Data Source I*, the main weakness or limitation of *Data Source II* comes from the fact that even if sampling took place on every day of the week, only patients that had been admitted to the emergency department between 11:00 am and 11:00 pm were approached for participation. Sampling frame time limits were restricted in the original project due to budgetary constraints; carrying out interviews late at night and early in the morning would have increased expenditure without being cost-efficient in terms of inclusion for this study. By comparing the number of patients contacted for participation and the administrative statistics for the study period it can be estimated that about 25% of the potential participants to the study were not contacted because of

this time restriction. As highlighted by results from *Article II*, and as expected, injured patients admitted during the night showed generally high figure of acute alcohol consumption. By contrast, the uncovered period includes as well morning (day time) admission for which lower than average figures of acute consumption were found. Accordingly, even if the figures presented in *Articles III* and *IV* can be expected to be biased, the strength of this bias can hardly be evaluated. Even so, it can be expected that, as a result of this bias, estimates derived in these two articles should be conservative.

6.2.3 Other limitations

The use of a control-condition of medical patients, when deriving risks estimates, is a common limitation of *Articles III* and *IV*. As mentioned earlier (Section *2.2.5*), such "quasi-control" groups have traditionally been considered as satisfactory in ED studies. Biases in relative risk estimates are, however, to be expected. As such, alcohol consumption in the few hours preceding non-injured patients' admissions might have been influenced by the occurrence of preliminary symptoms, before the development of disabling symptoms that led to the visit to the emergency department. Acute consumption in the "controls" would thus be biased toward an underestimation. In contrast, emergency department non-trauma patients have been reported to have higher levels of alcohol consumption than general population controls[17]. Biases accordingly should – to some extent – cancel each other out. Strength and direction of bias related to the use of this control condition are accordingly difficult to assess.
Another important limitation of the analyses conducted in *Article IV* is the single consideration of alcohol consumption in the 24 hours prior to admission (a point already discussed in Section *4.3*, headings "*Alcohol exposure: measurement tools*"). As a consequence, for a few patients, alcohol consumption after injury occurrence (but before their admission) might have been included in the total amount consumed. In addition to possibly overestimating the consumption before injury of these cases, the sole use of the 24-hour time frame has the weakness of not distinguishing between patients with high amounts of alcohol consumed over a short time period and patients with regular consumption over the 24 hours (e.g. with meals). The effects of high levels of blood alcohol concentration are thus potentially confounded with those of alcohol hangover or of repeated consumption of low amounts of alcohol. Results of *Article III* nonetheless highlight that estimated risks increased as measurement periods were shorter. This concurs with previous findings on more important relative risks for alcohol consumption in the hours preceding closely the injury occurrence[64]. In view of that, *Article IV* estimates of alcohol-related risk can be considered once again as conservative.

Finally, with regard to interpersonal violence (*Articles I* and *III*), neither of the two datasets could distinguish participants who should be considered responsible for their injury (perpetrator) from participants who had been injured as a result of someone else's action (victim). Estimates derived in *Articles III* were thus based on exposure status of injured patients. The absence of alcohol consumption by a "victim" of violence can, however, not be assumed to be by itself the key factor in preventing violence-related injuries. However, it can be assumed that a higher proportion of acute consumption should be expected among perpetrators than among victims[182]. For this

reason, it can be expected that the reported estimates should be down-biased and as a consequence that the attributable fractions derived in *Article III* are conservative.

6.3 IMPLICATIONS

As highlighted by the large shares of injuries that are due to alcohol consumption, the alcohol and injury relationship represents an essential public health issue[5-7]. Needs for action exist, as do potential intervention tools. Findings suggest that the alcohol and injury link not only concerns injury events that are expected to show a strong association (i.e. violence and traffic-related). Similarly, not only individuals with hazardous usual drinking sustain injuries in line with an acute consumption. These findings imply that reflections in terms of potential target group for intervention have to be conducted. Such exertion seems particularly required as, by contrast to other alcohol-related adverse consequences, people with "at risk" consumption do not represent the largest condition when considering alcohol-related preventable burden of injury.

Large scale interventions

In Switzerland, communication campaigns have been used for decades to highlight public health issues related to alcohol consumption and problems. Nonetheless, the effects of such campaigns are uncertain when compared to those of other interventions (e.g. structural interventions aiming at reducing the level of alcohol availability or even brief alcohol interventions[200-203]).

As discussed above, to consider injury fractions due to different levels of acute alcohol consumption did bring to light an interesting finding: a "preventive paradox" acts in the alcohol and injury interweaving[138 187 188].

The high impact of low and moderate levels of consumption highlights that it is not enough to attempt to target individuals with high risk drinking behaviors, such as heavy episodic drinkers or chronic high volume drinkers. Consumption episodes of relatively low amounts of alcohol and less harmful drinking patterns are for this reason also to target to significantly reduce the alcohol-related injury burden. Such findings suggest that population-based approaches may be appropriate means for prevention; maybe as a complement to interventions targeting different consumer groups within specific setting such as in emergency departments[204].

Effects of structural measures affecting the physical availability of alcoholic beverages have been evaluated in different countries[205-211]. Multi-components interventions, combining structural (e.g. changes in legal regulation or better law enforcement) and "non-structural" components (e.g. interventions encouraging responsible beverage service or augmentation of substance abuse treatment offers), have been reported to lead to significant reductions in high-risk alcohol consumption, in alcohol-related injuries resulting from assaults and motor vehicle crashes, and in fatal alcohol-related traffic crashes[206 207]. It can be added that "natural" interventions leading to increases in the availability of alcohol (due to deregulations of alcohol market) have shown to lead to increases in alcohol-related injury morbidity and mortality[205 208-211].

In Switzerland, changes in legal regulations (i.e. lowering of the legal limit of drunk driving to 0.05% of blood alcohol level, and carrying out of systematic roadside police

controls), in combination with communication campaigns, have recently been implemented to reduce drunk driving. As a consequence, alcohol-related motor vehicle crashes with fatal and severe injuries have consistently decreased in official statistics[212], which argues for the likely effects of future structural interventions on alcohol availability in this country.

Structural interventions aiming at decreasing the availability of alcohol (e.g. by means of tax increases or restrictions of retail conditions) are frequently unpopular since the population often views them as threats to "individual freedom." Such interventions in Switzerland could thus benefit from communication campaigns supporting and detailing the reasons for their implementation[213].

In this perspective, *Article III* reveal that one-fifth of injuries from falls could theoretically be prevented by not consuming alcohol (these injuries represent about half of all injuries in the study population). Yet, it is possible that, potentially as a result of interventions targeting drunk driving, lay people do not consider alcohol as a major source of "risk" for sustaining an injury under other "circumstances." Informational prevention campaigns could thus complement structural interventions. These could emphasize that individuals risk injury as a consequence of their drinking even if they are consuming alcohol in a moderate way, and even if they do not combine such consumption with at risky activities such as driving or diving. The findings of "at higher risk for injury from the first drink" and of "the more you consume, the more you increase your individual risk for being injured" could then be used as rationales for the implementation of structural interventions.

Treatment and interventions in emergency settings

For many years, emergency departments have been a privileged setting for implementation and evaluation of brief alcohol interventions[204 214-216].

Alcohol interventions in such settings have the potential to influence both injured patients' alcohol consumption and their risk of injury recurrence[215-217]. Emergency department admissions are thus opportunities to lower the alcohol-related burden of injury and disease.

Initial findings relate to injury and injured patients' characteristics that could have potential implications with regard to the implementation of these interventions. Alcohol consumption forms part of the history of a large proportion of injuries. Besides, patients reporting levels of usual consumption exceeding common guidelines for "safe" or "low risk" drinking were more likely to be injured under the influence of alcohol than were their counterparts with safer drinking patterns. In the same vein, injuries sustained after alcohol consumption and injuries sustained by people with hazardous usual drinking patterns but without direct influence of alcohol (in the event) were found to differ from each other. They concern specific populations and distinct groups for interventions. In addition, acute and usual alcohol consumption "involvements" appeared to vary across injury circumstances.

Together, these findings suggest that future interventions that are intended to influence the alcohol consumption of injured patients should consider an emergency admissions not only through the focus of an "at risk usual alcohol consumption." It could therefore be interesting to consider the way the patient's usual drinking patterns combines with the consumption "in the event." It could further be suggested that considering this combination and to address potential attribution phenomenon (i.e. the fact that a patient

is or is not associating the injury with his/her alcohol consumption) could be relevant to future interventions[218]. Finally, regarding acute and usual alcohol consumption as part of a broader framework into which the injury occurred could potentially give opportunities to design or modulate interventions for different patients' "profiles." This appears relevant, since undifferentiated screening and interventions are not likely to affect all patients equally.

Care implications

It was observed that acute alcohol consumption is significantly associated with the time of the injury (i.e. night and weekend injuries were closely tied to acute alcohol consumption; *Article II*). This information is probably tacit knowledge among emergency department medical staff. However, the statistical consistency of this phenomenon suggests that the time of injury can be a key indicator of potential alcohol involvement; an important feature in clinical perspectives since presence of alcohol in the organism is known to be a crucial element in the diagnosis and treatment of injured patients (see Section *2.1.3*). By contrast, the thesis underlines the inappropriateness of considering either the body region that is injured or the nature of the sustained trauma to identify injuries as likely to be alcohol-related (*Article IV*).

Future research

Finally, findings of the thesis highlight the need for further research on alcohol and injury. Hazardous "usual" drinking patterns have been reported to increase the risk for injury[75] and to have the potential of moderating the association between acute consumption and injury[52]. The present thesis observed that some typical injury circumstances were associated with specific hazardous drinking patterns. Such an association is intriguing and should be considered in future research. The deeper investigation of potential causal links between usual consumption and specific injury circumstances would potentially highlight specific settings of injury occurrence, such as here sport activities, in which targeted prevention activities could be aimed. The thesis also underlined the fact that injury characteristics – among which acute and usual alcohol consumption – are interrelated but not interchangeable (*Article I*). Alcohol research has to date hardly considered injuries as multi-factorial. However, considering injuries from a more complex perspective would have the potential to give a supplementary and potentially broader picture of alcohol involvement in injury events. This might for instance have potential for the development of sound alcohol-related countermeasures in line with other injury factors.

7 CONCLUSION

Findings consistently emphasize the important implication of alcohol consumption in injuries treated in emergency departments in Switzerland. Associations between both acute and usual consumption and specific and unspecific injury circumstances are observed, highlighting the complexity of the relationship between these phenomena. Moreover, methodological investigations suggest that, in an epidemiological perspective, the tools considered for measuring acute alcohol consumption throughout the thesis are trustworthy, which strengthens the validity of its results.

It was estimated that relatively large fractions of injuries (between 15% and 33%) could have been prevented in absence of alcohol consumption "in the preceding 24 hours." Also, even if injuries from interpersonal violence showed a stronger connection with acute alcohol consumption, these injuries did not represent a large part of the total injury burden in the study population. Accordingly, future interventions should aim to prevent interpersonal violence as well as other "non-intentional" injuries. Since low levels of acute consumption were consistently associated with higher risk of injury, and since these levels of consumption were responsible for the major share of alcohol-attributable burden (at least for those that were not related to violence), the findings suggest that episodes of relatively low levels of alcohol consumption should be targeted in coming interventions.

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10 APPENDIX

Questionnaire *Data Source I*

CTA
centre de traitement en alcoologie

En collaboration avec sfa/ispa et ISGF

«Cannabis et traumatisme : une étude transversale»

Questionnaire

Project financed by the Swiss National Science Foundation;
Contract no. 3200B0-105967/1.

ID no. xxxx

Vx

SECTION A: FORMULAIRE D'ADMISSION

IDENT	**Numéro d'identification du répondant pour l'étude**	xxxx

QA01	**Numéro IPAO**									
QA02	**Numéro de séjour** *(INDISPENSABLE pour relance de l'interview)*									
QA03	**Numéro d'enregistrement du patient (no. IPP)** *(INDISPENSABLE pour relance de l'interview)*									

QA04	**Date d'admission**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QA05a	**Heure d'accueil (codification sur 24 heures)**					*h*	*h*	*m*	*m*
QA05b	**Heure d'admission**					*h*	*h*	*m*	*m*
QA05c	**Heure de transfert au service des Urgences**					*h*	*h*	*m*	*m*

QA06	**Sexe du patient**	M	1
		F	2

QA07	**Age du patient (en années)**	__	__	ans

Si l'age du patient est inférieur à 16 ans, le patient est innéligible (arrêter ici - pas de filtrage)

QA08	**Plainte principale** [brève description – si possible : mécanisme et nature du traumatisme]	**CODE ELTG** — — —

QA09	**Lieu de prise en charge (URGA/URGC)**	URGA	1
		URGC	2
	Bloc de prisen en charge	___	

QA10	**Le patient est-il pris en charge suite à un traumatisme ou suite à une maladie?**	Traumatisme	1
		Maladie	2

En cas de maladie, le patient est innéligible (arrêter ici - pas de filtrage)

QA11	S'il s'agit d'un traumatisme mais que le patient n'est pas éligible (défini avant-même de rentrer en contact avec el patient), précisez la raison :

QA12	**Le patient est-il éligible pour l'étude?** (traumatisme + survenue moins de 24 heures avant l'arrivée aux Urgences)	OUI	1
		NON	2

En cas d'éligibilité contacter la personne responsable de la prise en charge du patient

QA13	**Initiales d'identification de l'enquêteur**		_	_	_
QA14	**Ordinateur portable utilisé pour la saisie des données**	Emergency Room :	1	2	

Uniquement en cas d'acceptation de l'échantillonage sanguin :

IUML	**Numéro d'identification (IUML) de l'échantillonage**	[autocollant IUML]

SECTION B: REGISTRE DES CONTACTS

QB01a	**Date de la première tentative de contact**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*	
QB01b	**Heure de la première tentative de contact (codification sur 24 heures)**	*h*	*h*	*m*	*m*					
QB01c	**Le patient a-t-il pu être contacté (première tentative)?**	Oui [Aller à **QC01a**]								1
		Non								2

QB01d	**Pour quelle raison le patient n'a-t-il pas pu être interviewé (première tentative)?**	
	Raisons linguistiques *Remerciez et aller à la section P (même feuillet)*	1
	Refus *Remerciez et aller à la section P (même feuillet)*	2
	Soins / Refus du personnel infirmier	3
	Ventilé	4
	Trop sévèrement blessé ou inconscient	5
	Confus	6
	Trop intoxiqué pour coopérer	7
	Le patient n'a pas pu être localisé	8
	Le patient ne voulait pas coopérer	9
	Autre (spécifiez_____)	99

QB02a	**Date de la deuxième tentative de contact**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*	
QB02b	**Heure de la deuxième tentative de contact (codification sur 24 heures)**	*h*	*h*	*m*	*m*					
QB02c	**Le patient a-t-il pu être contacté (deuxième tentative)**	Oui [Aller à **QC01a**]								1
		Non								2

QB02d	**Pour quelle raison le patient n'a-t-il pas pu être interviewé (deuxième tentative)?**	
	Raisons linguistiques *Remerciez et aller à la section P (même feuillet)*	1
	Refus *Remerciez et aller à la section P (même feuillet)*	2
	Soins / Refus du personnel infirmier	3
	Ventilé	4
	Trop sévèrement blessé ou inconscient	5
	Confus	6
	Trop intoxiqué pour coopérer	7
	Le patient n'a pas pu être localisé	8
	Le patient ne voulait pas coopérer	9
	Autre (spécifiez_____)	99

QB03a	**Date de la troisième tentative de contact**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*	
QB03b	**Heure de la troisième tentative de contact (codification sur 24 heures)**	*h*	*h*	*m*	*m*					
QB03c	**Le patient a-t-il pu être contacté (troisième tentative)**	Oui [Aller à **QC01a**]								1
		Non								2

QB03d	**Pour quelle raison le patient n'a-t-il pas pu être interviewé (troisième tentative)?**	
	Raisons linguistiques *Remerciez et aller à la section P (même feuillet)*	1
	Soins / Refus du personnel infirmier *Remerciez et aller à la section P (même feuillet)*	2
	Soins *Abandonnez l'interview* [aller à la section P]	3
	Ventilé *Abandonnez l'interview* [aller à la section P]	4
	Trop sévèrement blessé ou inconscient *Abandonnez l'interview* [aller à la section P]	5
	Confus *Abandonnez l'interview* [aller à la section P]	6
	Trop intoxiqué pour coopérer *Abandonnez l'interview* [aller à la section P]	7
	Le patient n'a pas pu être localisé *Abandonnez l'interview* [aller à la section P]	8
	Le patient ne voulait pas coopérer *Abandonnez l'interview* [aller à la section P]	9
	Autre (spécifiez_____) *Abandonnez l'interview* [aller à la section P]	99

SECTION C: FILTRAGE ET ÉVALUATION PAR OBSERVATION D'INTOXICATION A L'ALCOOL ET AU CANNABIS

Bonjour, mon nom est (NOM) du **Département universitaire de médecine et santé communautaire**. Nous prenons contact avec les gens qui viennent au service des urgences aujourd'hui et je souhaiterais vous interviewer. Seriez-vous d'accord de répondre à quelques questions ?

SI NECESSAIRE: c'est une étude qui est conduite ici au CHUV et qui a pour but d'en savoir un peu plus sur les problèmes et les raisons qui amènent les gens au service des Urgences (donner si nécessaire certains renseignements supplémentaires - voir feuille d'information annexée - et assurer l'interviewé-e que les données et résultats seront traités de manière strictement confidentielle).

QC01a	**Date d'observation / de contact**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QC01b	**Heure d'observation / de contact (codification sur 24 heures)**					*h*	*h*	*m*	*m*

QC02	**A quelle heure votre accident s'est-il produit?** *REMARQUE : Si le patient ne sait plus avec précision, demander l'heure approximative (cette information est indispensable) !*								
QC02a	Date	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QC02b	Heure (codification sur 24 heures)					*h*	*h*	*m*	*m*

Si > 24 heures *avant l'arrivée au service des urgences, remerciez et interrompez l'interview*

QC03	**Est-ce le premier traitement que vous recevez pour cette blessure, i.e. pas de réadmission?**	Oui	1
		Non	2

Si Non, remerciez et interrompez l'interview

QC04	**Pouvez-vous SVP répondre aux quelques questions que je vais vous poser maintenant :** Note :En cas de réponse incorecte, permettez au sujet de corriger sa réponse erronée en lui demandant « Êtes vous sûr ? »

	Réponses	***1ère évaluation***		***2ème évaluation***	
Temporalité :		juste	faux	juste	faux
En quelle année sommes-nous ?	[___ ___ ___ ___]	J	F	J	F
En quel mois sommes-nous ?	[___ ___]	J	F	J	F
Quel jour du mois sommes-nous ?	[___ ___]	J	F	J	F
Quel jour de la semaine sommes-nous ?	L / M / M / J / V / S / D	J	F	J	F
En quelle saison sommes-nous ?	printemps / été / automne / hiver	J	F	J	F
Spatialité :					
Dans quelle région sommes-nous ?	[_____]	J	F	J	F
Dans quel pays sommes-nous ?	[_____]	J	F	J	F
Dans quelle ville sommes nous ?	[_____]	J	F	J	F
Dans quel lieu sommes-nous ?	[_____]	J	F	J	F
	Total : [__]	Réponses correctes (1ère évaluation)			
	Total : [__]	Réponses correctes (2ème évaluation)			

QC05 ***(interviewer)***	**Décision concernant l'éligibité**	1ère éval.	2ème éval.
	Inéligibilité temporaire (moins de 7 réponses correctes)	0	0
	Eligibilité	1	1

Si Inéligibilité temporaire, suspension momentanée de l'interview et nouvelle évaluation dans les heures ou jours suivants ;
Si le patrient est éligible, prétexter d'aller chercher votre matériel et contacter le personnel en charge du soins du patient pour opérer rapidement et conjointement l'évaluation d'intoxication (QC05 à QC08).

ÉVALUATION D'INTOXICATION A L'ALCOOL ET AU CANNABIS PAR OBSERVATION : A remplir en collaboration avec le personnel médical

Ne pas remplir en présence du patient !!!

Note : Cette observation doit être entreprise par une personne entraînée à la détection des signes d'intoxication à l'alcool et au cannabis en concordance avec les codes Y91.
Cette évaluation est entreprise afin de déterminer la possibilité d'éligibilité du patient. En cas d'inéligibilité temporaire une ré-évaluation doit impérativement être entreprise dans les heures ou jours (selon le degré d'intoxication) suivant la première tentative d'évaluation.

QC06	***Dans le tableau ci-dessous, indiquez SVP quels signes d'intoxication le patient montre-t-il, ainsi que la sévérité de ces signes (cochez les cases appropriées)***

	1ère évaluation						***2ème évaluation***					
	Sévérité / Proéminence						***Sévérité / Proéminence***					
Signes cliniques	***Très sévère***	***Sévère***	***Modéré***	***Léger***	***Aucune***	***Pas applicable***	***Très sévère***	***Sévère***	***Modéré***	***Léger***	***Aucune***	***Pas applicable***
Odeur d'alcool dans l'haleine												
Odeur de cannabis (haleine, habits, etc.)												
Désorientation												
Tremblements												
Yeux injectés de sang et couleur du visage pâle ou empourprée												
Troubles du langage (p.ex. de l'articulation)												
Trouble de la coordination moteur												
Troubles de l'attention et/ou du jugement												
Humeur exaltée (euphorie) ou dépressive												
Trouble des réponses comportementales												
Troubles des réponses émotionnelles												
Diminution de la capacité à coopérer												
Nystagmus horizontaux et verticaux												
Pupilles dilatées												

QC07	**Nom de la personne ayant opéré cette évaluation avec vous**	_____

QC08	**En vous basant sur les signes mentionnés ci-dessus, et concernant uniquement une potentielle intoxication à l'alcool, diriez-vous que le patient est dans l'état de :** *(Cochez la catégorie correspondante)*		*1ère éval.*	*2ème éval.*
Y91.3a	*Très sévère intoxication à l'alcool* *(Troubles très sévères dans les fonctions et réponses, difficultés très sévères de coordination ou perte de la capacité à coopérer)*		*4*	*4*
Y91.2a	*Sévère intoxication à l'alcool* *(Troubles sévères dans les fonctions et réponses, difficultés sévères de coordination ou diminution de la capacité à coopérer)*		*3*	*3*
Y91.1a	*Intoxication modérée à l'alcool* *(Odeur d'alcool dans l'haleine, troubles modérés du comportement dans les fonctions et réponses ou difficultés modérées de coordination)*		*2*	*2*
Y91.0a	*Légère intoxication à l'alcool* *(Odeur d'alcool dans l'haleine, léger troubles du comportement dans les fonctions et réponses ou légères difficultés de coordination)*		*1*	*1*
Y91.9a	*Implication d'alcool non-spécifiée ci-dessus (spécifiez les raisons: _____ _____ _____)*		*9*	*9*
	Ou	**Aucune intoxication à l'alcool**	**0**	**0**

QC09	**En vous basant sur les signes mentionnés ci-dessus, *et concernant uniquement une potentielle intoxication au cannabis*, diriez-vous que le patient est dans l'état de :** *(Cochez la catégorie correspondante)*		*1ère éval.*	*2ème éval.*
Y91.3b	Très sévère intoxication au cannabis *(Troubles très sévères dans les fonctions et réponses, difficultés très sévères de coordination ou perte de la capacité à coopérer)*		4	4
Y91.2b	Sévère intoxication au cannabis *(Troubles sévères dans les fonctions et réponses, sévères difficultés de coordination ou diminution de la capacité à coopérer)*		3	3
Y91.1b	Intoxication modérée au cannabis *(Odeur de cannabis dans l'haleine, troubles modérés du comportement dans les fonctions et réponses ou difficultés modérées de coordination)*		2	2
Y91.0b	Légère intoxication au cannabis *(Odeur de cannabis dans l'haleine, léger troubles du comportement dans les fonctions et réponses ou légères difficultés de coordination)*		1	1
Y91.9b	*Implication de cannabis non-spécifiée ci-dessus (spécifiez les raisons: _____ _____ _____)*		9	9
	Ou	**Aucune intoxication au cannabis**	**0**	**0**

QC10 *(interviewer)*	**Pensez-vous qu'il y ait une évidence (signe) de consommation de substance autre que de l'alcool ou du cannabis ?**	
Non		0
Oui, sur la base des informations données par le patient		1
Oui, sur la base d'observations		2
Oui, sur la base à la fois d'informations données par le patient et d'informations supplémentaires		3
Pas de certitude		9

QC11 *(interviewer)*	Décision concernant l'éligibité	*1ère éval.*	*2ème éval.*
	Inéligibilité temporaire (pour cause de **sévère intoxication**)	0	0
	Eligibilité	**1**	**1**

Si Inéligibilité temporaire, suspension momentanée de l'interview et nouvelle évaluation dans les heures ou jours suivants

Si la personne est éligible, soumetez lui la feuille d'information ! *La lui lire si nécessaire ! Et demander son consentement à l'interview (uniquement interview – le consentement pour la mesure de l'air expiré se fait ultérieurement) !*

Si le patient a attendu plus de 6 heures (mais moins de 24 heures) avant de se présenter au service des urgences, précisez que ni la prise de sang, ni la mesure de l'air expiré ne lui seront demandées !

Veuillez s'il vous plaît lire ce formulaire de consentement. Il vous en dit un peu plus à propos de l'étude et sur ce que nous vous demandons de faire (ou je peux le lire pour vous si vous le désirez). DEMANDEZ AU PATIENT/A LA PATIENTE SI IL/ELLE CONSENT A PARTICIPER A L'ENQUÊTE

QC12	**Le consentement (patient) à la participation à l'enquête (questionnaire) a-t-il été donné?**		
		Oui	1
		Non [section P]	2

Si Non, remerciez, interrompez l'interview et remplissez la section P.

SECTION D: QUESTIONNAIRE CONCERNANT LA BLESSURE

IDENT	**Numéro d'identification du répondant pour l'étude**	_	_	_	_

AGE	**Age du patient**	[__ __]	
GENDER	**Sexe du patient**	masculin	1
		féminin	2

QD00	**Le consentement (patient) à la participation à l'enquête (au questionnaire) a-t-il été donné?**	Oui	1
		Non	2

Si non, le patient ne doit pas être interrogé !

Je souhaite maintenant simplement vous poser quelques questions concernant votre blessure ou votre accident *(Ces informations peuvent être obtenues au travers du dossier médical si le patient ne peut pas répondre à ces questions – ces informations sont à demander au personnel infirmier).*

	Pourrriez-vous me rappeler l'heure à laquelle votre accident s'est produit? *REMARQUE : Si le patient ne sait plus avec précision, demander l'heure approximative (cette information est indispensable) !*								
QD00a	Date	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QD00b	Heure (codification sur 24 heures)					*h*	*h*	*m*	*m*

QD00c	**En vous rapportant à cette heure, dans quel délais le patient s'est-il présenté au service des Urgences ?**	
	Moins de 6 heures apèrs la survenue	1
	Entre 6 et 24 heures après la survenue	2
	Pas d'information	9

Racontez-moi – s'il vous plaît – ce qui vous est arrivé. C'est-à-dire quelle est la raison principale de votre présence ici aujourd'hui?

Note pour l'interviewer: veuillez répondre aux questions QD01 à QD06 en vous aidant de cette description; posez des questions supplémentaires si la description donnée n'est pas suffisamment précise. Si nécessaire, le dossier médical peut également être utilisé pour répondre aux questions.

QD01	Pour quel type de traumatisme le patient est-il traité? [CODEZ TOUT CE QUI S'APPLIQUE]	
	Fracture	1
	Entorse, foulure, luxation	2
	Entaille, morsure, blessure pénétrante, plaie ouverte	3
	Contusion, éraflure, plaie superficielle	4
	Brûlure	5
	Commotion cérébrale, blessure fermée de la tête	6
	Atteinte d'un système (locomoteur, cardio-vasculaire, respiratoire, digestif, neurologique) / Polytraumatisme (≥3 systèmes atteints)	7
	Autre (spécifiez _____)	8
	Manque d'information / R ne sait pas / refuse de répondre	9

QD10	**Comment avez-vous été blessé?** [CODEZ UNE SEULE REPONSE]	
	A été renversé par un véhicule (en tant que piéton)	1
	A été impliqué dans un accident de la route (en tant que conducteur)	2
	A été impliqué dans un accident de la route (en tant que passager)	3
	Agression sexuelle	4
	Blessure suite à un acte de violence / Agression	5
	Blessure par balle	6
	Coup de couteau, entaille, morsure	7
	Etouffement, pendaison	8
	Chute, a trébuché	9
	Frappé contre / attrapé entre (coincé par quelque chose)	10
	Noyade / quasi-noyade	11
	Empoisonnement	12
	Brûlure par feu, flamme, chaleur ou liquide brûlant	13
	Autre (spécifiez _____)	89
	Manque d'information / R ne sait pas / refuse de répondre	99

QD12	**Ou étiez-vous lorsque vous avez eu votre blessure/accident?** *(si nécessaire, provoquez la réponse ou regardez dans le dossier médical)*	
	Chez soi	1
	Chez quelqu'un d'autre	2
	Dans la rue, sur la route	3
	A l'école	4
	Dans un bar, un restaurant, un hôtel ou un autre endroit où l'on peut boire de l'alcool	5
	Sur sa place de travail	6
	Ailleurs (spécifiez _____)	7
	Manque d'information / R ne sait pas / refuse de répondre	9

QD14	**Que faisiez-vous au moment de votre blessure/accident?** *(si nécessaire, provoquez la réponse ou regardez dans le dossier médical)*	
	Travail salarié	1
	Trajet ou voyage	2
	Formation ou éducation	3
	Sport	4
	Loisirs, jeux	5
	Ne faisait rien en particulier	6
	Autre (spécifiez _____)	7
	Manque d'information / R ne sait pas / refuse de répondre	9

QD16	**Pourquoi avez-vous été blessé? Etait-ce suite à un acte intentionnel ou à un accident? Vous êtes vous fait cette blessure vous-même ou a-t-elle été causée par un tiers?** *(si nécessaire, provoquez la réponse ou regardez dans le dossier médical)* [CODEZ LA RAISON PRINCIPALE]		
	Blessure accidentelle causée par soi-même	[*aller à QD22*]	1
	Blessure accidentelle causée par une autre personne		2
	Blessure intentionnelle causée par soi-même	[*aller à QD22*]	3
	Blessure intentionnelle causée par une autre personne		4
	Intervention légale	[*aller à QD22*]	5
	Autre (spécifiez _____)		6
	Manque d'information / R ne sait pas / refuse de répondre		9

QD18	*Remarque: seulement en cas d'implication d'une autre personne:* **Qui était la personne qui vous a blessé ou s'est battue avec vous?** [CODEZ L'AUTEUR PRINCIPAL]	
	Epoux, partenaire (ancien ou actuel)	1
	Parent, beau-parent	2
	Autre personne de la famille (spécifiez _____)	3
	Ami, connaissance	4
	Inconnu	5
	Autre (spécifiez _____)	6
	Manque d'information / R ne sait pas / refuse de répondre	9

QD20	*Remarque: seulement en cas d'implication d'une autre personne:* **Selon vous, la ou les personne(s) qui vous a(ont) blessé, agressé ou avec qui vous vous êtes battu avai(en)t-elle(s) consommé de l'alcool?**	
	Oui, sans aucun doute	1
	Suspecté	2
	Non	3
	R ne sait pas, n'est pas certain	9

QD21	*Remarque: seulement en cas d'implication d'une autre personne:* **Selon vous, la ou les personnes qui vous a(ont) blessé, agressé ou avec qui vous vous êtes battu avai(en)t-elle(s) consommé du cannabis ou du haschich, etc… ?**	
	Oui, sans aucun doute	1
	Suspecté	2
	Non	3
	R ne sait pas, n'est pas certain	9

QD22	**Durant les douze derniers mois, avez-vous fréquenté un service d'urgences pour une blessure ou un accident?** *(Sans compter cette occasion)*		
	Oui		1
	Non	[*aller à section E*]	2
	R ne sait pas, ne se souvient pas		9

QD23	**Si oui, en excluant cette occasion-ci, combien de fois avez-vous été vu dans un service d'urgence pour une blessure lors des douze derniers mois?**	
	Nombre de visites au service des urgences	[___]

SECTION E: CONSOMMATION D'ALCOOL AVANT L'INCIDENT (BLESSURE/ACCIDENT)

QE01	**Heure de l'interview (codification sur 24 heures)**	*h*	*h*	*m*	*m*

QE02	**Date de l'interview**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*

QE03	**Numéro d'identification de l'enquêteur**			

Je vais maintenant vous poser un certain nombre de questions relatives à la consommation d'alcool. Ceci fait partie de l'enquête. Et je peux vous assurer que ces informations seront traitées de manière strictement confidentielle.

Rappeler éventuellement qu'aucune information fournie ne sera répertoriée dans le dossier médical, ni ne sera utilisée en dehors de cette étude ou transmise à qui que ce soit.

QE04	**Dans les 6 heures précédant le moment où vous avez été blessé ou accidenté, avez-vous consommé de l'alcool – même juste un verre?**	
	Oui	1
	Non [*aller à Section F*]	2
	R refuse de répondre	8
	R ne sait pas	9

	A quelle heure avez-vous commencé à boire?								
QE05	Date	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QE06	Heure (codification sur 24 heures)					*h*	*h*	*m*	*m*

QE07	**Combien d'heures et de minutes se sont-elles écoulées entre le moment où vous avez consommé votre dernier verre et le moment où vous avez été blessé ou accidenté?**				
	Heures/minutes	*h*	*h*	*m*	*m*

Je voudrais maintenant savoir approximativement ce que vous avez bu durant les **6 heures** précédant le moment où vous avez été blessé ou accidenté

A/ Qu'avez-vous bu durant les 6 heures précédant le moment où vous avez été blessé ou accidenté?
B/ De quelle grandeur étai(en)t le ou les contenant(s) (verres/bouteilles)?
C/ Et combien d'unités (verres/bouteilles) de chaque boisson avez-vous consommé?

Note : Si vous n'êtes pas à même de catégoriser le type de boisson, relevez SVP la marque. La catégorisation peut être établie lors de la saisie informatique des données.

Boisson alcoolisée*	Taille du contenant	Nombre d'unités	Question
Bière	Verre, canette ou bouteille standard (env. 300ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE08**
	Chope, canette de 500ml ou grande bouteille (500ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE09**
Vin, champagne	Verre (100ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE10**
	½ bouteille (375ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE11**
	Bouteille (750ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE12**
Apéritif (Martini, Campari, Pastis, etc.)	Mesure simple (20ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE13**
	Double mesure (40ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE14**
	½ bouteille (375ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE15**
Alcool fort/spiritueux (Kirsch, Whisky, Liqueur, etc.)	Mesure simple (20ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE16**
	Double mesure (40ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE17**
	½ bouteille (375ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE18**
Alcopops	Bouteille standard	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE19**
Mixed drink (Cocktails, Gin-Tonic, Rum-Cola, Irish Coffee, etc.)	Long drinks ou cocktails	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QE20**

Si R a donné une description de sa consommation	[aller à QE22]
Si R ne sait pas, ne se souvient pas	[aller à QE21]
Si R refuse de répondre à la question	[aller à QE21]

QE21	*Si le répondant ne peut pas se souvenir de sa consommation d'alcool détaillée sur les 6 heures précédant le moment où il a été blessé:* **Combien de verres d'alcool avez-vous bu au total durant les 6 heures précédant le moment où vous avez été blessé (un verre représente approximativement 3dl de bière, 1dl de vin ou un verre d'alcool fort/spiritueux (20-40ml))?**	
[Question ouverte]		[ ] unités
	R refuse de répondre à la question	98
	R ne sait pas, ne se souvient pas	99

QE22	**Sur une échelle de 0 à 4, 4 représentant « très sévèrement ivre ou soûl » et 0 représentant « pas ivre ou soûl du tout », à quel point vous sentiez-vous ivre ou soûl au moment où vous avez été blessé ou accidenté?** *(Lire la liste de réponses possibles au R; ré-exposer la question en soulignant A votre avis à quel point étiez vous ivre…)*	
Y91.3	Très sévèrement soûl/ivre / très sévèrement intoxiqué	4
Y91.2	Sévèrement soûl/ivre / sévèrement intoxiqué	3
Y91.1	Modérément soûl/ivre / modérément intoxiqué	2
Y91.0	Un peu soûl/ivre / un peu intoxiqué	1
	Pas soûl du tout	0
Y91.9	Inconnu (R refuse de spécifier à quel point)	9

QE23	**Avez vous bu de l'alcool entre le moment où votre blessure/accident est survenu(e) et celui de votre venue au service des urgences?**		
	Oui		1
	Non	[*aller à QE25*]	2
	R refuse de répondre		8
	R ne sait pas		9

QE24	Si le répondant a consommé de l'alcool entre le moment de la blessure ou de l'accident et son arrivée au service des urgences: **Combien de verres d'alcool avez-vous bus? (un verre correspond approximativement à 3dl de bière, 1dl de vin ou un verre d'alcool fort/spiritueux (20-40ml))**	
[Question ouverte]		[___] verres
	R ne sait pas, ne se souvient pas	99

QE25	**Pensez-vous que votre blessure ou accident serait également survenu(e) si vous n'aviez pas consommé d'alcool?**	
	Oui	1
	Non	2
	R ne sait pas, n'est pas certain	9

SECTION F: CONSOMMATION DE CANNABIS AVANT L'INCIDENT (BLESSURE/ACCIDENT)

Je vais maintenant vous poser un certain nombre de questions relatives à la consommation de cannabis. Ceci fait partie de l'enquête. Tout comme pour les questions précédentes, ces informations seront traitées de manière strictement confidentielle

Rappeler éventuellement qu'aucune information fournie ne sera répertoriée dans le dossier médical, ni ne sera utilisée en dehors de cette étude ou transmise à qui que ce soit.

QF01	**Dans les 6 heures précédant le moment où vous avez été blessé ou accidenté, avez-vous consommé du cannabis, du haschich, de la marijuana, de l'herbe ou n'importe quelle substance apparentée – même seulement une bouffée?**	
	Oui	1
	Non [*aller à Section G*]	2
	R refuse de répondre	8
	R ne sait pas	9

Remarque: dans le reste de l'interview, nous n'emploierons plus que le terme de cannabis mais il englobe aussi le haschisch, la marijuana et l'herbe.

	A quelle heure avez-vous commencé à consommer du cannabis?								
QF02	Date	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QF03	Heure (codification sur 24 heures)					*h*	*h*	*m*	*m*

QF04	**Combien d'heures et de minutes se sont-elles écoulées entre le moment où vous avez consommé votre dernière bouffée de cannabis et le moment où vous avez été blessé ou accidenté?**				
	Heures/minutes	*h*	*h*	*m*	*m*

QF05	**Combien avez-vous consommé de cannabis durant les 6 heures précédant le moment où vous avez été blessé? Etait-ce environ une bouffée ou plusieurs bouffées, un joint ou une pipe, deux joints ou plus ou était-ce sous une autre forme? Si autre forme, en quelle quantité?**	
	Une bouffée sur un joint ou une pipe	1
	Plusieurs bouffées sur un joint ou une pipe	2
	A peu près un joint ou une pipe	3
	A peu près deux joints ou pipes	4
	Plus de deux joints ou pipes	5
	Autre forme (cookies; space cake, etc.); combien _____	6
	R refuse de répondre	8
	R ne sait pas	9

QF07	**Sur une échelle de 0 à 4, 4 représentant « très sévèrement stoned » et 0 représentant « pas stoned du tout », à quel point vous sentiez-vous stoned au moment où vous avez été blessé ou accidenté?** *(Lire la liste de réponses possibles au R; ré-exposer la question en soulignant A votre avis à quel point étiez* vous *stoned …)*	
YY91.3	Très sévèrement stoned / très sévèrement intoxiqué	4
YY91.2	Sévèrement stoned / sévèrement intoxiqué	3
YY91.1	Modérément stoned / modérément intoxiqué	2
YY91.0	Un peu stoned / un peu intoxiqué	1
	Pas stoned du tout	0
YY91.9	Inconnu (R refuse de spécifier à quel point)	9

QF08	**Avez vous consommé du cannabis entre le moment où votre blessure/accident est survenu(e) et celui de votre venue au service des urgences?**		
	Oui		1
	Non	[*aller à QF11*]	2
	R refuse de répondre		8
	R ne sait pas		9

QF09	**Quelle quantité de cannabis avez-vous consommée après avoir été blessé ou accidenté?**	
Une bouffée sur un joint ou une pipe		1
Plusieurs bouffées sur un joint ou une pipe		2
A peu près un joint ou une pipe		3
A peu près deux joints ou pipes		4
Plus de deux joints ou pipes		5
Autre forme (cookies; space cake, etc.); combien _____		6
R refuse de répondre		8
R ne sait pas		9

QF11	**Pensez-vous que votre blessure ou accident serait également survenu(e) si vous n'aviez pas consommé de cannabis?**	
	Oui	1
	Non	2
	R ne sait pas / n'est pas certain	9

SECTION G: AUTRES SUBSTANCES

QG01	Dans les 6 heures précédant le moment où vous avez été blessé ou accidenté, avez-vous consommé de la cocaïne?	
	Oui	1
	Non	2
	R refuse de répondre	8
	R ne sait pas	9

QG02	Dans les 24 heures précédant le moment où vous avez été blessé ou accidenté, avez-vous consommé des somnifères ou des tranquillisants (benzodiazépines)?	
	Oui	1
	Non [*aller à QG06*]	2
	R refuse de répondre [*aller à QG06*]	3
	R ne sait pas	9

QG03	Dans les 6 heures précédant le moment où vous avez été blessé ou accidenté, avez-vous consommé des somnifères ou des tranquillisants (benzodiazépines)?	
	Oui	1
	Non	2
	R refuse de répondre	3
	R ne sait pas	9

QG04 Quelle sorte de somnifère ou tranquillisant (benzodiazépines) était-ce? [CODEZ LA SUBSTANCE PRINCIPALE]			
Benzodiazépines:			
Alprazolam (Xanax®)	1	Nitrazepam (Mogadon®)	15
Bromazepam (Lexotanil®)	2	Nordazepam (Vegesan®)	16
Brotizolam (Lendormin®)	3	Oxazepam (Seresta®, Anxiolit®)	17
Clobazam (Urbanyl®)	4	Prazepam (Demetrin®)	18
Clonazepam (Rivotril®)	5	Temazepam (Normison®)	19
Cloxazolam (Lubalix®)	6	Triazolam (Halcion®)	20
Dikaliumclorazepat (Tranxilium®)	7	**Similaires:**	
Diazepam (Valium®, Diazepam Desitin®, Paceum®, Psychopax®, Stesolid®)	8	Clométhiazole (Distraneurin®)	21
Flunitrazepam (Rohypnol®)	9	Méthaqualone (Toquilone compositum®)	22
Flurazepam (Dalmadorm®)	10	Zaleplon (Sonata®)	23
Ketazolam (Solatran®)	11	Zoplicon (Imovane®)	24
Lorazepam (Temesta®, Somnium®, Lorasifar®)	12	Zolpidem (Stilnox®)	25
Lormetazepam (Noctamid®, Loramet®)	13	Autre, précisez [_____]	26
Midazolam (Dormicum®)	14	R ne sait pas	99

QG06	Dans les 6 heures précédant le moment où vous avez été blessé ou accidenté, avez-vous consommé un autre type de drogue?	
	Oui	1
	Non [*aller à Section H*]	2
	R refuse de répondre	8
	R ne sait pas	9

QG07	Quel genre de drogue était-ce?	
	[Question ouverte]	[_____]

SECTION H: CONSOMMATION HABITUELLE D'ALCOOL

Je vais maintenant vous poser quelques questions concernant votre consommation habituelle d'alcool. Souvenez-vous que toutes vos réponses sont confidentielles.

QH01	**Dans les 12 derniers mois, à quelle fréquence avez-vous généralement consommé de l'alcool?** *(Proposez si nécessaire – de la bière, du vin, des spiritueux ou n'importe quelle autre sorte d'alcool)*	
	2 fois par jour ou plus	1
	1 fois par jour; ou presque tous les jours	2
	4 ou 5 fois par semaine	3
	2 ou 3 fois par semaine	4
	2 à 4 fois par mois	5
	Plus rarement	6
	Jamais, abstinent [*aller à Section J*]	7
	R refuse de répondre	8
	R ne sait pas	9

J'aimerais maintenant que vous pensiez à une **occasion typique de consommation d'alcool** et que vous répondiez aux quelques questions suivantes.

QH02	**Combien de verres consommez-vous habituellement lors d'une occasion typique de consommation d'alcool (un verre représente approximativement 3dl de bière, 1dl de vin, un verre d'alcool fort/spiritueux (20-40ml) ou un cocktail (mixed drink))?**	
[Question ouverte]		[ ] unités
	R refuse de répondre à la question	98
	R ne sait pas, ne se souvient pas	99

QH03a QH03b	**L'année dernière, combien de fois vous est-il arrivé de boire 5 verres (pour les hommes) / 4 verres (pour les femmes) de bière, de vin, d'eau-de-vie ou d'un alcool quelconque, en une seule fois?**	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH04a QH04b	**L'année dernière, combien de fois vous est-il arrivé de boire 8 verres (pour les hommes) / 6 verres (pour les femmes) de bière, de vin, d'eau-de-vie ou d'un alcool quelconque, en une seule fois?**	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH05	L'année dernière, combien de fois avez-vous eu l'impression que vous ne pouviez plus arrêter de boire après avoir commencé?	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH06	L'année dernière, combien de fois n'avez-vous pas été capable de faire ce qui était attendu normalement de votre part parce que vous aviez bu?	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH07	L'année dernière, combien de fois avez-vous bu de l'alcool le matin pour vous remettre en train après avoir bu quelques verres de trop le soir précédent?	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH08	L'année dernière, combien de fois avez-vous eu des sentiments de culpabilité ou des remords à cause de votre consommation d'alcool?	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH09	L'année dernière, combien de fois n'avez-vous pas été capable de vous souvenir de ce qui s'était passé la nuit précédente, parce que vous aviez bu?	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QH10	Vous êtes-vous vous-même ou avez-vous blessé corporellement quelqu'un d'autre par votre consommation d'alcool?	
	Non	1
	Oui, mais pas l'année dernière	2
	Oui, l'année dernière	3
	R refuse de répondre	8
	R ne sait pas	9

QH11	Un de vos parents, un ami ou un médecin a-t-il émis des réserves au sujet de votre consommation d'alcool ou vous a conseillé d'en réduire la consommation?	
	Non	1
	Oui, mais pas l'année dernière	2
	Oui, l'année dernière	3
	R refuse de répondre	8
	R ne sait pas	9

QH12a QH12b	L'année dernière, combien de fois avez-vous conduit une voiture, une moto ou une motocyclette après avoir consommé 5 verres ou plus (pour les hommes) / 4 verres ou plus (pour les femmes) de bière, de vin, d'eau-de-vie ou d'un alcool quelconque?	
	Jamais	1
	Moins d'une fois par mois	2
	Chaque mois	3
	Chaque semaine	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

SECTION I: CONSOMMATION D'ALCOOL EXACTEMENT UNE SEMAINE AVANT LA BLESSURE

Dans cette partie du questionnaire je vais vous interroger à propos de ce que vous étiez en train de faire il y a exactement une semaine.

Premièrement, je voudrais que vous pensiez à ce que vous étiez en train de faire et où vous étiez exactement une semaine, heure pour heure, avant que survienne votre blessure ou accident.

(Aidez si nécessaire –par exemple avec: « Vous avez dit que vous avec été blessé/accidenté aujourd'hui, samedi, à 17h30; où étiez-vous samedi dernier à 17h30? »)

QI01	**Pensez à l'heure à laquelle vous avez été accidenté (aujourd'hui) et rappelez-vous cette même heure il y a une semaine. Où étiez-vous il y a une semaine?** *(Si nécessaire énoncer les réponses possibles)*	
	Chez soi	1
	Chez quelqu'un d'autre	2
	Dans la rue, sur la route	3
	A l'école	4
	Dans un bar, un restaurant, un hôtel ou un autre endroit où l'on peut boire de l'alcool	5
	Sur sa place de travail	6
	Ailleurs (spécifiez _____)	7
	R refuse de répondre	98
	R ne sait pas	99

QI03	**En pensant toujours à la semaine dernière à la même heure, aviez-vous consommé de l'alcool – même juste un verre - durant les 6 heures qui précédaient?**	
	Oui	1
	Non [*aller à section J*]	2
	R refuse de répondre	8
	R ne sait pas	9

	A/ En pensant toujours à la semaine dernière à la même heure, qu'aviez vous bu? **B/ De quelle grandeur étai(en)t le ou les contenant(s) (verres/bouteilles)?** **C/ Et combien d'unités (verres/bouteilles) de chaque boisson avez-vous consommé?**

Note: * Si vous n'êtes pas à même de catégoriser le type de boisson, relevez SVP la marque. La catégorisation peut être établie lors de la saisie informatique des données.

Boisson alcoolisée*	Taille du contenant	Nombre d'unités	Question
Bière	Verre, canette ou bouteille standard (env. 300ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI04**
	Chope, canette de 500ml ou grande bouteille (500ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI05**
Vin, champagne	Verre (100ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI06**
	½ bouteille (375ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI07**
	Bouteille (750ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI08**
Apéritif (Martini, Campari, Pastis, etc.)	Mesure simple (20ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI09**
	Double mesure (40ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI10**
	½ bouteille (375ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI11**
Alcool fort/spiritueux (Kirsch, Whisky, Liqueur, etc.)	Mesure simple (20ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI12**
	Double mesure (40ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI13**
	½ bouteille (375ml)	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI14**
Alcopops	Bouteille standard	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI15**
Mixed drink (Cocktails, Gin-Tonic, Rum-Cola, Irish Coffee, etc.)	Long drinks ou cocktails	[_____] Aucune=0 ; R ne sait pas/refuse de répondre=99	**QI16**

Si R a donné une description de sa consommation	[*aller à Section J*]
Si R ne sait pas, ne se souvient pas	[aller à *QI17*]
Si R refuse de répondre à la question	[aller à *QI17*]

QI17	Si le répondant ne peut pas se souvenir de sa consommation d'alcool détaillée de la semaine dernière à la même heure: **En repensant toujours à la semaine dernière à la même heure, combien de verres d'alcool aviez-vous bu *au total* (un verre représente approximativement 3dl de bière, 1dl de vin ou un verre d'alcool fort/spiritueux (20-40ml))?**

[Question ouverte]	[ ] unités
R refuse de répondre à la question	98
R ne sait pas, ne se souvient pas	99

SECTION J: CONSOMMATION HABITUELLE DE CANNABIS

Je vais maintenant vous poser quelques questions concernant votre consommation habituelle de cannabis. Souvenez-vous que toutes vos réponses sont confidentielles.
Remarque: ici encore le terme de cannabis englobe aussi le haschisch, la marijuana et l'herbe.

QJ01	**Avez-vous déjà pris du cannabis?**	
	Oui	1
	Non [*aller à Section L*]	2
	R refuse de répondre	8
	R ne sait pas	9

QJ02	**Avez-vous pris du cannabis dans les 6 derniers mois?**	
	Oui	1
	Non [*aller à Section L*]	2
	R refuse de répondre	8
	R ne sait pas	9

QJ03	**A quelle fréquence avez-vous consommé du cannabis au cours des 6 derniers mois?** **INT: lire si nécessaire**	
	Jamais [*aller à Section L*]	1
	1 fois par mois ou moins souvent	2
	2 à 4 fois par mois	3
	2 à 3 fois par semaine	4
	4 fois par semaine ou plus souvent	5
	R refuse de répondre	8
	R ne sait pas	9

QJ04	**Combien de fois avez-vous consommé du cannabis durant les 30 derniers jours?**	
	Jamais	0
	1 fois	1
	2 - 3 fois	2
	1 fois par semaine	3
	2 à 3 fois par semaine	4
	4 à 5 fois par semaine	5
	Tous les jours ou presque tous les jours	6
	Plusieurs fois par jour	7
	R refuse de répondre	8
	R ne sait pas	9

QJ05	**Quand vous consommez du cannabis, combien en consommez-vous à la fois?** **Est-ce environ 1 bouffée ou plusieurs bouffées, 1 joint ou une pipe, 2 joints ou plus ou est-ce sous une autre forme?** **Si autre forme, en quelle quantité?**	
	Une bouffée sur un joint ou une pipe	1
	Plusieurs bouffées sur un joint ou une pipe	2
	A peu près un joint ou une pipe	3
	A peu près deux joints ou pipes	4
	Plus de deux joints ou pipes	5
	Autre forme (cookies; space cake, etc.); combien _____	6
	R refuse de répondre	8
	R ne sait pas	9

Les quelques questions suivantes concernent encore votre consommation de cannabis. Donnez-moi s'il vous plaît la réponse qui est la plus correcte, selon vous, si vous considérez votre consommation de cannabis au cours des 6 derniers mois.

QJ07	**Dans une journée typique où vous prenez du cannabis, pendant combien d'heures êtes-vous stoned?**	
	1-2 heures	1
	3 ou 4 heures	2
	5 ou 6 heures	3
	7 à 9 heures	4
	10 heures ou plus	5
	R refuse de répondre	8
	R ne sait pas	9

QJ08	**Combien de fois étiez-vous "stoned" pendant au moins 6 heures?**	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QJ09	**Au cours des 6 derniers mois, combien de fois aviez-vous l'impression de ne plus pouvoir vous arrêter de prendre du cannabis?**	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QJ10	**Au cours des 6 derniers mois, combien de fois n'étiez-vous plus en mesure de faire ce que l'on attend normalement de vous à cause de la prise de cannabis?**	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QJ11	**Au cours des 6 derniers mois, combien de fois avez-vous pris du cannabis le matin pour être à nouveau en forme après une forte consommation de cannabis la veille?**	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QJ12	Au cours des 6 derniers mois, combien de fois avez-vous eu des sentiments de culpabilité ou des remords à cause de votre consommation de cannabis?	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QJ13	Au cours des 6 derniers mois, combien de fois avez-vous eu des problèmes de mémoire ou de concentration à cause de votre consommation de cannabis?	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

QJ14	Au cours des 6 derniers mois, avez-vous été blessé physiquement ou est-ce qu'une autre personne l'a été en raison de votre consommation de cannabis?	
	Non	1
	Oui	2
	R refuse de répondre	8
	R ne sait pas	9

QJ15	Au cours des 6 derniers mois, est-il arrivé qu'un parent, un ami ou un médecin exprime des réserves sur votre consommation de cannabis ou vous conseille de réduire votre consommation?	
	Non	1
	Oui	2
	R refuse de répondre	8
	R ne sait pas	9

QJ16	Au cours des 6 derniers mois, combien de fois avez-vous conduit une voiture, une moto ou une motocyclette dans les 2 heures qui ont suivi la consommation de cannabis?	
	Jamais	1
	Moins d'une fois par mois	2
	Mensuellement	3
	Hebdomadairement	4
	Tous les jours ou presque tous les jours	5
	R refuse de répondre	8
	R ne sait pas	9

SECTION K: CONSOMMATION DE CANNABIS EXACTEMENT UNE SEMAINE AVANT LA BLESSURE

Note: uniquement un bref rappel pour les patients ayant déjà été soumis aux questions concernant la consommation d'alcool exactement une semaine avant la survenue de la blessure ou de l'accident.

Dans cette partie du questionnaire je vais vous interroger à propos de ce que vous étiez en train de faire il y a exactement une semaine.

Premièrement, je voudrais que vous pensiez à ce que vous étiez en train de faire et à où vous étiez exactement une semaine, heure pour heure, avant que survienne votre blessure ou accident.

(Aidez si nécessaire –par exemple avec: « Vous avez dit que vous avec été blessé/accidenté aujourd'hui, samedi, à 17h30; où étiez-vous samedi dernier à 17h30? »)

QK01	**Pensez à l'heure à laquelle vous avez été accidenté (aujourd'hui) et rappelez-vous cette même heure il y a une semaine. Où étiez-vous il y a une semaine?** *(Si nécessaire énoncer les réponses possibles)*	
	R a déjà été interrogé à ce propos	0
	Chez soi	1
	Chez quelqu'un d'autre	2
	Dans la rue, sur la route	3
	A l'école	4
	Dans un bar, un restaurant, un hôtel ou un autre endroit où l'on peut boire de l'alcool	5
	Sur sa place de travail	6
	Ailleurs (spécifiez _____)	7
	R refuse de répondre	8
	R ne sait pas	9

QK03	**En pensant toujours à la semaine dernière à la même heure, aviez-vous consommé du cannabis, du haschich ou n'importe quelle substance apparentée – même seulement une bouffée - durant les 6 heures qui précédaient?**	
	Oui	1
	Non [*aller à Section L*]	2
	R refuse de répondre	8
	R ne sait pas	9

QK04	**Combien était-ce environ? Environ une bouffée ou plusieurs bouffées, un joint ou une pipe, deux joints ou plus ou était-ce sous une autre forme? Si autre forme, en quelle quantité?**	
	Une bouffée sur un joint ou une pipe	1
	Plusieurs bouffées sur un joint ou une pipe	2
	A peu près un joint ou une pipe	3
	A peu près deux joints ou pipes	4
	Plus de deux joints ou pipes	5
	Autre forme (cookies; space cake, etc.); combien _____	6
	R refuse de répondre à la question	8
	R ne sait pas, ne se souvient pas	9

SECTION L: MESURE DE L'ALCOOL DANS L'AIR EXPIRÉ

Remarque : Si plus le patient s'est présenté au service des Urgences plus de 6 heures après la survenue du traumatisme (voir partie du questionnaire concernant la blessure) la mesure d'alcool dans l'air expiré ne lui est pas proposée !

QL0x	**Le consentement à la mesure d'alcool dans l'air expiré a-t-il été demandé?**	Oui	1
		Non [*section M*]	2

DEMANDEZ AU PATIENT/A LA PATIENTE SI IL/ELLE CONSENT A ***LA MESURE D'ALCOOL DANS L'AIR EXPIRÉ***

REPRENDRE LA FEUILLE DE CONSENTEMENT ET Y REPORTER LA RÉPONSE

QL00	**Le consentement à la mesure d'alcool dans l'air expiré a-t-il été donné?**	Oui	1
		Non [*section M*]	2

QL01	**Heure de mesure (codification sur 24 heures)**	*h*	*h*	*m*	*m*

QL02	**Initiales d'identification de l'enquêteur**			

Maintenant, j'ai juste besoin de prendre une mesure avec cet instrument. Lorsque je vous le dis, prenez une respiration profonde et retenez-la durant un moment. Soufflez ensuite de manière continue dans le support en plastique jusqu'à ce que je vous dise d'arrêter.

QL03	**Une mesure valide a-t-elle été obtenue?**	Oui [*question QL06*]	1
		Non [*question QL04*]	2

QL04	**Si une mesure de l'alcool dans l'air expiré n'a pas pu être prise, veuillez s'il vous plaît en exposer la raison.**	
	Le patient n'a pas pu être localisé	1
	Le patient manquait de souffle pour la mesure	2
	L'appareil de mesure ne fonctionnait pas	3
	Autre raison (spécifiez _____)	4

QL06	**Niveau de mesure du Breathalyser**	0	.			

SECTION M: INFORMATIONS GENERALES

Pour finir cette interview, je vais maintenant vous poser quelques questions plus générales vous concernant !

QM01	**Quelle est la formation/l'école la plus élevée que vous avez terminée?**	
	Aucune formation achevée	0
	Scolarité obligatoire ou complémentaire (1 ou 2 ans)	1
	Apprentissage ou école professionnelle à plein temps	2
	Gymnase/collège/lycée, école préparant à la maturité, école de degré diplôme ou école normale ou pédagogique	3
	Formation professionnelle supérieure (brevet, maîtrise), école professionnelle supérieure, haute école spécialisée ou université, haute école	4
	R refuse de répondre / R ne sait pas	9

QM02	**Avez-vous un travail rémunéré, et si oui, à quel pourcentage travaillez-vous?**	
	Non	1
	Oui, 50% ou pourcentage inférieur	2
	Oui, entre 51 et 60% [*aller à QM04*]	3
	Oui, entre 61 et 70% [*aller à QM04*]	4
	Oui, entre 71 et 80% [*aller à QM04*]	5
	Oui, entre 81 et 90% [*aller à QM04*]	6
	Oui, entre 91 et 100% [*aller à QM04*]	7
	R refuse de répondre / R ne sait pas	9

QM03	**Si vous ne travaillez pas ou si vous travaillez à un pourcentage égal ou inférieur à 50%, quelle en est la raison?** *(Si nécessaire, lire la liste au patient)*	
	Retraité	1
	En charge d'enfant(s), homme/femme au foyer	2
	Encore à l'école	3
	Au collège/gymnase, à l'université ou suit une autre formation supérieure	4
	En recherche d'emploi	5
	Malade ou invalide (bénéficiaire d'une rente)	6
	Travail non rémunéré, volontariat	7
	Autre (spécifiez _____)	8
	R refuse de répondre / R ne sait pas	9

	Dans quelle mesure chacun des énoncés suivants vous décrivent-ils? (LIRE LES ITEMS) Diriez-vous que ceci vous décrit « *assez bien* », «*un peu* », « *plutôt pas* » ou « *pas du tout* »?	ASSEZ BIEN	UN PEU	PLUTÔT PAS	PAS DU TOUT
QM05	J'agis souvent sur un coup de tête sans m'arrêter pour penser.	1	2	3	4
QM06	Je prends un réel plaisir à faire des choses qui sont un peu dangereuses.	1	2	3	4
QM07	J'aime me tester de temps en temps en faisant quelque chose d'un peu risqué.	1	2	3	4
QM08	Je suis toujours partant pour une nouvelle expérience.	1	2	3	4
QM09	J'aime essayer de nouvelles choses juste pour l'excitation.	1	2	3	4
QM10	Je suis attiré par le frisson dans la vie lorsque j'en ai l'occasion.	1	2	3	4
QM11	J'aime expérimenter de nouvelles et différentes sensations.	1	2	3	4
QM12	On pourrait dire que j'agis avec impulsivité.	1	2	3	4
QM13	Un grand nombre de mes actions semblent être précipitées.	1	2	3	4

QM14	Quelle est votre nationalité?	
	Spécifiez [_____] Liste des pays de la section BEV	
	Pas de réponse	999

QM15	Pouvez-vous m'indiquer votre taille sans chaussures?	
	En cm : [___ ___ ___] cm (en trois chiffres)	
	Pas de réponse / refus de répondre	999

QM16	Et combien pesez-vous sans vêtements?	
	En kg : [___ ___ ___] kg (en trois chiffres)	
	Pas de réponse / refus de répondre	999

Remarque : s'il n'est pas demandé au patient de se soumettre à la prise de sang, continuez avec la section O de la partie 1 ; s'il est demandé au patient de se soumettre à la prise de sang, poursuivez avec la section N !

SECTION N: MESURE DE SUBSTANCES DANS LE SANG

*DEMANDEZ AU PATIENT/A LA PATIENTE SI IL/ELLE CONSENT A **LA PRISE DE SANG***

REPRENDRE LA FEUILLE DE CONSENTEMENT ET REPORTER SA RÉPONSE

Remarque : Si plus le patient s'est présenté au service des Urgences plus de 6 heures après la survenue du traumatisme (voir partie du questionnaire concernant la blessure) la prise de sang ne lui est pas proposée !

QN01	**Le consentement à la prise de sang a-t-il été demandé?**	Oui		1
		Non	*[allez à section O]*	2
QN02	**Le consentement à la prise de sang a-t-il été donné?**	Oui		1
		Non	*[allez à section O]*	2

En cas d'acceptation, *référencez les 3 conteneurs de l'échantillon sanguin, la boîte du kit et la partie1 du questionnaire avec les autocollants de l'IUML - REMPLIR ADDITIONNELLEMENT LA SECTION N-bis (à insérer dans le kit avec les prélèvements). Veuillez vous assurer que le numéro d'identification des échantillons est identique au numéro d'identification du formulaire d'admission ainsi que sur la première page du questionnaire !*

QN03	**Numéro référencé sur les échantillons**	[__ __ __ __ __] **code-IUML**

Utilisez les autocollants mis à disposition par l'IUML

QN04	**Heure de prise de sang (codification sur 24 heures)**	*h*	*h*	*m*	*m*
QN05	**Nom de la personne opérant la prise de sang**	**[_____]**			

QN06	**Des benzodiazépines ont-ils été administrés au patient après sa prise en charge par du personnel médical?**	Oui	1
		Non [*aller à QN08*]	2

QN07	**Quelle sorte de benzodiazépines était-ce?**			
Alprazolam (Xanax®)	1	Nitrazepam (Mogadon®)	15
Bromazepam (Lexotanil®)	2	Nordazepam (Vegesan®)	16
Brotizolam (Lendormin®)	3	Oxazepam (Seresta®, Anxiolit®)	17
Clobazam (Urbanyl®)	4	Prazepam (Demetrin®)	18
Clonazepam (Rivotril®)	5	Temazepam (Normison®)	19
Cloxazolam (Lubalix®)	6	Triazolam (Halcion®)	20
Dikaliumclorazepat (Tranxilium®)	7	**Similaires:**	
Diazepam (Valium®, Diazepam Desitin®, Paceum®, Psychopax®, Stesolid®)	8	Clométhiazole (Distraneurin®)	21
Flunitrazepam (Rohypnol®)	9	Méthaqualone (Toquilone compositum®)	22
Flurazepam (Dalmadorm®)	10	Zaleplon (Sonata®)	23
Ketazolam (Solatran®)	11	Zoplicon (Imovane®)	24
Lorazepam (Temesta®, Somnium®, Lorasifar®)	12	Zolpidem (Stilnox®)	25
Lormetazepam (Noctamid®, Loramet®)	13	Autre, précisez [_____]	26
Midazolam (Dormicum®)	14	R ne sait pas	99

QN09	**Si un échantillon sanguin n'a pas pu être pris, veuillez SVP en exposer la raison.**	
	Un échantillon sanguin a été pris	0
	Le personnel infirmier n'avait pas de temps à consacrer à cette tâche	1
	Le patient n'a pas pu être localisé	2
	Impossibilité de faire une prise de sang sur le patient	3
	Autre raison (spécifiez _____)	4

Remarque : terminez l'interview avec la section O de la partie 1

SECTION O: FIN DE L'INTERVIEW

J'en ai maintenant fini avec ce questionnaire. Merci beaucoup de nous avoir aidé dans le cadre de cette enquête. Je voudrais juste savoir s'il y a un quelconque commentaire que vous voudriez faire ou ajouter?

Commentaires de l'interviewé: .....

.....

.....

.....

.....

Commentaires de l'interviewer: .....

.....

.....

.....

QO01	**Heure à laquelle l'interview a pris fin (codification sur 24 heures)**	*h*	*h*	*m*	*m*
QO02	**Durée totale de l'interview** *(en minutes)*				

SECTION P: RAPPORT DE NON-INTERVIEW OU D'INTERVIEW INTERROMPUE

Si vous n'avez pas eu la possibilité d'interviewer le patient ou si l'interview a dû être achevé prématurément pour n'importe quelle raison, veuillez compléter la section suivante.

QP01	**Date**	*j*	*j*	*m*	*m*	*a*	*a*	*a*	*a*
QP02	**Heure (codification sur 24 heures)**				***h***	***h***	***m***	***m***	

QP03	**Pour quelle raison le patient n'a-t-il pas pu être interviewé ou complètement interviewé?**
[brève description de la raison principale] p.ex. : refus ou refus indirect, raisons linguistiques, le patient n'a pas pu être localisé, le patient a quitté le service des urgences/le CHUV, le patient était trop intoxiqué, le patient était trop sévèrement blessé pour être interviewé, le patient est décédé, etc…	