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COMMUNITY INJURY SURVEY IN MACEDONIA

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MINISTRY OF HEALTH

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The authors

ACRONYMS

APW	Agreement for Performance
BCA	Biannual Country Agreement
CDC	Centers for Disease Control
HFA	Health for All
WHO	World Health Organization
RIHP	Republic Institute for Health Protection
IHP	Institute for Health Protection
MoH	Ministry of Health
MLSG,	Ministry of Local Self-Government
SSO	State Statistical Office
ID	Identification document
ICD 10	International Classification of Diseases - 10th revision
NGO	Non-Governmental Organization
UN	United Nations
SDR	Standardized Mortality Rate
SD	Standard deviation
RTI	Road Traffic Injury
PHC	Primary Health Care
USA	United States of America
YPLL	Years of Potential Life Lost
DALY	Disability Adjusted Life Year
PPS	Probability Proportional to Size

CONTENTS

EXECUTIVE SUMMARY

Introduction

Injuries and violence are ranked among the leading causes of death and disability around the world, being a particular burden for low and middle income countries and showing an increasing trend. Injuries and violence have substantial contribution to the disease burden in the Republic of Macedonia too, but the precise magnitude of injury-related mortality and disability is not known due to incomplete routine national vital and health statistics.

Rationale

Providing quality epidemiological data is of essential importance not only for the quantification of the magnitude of the injuries as a public health problem in the country, but also for the risk factor identification and protection as well as for undertaking an efficient and urgent prevention program. The gap of information can be overcomed by collecting a standardized, community-based data on the nature and extent of injuries.

The community injury survey in Macedonia was conducted within the activities defined in the Biannual Country Agreement 2007-2008 between the World Health Organization and Ministry of Health of R. Macedonia. For that purpose, Memorandum of understanding was signed between the Ministry of Health and Ministry for Local Self-Government, defining the importance of the survey that will be conducted and the need for collaboration of households with the representatives of the Republic Institute for Health Protection and 10 Regional institutes for health protection.

Goal and objectives

The principle goal of the survey was to collect data to determine the magnitude, scope, and characteristics of injuries in the Republic of Macedonia at national and community level, applying WHO standard methodology. This was done by collecting data on prevalence of different types of injuries and their comparison with routine health statistics, identification of the risk factors for severe injuries, disability and death, assessment of the severity of injuries and their impact on the outcome

of the injury and recommendation of preventive measures, using the acquired information.

Methodology

Standard methodology was applied as recommended in the WHO Guideline for community-based survey on injuries and violence.

Sample

The community-based survey was conducted at national level, based on a national estimate of injury prevalence, on a nationally representative reference sample of 1200 households, designed through a standard multistage sampling procedure.

The survey was conducted by specialists of social medicine from the Republic Institute for Health Protection and the 10 regional institutes for health protection in 2008.

Survey instrument

The Survey instrument (household and individual forms) was developed in accordance with the WHO Guideline for community-based survey on injuries and violence, applying the minimum set of core and expanded data, using as "case definition": injuries that have been medically treated or self-treated, that have led to disability in the past 6 months and/or death in the past 12 months. All reported and recorded injuries in the sample were analyzed; the results were also interpreted applying weighted average, as to present numbers projected on the total population. In addition, the findings were compared with the official data of the Republic Institute for Health Protection for the in-patient and out-patient morbidity and State Statistical Office mortality data (presented in boxes).

The total number of completed questionnaires is 4868 (equivalent to 56871 respondents in the weighted sample).

Results

The survey has recorded injury rates of 2876/100000 in the original sample and 2015/100000 in the weighted sample, rates that are similar to the rate reported by the Republic Institute for Health Protection for the year 2005 (2576) .

Injuries were most frequent in the Skopje region with prevalence rate of

3396.61/100.000; the lowest rate was reported for the South-west region (1325.54/100.000).

The mean age of injured was 36.6 years; the highest percentage of injuries was registered for the age group 15-19 years, followed by those aged 20-24, implying that most of the injuries occurred among adolescents and young people.

Most injured individuals are of Macedonian ethnicity, have completed either primary or secondary school and are married or single.

In general, injuries occurred between 10-12 a.m., at home or at street/highway, when victims were performing paid work or unspecified activities.

Women usually suffered falls, while men were struck or hit by a person or an object. Majority of injuries were unintentional; 95% of both genders denied use of alcohol before the event.

The nature of injuries was predominantly fracture, most prevalent in both genders and in all age groups and are all reported it as unintentional. However, bruises or head injuries were reported as mostly intentional.

First aid at scene was provided for most of the injured persons, by a friend or a family member and the injured were transported to a health facility by a private car or a taxi within 1 hour after the accident. More that 2 thirds asked for medical care that was provided in hospitals and were treated conservatively. The average length of stay was 10 days, while the average rehabilitation was 58 days. Two thirds of the injuries did not result in any physical disability; almost 7% of the injured lost their employment due to the injury, while one third reported decline in the household income.

There were 23 injury deaths in the weighted sample, with a rate of 40/100.000.

Conclusions

Community-based injury survey is the first survey of this type conducted in the country and provided data for the first two steps of the public health approach: documentation of the magnitude, the scope and certain characteristics of injuries in the Republic of Macedonia and identification of risk factors.

The advantage of the conducted community-based injury survey over health system-based surveillance methods is that it captured the

injuries that fail to reach hospitals, i.e. the injury deaths occurring in the community, injuries that are treated outside the formal health sector and minor injuries that do not necessarily require medical treatment.

The additional value of this survey is that it has provided very useful baseline information on the injury pyramid in Macedonia. Information obtained is intended to be used for decision-making primarily by health workers, researchers and scientists from relevant ministries, academic institutions and NGOs who are concerned with this problem.

Recommendations

Prevention of injury and violence is set as on one of the priorities in the enacted Health Strategy of the Republic of Macedonia 2008-2020, prepared by the Ministry of Health, i.e., Goal No. 9 refers to "achievement of significant and sustainable reduction of the number of injuries, disability and occurrence of death due to accidents and violence".

Based on the WHO recommendations EURO resolution EUR/55/R9, the priority activities in the area of injury control and prevention in Macedonia will be to: give higher priority to injury prevention by developing national action plans; develop injury surveillance; strengthen capacity to address injuries; promote evidence-based approaches for prevention and care; support further development of the Department for violence and injury control and prevention.

INTRODUCTION

Definitions

An injury is the physical damage to the human body which is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance, or it is a result of the lack of one or more vital elements, such as oxygen. This energy could be mechanical, thermal, chemical or radiant[1].

Injuries are usually defined as unintentional or otherwise. The main causes of unintentional injuries are road traffic injuries, poisoning, drowning, falls and burns. Violence is defined as the intentional use of physical force or power, threatened or actual, against oneself, another person, or a group or community that results in injury, death, psychological harm, maldevelopment or deprivation[2].

Violence can be divided by type: self-directed (as in suicide or self-harm), collective (in war and by gangs) and interpersonal (against a child, partner, elder acquaintance or stranger)[3].

In addition to intent and cause, injuries can be categorized by their settings, such as home, workplace and road, and by activities, such as sports or other leisure activities.

Injuries as global public health problem

Worldwide, injuries and violence are ranked among the leading causes of death and disability, which is especially true for low- and middle-income countries where they have an increasing trend. This is greatly due to the epidemiological, demographic and socio-economic transitions that have marked the development of these countries over the last decades[4],[5].

According to the WHO data for 2000, about 5,8 million people die each year as a consequence of some form of injury, which covers almost 9% of all deaths[6],[7]. This is equal to almost 14,000 deaths caused by injuries every day. Combined data from high-income countries, such as the Netherlands, Sweden and the USA, show that for every person that has lost his/her life as a result of an injury in these countries, about 30 has been hospitalized, and about 300 have been treated in hospital emergency centers[8].

Worldwide, injuries are currently the reason for 10% of all disability-adjusted life years (DALY). This figure is expected to rise to 20% by the year 2020[6,9]. The economic costs of the society are also very high; the losses in

the segment of productivity caused by death and disability due to injuries, in combination with the cost of the treatment and rehabilitation of the injured persons, are estimated at billions of US dollars[7,8].

Every day in the WHO European Region, injuries kill over 2000 people, put 60 000 in hospital and necessitate outpatient emergency treatment for 600 000. They are the main cause of death in the Region for people aged up to 45 years. Evidence on road traffic injuries (RTIs), drowning, poisonings, falls, fires, self-inflicted injuries and interpersonal violence in the 52 countries in the WHO European Region indicates that they can be studied, predicted and prevented[3].

If all countries in the Region equaled those with the best performance, more than two out of three injuries (68%) would be prevented and 500 000 lives would be saved a year[3].

This would eliminate much suffering and make critical health sector and other resources, currently devoted to dealing with injuries, available for other priorities[3].

Burden of injuries in Macedonia

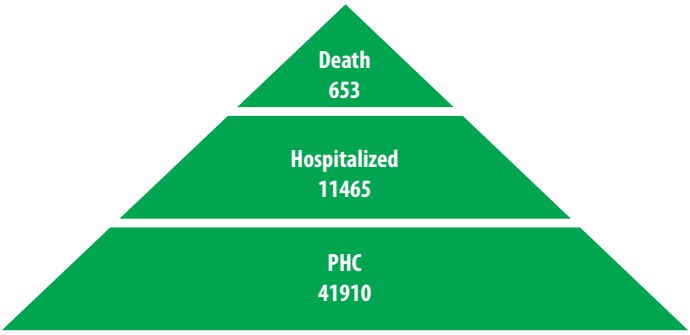
Injuries and violence in Macedonia, as well as in other countries in Europe and regions around the world, have a big share in the burden of disease. However, the precise magnitude of injury-related mortality and disability is not known due to incomplete routine national vital and health statistics.

Mortality caused by injuries is just the tip of the iceberg. For every death caused by an injury, there is a much larger number of injuries ending in (i) hospitalization, (ii) treatment in an Emergency Center or (iii) treatment at primary health care level. A large number of the injured persons remain with permanent consequences i.e. permanent disability[10]. Injuries have become even more significant public health problem, especially given the fact that they mostly affect young people, i.e. the economically most productive segment of the population.

Information about a fatal outcome can be easily obtained, but the non-fatal injuries and the psychological traumas remain unrecorded[10]. It is of great importance to use more than one source of information in order to cover all injuries.

The clinical pyramid of injuries in the Republic of Macedonia is very illustrative with regard to the iceberg phenomenon (Figure 1)[11].

Figure 1. Clinical pyramid of injuries in Macedonia in 2006



Source: RIHP, Health map of RM, 2008[11]

Despite the undisputed impacts of the injury burden, limited attention has been paid to injury as a public health problem. There are several reasons for this relative inaction, one of which is the lack of reliable and valid information on injuries that makes the size of the problem visible to policy-makers. There is a clear need for better, more reliable data on the nature and extent of injury.

RATIONALE FOR CONDUCTING COMMUNITY SURVEY ON INJURIES IN MACEDONIA

Providing quality epidemiological data is of essential importance not only for the quantification of the magnitude of the injuries as a public health problem in the country, but also for the risk factor identification and protection as well as for undertaking an efficient and urgent prevention program.

There are several ways in which information on injuries can be obtained in Macedonia: national vital statistics systems, hospital-based surveillance, community surveys and specific research studies. Hospital-based surveillance and community surveys are the two main routes by which information about injuries may be obtained.

Hospital-based surveillance systems suffer from a number of shortcomings; the fact that they tend to underestimate the burden of injury is not the least. Deaths due to injury that occur outside the hospital environment are not covered by such systems; they also fail to capture those injuries

that do not receive hospital attention (either because the injury was not severe enough to warrant medical treatment or because help was sought elsewhere).

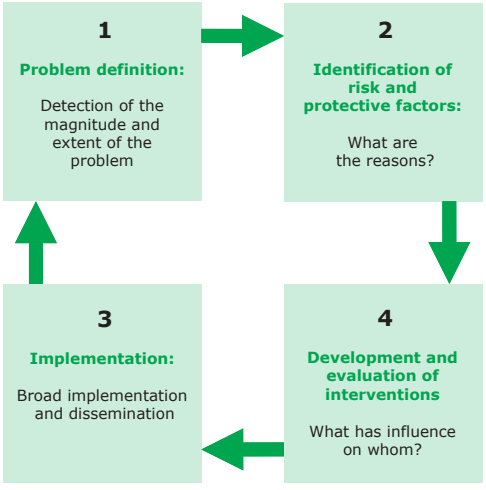
This gap can be overcome by providing a standardized, community-based data on the nature and extent of injuries.

Community-based survey is one way of obtaining data on injury occurrence and deaths on all types of injuries. Community-based injury surveys have one overriding advantage over health system-based surveillance methods since they capture injuries that fail to reach hospitals, i.e. those injury deaths occurring in the community, injuries that are treated outside the formal health sector and minor injuries that do not necessarily require hospital attention. Overall, community-based surveys provide useful baseline information on injuries, and in many cases, the data collected may be more comprehensive than that collected through hospital-based surveillance systems. In certain situations, results of local scale community surveys may be extrapolated to larger populations[12].

In addition, community surveys can be an important supplement to hospital surveillance and are particularly relevant in situations where population denominator data are not available, in settings where vital statistics and hospital-based data are non-existent or unreliable. In such cases community surveys may be the only source of information.

Community survey and public health approach

Figure 2. Public Health approach



The public health approach to injuries as a health problem has at its heart a multisectoral and science-based framework, and involves four key steps: **Surveillance -** What is the problem?; **Risk factor identification -** What are the causes?; **Develop and evaluate interventions -** What works??; **Implementation -** How is it done?.

In terms of the public health approach to injury prevention, a community survey primarily contributes to the first two steps, the description of the magnitude of the problem and the identification of risk factors. The data collected in a community survey can also assist in setting priorities for action and guide program design for intervention[12].

Advantages of a community survey

The data collection method at the community level has its advantages against the other methods in practice: data collected on all injures regardless of treatment or where it is sought; useful for calculating mortality rates; characterizing injuries by various demographic subpopulations (e.g. by age and sex), by place of occurrence, and by type and nature of injury; study sample can be representative of the general population; the survey can be used to define the denominator population; computation of incidence and prevalence rates by demographic and other parameters; allows direct comparison of injury rates between different demographic or geographic regions; can provide estimates on injury burden in terms of costs, disability and mortality; can give information on health care utilization; opportunity to examine socio-cultural determinants of injuries.

Disadvantages of a community survey

The following disadvantages have been identified: various practical and logistical difficulties, for example, safety and security concerns (of interviewers and respondents); difficulty to access homes in heavily protected high-income areas, and daytime absence of respondents (especially in urban settings when the desired respondents are at work); relatively high cost; requires more effort in terms of resources (i.e. human, financial, and time-consuming); can be done only periodically; prone to recall bias (longer recall periods significantly underestimate the injury rate); raises certain ethical issues; care has to be taken not to violate confidentiality; prone to selection bias or sampling error and/or

measurement errors; use of proxy respondents can undermine perceptions with regard to causes and prevention of injuries; use of non-standardized terms and protocols limits the usefulness of results, especially in terms of comparability with other studies.

METHODOLOGY

Survey planning

Considering all benefits of a community survey it has been decided to conduct Injury Community Survey in Macedonia within the activities of the Biannual Country Agreement 2007-2008 between the WHO and the Ministry of Health of Macedonia.

The survey was conducted by the Republic Institute for Health Protection and the 10 Regional Institutes for Health Protection, with essential support received from the Ministry of Health and WHO.

Memorandum of understanding was signed between the Ministry of Health and Ministry for Local Self-Government, emphasizing the importance of the survey and utilization of data that will be collected. The Memorandum also defines collaboration of households with RIHP representatives as crucial to provide relevant data.

Goal and objectives of the survey

General objectives of the survey have been defined through discussion with stakeholders based on their expertise and knowledge of national and local priorities, local culture, attitudes and conditions as well as resource availability.

The principle goal of the survey was *to collect data to determine the magnitude, scope, and characteristics of injuries in the Republic of Macedonia at national and community level, applying the WHO standard methodology.*

To achieve this main objective, the following specific objectives have been defined:

- to collect data on prevalence of different types of injuries and to compare them with routine health statistics;
- to identify the risk factors for severe injuries, disability and death;
- to assess severity of injuries and their impact to the outcome of the injury;

- to assess and recommend *preventive measures*, using the acquired information.

The information gathered with this survey will be used for decision-making primarily by health workers, researchers and scientists from ministries, academic departments and non-governmental organizations (NGOs), which are concerned about the problem of injuries and interested in the collection of relevant data.

Scope of the survey

The survey was conducted at national level, based on a national estimate of injury prevalence, on a nationally representative reference sample designed through a multistage sampling procedure.

Survey timeframe

Study schedule was considered to be an important part of the planning process. The timetable, outlining the specific circumstances for undertaking the community survey was according to the expectations.

Table 1: Timetable of a community injury survey on 1200 households

Task(s)	Dec	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Identification of a resource person and coordinator; planning the survey													
Sample definition; pre-test, adaptation of the questionnaire and preparation of training materials													
Other practical arrangements for carrying out the survey													
Selection and training of field supervisors and interviewers													
Conduct the survey													
Enter and edit data													
Complete data processing													
Preparation of draft report													
Consultation meeting with WHO													
Report finalization													
Publishing/Distribution													

The calculation of the actual survey time required was based on an estimated survey sample of 1200 households, divided into 40 segments, each containing 30 households (1200/30=40). Initial assumption was that one interviewer can complete 5 interviews per day, calculated as total of 240 interviewer-days required for completion of the survey. For a 5-day working week, it was calculated that this is associated to 48 person-weeks of data collection.

The actual field work was conducted during 4 weeks, in the period March 01-31, 2008.

Resources

Human resources

Human resources were identified at the earliest stage of the planning process. Nineteen members of the working group were nominated:

Survey coordinator – Principal Investigator - In collaboration with WHO, a survey coordinator has been identified early in the planning process - senior professional with extensive previous experience in conducting community and other surveys in this field.

Scientific Research Committee was identified and appointed in order to collaborate closely with the survey coordinator. The members of the scientific committee took part in technical expertise of the survey design, implementation and data analysis.

Survey supervisors - 2 survey supervisors were recruited to assist with training, field work supervision, regular collection and verification of received questionnaires from the field as well as recommendation of remedial actions for identified problems. Guidelines were developed for field staff before the training session.,.

Field staff - field staff was recruited from employees of RIHP and 10 regional IHP, after being nominated by their respective authorities. A total of 15 field interviewers were selected and trained.

Technical support

Data analysis and reporting system was developed during the planning stage of the survey, including the procedures that impact the timetable, resource allocation and questionnaire design. Special data entry database was designed in Microsoft Office Access by the IT expert at RIHP.

Transportation and other different types of support were obtained by the Republic Institute for Health Protection and 10 Regional institutes for health protection.

Financial support

Financial support for the survey implementation was obtained by the World Health Organization, European Region Office, within the agreement with the Republic Institute for Health Protection.

SAMPLING METHODS

The sampling has been done in accordance with the WHO *Guidelines for conducting community surveys on injuries and violence* and the *Injury surveillance guidelines*[12].

Step 1: Determining the sample size

The following facts were considered for the final sample calculation:

- the sample population had to be of sufficient size to allow detection of differences among groups within the population;
- the sample had not be unduly large, thus incurring greater costs for only a marginal increase in information;
- the optimal sample size would depend on a range of factors (prevalence rate, acceptable margin of error, design effect and likely non-response rate)

Standard statistical formula was used to calculate optimal sample size.

$n = [4(r)(1-r)(f)(1.1)] / [(e^2)(p)(n_h)]$ where,

n = required sample size,
4 = factor to achieve 95% level of confidence (i.e. a reflection of the degree of certainty of obtaining the same results if the survey was to be repeated),
r = anticipated prevalence of the outcome being measured,
1.1 = factor necessary to raise the sample size by 10% to allow non-responses, f = the design effect,
e = margin of error to be tolerated,

p = proportion of the total population that the smallest subgroup comprises,

n_h = average household size.

Anticipated prevalence of injuries in the study population

Pertinent to the community survey in Macedonia, three possible injury rates were identified: the rates of in-patient and out-patient treated injuries and mortality from injuries in 2005 (Table 2). The rate of out-patient treated injuries has been used for the sample size calculation.

Table 2. Number and rates of injuries in the Republic of Macedonia (year 2005)

Injuries	Number	Rate/100000
Mortality	583	28
In-patient treated	11 797	579,2
Out-patient treated	52 428	2576

Source: Republic Institute for Health Protection

Design effect factor

Given the fact that this survey employed cluster sampling, a design that introduces an element of bias into the sample population (a loss of variation), it was decided to include "design effect" as a factor in the calculation of the required sample size, increasing it in proportion to the degree of bias that can be introduced by clustering. Based on previous experience from other cluster surveys (showing that the magnitude of the design effect ranges from 1 to 3) and recommendations for using a design effect of 2, it was agreed to introduce it in this survey as well.

Non-response rate

It is a common practice, when calculating the sample size, to increase the required sample size /to allow for non-responses/ to include non-respondents. The likely proportion of non-responses was estimated from previous surveys that had been conducted. Since this is the first community survey of this nature and scale in Macedonia, it was agreed to use the rate of 10%, which is generally considered to be a reasonable estimate.

Average household size

An average household size of 4.5 members has been calculated as a reasonable estimate for this parameter.

Proportion of the subgroup in the total population

If injury prevalence in particular subgroups of the population is the object of the survey, then the sample size (in terms of the number of households) needs to be adjusted upwards accordingly. However, since this survey was performed on the whole population, the proportion "p" of the total population was taken as 1.

Possible sample sizes

It was calculated that the sample size of **980** households will satisfy the requirements for this type of survey. However, just to be on the safe side, the sample size was increased by additional 20% to allow greater response rate[1].

Multi-stage sampling technique was used to select the sample for this survey. Eight statistical regions and division urban/rural were set as a starting point for selection of 16 strata (8*2=16). A list of randomly selected cities/rural settlements was created, proportionate to the number of inhabitants recorded during the Census, 2002. In all settlements (segments), 150 "starting points" were assigned, around which 8 households have to be interviewed (150*8=1200 households, estimated sample size).

Sampling frame

The State Statistical Office of the Republic of Macedonia divides the country into eight statistically representative regions (clusters); the first sampling stage was performed using a systematic random sampling technique (with PPS)[2]. The probability of injury rate was used to distribute the sample within the 8 representative regions.

[1] The recommended sample of 1200 households indicates a very high prevalence of injuries, much higher than the incidence rate of injuries in Macedonia.

[2] Although 70% of the total number of injuries in Macedonia are registered in four (out of eight regions), it was decided that the sample is selected from all 8 regions to give more representative data.

Table 3: Distribution of out-patient registered injuries by statistical regions in Macedonia in 2005: number, percentage and rate of injuries, number of the sample households per region

Statistical region	Number of injuries	% of total number of injuries	Rate of injuries/ 100.000 inhabitants	Population in 2005	Cumulative population in 2005	Number of sample households per region
Skopje region	13.212	25%	2.250	587.262	587.262	**304**
Polog region	8.111	15%	2.627	308.774	896.036	**186**
Pelagonija region	7.995	15%	3.379	236.594	1.132.630	**182**
Southwest region	7.715	15%	3.465	222.626	1.355.256	**176**
Eastern region	6.189	12%	3.056	202.522	1.557.778	**142**
Southeast region	3.962	8%	2.304	171.997	1.729.775	**90**
Vardar region	3.052	6%	2.290	133.283	1.863.058	**70**
Northeast region	2.192	4%	1.261	173.798	2.036.856	**50**
Macedonia	**52.428**	**100%**	**2.576**	**2.036.856**		**1200**

Selection of segments in the sampling frame

In the second stage, segments were selected (sub-clusters), represented by the municipalities (cities), within each cluster/region. Yet again, cluster sampling with probability proportional to size (PPS) was used to determine the municipalities that will define the sampling frame for the last stage. Each region was assigned a code and name (Table 4), annotating the central city in the region, number of rural and urban segments to be surveyed, total number of households as well as ID numbers for the assigned households for each interviewer:

Table 4. Regions, cities and households selected for the survey sample

Regional code	Name of region	Central city	# of segments	# of urban segments	# of rural segments	Total # of households	Numeration of households in the segment
1	Vardar	Veles	10	7	3	80	1-80
2	East	Stip	15	9	6	120	81-200
3	South-west	Ohrid	17	8	9	136	201-336
4	South-east	Strumica	13	5	8	104	337-440
5	Pelagonija	Bitola	17	12	5	136	441-576
6	Polog	Tetovo	23	8	15	184	577-760
7	North-east	Kumanovo	13	8	5	104	761-864
8	Skopje	Skopje	42	35	7	336	865-1200
	Macedonia		**150**	**92**	**58**	**1200**	

As shown in Table 4, 150 segments were selected as representative for the respective region (92 urban and 58 rural segments).

Random selection of households

The last stage involved selection of households that will represent the sample by using sketch maps of each selected municipality (city). The definition used to define household for the purpose of the survey was: "a house, hut, room or apartment in which a family lives together with any relatives and lodgers".

From the starting point, the interviewer goes in direction right where household numbers ascend, choosing every 4th household for an interview. When he/she reaches the end of the street, he/she goes again in direction right and continues until completing 8 interviews in the specified segment. If the street/household number assigned in the sample does not exist, the interviewer goes in direction right into the next street.

In rural areas, where it was not possible to assign starting points, it was agreed to consider the school, outpatient clinic or other "central point" as a starting point to begin with the survey for that segment (in some cases it was central rural valve, grocery shop, etc). The interviewer should face the entrance of that object and continue in direction right, choosing each 4th household for an interview.

SURVEY INSTRUMENT – QUESTIONNAIRE DESIGN

The Survey instrument has been developed in accordance with the WHO Guideline for community-based survey on injuries, applying the minimum set of core and expanded data[12]. Household and individual forms have been developed (See Annex 2).

Individual Form:

The "Core" data set comprises a total of 24 pieces of information grouped as follows:

- Demographic information: Identifier, respondent (victim or proxy), gender, age, education, occupation, marital status, nationality and religion.

- Injury event factors: exact time of injury, day of the week and hour, place, activity, mechanism, intent, use of alcohol, nature, diagnosis (by ICD-10) and external cause of injury (by ICD-10).
- Medical care and treatment of injury: first aid at scene, time of given first aid, person who provided first aid, transport to health facility, transport time, seeking medical care, place of medical care, type of medical treatment, admission to hospital/health facility, length of hospital stay, length of rehabilitation.
- Injury-related disability and post-injury impact: physical disability, nature of physical disability, effect on usual activities, return to normal activity, loss of employment, absence from work/school, absence from work/school of a household member, decline of household income, loss of job of a household member.
- Injury-related death: age at death, place of death, time of death (in relation to injury event).

The expanded data elements include:

- Traffic-related injuries: mode of transport, victim role (type of road user), counterpart, risk factors, seat-belt use (by the injured person), helmet use (by the injured person).
- Violence-related injury and suicidal behavior: relationship (of perpetrator to victim), object (item or action used to injured victim), feeling of safety, control of temper, carrying weapon, childhood violence (history of); suicide attempts, method of the most recent attempt, medical attention for the most recent attempt.
- Poisoning-related injuries: substance, access to product.
- Fall-related injuries: height of fall, object or place the person fell from.
- Burn-related injuries: substance causing burn.
- Drowning/near-drowning: activity (at time of event), body of water

International Classification of Diseases, 10th revision (ICD 10) has been used for classifying and coding the data obtained during the community injury survey in order to compare data collected by other injury surveillance systems and surveys. ICD 10 codes were used for nature and external cause of injury and death.

The respondent

Household form elements:

Household number, segment, region, municipality, settlement, date of interview, interviewer, respondent, other members (for each of them - age, sex, member injured in the past 6 months, whether the injury caused disability, household member that has died following an accident/injury in the past 12 months).

Case definition

This survey used the following "case definition": *injuries that have been medically treated or self-treated, that have lead to disability in the past 6 months and/or death in the past 12 months*.

Recall period

On the grounds that people tend to remember major events and forget minor incidents unless they are very recent, it was decided that a recall period of up to 6 months be used when obtaining information on minor/ moderate injuries and a recall period of 12 months be used for more severe (but less frequent) injuries and deaths[12].

Translation and pre-testing of the survey instrument

In line with the final agreement of involved parties about the final version of the survey instrument, the questionnaire was translated into local languages, Macedonian and Albanian. Special consideration was given to wording of the questions, as to avoid misinterpretation of questions and answers. The final version of the questionnaire was pre-tested among interviewers during the training and necessary changes made before its multiplication.

Pre-test of the instrument in the field was implicit before the actual commencement of the survey. The aim of the pre-test was to identify potential problem areas, unanticipated interpretations and cultural objections to any of the questions. The pre-test was conducted in January, 2008, on a sample population similar to that which was subject of the survey in March 2008.

On completion, the results of the pre-test were discussed with colleagues, with the interviewers and, when necessary, with the translators. Necessary changes to the instructions to interviewers were also made at this stage.

FIELD WORK

Practical arrangements for the survey

It was considered essential to inform local authorities and community leaders before beginning the study. In addition to the information distributed by the Ministry of Local Self-Government, an Information letter was sent to media (at national and local level).

The study team established a Coordination centre from where the survey operations were coordinated. The coordination centre was set up in the Department for Injury and Violence Prevention and Control, in the Republic Institute for Health Protection. The coordination centre operated as headquarters of the survey and housed the survey's computing equipment and served as a storage facility for completed questionnaires. Contact was maintained on daily basis with the local offices and the field teams located in the 10 Regional institutes for health protection and the survey's central headquarters, providing assistance on as-needed basis.

Based on a calculation to perform the survey on a sample of 1200 household, estimation was made that 4-5 households can be interviewed per day by each interviewer. With a total of 12 interviewers (5 x 12 = 60), it was calculated that 60 households can be interviewed per day.

All field interviewers were provided with identification cards and letters of introduction, so that all respondents were assured of the identity of the interviewers.

Before commencement of the field work, each interviewer was provided with information on the planned survey area indicating the city or rural area, as well as the smaller-scale features (i.e. villages, census enumeration areas).

Before questionnaire pre-testing and field-worker training, both the questionnaire and the accompanying instructions for the interviewers were translated into the appropriate local languages, Macedonian and Albanian.

A social scientist has translated the questionnaire, and then another professional translator has independently translated the questionnaire back into the original language. The two versions were then compared; words that seem to be ambiguous or confusing were discussed and correct translation agreed. Copies were made once the final version of the questionnaire was agreed.

Training the field workers

One-day training for field staff was organized on February 27, 2008.

The instrument was pre-tested during the training, when 9 pairs of field-interviewers interviewed each other, following detailed instructions provided by the supervisors. This exercise was an excellent opportunity to resolve some issues and dilemmas that aroused during the interviews.

Setting up computers and hiring data processing staff

In order to process the data collected during the course of the survey, a computer center was established at the Republic Institute for Health Protection. Data-entry staff was engaged (2 research fellows) that completed data entry in two weeks.

Microsoft Office Access data entry program was created by IT specialist from RIHP, specifically designed to enter data collected with the instrument.

CONDUCTING THE FIELD WORK

The field supervisor's and interviewer's role

Two field supervisors were recruited for the survey; both are the senior members of the field team and were responsible for ensuring both the progress and the quality of the field work, as well as the well-being and safety of the team members. Field supervisors reported to the survey coordinator and acted as the primary link between the survey coordinator and the interviewers. The specific responsibilities of the field supervisor were to make the necessary preparations for the field work, to organize and direct the field work, and to spot-check the data collected in the household questionnaire.

The field supervisors were also responsible for assuring that all segments and households selected by the sampling procedure were visited by the field workers.

The interviewer's roles and responsibilities were clarified during the one-day training, but also on a daily basis by survey coordinator and supervisors.

Quality assurance

In the case of community surveys, the main sources of measurement error are likely to be coverage error (e.g. incorrect selection of eligible respondents), response error (e.g. respondent does not understand the question) and interviewer error (e.g. interviewer influences the respondent to answer in a certain way). Proper training of all field staff to a high standard was conducted, as well as routine consistency checks on completeness and accuracy of questionnaire completion by field supervisors, good survey organization and careful field supervision were organized.

Ethical aspects of conducting the survey

The following four principles were taken into account:

1. A duty to show respect for persons.
2. A duty to be sensitive to cultural differences.
3. A duty not to exploit the vulnerable.
4. A duty to alleviate suffering.

RESULTS

Data on all reported and recorded injuries in the sample were analyzed; results were also interpreted applying weighted average, as to present numbers projected on the total population.

Findings have been compared with the official data of the Republic Institute for Health Protection for the inpatient and outpatient morbidity along with mortality data from the State Statistical Office (presented in boxes).

Response rate

The total number of surveyed households was 1200, randomly selected from the 8 statistical regions (Vardar, East, South-West, South-East, Pelagonija, Polog, North-East and Skopje) i.e. the response rate was 100%.

Table 5. Sample: Regions, segments and households that responded

Region code	Region	# of segments	# of urban segments	# of rural segments	Total # of households
1	Vardar	10	7	3	80
2	East	15	9	6	120
3	South-west	17	8	9	136
4	South-east	13	5	8	104
5	Pelagonija	17	12	5	136
6	Polog	23	8	15	184
7	North-east	13	8	5	104
8	Skopje	42	35	7	336
Macedonia		**150**	**92**	**58**	**1200**

The response rate is result of an over-sampling strategy (the sample size was increased by additional 20%) as well as of the careful selection of households that have to be surveyed, precise addresses and instructions, as well as appropriate distribution of segments among the field workers. Replacement was made in only 20 cases, i.e. the address provided was a construction site or commercial object. In that case, the field worker was instructed to interview the first next household as a starting point and continue with the next 4$^{th.}$

The total number of completed questionnaires is 4868, showing balanced gender distribution; namely, 2443 (50.2%) respondents are male, 2425 (49.8%) are female. Applying appropriate weight coefficient to regions shows total of 56871 respondents (28549 male and 28322 female). As for the place of residence, 2802 respondents in the original sample (57.6%) reside in urban areas, whereas 2066 (42.4%) live in rural settlements. In the weighted sample, corresponding numbers are 32758 respondents in urban areas and 24113 respondents in rural areas.

The respondent

In almost half of the interviews, it was the injured person/victim that provided the answers in the questionnaire (45.7%); 30.5% responses were obtained by a senior member of the family; 15% by the parent of the victim and 5.2% by other person.

Injury rates

A total of 140 respondents in the sample were identified who had reported having injuries in the recall period; in the weighted sample, the number of injured respondents was 1146 individuals.

The survey has recorded injury rates of 2876/100.000 in the original sample and 2015/100.000 in the weighted sample; rates that are similar to the rate reported by the RIHP for the year 2005 (2576), as presented in the box below.

Incidence rate was calculated as a *number of reported injuries in the recall period (past 6 months) multiplied by 2.*Thus, it is calculated that there were a total of 278 injured individuals in the original sample and 2269 injured individuals in the weighted sample, in the period 12 months before March, 2008; incidence rate was 5710/100.000 in the original sample and 3989/100000 in the weighted sample. These rates are twice higher compared to the rates from the surveillance system.

There were 58.6% male respondents who had reported injuries in the original sample (absolute number of 82 individuals) and similar percentage (57.4%) or in absolute numbers 658 males in the weighted sample. Corresponding numbers for females were 58 injured women in the original sample and 488 women in the weighted sample. Calculated rates per 100.000 population in the original sample show that rates were higher in men (3356/100.000), compared to women with a rate of 2392/100.000. Rates are similar in the weighted sample, showing injuries rates in males of 2305/100.000 and 1723/100.000 in females.

Injury prevalence in Macedonia – official statistical data

Injuries registered in outpatient clinics show declining trends in the period 2000-2006, from 62.269 to 41.910 cases (decline in morbidity rate per 100.000 population from 3066 in 2000 to 2576 in 2005 and 2054 in 2006). The largest number of injuries were registered at GP departments – 28.048 (33,5%), at the departments for health care of school children and youth – 14.480 (27,6%), at the departments for health care of children aged 0 to 6 years – 6437 (12,3%), at the departments for occupational medicine – 3453 (6.6%), and only 10 at the departments for health care of women. There has been a big decline of the number of registered injuries at the departments for health care of women – from 364 in 2000 to only 8 in 2004 and 10 in 2005. The incidence rate is highest in young children aged 0 to 6 – 3850,7 per 100,000 children. Incidence grows with age. The rate is higher in adults – 2539,7 per 100000[13] .

In-patient treated injuries in Macedonia – official statistical data

Severe injuries are treated in hospitals. Available data in hospitals show that 11.465 patients were hospitalized due to injuries in 2006, which is a hospital morbidity rate of 561,9 per 100,000. The rates are twice higher for men than for women. The hospital morbidity rate is the highest in young children and people over 65 (the rate increases with age), and the lowest in young people aged 20-34[11].

50.8% of injured respondents reside in rural areas, compared to 49.2% injured in urban settlements. Injury rate in the original sample was 2534/100.000 in urban areas and higher in rural areas (3340/100.000). Results are consistent in the weighted sample as well, showing a rate of 1177/100.000 in urban areas, and almost double in rural areas with a rate of 2339/100.000.

The highest percentage of injuries (35%) were reported in the Skopje region (Table 6), followed by the Polog region (25.7%) and the East region (12%). 6.9% of injuries occurred in Pelagonija, 5.4% and 5.2% were reported for the North-east and South-west regions respectively, while identical percentage (4.9%) of injuries was reported in the Vardar and South-east regions.

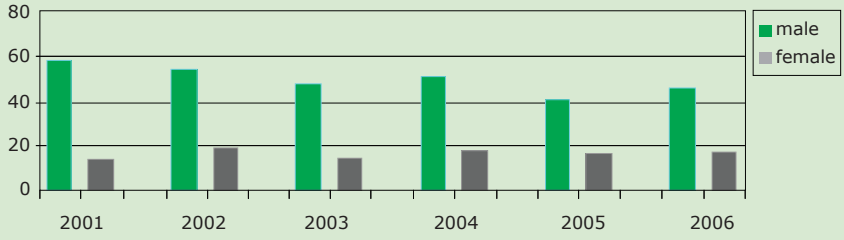
Table 6: Number, percentage of injuries and rate/100000 by region

Region	# of respondents	%	Rate/100.000
Vardar	**2780**	**4,9**	**2085.78**
East	**6850**	**12,0**	**3382.35**
South-west	**2951**	**5,2**	**1325.54**
South-east	**2787**	**4,9**	**1620.38**
Pelagonija	**3903**	**6,9**	**1649.66**
Polog	**14604**	**25,7**	**4729.67**
North-east	**3050**	**5,4**	**1754.91**
Skopje	**19947**	**35,0**	**3396.61**
Macedonia	**56871**	**100,0**	**2015**

Injury Mortality in Macedonia – official statistical data

Mortality from injuries has declined in the reporting period 2000-2006. The injury mortality rate in Macedonia in 2006 was 32,01 per 100.000 population, which is lower than the 2001 mortality rate of 36,4 per 100.000, whilst the standardized mortality rate is 29,5 per 100.000 (2005)[11] . The mortality rate increases with age and is three times higher in men – 46,3 per 100.000 (compared with 17,4 in women). Unintentional injuries are predominant in the structure of the fatal injuries with a share of 66,8% (of which 33,7% are traffic-related injuries), followed by suicides with 24,4% and homicides with 8,8%.

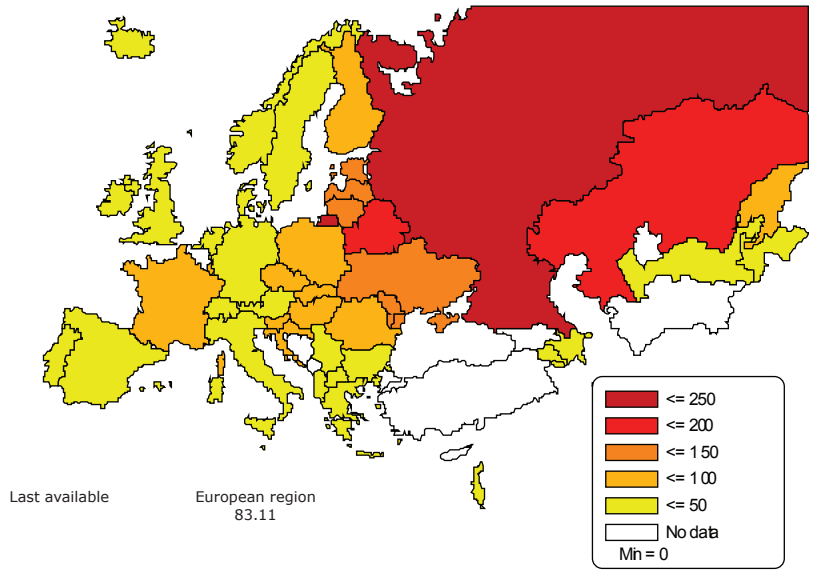
Figure 3. Injury mortality rate in R. Macedonia in the period 2000-2006



Source: State Statistical Office of the Republic of Macedonia/RIHP

The distribution of the SDR (Standardized Death Rate) from an external cause and poisoning shows that standardized death rate of 32.9 in the Republic of Macedonia is lower compared to the neighboring countries and the EU average (Serbia – 45,1; Albania 42,95; Bulgaria 46,25; and EU 44,3; but higher than in Greece – 32,5 (Figure 3).

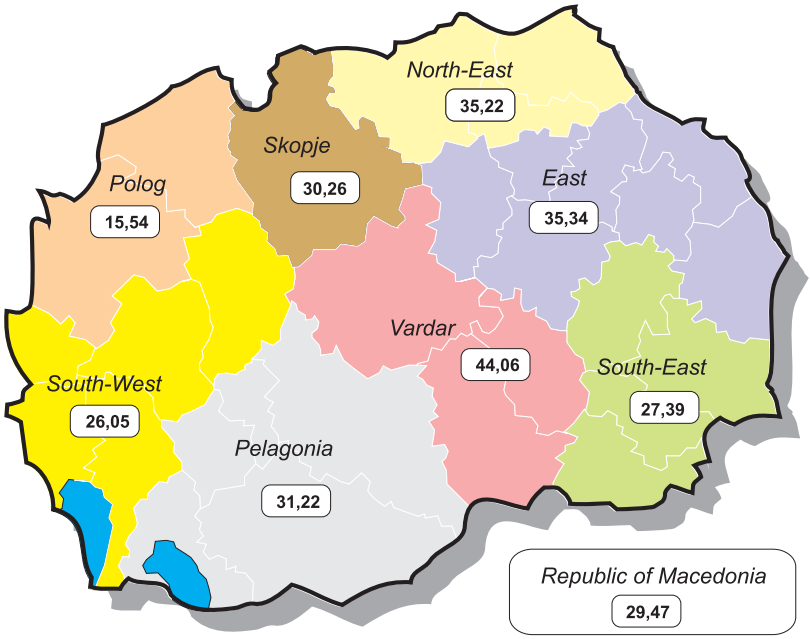
Map 1. Standardized death rate from an external cause and poisoning per 100.000



Source: HFA database, WHO 2008

The regional distribution of the SDR caused by injuries shows that it is much higher in certain regions such as the Vardar region (44,1/100.000), the Eastern region (35,3/100.000), the North-eastern region (35,2/100.000), the Pelagonia region (31,2/100.000) and the Skopje region (30,3/100.000), especially compared with the Polog region (15,5/100.000), but also the South-western region (26,1/100.000) and the South-eastern region (27,4/100.000) (Map 2). There are also differences in the death rates caused by injury among municipalities in all of these regions, as well as differences between the regions in terms of the different types of injuries.

Map 2. Standardized death rate caused by injuries in 2005 in Macedonia, by regions



Source: Medical map. Republic Institute of Health Protection, 2007[14]

Demographic characteristics of injured

Age

The mean age of the respondents that have reported injuries is 39 years; minimal age is 3 years, maximal 86 years. Weighted average age is 36.6 years $\pm$ 21.6 years (SD).

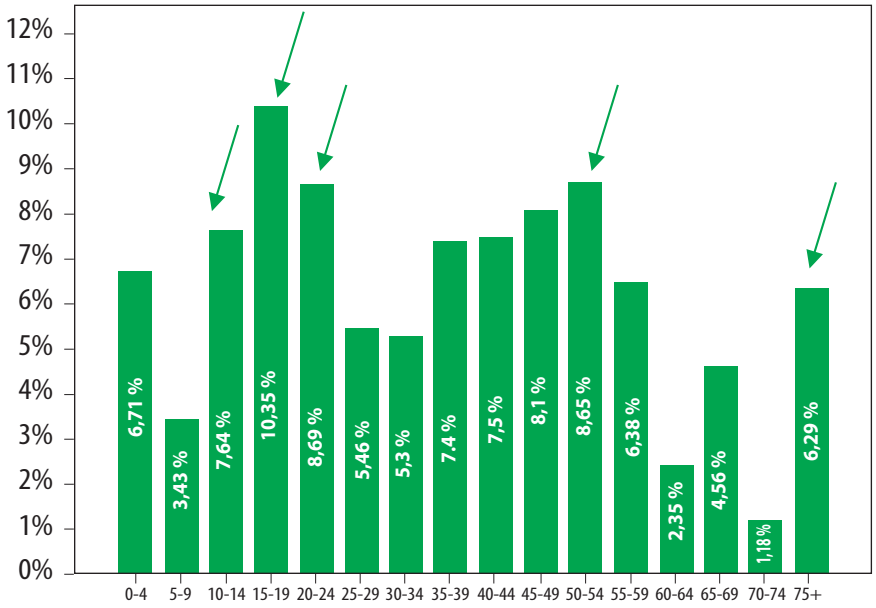
The mean age of female respondents is 40 years $\pm$ 24 years (SD); minimal age of injured females is 3 years, maximum 84 years.

Male respondents are younger with an average age of 38 $\pm$ 20 years (SD); the youngest respondent is 4 years old, while the oldest is at age of 86.

Figure 4 shows the age group distribution of injured individuals (weighted data). The highest percentage of injured respondents was detected among age groups 15-19 (10.3%); the least number of injuries was reported for the age group 70- 74 year olds (1.2%). 8.7%, 8.6% and 8.1%

were reported for the age groups 20-24, 50-54 and 45-49, respectively. Similar percentage of injuries has been recorded for age groups 10-14 (7.64%), 35-39 (7.5%) and 40-44 (7.5%).

Figure 4: Distribution of injured individuals by age groups (weighted data)



Education

Most of the injured respondents have completed either primary (42.9%) or secondary school (40.7%); 10.1% have university diploma and 1.4% do not have any education. For 2.5% of the respondents, educational status is unknown. Calculated rates are identical in respondents with primary and high school education (2018/100.000); slightly higher was the rate in respondents with university education (2021/100.000). The lowest rate has been calculated for respondents with no education (2014/100.000).

Analyzed by gender, most of the injured female respondents had completed elementary school (56.9%), while most of the males had completed high school (51.2%).

Occupation

Consistent with data obtained for educational status of the injured persons, the highest percentages of injured individuals are reported for students (16.4%) or housewives (14.3%); percentages for the retired and unemployed are 10.8% and 12%, respectively. Similar percentages were reported for injured individuals among professional workers (8.9%) and self-employed (6.4%) (weighted sample).

Marital status

Injured respondents are either married (42.7%), or single (42.8%), 8.9% are widowed, while only 1.7% are divorced (weighted sample).

Ethnicity/religion

Most of the respondents are of Macedonian (47.8%) or Albanian ethnicity (37.2%); other ethnic groups are represented with 2.9% Serbs, 1.6% Vlach, 2.1% Roma, 1.5% Turks and 3.6% declared themselves as of other ethnicity. As for religion, 52.1% of respondents are Christian, while 42.9% have acknowledged their religion as Muslim. The percentage of injured Albanians and Muslims was higher than their participation in the total population, but rates per 100.000 population were very similar with respondents of the Macedonian ethnicity.

Rates are the highest in ethnic Macedonians (2016/100.000), followed by Muslim (2013/100.000) and Roma population (2010/100.000). Rates are identical in respondents of Turkish or Serbian ethnicity (1993/100.000) and are the lowest in Vlach respondents (1978/100.000).

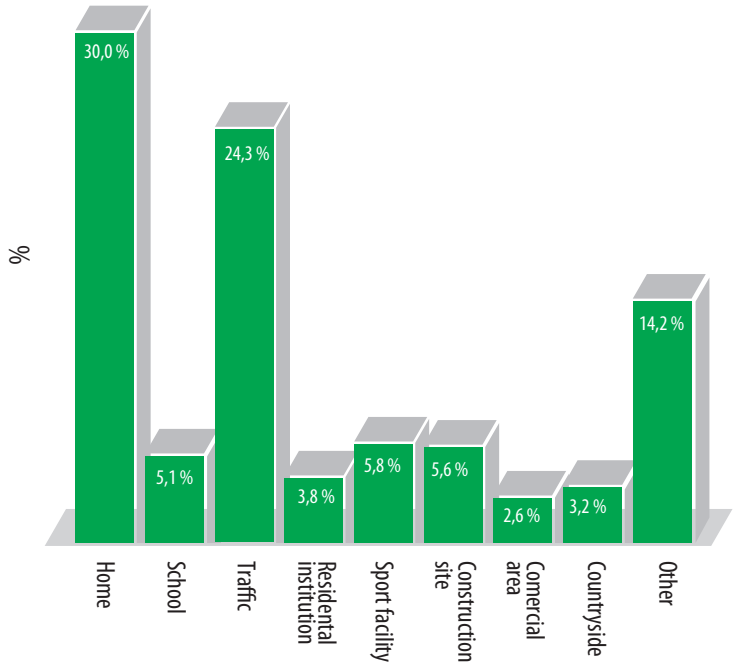
Injury event data - factors

Exact time of the injury - accident

The highest percentage of injuries occurred between 10 and 12 a.m. (28.4%) or 4-5 p.m. (15%); however, the time of injury event was not reported for 30.7% of the cases.

As for the location where the injury event took place, majority of the individuals reported injuries at home (30%) or in traffic (24.3%); 5.6% of the injuries took place at industrial or construction area, while 5.1 and 5.6% of the injuries occurred either in school or sports area.

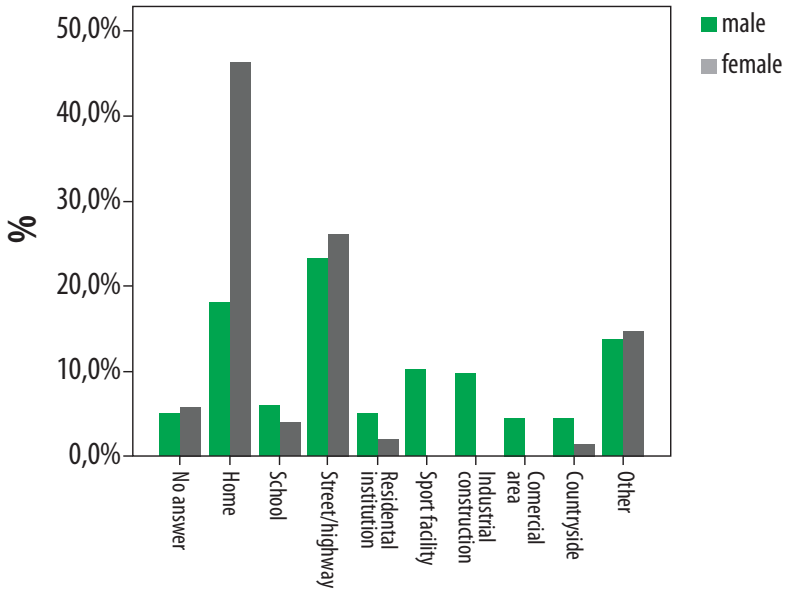
Figure 5. Most frequent locations of injuries



Answers recorded as *Other* provide further explanation on the place of injury, e.g. most of the injuries that took place at home occurred in courtyard.

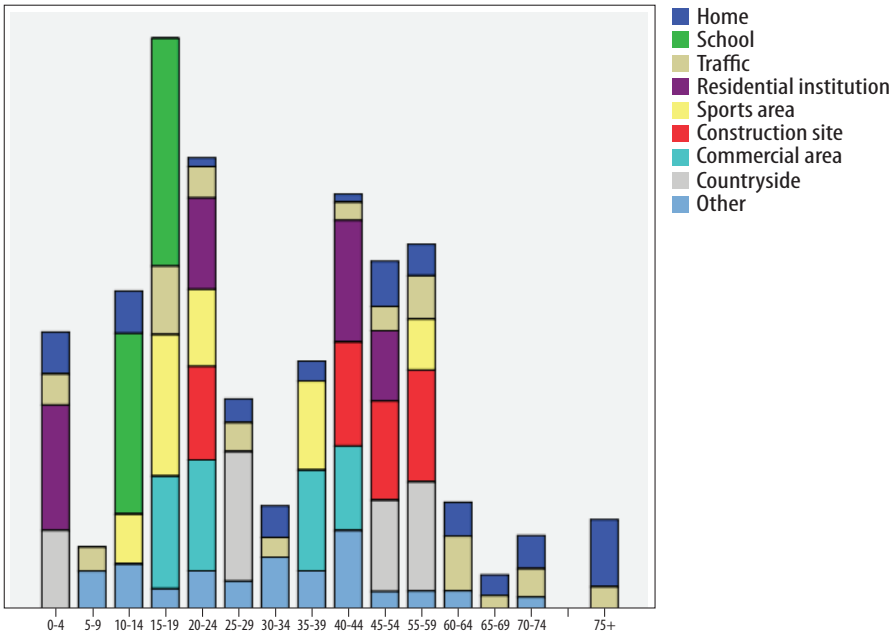
Cross tabulation of the place where the injury occurred with gender of the respondents has shown highly significant statistical difference among the groups, both men and women being most frequently injured in traffic (23% and 26.1%, respectively). Women were more likely to be injured at home (46.2%) when compared to men (18%). No injures were reported for women that had occurred at sport facility, construction site or commercial area, compared to 10.2, 9.7 and 4.5% injured men in those areas, respectively.

Figure 6 : Distribution of injuries by gender and place of occurrence



Analysed by age groups, most of the injuries occurred at home in all age groups, except in age groups 5-9, 15-19 and 70-74 and this association proved to be statistically significant as well. As expected, injuries at school were reported for 10-14 year olds (29.3% of injuries in this age group) and 27.3% of all injuries among 15-19 year olds. Street/highway injuries were reported for all age groups (except in groups 10-14, 35-39 and 70-74); the striking highest percentages were among the youngest groups - 5-9 year olds (41.8%), 15-19 (39.4%) and among the oldest- 55-59 years old (50.9%), as well. Injuries at sport facilities were reported for the age group 0-4 (17.3%) by their mothers who probably misunderstood the question with playgrounds, 20-24 (9.7%), 40-44 (15%) and 45-49 (8%). Surprisingly, injuries at construction/industrial areas were reported for the age groups 10-14 (9.3%) playing at these areas, and 15-19 (19.5%) possibly assisting or engaging in work, although majority of these injuries occurred, as expected in the age group 35-39 (17.2%) and 50-54 (8.4%). Injuries that occurred at commercial area were reported for the following age groups: 20-24 (14.7%), 40-44 (19%), 45-49 (16.8%) and 50-54 (17.7%). Countryside injuries occurred in 6.9% of 15-19 year olds, 8.1% of 20-24 year olds, 8.6% in those aged 35-39 and 7.1% in individuals aged 40-44 (Figure 7).

Figure 7: Distribution of injuries by age group and place of occurrence

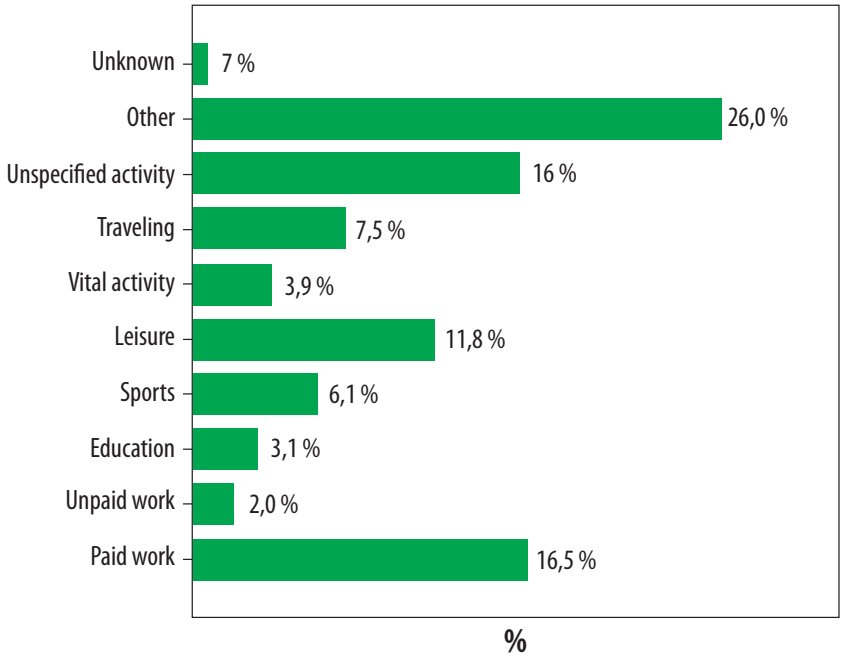


The highest percentage of injuries that were reported as *Other* belonged to the age group 5-9 (38.8%); other that aforementioned places of occurrence were also reported for the age groups 0-4 (9.2%), 25-29 (18.4%), 45-49 (8.8%) and 50-54 (9.8%). Answers reported as *Other* indicate a range of injuries that occurred in the yard, in a bar/restaurant or in a friend/ relative's home.

Activity

Answers on the question *What was the victim doing at the time of the injury* indicate that equal percentage of injuries occurred while the victim was performing paid work or unspecified activities (16.5%); 11.8% of the injuries occurred during leisure/play activities and 7.5% while the victim was traveling. Data were missing in 6.5%.

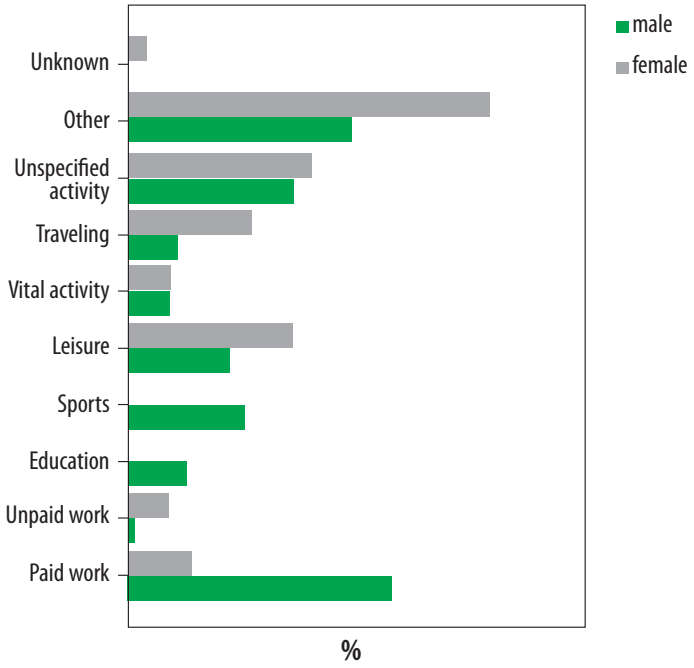
Figure 8: Distribution of injuries by the type of activity



Cross-tabulation of activity and gender or age group of respondents shows statistically significant difference among genders and age groups.

26% of answers reported as *Other* indicates that most of the injuries took place during regular activities at home (cooking, laundry, garden works) or at work. Cross-tabulation by gender indicates that most of injuries in men happened while the individual was doing paid work; in women, most of the injuries that occurred were reported as *Other* than specified in the list (Figure 9).

Figure 9: Distribution of injuries by gender and type of activity



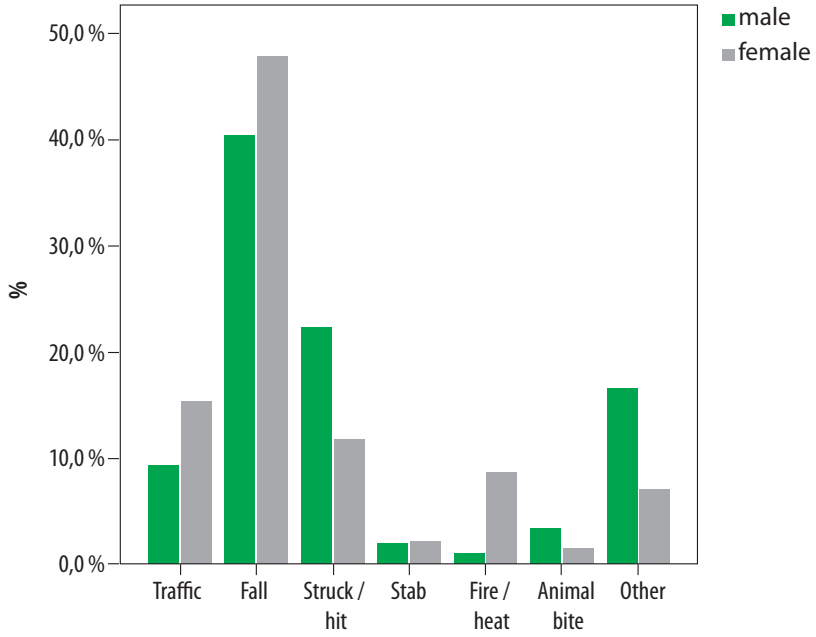
Mechanism

Most of the answers that describe *How the injury was inflicted* were falls (43.5%), followed by struck/hit by a person or object (17.8%) and traffic (11.8%). Fire, flames or heat were responsible for 4.3% of the injuries and for 2.7% cases it was animal bite.

12.6% of the answers recorded as *Other* included an array of injury mechanisms, such as: knife, glass or metal, chemical reagents, hot water and other professional tools.

Analyzed by gender, fall is the most common mechanism of the injury in both male and female, although it was slightly higher in women (47.8%) compared to 40.4% in men. Statistically significant difference among the groups was detected by cross-tabulation of gender and age groups. Men were twice as likely to be struck/hit by a person or object (22.3%) when compared to women (11.8%). On the other hand, women reported more traffic injuries (15.2%) than men (9.3%) or injuries as a result of fire/flame/heat (8.8% in women vs. 0.9% in men) (Figure 10).

Figure 10: Distribution of injuries by gender and mechanism of injury



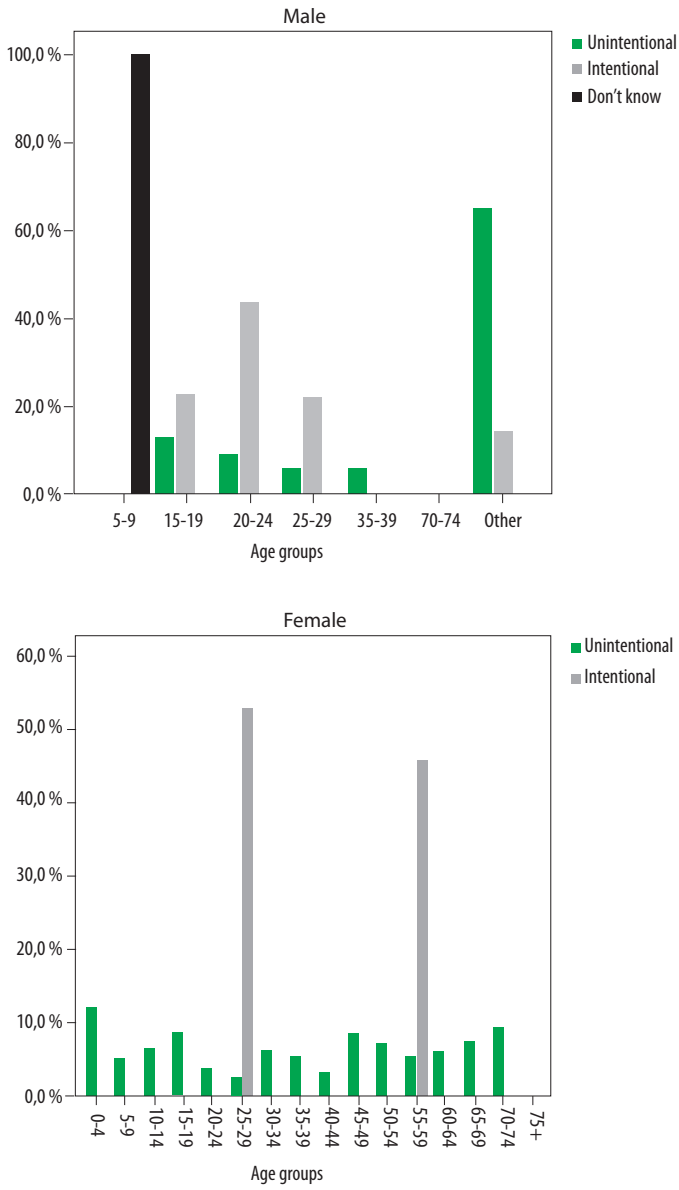
As for the age groups, most of the injuries that had occurred in the youngest age group (0-4) were either fall (58.2%) or animal bite (22.4%). Traffic as description of how the injury was inflicted, was most prevalent among the age group 55-59 (43.7%), followed by 35.3% in the 60-64 year olds. As high as 91.4% of injuries that occurred in the oldest age group (75+) had falls as mechanism; falls were also a mechanism of injury for 74% of the injuries in the age group 50-54 and 68.5% of the injuries in the age group 44-49. Struck/hit by a person or object was reported as a mechanism of injury mainly in the younger age groups, 48.5% in the 10-14 year olds, 45.6% in the age group 25-29 years. Stabbing was reported only in the age groups 10-14 (11.2%) and 30-34 (18.2%). Fire/flame or heat was responsible for 35.3% of the injuries in the age group 60-64, 12% in the age group 65-69, 11.2% in 10-14 and 7.1% in the age group 40-44.

Intent and Alcohol use

89.3% of the injuries were unintentional, while 5% of the respondents alleged human intent in the occurrence of the injury. The distribution of

injuries by age group, sex and intent is shown in Figure 11; it has to be noted that differences between groups have been tested with Chi-square and all were statistically significant.

Figure 11: Distribution of injuries by age group, gender and intent



Majority of the injuries were reported as unintentional by both genders and for all age groups with exception of male respondents in the age groups 5-9 and 65-69. All injuries in the age group 5-9 were reported for males exclusively and were of unknown intent. On the other hand, more intentional injuries were reported for male participants in the survey, with the highest percentage in the age group 20-24 year olds (42.1%); similar percentage of 21.9% and 22.8% intentional injuries were reported for male participants aged 15-19 and 25-29. Intentional injuries in female respondents were reported exclusively for the age groups 25-29 (53.6%) and 55-59 (46.4%).

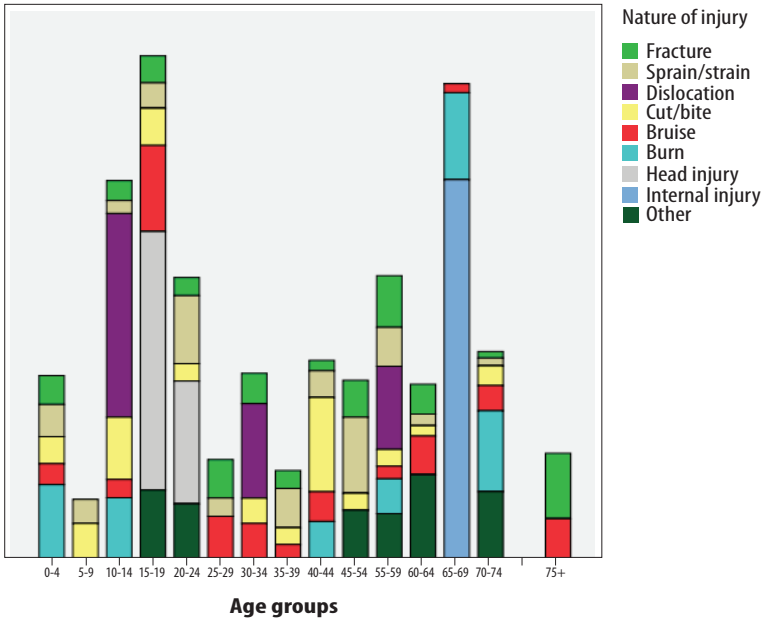
There were no self-inflicted injuries reported by the participants in our survey.

As high as 94.3% of the respondents denied any use of alcohol before the injury event. The percentage is similar when it is analyzed by gender.

Nature

The distribution of injuries by nature of the injury in different age groups is shown in Figure 12.

Figure 12: Distribution of injuries by age groups and nature of the injury



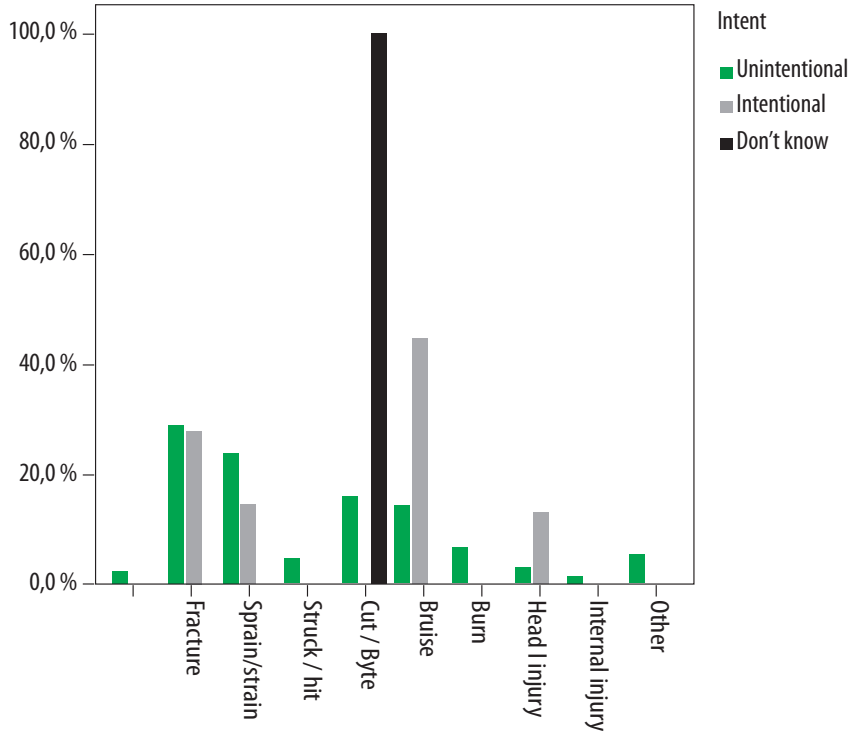
The physical nature of the injuries in the sample can be described most frequently as fracture (27.2%) or strain/sprain (21%); 14.7% injuries resulted in bruises or other superficial injury, while 14.6% belong to the group of cut/bite/other open wound. The nature of 5.2% injuries was flame/burn, 2.9% dislocations and 2.1% concussions; there was no poisoning reported by injured individuals.

Analyzed by age group, *fractures* were reported for all age groups, except in the age groups 5-9, 60-64 and 70-74 years old. The highest percentage of fractures were reported for the oldest age group 74+ (74.2%), followed by 50% in the age group 25-29, 42.4% in 50-54, 40.8% in 30-34; similar percentage of fractures was reported for 45-49 and 55-59 year old injured individuals (32.6 and 33.2%, respectively). *Sprain* was most frequent in the age groups 45-49 (51.7%) and 20-24 (43.1%); 29.3% in the age group 35-39 and 25% in the age group 50-54. *Dislocations* were reported for 3 age groups only, with highest percentage of 20.6% in the age group 10-14, 13.7% in the age group 30-34 and 7.4% in the age group 50-54. *Cut/bite or open wound* was reported for all age groups, with exception of age groups 25-29, 60-64 and the oldest age groups 70-74 and 74+. The highest percentage of these injuries was recorded for the age group 40-44 (47.9%), followed by children 5-9 (41.8%) and 10-14 years (31.2%) and the youngest age group 0-4 (15.4%), while these injuries in other age groups were represented with less than 10%. *Bruises* were also reported for all age groups, except in those aged 5-9, 20-24, 45-49 and 70-74. The highest (and similar) percentage of bruises was reported for injured persons aged 15-19 (32%) or 25-29 (31.6%), followed by the 30-34 year olds (27.3%), 55-59 (23.5%) and 75+ (25.8%). *Burn* was reported for 6 years old only; burn accounts for half of the injuries in participants aged 60-64 years (50%), followed by 65-69 (23.9%), 0-4 (15.4%), 10-14 (11.2%) and 7.1% in those aged 40-44. *Head injury* was reported exclusively for children aged 15-19 and accounted for 13.7% of injuries in this age group and 7.7% in the age group 20-24. *Internal organ injury* was reported for the age group 60-64 only, accounting for 35.3% of injuries in this age group. Cross-tabulation and Chi-square result have indicated statistically significant differences among genders.

Distribution of injuries by its nature and intent is presented in Figure 13. Similar percentages of fractures were reported as *unintentional* (29%) or *intentional* (28.4%). Sprains/strains were more unintentional (22.9%)

than intentional (14%). On contrary, bruises or head injuries were more frequently reported as intentional (44.4% and 13.2%) than unintentional (14% and 1.6%). There was no self-inflicted injury reported in our survey.

Figure 13: Distribution of injuries by nature and intent



Diagnosis – nature of injury (by ICD-10)

Chapter XIX of the International Classification of Diseases, 10th Edition, has been used for coding the nature of the injury (S00-T98), while the external cause of injury has been coded by codes from Chapter XX; Nature and external cause of injury was coded in the medical documentation of only those cases who have attended the hospital or out-patient clinic. This explains the poor recording of the e-codes.

ICD-10 diagnosis was recorded for 33.6% of the respondents; except for 2 cases with diagnosis T11.9 and W54.0, all diagnoses belonged to the class S and ranged from S01.8 to S93.4.

External cause of injury was recorded for 32.1% of the injured individuals, the highest percentage being for the diagnosis W01.0 (5.7%). Two cases were reported as S00.0, S41.0, X50.0 and X99.0, 15 were in the range V10.9 to V89.9 and 28 cases in the range W00 to W84.2.

Medical care and treatment of injury

First aid at scene

First aid at scene was provided for more than half of the respondents (51.9%). Majority of the injured individuals were provided assistance within half an hour after the accident (50.7%), and 45.7% after 1 hour.

As for the person who provided first aid to the victim, the highest percentage (27.1%) belonged to a friend or family member; in 15% it was other person, not specified in the list of answers. Description provided under the option *Other* revealed that it was mostly self-help (the victim).

Transport to health facility

Of those victims who have provided answers on the transfer to a health facility, most frequent mode of transport was by a private car (41.4%), followed by a taxi (13.8%); still, 20.5% of respondents did not go to any health facility. 5.7% went to a health facility by foot, 2730 victims (4.8%) were transported by an ambulance car and 1.4% by public transport. This is much lower than results from other studies[17,20]

Transport time

Majority of the victims were transported to a health facility within 1 hour after the accident (64%); 7.6% were transported 1-2 hours after the injury event and only 1.6% in a period of 3-6 hours or 13-24 hours.

Seeking medical care/place of medical care

72.4% of the injured individuals sought medical care for the injury; as for the place where medical care was sought, most victims went to a hospital (41.6%), 12% sought care in a health clinic, 11.5% in a health centre and 3.6% in a general medical practitioner office. Only 0.7% of the victims sought care by a traditional healer/bone setter or pharmacy.

Type of medical treatment

More than half (59.9%) of the injured individuals were treated conservatively, 9.5% underwent surgical intervention and 1.4% medical rehabilitation. 12.9% were admitted to a hospital, with average length of stay of 10 days ± 15 days (minimum length of stay 1 day, maximum 60 days). 13 individuals were sent for further rehabilitation; on average, the injured individuals underwent rehabilitation for 58 days ± 65 days (SD), with maximum duration of 180 days (2 individuals).

Post-injury impact

Physical disability

75.2% of the reported injuries did not result in any physical disability. Of those who were physically disabled, most frequent disability is walk with a limp (6.7%) or difficulty using hand or arm (4.1%); other disabilities with equal percentages (0.7%) includes inability to use hand or arm, loss of vision or inability to chew food.

Affect on usual activities/return to normal activity

46.4% of the victims were affected performing usual activities while similar percentage (43.6%) stated that the injury did not have any effect on their usual activities. 25% were able to return to normal activities, while 21.4% were not.

Loss of employment

Only 6.6% of respondents stated losing their employment due to the injury. 31.2% reported losing days of work/school; on average individuals lost 45 days ± 70 days (SD). Only 5% of injured individuals reported loss of work/school of a household member; on average, household members lost 7 days ± 8 days (SD) with minimum of 1 day and maximum of 21 days.

Decline of household income

33.6% of injured individuals reported decline in household income, while only 1 respondent stated a household member loss of employment due to taking care for the victim.

Injury-related death

Death as a result of accident was reported for 2 cases in the sample equivalent to 23 victims in the weighted sample, with a rate of 40/100.000, much higher than the rate provided by the State Statistical Office.

The average age of dead individuals was 69 years; the minimum age of victims was 67 years and maximum 72, mean age 68.84±2.41 years. However, these results have to be interpreted with caution, given the limitations of available data.

All victims died at a health facility, immediately after the injury and admission.

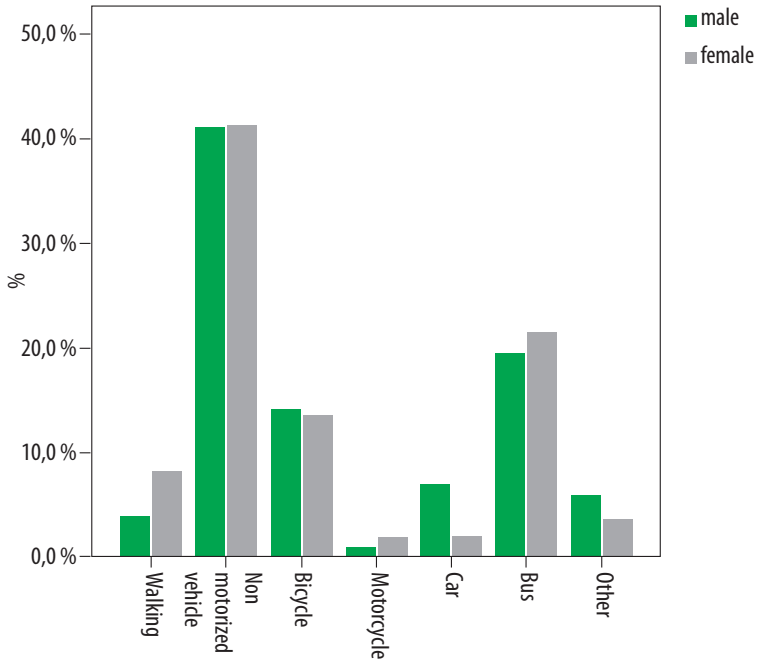
The State Statistical Office reported increase of 13.8% of injury deaths in 2007, compared with the previous year (743 deaths in 2006). Accidents have the highest participation of 72.1%, suicides 21.4% and homicides 6.5%[14].

Expanded data elements

Traffic-related injuries

Traffic-related injuries were reported for 15 individuals in the sample; equivalent to 5945 individuals in the weighted sample. The most frequent mode of transport was a car (3251 victims, 54,7%), while the victim was walking (1560 victims, 26.2%) or riding a motorbike (828 cases, 13.9%). 307 victims were injured when driving a truck/lorry (Figure 14).

Figure 14: Distribution of traffic-related injuries by gender and mode of transport



Analysed by gender, women were more likely to be injured when walking or being driven on a motorcycle or a bus; this proved to be statistically significant difference. On the other hand, men were more likely to be injured in a car (80%), compared to women (36.9%). Similar percentage of both men and women were injured while riding a bicycle or non-motorized vehicle.

26.2% of the victims of traffic injuries were pedestrians, similar percentage (29.5%) of drivers and 44.2% were passengers.

In 79.3% cases, the victim or his/her vehicle collided with a motorized vehicle, 20% of the victims couldn't remember how the accident happened and 0.7% victims fell from a motorbike.

A human being or weather conditions were identified as risk factors in 2.9% cases, a traffic vehicle in 4.3% cases, road or combination of all factors in only 1% cases.

Regular seat-belt use was reported for more than a half (55.1%) of the victims of traffic injuries; 8.3% used seat-belt at the time of the accident, 21.7% only occasionally use seat-belt, while 8% reported no use of seat-belt while driving a vehicle.

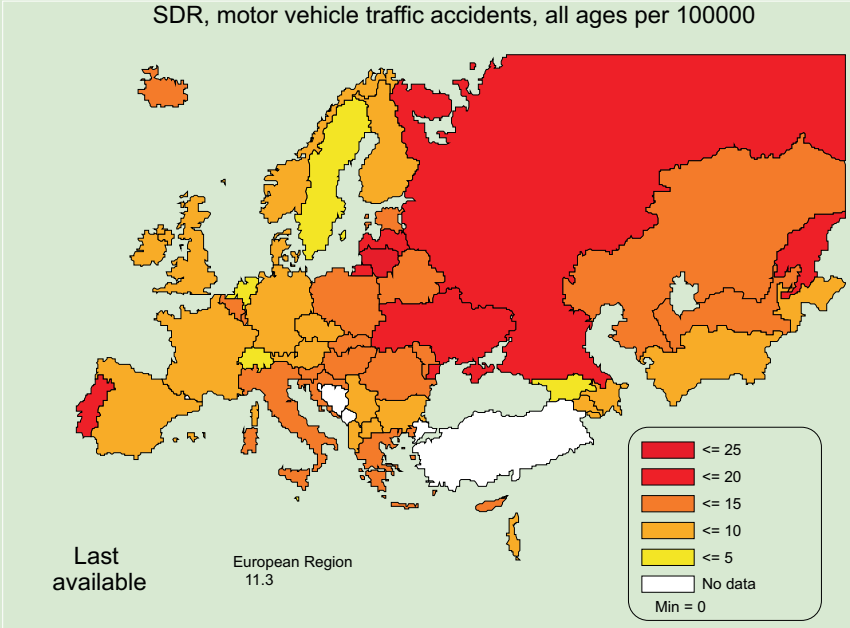
As for the use of helmets, more than half of the victims did not own helmets (58.2%), 22.6% used helmet occasionally while 10.5% reported never using helmet while riding a motorbike. Only 8.7% of the respondents reported regular use of a helmet while riding motorbikes. These findings are similar with the studies conducted in 2000 and in 2008[15],[17] . The latter showed traffic-related risk behaviour among students aged 13 - 15, in particular riding in car without seat-belt on, or riding in a car driven under the influence of alcohol[15].

Traffic injuries in Macedonia – official data

Traffic accidents and injuries are a priority public health problem in the world as well as in Macedonia, with a trend of increase [9,16,17,18]

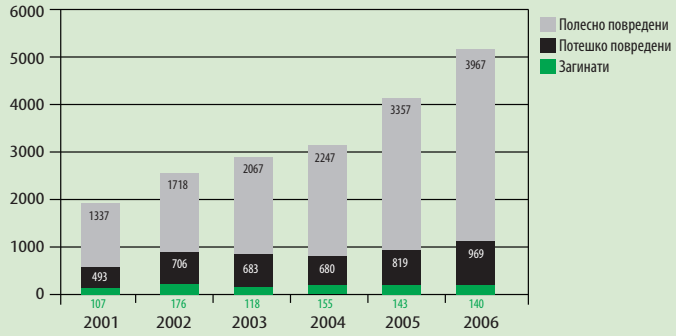
The standardized death rate caused by traffic accidents with a motor vehicle in Macedonia is the lowest compared to the neighboring countries. This rate in Macedonia is 6,27, which is lower than the ones in Serbia (7,42), Greece (14,9), Bulgaria (11,57), Albania (13,04), and EU (9,95). (Map 3).

Map 3. Standardized death rate caused by traffic accidents with a motor vehicle per 100.000



Source: Medical map. Republic Institute of Health Protection, 2007[16]

Figure 15 . Injured persons breakdown by the severity of the injuries



Source: RIHP, Information about the traffic accidents in RM for the period 2001-2007, Skopje 2007[16]

There is a noticeable increasing trend regarding the number of persons injured in traffic accidents, but at the same time there is an encouraging fact that the index of increase is higher with the less severe injuries as a result of the prevention measures that have been undertaken[18].

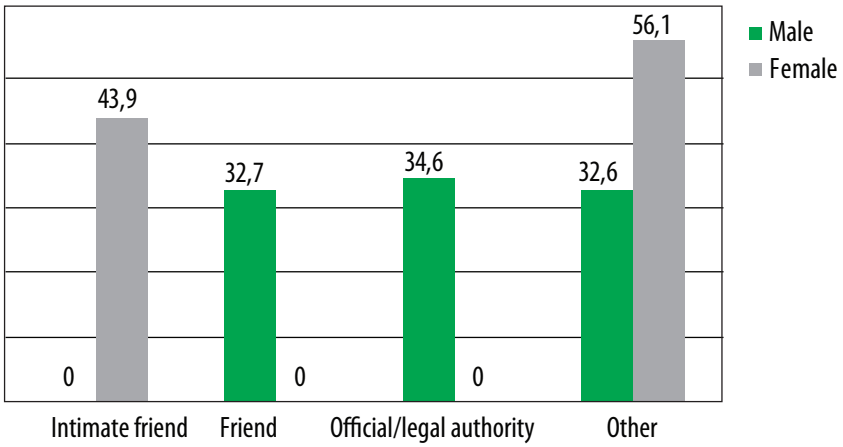
The estimate about the total economic costs of traffic-related injuries in children and young people in Macedonia is around 28 million US dollars. The treatment of the injured persons of this age only costs 2 million US dollars a year (1% of the total annual budget of the HIF), out of which almost 1 million is for treatment in tertiary level hospitals[17].

Violence-related injuries

Violence-related injuries were reported for 2209 respondents in the weighted sample; 55% of them were male. Answers on the relationship with the perpetrator revealed that in most cases, the perpetrator was the intimate partner (21.8%) or official/legal authority (19.1%); in 18.1% cases, the perpetrator was a friend of the victim.

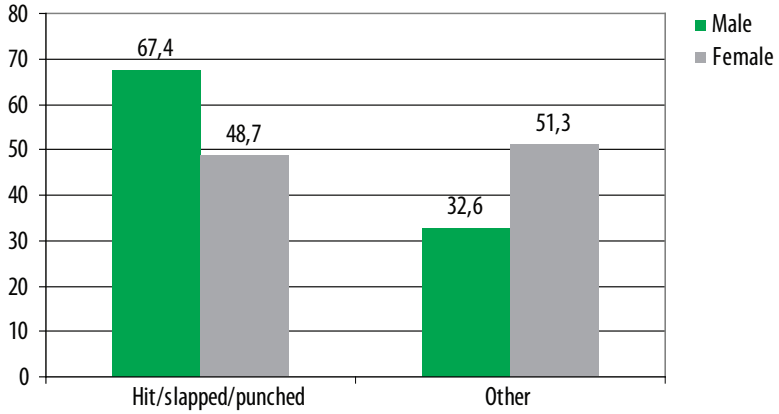
Analyzed by gender, men reported violence by either a friend (32.7%) or an official/legal authority (34.6%), while women reported violence by their intimate partner in 43.9% of the cases or answered "*other",* and this difference is statistically significant (Figure 16).

Figure 16: Distribution of injuries by gender and relationship with the perpetrator



With regard to the action that inflicted the injury, in more than a half (59% cases), the victim was hit, slapped, shoved, punched, pushed, or kicked without any weapon; 41% answered *Other*, an array of answers that include attack by more than one person. Landslide while working in mine, person cut while preparing food etc. were reported as unintentional injuries.

Figure 17: Distribution of injuries by gender and action that has inflicted the injury



Gender analysis has shown that men were twice as much likely to be hit compared to women, whose most frequent answer was *Other*; the difference was statistically significant. More than half of the victims that experienced this type of violence felt threatened by their intimate partner (54.7%), less felt threatened by an official/legal authority (23.2%), while similar percentage (22%) of the victims responded no feeling of any threat. Analyzed by gender, male respondents felt threatened by an official/legal authority or not feeling threatened, while women responses exclusively revealed feeling threatened by their intimate partners.

More than half of the respondents (51.3%) stated almost never being able to control their own temper; 26.6% could control their temper sometimes and 22% always. Male respondents answered either almost never (51.4%) or always controlling their temper (48.6%); the answers provided by the female respondents were either *almost never* (51.2%) or *sometimes* controlling their temper and there were no answers *always*.

A total of 1812 respondents who experienced this type of injury had reported that they were not carrying a weapon. Answers on the question of physical abuse in childhood revealed that as high as 49.9% respondents, although rarely, had experienced this kind of violence; 22% stated never being exposed to this abuse, while 28% refused to provide an answer to this question. Cross-tabulation by gender showed that male respondents gave answers *never* (48.5%) or *rarely* (51.5%) in similar percentages, while female respondents did not give any *never* response, but rather *rarely* (48.7%) or refused to give answer (51.3%) due to taboo, fear of the partner, or feeling unsafe. This is similar with the findings in other surveys presented in the Report Violence and Health in Macedonia and guide for prevention[19].

Answers on the question about past suicide attempts were obtained from 1812 respondents in the weighted sample. Almost half of the respondents (49.9%) attempted to commit suicide at some point in their lives, 22% stated *never* and 28% refused to give answer to this question. Gender analysis has shown that women were more likely to refuse to answer to this question (51.3%) than to give positive answer, during lifetime (48.7%), unlike men who responded either *ever* in lifetime (51.4%) or *never* (48.6%). The method used during the last suicide attempt was revealed by 905 respondents in the weighted sample and showed that it was either gun (46.6%) or intoxication (53.4%); men reported exclusively use of gun, while

women exclusively intoxication. None of the respondents sought medical care after the most recent suicide attempt. There were no reported cases of suicides.

Recent UNICEF study has shown that overall 10.0% of students had been bullied on one and more days during the past 30 days, while 8.6% of students seriously considered attempting suicide during the past 12 months; male students (6.8%) were less likely than female students (10.5%) to seriously consider attempting suicide[15].

Suicide and self-inflicted injuries in Macedonia – official statistical data

The distribution of the standardized death rate caused by suicide and self-injury in Macedonia is different than the one in the neighboring states. The standardized death rate caused by suicide and self-inflicted injury in the Republic of Macedonia is 7,01, being lower than in Slovenia (25) and Bulgaria (11,94), but higher than in Albania (4,38) and Greece (3,07). The standardized death rate caused by suicide and self-injury in the Republic of Macedonia is lower than the EU average of 11,5[19].

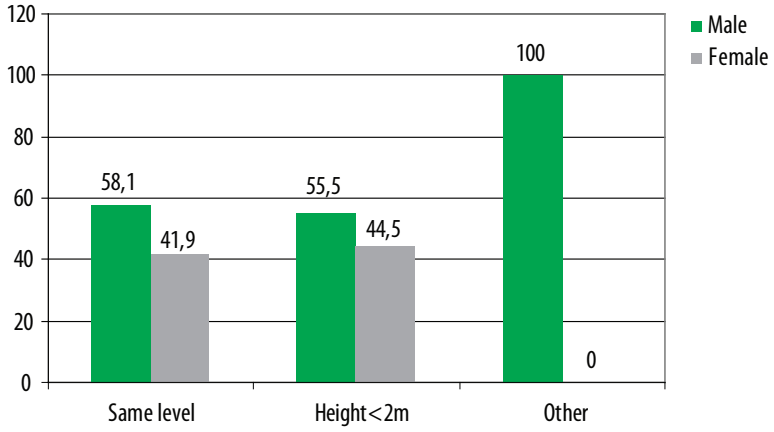
Poisoning-related injuries

There are no poisoning-related injuries reported in the survey.

Fall-related injuries

Fall-related injuries were reported for 12.136 individuals in the weighted sample. 62.9% falls occurred at the same level where the victim was standing, 31.6% at a height of less than 2 meters and 5.4% answered *Other* (person fell from a tractor, trolley or bike). As for the object the persons have fallen from, in 28.6% cases, the person fell from stairs, 8.8% fell from a tree and 62.6% from other objects (person has fallen from tractor, trolley or bike) – Figure 18.

Figure 18: Gender distribution of fall-related injuries by height of fall



The analysis by gender showed that the absolute number of falls was higher in men, compared to women and this difference is statistically significant. Similar percentages of men and women fell from the same level (13.6% and 13.2%, respectively) or from height less than 2 meters (6.6% men and 7% women). The answer *Other* was provided by men only (Figure 8).

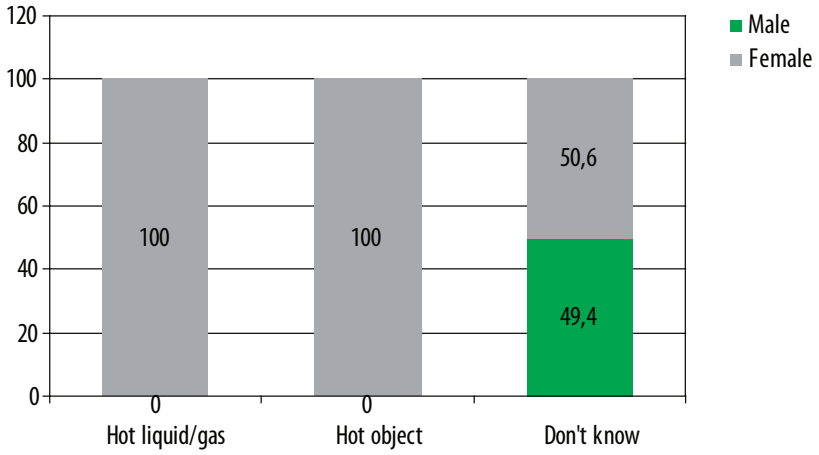
As for age groups, majority of injuries that occurred from the same level (37.4%) were reported for individuals aged 50-54 years, followed by the oldest age group 70+ (30%). On the other hand, injuries caused by fall from height less than 2 meters were reported for individuals aged 45-49 (30.2%), 60-64 (23.3%) and 11% for both 40-44 and 20-24 years old.

Burn-related injuries

Burn-related injuries were registered in 2160 respondents in the survey. In majority of the cases (44.3%), the substances that caused the burns were hot liquid, steam or gas; similar percentage of burns was caused by either hot object (27.2%) or other (28.5%).

Analyzed by gender, burn injuries were characteristic for female respondents, and were caused mostly by hot liquid/gas or hot object and this difference is statistically significant. Similar percentage of answers *Don't know* were reported from both male and female respondents in the survey.

Figure 19: Gender distribution of burn-related injuries



As for the age of the injured individuals, it is characteristic that all injuries caused by a hot object occurred in the youngest girls (0-4 years old); injuries caused by hot liquid/gas were reported for either 10-14 year olds (51%) or 54-49 years old (49%).

Drowning/near drowning

There were no drowning-related injuries reported in the survey.

CONCLUSIONS

Community-based injury survey is the first survey of this type conducted in the country and provided data for documentation of the magnitude, the scope and certain characteristics of injuries in the Republic of Macedonia.

The advantage of the conducted community-based injury survey over health system-based surveillance methods is that it captured the injuries that fail to reach hospitals, i.e. those injury deaths occurring in the community, injuries that are treated outside the formal health sector and minor injuries that do not necessarily require a medical treatment.

The survey was conducted on a randomly selected sample representing the respective regions and covering the territory of the entire country. It is of particular importance to notify that the survey was conducted by experienced social medicine specialists from the Republic and respective Regional institutes for health protection, a fact that gives special importance into the survey implementation and seriousness of the data gathered with the instrument. Analysis of the gathered data has been performed on both the original sample and weighted sample for correction of eventual sample errors and has allowed generalization of the results.

Community injury survey provided more comprehensive data on injuries and violence than data collected through hospital and out-patient-based surveillance system. In addition, community injury survey can be an important supplement to the surveillance and information system in Macedonia providing data for injuries that occurred in the community and is particularly relevant in situations where population denominator data are not available.

The added value of this survey is that it provided very useful baseline information on the injury pyramid in Macedonia: deaths, hospital admissions, outpatients (hospital and primary health care) and self-treated injuries.

Information obtained is intended to be used for decision-making primarily by health workers, researchers and scientists from relevant ministries, academic institutions and NGOs who are concerned with this problem.

Core data elements

The survey has recorded injury rates of 2876/100000 in the original sample and 2015/100000 in the weighted sample, rates that are similar to the rate reported by the RIHP for the year 2005 (2576), while the incidence rates of 5710/100000 in the original sample and 3989/100.000 in the weighted sample are more than twice higher of the rates reported in the surveillance system. This indicates that injuries and violence are serious public health problems that should be seriously considered for policy interventions.

Injuries are most frequent in the Skopje region with a prevalence rate of 3396.61/100.000; the lowest rate is reported for the South-west region (1325.54/100.000).

The mean age of injured individuals in RM was 36.6 years, men being slightly younger (average age of 38 years) than women (average age of 40 years). The highest percentage of injuries were registered for the age group 15-19 years, followed by those aged 20-24, implying that most of the injuries occurred among adolescents and young people. The analysis of their occupation has shown that the injured individuals were predominantly young people, mainly students. Most injured individuals were of Macedonian ethnicity, had completed either primary or secondary school and were married or single.

Most of the injuries occurred between 10-12 a.m., at home or street/ highway; women were more frequently injured at home. Victims were performing paid work or unspecified activities at the time of injury. As for mechanism of injury, women most often suffered falls, while men were struck or hit by a person or an object.

Majority of injuries were unintentional; however, intentional injuries were reported mostly by men from the age group 25-29 and women from the age group 55-59. As for alcohol consumption, as high as 95% of both genders denied any use of alcohol before the event.

The physical nature of injuries was predominantly fracture, most prevalent in both genders and in all age groups and all were reported as unintentional. However, bruises or head injuries were reported as mostly intentional.

The first aid at scene/site of the injury was given to most of the injured persons by a friend or a family member and the injured were transported

to a health facility by a private car or a taxi within 1 hour after the accident. More that 2 thirds sought medical care that was provided in hospitals and were treated conservatively. The average length of stay was 10 days, while the average rehabilitation was 58 days. Two thirds of the injuries did not result in any physical disability; still, half of the injured were affected performing usual activities. Almost 7% of the injured lost their employment due to the injury; one third reported decline in the household income.

Death as a result of an accident was reported for 2 cases in the sample (equivalent to 768 victims in the weighted sample, consistent with the State Statistical Office reports of 743 deaths). The average age of the dead individuals is 69 years. However, these results have to be interpreted with caution because of the limited available data.

Expanded data elements

Traffic-related injuries accounted for 10% of all reported injuries; men were more frequently injured when walking or driving, while women were mostly injured in a car. The mainly pointed risk factors were human being or weather conditions. More than half of the injured individuals regularly use seatbelt when driving, while less than 10% reported it use at the time of accident. Less than 10% of the victims used helmets while riding motorbikes.

Violence-related injuries accounted for 4% of the reported injuries in our survey, affecting mostly men in more than half of the cases. Intimate partner was identified by women as the most frequent perpetrator, who also felt threatened by them. Men were victims of their friend or official authority and were mostly likely to be hit. More than half of the respondents were not always able to control their temper and majority had never carried a weapon. Half of those victims had experienced physical abuse in childhood. Also, half of the respondents reported past suicide attempts, the frequent mode being gun or intoxication.

Fall as a mechanism of injury accounted for 21.5% of the injuries in RM, usually occurring at the same height where the victim was standing. The age of the individuals that suffered this type of injuries was usually 50-54 or 70+ years in both genders.

Injuries caused by substances that cause burns comprised 3.7% of the

victims in the survey. Burn injuries were predominant in women and were caused by a hot liquid or an object.

There were no poisoning-related injuries or drowning/near drowning registered in our survey.

RECOMMENDATIONS

STRATEGIC COMMITMENTS for violence and injury prevention and safety promotion

Prevention of injury and violence is set as on one of the priorities in the enacted Health Strategy of the Republic of Macedonia 2008-2020, prepared by the Ministry of Health, i.e., Goal No. 9 refers to "achievement of significant and sustainable reduction of the number of injuries, disability and occurrence of death due to accidents and violence".

In order to achieve these targets, the Government needs to undertake a set of activities which will enable to implement the WHO Resolution 56.24 with the WHO recommendations for violence prevention, the Resolution for road safety as well as WHO EURO resolution EUR/55/R9.

The 2004 World Health Day message is: "Governments should give high priority to preventing road traffic deaths and injuries in their policy statements and mobilize resources and political commitment to carry this out". The WHO and World Bank prepared the World Report on Road Traffic Injury Prevention which identifies the six main recommendations for improving road safety at global level:

- Identify a lead agency in the Government to guide the national road traffic safety effort;
- Assess the problem, policies and institutional settings relating to road traffic injury and the capacity for road traffic injury prevention in each country;
- Prepare a National road safety strategy and plan of action;
- Allocate financial and human resources to address the problem;
- Implement specific actions to prevent road safety crashes, minimize injuries and their consequences and evaluate the impact of these actions;
- Support the development of national capacity and international cooperation.

- Additional recommendations are given by the WHO Regional Office for Europe aiming to facilitate the implementation of the global recommendations in Europe:
- Strengthen and expand the role of the health sector as a champion of road safety;
- Improve implementation mechanisms and tools;
- Consider speed as the most important determinant for safety in road transport system;
- Strengthen the role of international organizations in preventing road safety.

Policy: injuries and violence are priorities for intervention

Injuries and violence are among the priorities for the Government of the Republic of Macedonia. Macedonian Ministry of Health has followed the above-mentioned recommendations aiming to achieve the set targets, appointing a focal point – coordinator for injury and violence control and prevention as well as establishing the Department for Injury and Violence Control and Prevention in the Republic Institute for Health Protection as a leading agency in the health sector for injury prevention and as a teaching base for research and safety promotion of the Medical School – Chair for Social Medicine. This Department for Injury and Violence Control and Prevention will work closely multidisciplinary supported by an inter-sector group of experts, in implementation of the proposed and agreed activities.

A range of activities in terms of injury-related studies and safety promotion have been undertaken by the Ministry of Health and by the Republic Institute for Health Protection in cooperation with the *World Health Organization:*

- National Commission on Violence Prevention has been established.
- National Campaign on violence prevention has been carried out.
- Report on violence and health in Macedonia and a Guide to prevention have been produced and promoted[19].
- Report on evaluation of the emergency services in the Republic of Macedonia has been promoted[20].
- Report by the National Commission on the marking of the First UN Global Road Safety Week 23-29 April 2007.
- Proposed activities for preventing traffic traumatism – continuation

of the activities of the National Commission for marking the First UN Global Road Safety Week 23-29 April 2007.

- Information on traffic accidents and injuries in Macedonia (2001-2007), adopted by the Government of RM[18].
- Family violence – inter-sectoral and multidisciplinary working group has been established and Strategy on family violence prevention has been developed and adopted.[21]
- National Strategy for road safety has been developed and adopted.[22]
- Community survey on injuries - A community survey on the burden of injuries and violence has been completed.
- Bloomberg project for the Global status report on road safety has been completed.

Partnerships at international, national and local levels through involvement in the Global campaign against violence and commencement of the National campaign for violence prevention have been created. In addition, establishment of the National Coordination body for protection from violence has created partnership among the Government of the Republic of Macedonia, i.e., relevant Ministries for Health, Labor and Social Policy, Interior, Education and Science, Justice, State Statistical Office, non-governmental organizations, WHO, UNICEF, Open Society Institute, UNIFEM and others.

Priority activities

WHO Recommendations EURO resolution EUR/55/R9.

- Give higher priority to injury prevention by developing national action plans;
- Develop injury surveillance;
- Strengthen capacity to address injuries;
- Promote evidence-based approaches for prevention and care;

- Support the network of national focal points for violence and injury prevention.

Based on the WHO recommendation EURO resolution EUR/55/R9, the priority activities in the area of injury control and prevention in Macedonia are:

(i) Further development of the newly established Department for Injury Control and Prevention.

(ii) Improvement of data collection, assessment and safety promotion research; capacity building-personnel education for injury control and prevention; create database for injuries and violence, especially for road traffic injuries and risk factors; create database for successful evidence-based intervention programs; preparation of Guideline for interventions for violence prevention and road safety.

(ii) Further development of the National health policy: develop a Strategy for injury and violence control and prevention and national action plan; develop a National Strategy for injury control and prevention with special accent on road traffic injuries in accordance with the WHO Resolution for road safety; develop an Action plan for Implementation of the Strategy for road traffic injury control and prevention and national action plan; define an action plan for implementation of the activities for injury prevention proposed in the overall national Strategy for health policy and health care; preparation of the Report of road traffic accidents and injuries in Macedonia in accordance with the WHO recommendations; preparation of a Chart Report on road traffic injuries, develop a Strategy for safe behavior as part of the overall health promotion strategy; strentghen the policies and strategies for protecting adolescents from diseases and risk behaviour; support health and safety promoting schools, including activities for injury prevention in schools; decrease the exposure of pupils to injury risk factors as well as change their behaviour, particullarly in context of violence prevention; Strategy for occupational health; revision of the protocol and criteria for issuing the medical certificate for drivers, professionals and amateurs, especially for some vulnerable groups of drivers, in accordance with the EU directives for safety.

(iii) Develop integral information system for injury surveillance within the global health information system linked with other relevant information systems; establish a national register for road traffic injuries (web-oriented) in accordance with the current legislation; preparation of a Guideline for injury surveillance in Macedonia in accordance with the WHO recommendations; define indicators for surveillance of road traffic injuries in accordance with the EU directives; revision of the registration form for road traffic injury in accordance with the EU standards; revision of the current legislation: Law on evidence in health care.

(iv) Capacity building: develop curriculum for safety promotion; train public health experts in Government organizations as well as in non-governmental ones.

Implementation of the six WHO national recommendations, provided in the World Report on Violence and Health[16], will be the future challenges for the health sector in prevention of violence, through fulfillment of proposed recommendations[19]:

Recommendation 1: *Multisectoral national action plan for prevention of violence should be prepared, implemented and monitored*

- Development of national health policy: implementation of Strategy for control and prevention of violence and health and National Action Plan with multidisciplinary and inter-sectoral approach;
- Full implementation of the international and national legislation for prevention of violence;
- Enforcement of legislation with preventive measures, treatment, social care and support for victims of violence.

Recommendation 2: *Capacities for data collection should be strengthened*

- Improvement in data collection and assessment of needs;
- Development of integrated system for monitoring of injuries and violence. In order to develop effective preventive strategies in the Republic of Macedonia, there is a need for better information, particularly on the number and type of violence, circumstances in which it occurs, risk population, risk factors, trends. A good system for monitoring injuries caused by violence has to have a standard system for classification of injuries (ICD-10), a system for medical evidence and documentation on individual cases and aggregated statistical reports, analysis and interpretation of information and submitting reports to relevant bodies;
- Development of an unified form – protocol for violence, which should be completed by each professional that has been in contact with the victim of violence: health professional, social worker or a person from the police, which will help in avoiding secondary victimization

of the victim of violence and will help in overall review of the case of violence;
- Alterations in the Evidence in Health Law, harmonized with the EU legislation;
- Preparation of guidelines for monitoring violence in accordance with the new legislation;
- Education and seminars for all relevant factors: health professionals, social workers, police, NGOs for implementation of protocols and evidencing violence;
- Education by implementation of TEACH-VIP.

Recommendation 3: *Priorities will be defined to support research of causes, consequences, costs and prevention of violence*

- Research and promotion of safety;
- Strengthening research activities in the field of violence, in the Department for control and prevention of injuries.

Recommendation 4: *Primary prevention will be promoted*

- Strengthening the role of health sector in primary prevention of violence,
- Promotion of gender and social equity;
- Capacity building: education and training for professionals in Government and non-Governmental institutions for prevention of violence at all levels, with particular focus on primary prevention;
- Education by implementation of TEACH-VIP.

Recommendation 5: *Response and support for victims of violence will be strengthened*

- Extension of the role of health sector in the secondary and tertiary prevention of violence;
- Improvement of the quality of health care by practicing evidence-based medicine;
- Education by implementation of TAECH-VIP: will be implemented by the Department for control and prevention of injuries;

- Development and implementation of a protocol for monitoring of victims of violence: joint activity of the Ministry of Health, Ministry of Labor and Social Policy and Ministry of Interior, non-governmental organizations, supported by UNIFEM – there is a draft version of the protocol;
- Preparation of a Book of Regulation for implementation of the Protocol into practice by relevant ministries.

Recommendation 6: *Prevention of violence will be integrated into social and educational policy, as well as promotion of gender and social equality*

- Preparation of a Guideline for promotion and realization of the rights of victims of violence in various sectors

In accordance with international recommendations, the following preventive activities will be undertaken:

1. collaboration and exchange of information for prevention of violence will be increased;
2. principles defined in international agreements, laws and other mechanisms for protection of human rights will be promoted and monitored;
3. practical, internationally agreed solutions against illegal trade with drugs and weapons will be searched for.

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ANNEX : QUESTIONNAIRE

World Health Organization
Ministry of Health
Republic Institute for Health Protection - Skopje

COMMUNITY SURVEY ON INJURIES IN MACEDONIA

Participation in this survey is voluntary and anonymous. Confidentiality is guaranteed.
Provided data with this questionnaire will be used only for Scientific Purposes and they won't be used in any case as a base for taking the legal procedure under the court

Household Number ☐☐☐☐
Segment ☐☐☐☐
Region ☐
Municipality ☐☐
Settlement ☐☐☐
Date of interview ☐☐☐☐☐☐
Interviewer ☐☐

HOUSEHOLD DEMOGRAPHIC DATA COLLECTION FORM

1. Basic demographic information of all household members

Household member number	Date of birth	Sex
01 (Senior female)		
02		
03		
04		
05		
06		
07		

2. Injury information

Take information only for injuries that have been medically treated or self-treated in the last 6 months, that have lead to disability and death in the last 12 months.

Household member number	Injured in the last 6 months*	Did injury event caused disability?*
01 (Senior female)	❑ Yes ❑ No	❑ Yes ❑ No
02	❑ Yes ❑ No	❑ Yes ❑ No
03	❑ Yes ❑ No	❑ Yes ❑ No
04	❑ Yes ❑ No	❑ Yes ❑ No
05	❑ Yes ❑ No	❑ Yes ❑ No
06	❑ Yes ❑ No	❑ Yes ❑ No
07	❑ Yes ❑ No	❑ Yes ❑ No

* If the person is not able to do the activities he/she was able to do before the injury.

3. Did anyone who lived in this household die following an accident or injury during the past 12 months?

Death event number	Relationship to senior female	Sex	Age at death (years)
D01			
D02			
D03			
D04			
D05			

FILL OUT A SEPARATE INDIVIDUAL FORM FOR: EACH DEATH; EACH CURRENT DISSABILITY, EACH INJURY WITH RECOVERY IN THE LAST 12 MONTHS

World Health Organization
Republic Institute for the Health Protection - Skopje

COMMUNITY SURVEY ON INJURIES IN MACEDONIA

Participation in this survey is voluntary and anonymous. Confidentiality is guaranteed.

Provided data with this questionnarie will be used only for Scientific Purposes and they won't be used in any case as a base for taking the legal procedure under the court

Household Number ☐☐☐☐

Household member number ☐☐☐☐☐☐

Date of interview ☐☐☐☐☐☐

Interviewer ☐☐

INDIVIDUAL FORM

Respondent:

Injured/victim	1
Senior female	2
Parent	3
Other relative	4
Other person	5

A. PERSONAL DEMOGRAPHIC DATA

1. Gender

Male	1
Female	2

2. Age - day, Month and the Year of birth ☐☐☐☐☐☐

or Age in years at the time of injury ☐☐

3. Education (finished or under procedure)

Elementary	01
High School	02
University	03
Without any education	04
Unknown or underdetermined	09

Number of years spent in full-time education by victim.

4. Occupation

Current occupation of the victim or, in the case of any injury-related death, the occupation of the victim at the time of his/her death.

01 Farmer
02 Civil servant (government employee)
03 Self-employed
04 Street vendor
05 Professional
06 Student
07 Homemaker
08 Non-paid worker/volunteer
10 Retired
11 Unemployed (able to work)
12 Unemployed (unable to work)
98 Other (specify)
99 Unknown

5. Marital status

Unmarried	1
Married	2
Divorced	3
Widow	4

6. Nationality –Ethnic group

Macedonian	1
Albanian	2
Turkish	3
Serb	4
Romanian- Vlah	5
Roma Population- gypsies	6
The others	7

7. Religion

Christian	1
Muslim	2
Others	3

4-7 Used as a proxy measures of socio-economic status

B. INJURY EVENT DATA - FACTORS

8. Exact time of the injury- accident

Day _____ Month _____ Year _____ | | | | | | |

Day of Week | |

Hour | | |

9. Place

Type of place where the injury event occurred.

01 Home
02 School
03 Street/highway
04 Residential institution
05 Sports and athletic area
06 Industrial or construction
07 Farm (excluding home)
08 Commercial area (shop, store, hotel, bar, office)
09 Countryside
98 Other (specify)
99 Unknown

10. Activity

What the victim was doing at the time of the injury.

01 Paid work (including travel to and from work)
02 Unpaid work (including travel to and from work)
03 Education
04 Sports
05 Leisure/play
06 Vital activity (i.e. sleeping, eating, washing)
07 Traveling
08 Unspecified activities (hanging around, doing nothing)
98 Other (specify)
99 Unknown

11. Mechanism

Description of how the injury was inflicted.

01 Traffic
02 Fall
03 Struck/hit by person or object
04 Stab
05 Gun shot
06 Fire, flames or heat
07 Drowning or near-drowning
08 Poisoning
09 Animal bite
10 Electricity shock
98 Other (specify)
99 Unknown

12. Intent

The role of human intent in the occurrence of the injury incident.

01 It was an accident (unintentional)
02 Someone else did it to me deliberately (intentional)
03 I did it to myself deliberately (self-inflicted)
99 Don't know

13. Use of alcohol

Alcohol use before the injury event.

01 Yes
02 No
77 Refused
99 Don't know/can't remember

14. Nature

The physical nature of the injury.

01 Fracture (broken bone)
02 Sprain or strain
03 Dislocation
04 Cut, bite or other open wound
05 Bruise or superficial injury
06 Burn
07 Poisoning
08 Concussion/head injury
09 Internal injury/internal organ injury
98 Other (specify)
99 Unknown

15. Diagnosis
nature of injury (by ICD 10)

16. External
cause of injury (by ICD 10)

15 and 16 data to be extracted from medical documentation if available

C. MEDICAL CARE AND TREATMENT OF INJURY

17. First aid at scene
Whether or not the injured person received first aid where in the injury happened.

01 Yes
02 No — if No go to q. 20
77 Refused (to answer)
99 Don't know

18. Time of the giving the first aid

after in half an hour	1
after 1 hour	2
after few hours	3

19. Person who provided first aid
The person who gave first aid to the injury victim where the injury happened

01 Bystander
02 Friend/family
03 Teacher
04 Police
05 Ambulance personnel
06 Doctor
07 Nurse
08 Fire brigade personnel
77 Refused (to answer)
98 Other (specify)
99 Don't know

20. Transport to health facility

How the injured person got to a health facility.

01 By foot
02 By private car
03 By taxi
04 By public transport
05 By ambulance
06 By bicycle
07 By animal cart
08 Did not go to a health facility
77 Refused (to answer)
98 Other (specify)
99 Don't know

21. Transport time

How long it took for the injured person to reach a health facility for treatment.

01 Less than 1 hour
02 1–2 hours
03 3–6 hours
04 7–9 hours
05 10–12 hours
06 13–24 hours
07 More than 24 hours
08 Did not go to health facility
77 Refused (to answer)
99 Don't know

22. Seeking medical care

Did the injured person seek medical attention after their injury?

01 Yes
02 No if No go to q. 28
77 Refused
99 Don't know/Can't remember

23. Place of medical care

What type of facility did the victim go to for medical treatment of their injury.

01 Hospital
02 Health clinic
03 Health centre or health post
04 General medical practitioner
05 Community health worker
06 Traditional practitioner/healer/bone setter
07 Pharmacy/drug store
77 Refused
98 Other (specify)
99 Don't know/can't remember

24. Type of medical treatment

operative	1
conservative	2
Medical rehabilitation	3

25. Admission to hospital/health facility

Victim spending at least one night in a hospital or health facility bed due to injury

01 Yes
02 No if No go to q. 28
77 Refused
99 Don't know/can't remember

26. Length of hospital stay

Total number of days victim was hospitalized for treatment of injury.

Number of days ☐☐☐

Numeric (record exact number of days)
99 Don't know/can't remember

27. Duration of the rehabilitation in days ☐☐☐

D. POST-INJURY IMPACT

INJURY-RELATED DISABILITY

28. Physical disability Impairments, activity limitations and participation restrictions resulting from the injury event.

01 Yes
02 No if No go to q. 30
77 Refused
99 Don't know/can't remember

29. Nature of disability

Physical nature of the disability causing impairment.

01 Unable to use hand or arm
02 Difficulty using hand or arm
03 Walk with a limp
04 Loss of hearing
05 Loss of vision
06 Weakness or shortness of breath
07 Inability to remember things
08 Inability to chew food
77 Refused
98 Other (specify)
99 Don't know/can't remember

30. Affect on usual activities
Did the injury affect the victim's usual activities?

01 Yes
02 No if No go to q. 32
77 Refused
99 Don't know/can't remember

31. Return to normal activity
Has the victim been able to return to the same level of usual activity as before the injury?

01 Yes, fully
02 Yes, but only partially
03 No
77 Refused
99 Don't know/can't remember

32. Loss of employment
Did victim lose employment as a result of being injured?

01 Yes
02 No
77 Refused
99 Don't know/can't remember

33. Injured member loss of work/school
Did an injured member lose days of work or school?

01 Yes >>> fill number of days
02 No
77 Refused
99 Don't know/can't remember

Number of days | | | |

34. Hosehold member loss of work/school
Did a household member lose days of work or school?

01 Yes >>>fill number of days
02 No
77 Refused
99 Don't know/can't remember

Number of days | | | |

35. Decline of household income
Whether there was a decline in the usual household income as a result of the injury event.

01 Yes
02 No
77 Refused
99 Don't know

36. Loss of job (household member)
If a household member lost employment or had to leave school due because of having to care for the victim

01 Yes
02 No
77 Refused
99 Don't know

E. INJURY-RELATED DEATH

37.Age at death
Age (in years) of the victim who died as a result of injury.

Coding instructions Numeric (record age in years)

38. Place of death
Where the victim died in relation to where the injury occurred.

01 At the place where the injury occurred
02 At a health facility (e.g. hospital, clinic, health centre)
03 At home
77 Refused
98 Other (specify)
99 Don't know/can't remember

39. Time of death
Time of death of the victim in relation to when the injury occurred.

01 Immediately
02 Less than 1 hour after the injury
03 Between 1 and 6 hours after the injury
04 More than 6 hours but less than 12 hours after the injury
05 Between 12 and 24 hours after the injury
06 More than 1 day but less than 1 week after the injury
07 More than 1 week after the injury
98 Other (specify)
99 Don't know/can't remember

EXPANDED DATA ELEMENTS

Take information only for appropriate type of injury, skip the others

F. TRAFFIC-RELATED INJURIES

40. Mode of transport

How the injured person was travelling at the time of injury.

01 Walking
02 Non-motorized vehicle
03 Bicycle
04 Motorcycle
05 Car
06 Pickup, van, jeep or minibus (vehicle that seats less than 10 people)
07 Truck /lorry
08 Bus
09 Three-wheel motorized vehicle
98 Other (specify)
99 Don't know/can't remember

41. Victim role

What was the role of the victim (type of road user) in the injury event?

01 Pedestrian
02 Driver
03 Passenger
98 Other (specify)
99 Unknown

42. Counterpart

With what did the victim (or his/her vehicle) collide?

01 Pedestrian
02 Bicycle
03 Motorcycle
04 Motorized vehicle
05 Fixed object
98 Other (specify)
99 Don't know/can't remember

43.The risk factors

Human	1
Traffic vehicle	2
Road	3
Weather conditions	4
Combination (short listed)	5

44. Seat belt use
Frequency of seat-belt use (by injured person).

01 All the time
02 At the time of the accident
03 Sometimes
04 Never
05 Have not been in a vehicle in the past 30 days
06 There is not seat belt in the car I usually drive or ride in
77 Refused
99 Don't know/unsure

45. Helmet use
Frequency of safety helmet use (by injured person).

01 All the time
02 Sometimes
03 Never
04 Have not been on a motorcycle or motor-scooter in the past 30 days
05 Do not own a helmet
77 Refused
99 Don't know /unsure

G. VIOLENCE-RELATED INJURY

Ask directly the victim, unless the victim is child or fatal injury.

46. Relationship
The relationship of the perpetrator to the victim.of the line of questioning.

01 Intimate partner
02 Parent
03 Child, sibling, or other relative (e.g. brother, cousin, sister)
04 Friend or acquaintance
05 Unrelated caregiver
06 Stranger
07 Official or legal authorities
77 Refused
98 Other (specify)
99 Unknown

47. Object
Action that inflicted the injury.

01 Shot with a firearm/gun
02 Beaten, stabbed, burnt, throttled or otherwise attacked with another weapon (e.g. bottle,glass, club, knife, hot liquid, rope)
03 Hit, slapped, shoved, punched, pushed, or kicked without any weapon
77 Refused
98 Other (specify)
99 Unknown

48. Feeling of safety
Respondent's perception of the threat of violence

01 Intimate partner
02 Parent
03 Child, sibling or other relative (e.g. brother, cousin, sister)
04 Friend or acquaintance
05 Unrelated caregiver
06 Stranger
07 Official or legal authority (e.g. police officer, soldier)
09 No one (not been frightened for safety)
77 Refused
98 Other (specify)
99 Unknown

49. Control of tamper
Perceived ability of respondent to control their own temper

01 Never
02 Almost never
03 Sometimes
04 Almost always
05 Always
77 Refused

50. Weapon carrying
Weapon carrying (by injured person).

01 No
02 Yes, for protection
03 Yes, for work
04 Yes, for sport (e.g. hunting target practice)
77 Refused
99 Unknown

51. History of childhood violence
Physical abuse in childhood.

01 Never
02 Very rarely
03 Once a month
04 Once a week
05 Almost daily
77 Refused
99 Unknown

52. Suicide attempts
Whether or not respondent has attempted to commit suicide.

01 Yes, in the last 12 months
02 Yes, ever in your lifetime
03 Never
77 Refused
99 Don't know/can't remember

53. Method of most recent attempt
The method of attempted suicide the respondent chose for his/her most recent attempt.

01 Gun
02 Hanging
03 Jumping from a height
04 Drowning
05 Intoxication with pesticides, pills, medicines
06 Cutting myself
77 Refused
98 Other (specify)
99 Don't know/can't remember

54. Medical attention for most recent attempt
Whether or not respondent sought medical attention after most recent suicide attempt.

01 Yes
02 No
77 Refused
99 Don't know/can't remember

J. POISONING-RELATED INJURIES

55. Substance

Type of substance that caused the poisoning.

01 A drug or medical substance used mistakenly or in overdose
02 A solid or liquid toxin (e.g. pesticides, household cleaning products, rat poison)
03 Inhaling gases or vapors
04 Eating a poisonous plant or the substance mistaken for food
05 A venomous animal
77 Refused
98 Other (specify)
99 Don't know/can't remember

56. Access to product

Availability and point of access to substance causing the poisoning injury.

01 At home
02 Work
03 School
04 From another person
77 Refused
98 Other (specify)
99 Unknown

K. FALL-RELATED INJURIES

57. Height of fall

Approximate distance that the victim fell or level from which the person fell.

01 Same level as you were standing
02 Height less than 2 meters
03 Height greater than 2 meters
77 Refused
98 Other (specify)
99 Don't know/can't remember

58. Object. place person fell from

Object from which the fall occurred (in the case of a fall from height).

01 Stairs
02 Tree
03 Roof
04 Balcony
05 Ladder
06 Back of an animal
77 Refused
98 Other (specify)
99 Don't know/can't remember

L. BURN-RELATED INJURIES

59. Substance causing burn

Contact with type of substance/object that caused the burn injury.

01 Contact with a hot liquid, steam or other gas
02 Contact with a hot object or solid substance (e.g. cooker, kettle, stove, iron)
03 Contact with flames/fire
04 Inhalation of smoke from burning object/substance
77 Refused
98 Other (specify)
99 Don't know/can't remember

M. DROWNING/NEAR-DROWNING

60. Activity

Type of activity the victim was engaged in at the time of drowning event.

01 Bathing
02 Swimming/playing
03 Collecting water
04 Fishing
05 Traveling by foot
06 Traveling by boat
77 Refused
98 Other (specify)
99 Don't know/can't remember

61. Body of water

Physical circumstance (type of water body) in which the victim drowned.

01 Well
02 Pond near your home
03 Ditch near your home
04 River of lake
05 Bay, ocean, sea
06 Flood water
07 Swimming pool
77 Refused
98 Other (specify)
99 Don't know/can't remember

THANK YOU