

**Population Losses in the “Siege” of Sarajevo  
10 September 1992 to 10 August 1994**

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**DEMOGRAPHIC UNIT - LRT**

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## Section 1. Executive Summary

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In this report we discuss population losses in the siege<sup>1</sup> of Sarajevo. The major source used in this report was the Households Survey of Sarajevo, 1994, (HSS-1994). Since its completion until the present, this survey has never been presented to any audience. The authors of the survey lacked resources for computerisation, data processing, and analysis. The Office of the Prosecutor (hereafter OTP) conducted a project in which these activities were completed in order to produce reliable statistics of population losses during the siege of Sarajevo. The outcome of the OTP project is presented in this report.

The study area was the one within the Sarajevo front lines as set up by mid-1994. In practice, the area covered *parts* of six municipalities<sup>2</sup>: Centar, Ilidža, Novi Grad, Novo Sarajevo, Stari Grad, and Vogošća. The statistical definition of the area included 89 local communities (mjesne zajednice). The period of the study was from 10 September 1992 to 10 August 1994.

The HSS-1994 was conducted at mid-1994 (from April to September 1994), and collected retrospective information about several demographic events, including killing, wounding and natural death. The reporting period lasted from January 1992 to September 1994. The survey population, meant to be complete, was about 340,000 individuals<sup>3</sup>. This large size of this population, even if it was incomplete, gives good reasons to believe, that it was large enough to use it in estimating statistics of killing, wounding and natural death for the area and period studied here. The source is discussed in Section 3.

We also used several other sources of information, such as the Bakije Mortality Database (*Bakije*) and Mortality Database of Muslims against Genocide (*MAG*). In order to verify the identity of all casualties, the above-mentioned sources (HSS-1994, Bakije and MAG) were cross-examined against the 1991 population census for Bosnia and Herzegovina. (In other words, sources were matched or linked<sup>4</sup> with the census at the level of individual records). In order to distinguish between civilian and military casualties, the two major sources (HSS-1994 and Bakije) were compared (through linking) with official lists of fallen soldiers from ABiH (Armija Bosne i Hercegovine) and VRS (Armija Republike Srpske), obtained from the Ministries of Defence of the Federation of Bosnia and Herzegovina and Republika Srpska. All these sources are summarised in Section 4.

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<sup>1</sup> The term siege is used to refer to events in Sarajevo, as they become popularly known.

<sup>2</sup> The area of the six *entire* municipalities is hereafter called *Sarajevo Six*, on the contrary to *parts* of the six municipalities located within the 1994 front lines in Sarajevo.

<sup>3</sup> The size of survey population is to a certain extent indicative. It has been obtained from the number of households interviewed in HSS-1994, i.e. 85,000, each consisting on average of 4 persons. The number of individuals in the survey could be slightly lower, but assuming a larger population is safer for the calculation of relative measures, such as demographic rates of killing or wounding. Rates, which relate a fixed number of events to a larger population, are more conservative (i.e. lower).

<sup>4</sup> Approximately 80% of records in each source were successfully linked with the census (for some sources the matching rate was even higher). The unsuccessful matching was due to mistakes in names or other data deficiencies.

**Table 1. An overview of summary statistics from the Households Survey of Sarajevo, 1994**

Variables	Variables' Categories	Killed		Wounded	
		Number	Percent	Number	Percent
Sample Size	Overall Total	3798	100.00	12919	100.00
Sex	Men	3127	82.33	10438	80.80
	Women	670	17.64	2477	19.17
	Unknown	1	0.03	4	0.03
Age (years)	0-4	22	0.58	69	0.53
	5-9	79	2.08	234	1.81
	10-17	194	5.11	948	7.34
	0-17	295	7.77	1251	9.68
	18-69	3397	89.44	11473	88.81
	70+	85	2.24	179	1.39
	Unknown	21	0.55	16	0.12
Ethnicity	Croats	135	3.55	452	3.50
	Muslims	2340	61.61	8715	67.46
	Others	330	8.69	1391	10.77
	Serb	158	4.16	633	4.90
	Unknown	835	21.99	1728	13.38
Status: Reported in HSS94	Civilians	1399	36.84	5093	39.42
	Soldiers	2381	62.69	7774	60.17
	Unknown	18	0.47	52	0.40
Status: External Definition	Civilians	1732	45.60	na	na
	Soldiers	2062	54.29	na	na
	Unknown	4	0.11	na	na
	<i>Of Soldiers:</i>	<i>Of 2062:</i>			
	<i>ABH</i>	<i>1577</i>	<i>41.52</i>	na	na
	<i>VRS</i>	<i>1</i>	<i>0.03</i>	na	na
	<i>HSS94</i>	<i>484</i>	<i>12.74</i>	na	na
Year of Event	1992	1201	31.62	3923	30.37
	1993	2196	57.82	7897	61.13
	1994	401	10.56	1099	8.51
Opština of Event	Centar	369	9.72	1504	11.64
	Ilidža	856	22.54	2626	20.33
	Novi Grad	1053	27.73	3817	29.55
	Novo Sarajevo	265	6.98	1089	8.43
	Stari Grad	507	13.35	1423	11.01
	Vogošća	175	4.61	391	3.03
Cause of Event	Sarajevo unsp.	573	15.09	2069	16.02
	Shelling	2160	56.87	8009	61.99
	Sniping	699	18.40	3111	24.08
	Other Firearms	529	13.93	1199	9.28
	Other Casualties	410	10.80	600	4.64

**Table 1. - Continued: Civilian Casualties**

Variables	Variables' Categories	Killed		Wounded	
		Number	Percent	Number	Percent
Sample Size	Overall Total	1399	100.00	5093	100.00
Sex	Men	782	55.90	2802	55.02
	Women	617	44.10	2291	44.98
	Unknown	0	0.00	0	0.00
Age (years)	0-4	22	1.57	69	1.35
	5-9	79	5.65	233	4.57
	10-17	166	11.87	848	16.65
	0-17	267	19.09	1150	22.58
	18-69	1040	74.34	3769	74.00
	70+	83	5.93	172	3.38
	Unknown	9	0.64	2	0.04
Cause of Event	Shelling	932	66.62	3405	66.86
	Sniping	253	18.08	1296	25.45
	Other Firearms	101	7.22	288	5.65
	Other Casualties	113	8.08	104	2.04

The linking confirmed the validity of sources and also helped increase information about individuals by using the sources jointly. This method of analysis considerably increased the reliability and scientific value of our results.

In this report we present the following types of results:

- absolute numbers of killed and wounded persons (Section 5)
- demographic rates of killing, wounding and natural death (Section 6)
- an estimated overall number of persons killed (Section 7)

All absolute numbers are the lowest confirmed and should be seen as minimum numbers. The lists of casualties of the siege from 10.09.1992 to 10.08.1994 (3,798 names of killed persons, and 12,919 names of wounded persons) can be obtained from the demographic unit at a request.

**Table 2. Overview of total numbers of events reported in three HSS-1994 samples**

Event	HSS-1994	HSS-1994	HSS-1994
	ALL	01.01.92-30.09.94	10.09.92-10.08.94
Wounding	24197	21681	12919
Killing	7879	6055	3798
Nat Death	4981	4967	3434
Total	37057	32703	20151

The most significant findings of our study are shown in Table 1 and 2 and are listed below:

**Absolute numbers of casualties:**

- the total number of events reported in HSS-1994 was 37,057 (killing, wounding and natural deaths). Of this total, 20,151 events occurred in the area and period studied in this report,
- the number of killed persons obtained from HSS-1994 for the area and period studied here was 3,798, and the number of wounded persons was 12,919,
- these two numbers were obtained after data cleaning, re-coding of variables, a thorough control of data quality and internal data consistency, and elimination of duplicates from the HSS-1994 data,
- the vast majority of those killed or wounded were men (3,127 killed and 10,438 wounded men), most of them were at active military age (18-69 years) and were soldiers,
- however, many children, women and the elderly were reported among casualties as well,
- among those killed there were 295 children (0-17 years of age), 670 women, 85 elderly (70+ years of age),
- among those wounded the numbers were as follows: 1,251 children (0-17), 2,477 women, 179 elderly (70+),
- in total a minimum of 1,399 civilians were killed and 5,093 were wounded,
- shelling, sniping and other firearms were the most significant causes of killing and wounding
- some 2,160 persons (of which 932 civilians) were killed by shelling, 699 (253 civilians) by sniping, and 529 (101 civilians) by other firearms, some 410 remaining deaths (113 civilians) were caused by other causes of killing,
- with regard to wounding, 8,009 persons (of which 3,405 civilians) were wounded by shelling, 3,111 (1,296 civilians) by sniping, 1,199 (288 civilians) by other firearms, and 600 (104 civilians) by other causes,
- the ethnic composition of casualties includes a majority of Muslims (2,340 killed and 8,715 wounded, also killing and wounding rates for Muslims were considerably higher than for any other ethnic group), which may be related to the ethnic composition of the population at risk,
- ethnic targeting of the population could not be studied in this report as the ethnic composition at mid-1994 was rather uncertain (no source available),
- daily timing of killing and wounding indicates that casualties were observed almost every day from 10 September 1992 to 10 August 1994,
- most incidents occurred in 1992 (average of 300 killed persons per month and 10 killed per day), then in 1993 (177 killed per month and 6 per day), and at last in 1994 (64 killed per month and 2 per day),
- a similar pattern was obtained for wounded persons, which confirms the timing of shelling and sniping and other conflict-related activities,
- the analysis of timing also suggests that many civilian casualties were not caused by mechanisms which were killing or wounding soldiers, thus, some kind of targeting civilians might be possible.

**Demographic rates:**

- the 1992-94 killing rate was very high, equalled 1,153 deaths per 100,000 population and made up about 85% of the 1990-91 total rate for the Sarajevo Six,

- the overall death rate (for killing and natural deaths together) equalled 2,213 deaths per 100,000 and was higher than the 1990-91 by 65%, more than a half of this rate (52%) were killings, which means that the natural death rate (1,060) was lower than the killing rate (1,153),
- the municipalities that suffered most (in terms of killing) were the following: Stari Grad (ratio of 1992-94 to 1990-91 rates = 115%), Vogošća (104%) and Novi Grad (100%),
- the age patterns of killing and natural death are distinctively different: for killings most deaths are associated with lower ages (18-69), this must be seen as premature mortality, which does not compare with regular age-related mortality (i.e. in the age pattern of natural mortality most deaths appear at the highest ages),
- the 1992-94 wounding rate was extremely high, 4,412 wounded persons per 100,000 population, and was more than three times higher than the 1990-91 death rate.

#### **Estimated overall numbers:**

- although the major source used in this report (i.e. HSS-1994) is very large, the total of 3,798 killed persons is incomplete (so are all sources of information about war-related mortality),
- we therefore made an estimate of the unknown overall number of killed persons and obtained 4,352 individuals,
- the ethnic composition of this estimate includes 3,437 (79%) Muslims, 232 (5.3%) Serbs, 198 (4.5%) Croats and 485 (11.1) Others,
- we repeated the estimation also for natural deaths and produced an estimate of all deaths in the area and period studied, the number obtained is 8,132 deaths, which include approximately 53.5% killed persons.

#### **List of casualties:**

- We completed two lists of casualties of the siege, one of those killed (3,789 names), one of those wounded (12,919) persons. The lists are based on the Households Survey of Sarajevo, 1994, and include the casualties that are relevant to the area and period studied in this report.

Summing up, we must conclude that the population of Sarajevo experienced great losses during the siege. The share of killed civilians was very high, and of wounded civilians extremely high. So was the share of children, the elderly and women killed or wounded during the siege. Civilian casualties were largely unrelated to mechanisms that killed or wounded soldiers. The losses lasted over the whole period studied in this report.

## Section 2. The Scope, Sources and Structure of This Report

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This report presents statistical data and analysis concerning persons who were killed, died naturally, or were wounded during the siege of Sarajevo between 10 September 1992 and 10 August 1994. The area studied in this report covers selected parts of six municipalities of Sarajevo: Centar, Ilidža, Novi Grad, Novo Sarajevo, Stari Grad, and Vogošća. The parts included in this report were located within the Sarajevo front lines by mid-1994, were seen by Bosnian authorities and local people as a free territory of the city by that time, and the population living in these areas at that time was able to report demographic events that occurred in their families to those searching for this information.

Our principal objectives are to provide reliable statistics on population losses in the above-mentioned period and area, to measure the scale of these losses in relative terms (i.e. as mortality ratios), and to compare them with pre-war mortality ratios for Sarajevo. All this can be done as the sources used for this report are extensive. Our major source, the Households Survey on the Free Territory of Sarajevo in 1994, was a census-like population survey in the area within front lines in Sarajevo at mid-1994. Thus, it was expected to cover the entire population living in this area at the time the survey was conducted. It largely succeeded to achieve this objective, for the coverage within the front lines was 85,000 households<sup>5</sup>. However, none of existing sources is complete, not even the 1994 Sarajevo Households Survey<sup>6</sup>. Thus, the numbers we obtained from the original sources must be seen as the lowest confirmed (i.e. so-called minimum numbers). In order to increase our knowledge of the overall number of casualties, we also present a probabilistic<sup>7</sup> estimate of this total, produced on the basis of merged sources with eliminated duplicates.

The report was prepared by the demographic unit of the Office of the Prosecutor (OTP) for the case of the Prosecutor of the Tribunal vs. Stanislav Galić, Case Number IT-98-29-I. Two main sources of information analysed in this report are *the Households Survey on the Free Territory of Sarajevo in 1994* (hereafter *HSS-1994*), conducted by the Institute for Research of War Crimes and International Law in Sarajevo, and *Mortality Database of the Bakije Funeral Home in Sarajevo* (hereafter *Bakije*). Both sources cover the area within the front lines in Sarajevo, both contain detailed information about those killed or who died naturally during the siege of Sarajevo. The cause of death is however not explicitly reported in the Bakije collection. To obtain causes of death for the records in the Bakije Mortality Database, we matched them with the Mortality Database of the Muslims against Genocide (hereafter *MAG*) and also the Households Survey of Sarajevo, 1994.

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<sup>5</sup> It is difficult to say how many households altogether lived within the 1994 front lines. Certainly the number was much less than the total number of households reported in the 1991 population census for the six municipalities, that **contained** the survey area. Large parts of these six municipalities were located outside the front lines and were inaccessible to the survey. Survey area was therefore a merger of certain smaller parts within the six municipalities. The number reported in the census for six municipalities (each as a whole) was 144,102 households. The survey total of 85,000 households is approximately 59% of the pre-war total for six entire municipalities.

<sup>6</sup> This conclusion is based on a comparison of siege-relevant records from three sources: the 1994 Sarajevo Households Survey, Mortality Database of Muslims against Genocide and Database of Bakije Funeral Home in Sarajevo. A number of records are reported in all three sources, some in two of them, but each source also includes a number of unique records that are not included elsewhere.

<sup>7</sup> The terms “probabilistic” or “stochastic” mean that an estimate is based on the probability theory.



In order to verify the identity of all casualties, the above mentioned sources (HSS-1994, Bakije and MAG) were cross-examined (through linking) against the 1991 population census for Bosnia and Herzegovina. In order to distinguish between civilian and military casualties, the two major sources (HSS-1994 and Bakije) were compared (i.e. linked) with official lists of fallen soldiers from ABH and VRS obtained from the Ministries of Defence of both political entities, i.e. the Federation of Bosnia and Herzegovina and Republika Srpska.

The sources were linked with the census at the level of individual records. The linking confirmed the validity of sources and also helped increase information about individuals by using the sources jointly. The reliability of results obtained from this method of analysis is considerably higher than if no linking is applied.

We divided this report into 8 sections and 6 annexes. Section 1 is a summary of findings. The scope, sources and structure of this report are discussed in Section 2. Sections 3 and 4 concentrate on our information sources. Measures of population losses obtained from HSS-1994 are presented in Sections 5 (absolute terms) and 6 (relative terms and comparisons with pre-war ratios). A stochastic estimate of the overall number of casualties obtained from two sources, *HSS-1994* and *Bakije*, is discussed in Section 7. Section 8 summarises the findings of this report.

The annexes 1 to 6 contain, respectively: a description of survey area (Annex 1), the questionnaire used in HSS-1994 (Annex 2), statistics of those killed (Annex 3) and those wounded (Annex 4) obtained from HSS-1994, demographic rates of killing, wounding and natural death for the area and period of the siege (Annex 5), and finally details of the capture-recapture method applied in estimation of the overall number of those killed in Sarajevo from 10.09.1992 to 10.08.1994 (Annex 6).

### Section 3. The Households Survey in the Free Territory of Sarajevo in 1994 (HSS-1994)

#### 3.1 The Households Survey on the Free Territory of Sarajevo in 1994 (HSS-1994)

*The Households Survey on the Free Territory of Sarajevo in 1994* was conducted during the war in the spring and summer of 1994 (most of interviews were completed in May and June 1994, Table 3), in these parts of the besieged Bosnian capital, which were under control of the BiH government army. The survey was designed, co-ordinated and executed by the Sarajevo Institute for Research of War Crimes and International Law (hereafter *the Institute*), led by Prof. Smail Čekić, in co-operation with the University of Sarajevo, statistical authorities of Sarajevo, and local communities (*mjesne zajednice, MZ*) from the survey area. The interviews were conducted via the local communities<sup>8</sup> located within the front lines in Sarajevo.

**Table 3. Timing of Interviews of HSS-1994**

Year	Month	Count	Percent	Cumulative
1994	April	69	0.19	0.19
1994	May	6668	18.01	18.20
1994	June	25431	68.69	86.89
1994	July	79	0.21	87.10
1994	August	1695	4.58	91.68
1994	September	1357	3.67	95.35
	Blank Date	1723	4.65	100.00
Total	All Months	37022	100.00	na

Practically only certain parts of six municipalities: Centar, Novi Grad, Stari Grad, Novo Sarajevo, Ilidža and Vogošća, were covered by the survey. Specific local communities are indicated in Table A1.1 in Annex 1.

The questionnaires used in the survey are related to households; i.e. one questionnaire contains information about one household (Annex 2). According to the authors of HSS-1994, approximately 85,000 households living in Sarajevo at mid-1994 participated in the survey. Individual household members can be easily identified as well, for their names are listed in responses to subsequent questions. An assumption, that each household consisted of 4 members<sup>9</sup>, gives us a survey population

<sup>8</sup> Local communities, officially constituting small administrative units within municipalities, remained in touch with their members and had the easiest access to the population. During the siege the communities distributed goods provided by the international aid among the population of Sarajevo.

<sup>9</sup> The assumption of the four-person household size is not fully consistent with the pre-war 1991 household size (3.2 persons per household in the Sarajevo Six). We increased this number in order to adjust it for the large number of displaced persons and refugees living in Sarajevo, in many cases together with their relatives or friends, at mid-1994. Although for 1994 we were unable to rely on reliable statistics with this regard, for 1998

of approximately 340,000 individuals, which is 75% of the 1991 census population of the Sarajevo Six.

The questionnaire includes information on the following items:

1. Place of residence of a given household (current, i.e. 1994 address)
2. Type of place the household lives at:
  - a) They have not changed their pre-war place of residence (currently live at their pre-war address)
  - b) They have changed their location within the free territory, i.e. the territory controlled by the government army (ABiH)
  - c) They are refugees or displaced persons from territories controlled by other armies; currently live at a temporary location
3. Members of the household who at the time of interview lived on the free territory of the city of Sarajevo (first listed: head of the household)
4. Members of the household who became refugees or displaced, also those who at the time of interview stayed on the territory controlled by armies other than ABiH
5. Members of the household who had been killed during the conflict
6. Members of the household who had been wounded during the conflict
7. Members of the household who had gone missing during the conflict
8. Members of the household who had been in detention camps and/or in prisons during the conflict
9. Those disabled by war activities
10. Live births in the household during the conflict
11. Stillbirths in the household during the conflict
12. Those who died naturally during the conflict (and where are they buried)
13. Household's living conditions in Sarajevo in 1994
  - a) Pre-war (own?) home/flat
  - b) A place different from their pre-war (own?) home/flat since their pre-war place has been destroyed
  - c) A place different from their pre-war place but they moved not because of destruction of their pre-war place
  - d) They live in a collective place with other refugees/displaced
  - e) They are refugees/displaced and live with their relatives
14. Were there any refugees from this household in World War II?
15. Did the household lose any relatives in World War II?

For survivors living in Sarajevo at mid-1994 (listed under question 3) ethnicity and religion were reported, for all respondents their year of birth (i.e. age). Sex was available for everyone from the relationship to household head or name. Importantly, for killings, woundings and natural deaths, the place, date- and cause-of-event were included (for natural deaths place-of-death was given as place-of-burial and cause-of-death as just "natural death").

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we can quote the UNHCR (United Nations High Commissioner for Refugees) figure of DPs (displaced persons)

There are several reasons for the uniqueness of this survey:

- two types of variables are available from one and the same survey: the population exposed to the conflict, and several essential demographic events (killing, natural death, wounding, gone missing, displaced etc.) that occurred in this population
- these two types of variables could be used jointly to estimate relative measures (i.e. fractions) of killed, natural deaths, wounding, gone missing, displaced etc. in the de facto population living in Sarajevo in 1994
- the estimated fractions can be extrapolated for the whole Sarajevo population under the siege
- the number of events included in the questionnaire is very large and many war consequences can be revealed based on this single source
- the sample is large and covers the majority of the Sarajevo population in this period, which ensures a high reliability of the estimates.

The authors of the survey have never computerised the information reported in the questionnaires, for they lacked the necessary resources. Thus, losses of the Sarajevo population have never been estimated and presented to a broad audience.

As population losses of Sarajevo are an essential issue in the GALIĆ case (IT-98-29-I), the survey material was requested by OTP to produce statistics about population losses relevant to this case. We concentrated on three most significant events: killing, natural death and wounding, which brought us to establishing a database of approximately 40,000 records. The population exposed to risk (in total some 340,000 individuals) was generally left aside<sup>10</sup>, as the computerisation of such a large quantity of information would be too time consuming and too costly. The data processing project, conducted at OTP, is summarised below.

### 3.2 Survey Computerisation

Databases and analyses discussed in this report are individuals-oriented. Only questions 1, 2, 3, 5, 6, 12, and date of survey and person giving statement (interviewed person) were computerised and analysed. Note that the above-mentioned questions contain information about killings, woundings and natural deaths and also personal details of those who experienced these events. The remainder of the questionnaire was neglected.

This practically means that out of the original 85,000 questionnaires a selection was made of **all these questionnaires in which killings, woundings and natural deaths were reported (approximately**

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and refugees living still in the Sarajevo Six, which is 72,372 persons.

<sup>10</sup> Except of the municipality of Stari Grad, which was the most centrally located and most exposed to risk. For Stari Grad we included all collected questionnaires, i.e. those where events were reported and those with no events. We did it for future reference and having an example of both the population data and demographic events coming from this population. In this report, however, Stari Grad municipality is only included in terms of events, i.e. killing, natural deaths and wounding, not the population.

**40,000 questionnaires**). In this way we collected all available information about the events that were needed to produce statistics on the population losses during the siege of Sarajevo.

Relevant questionnaires were selected from the archive of the Institute for Research of War Crimes and International Law in Sarajevo in August 2001 by the staff of the demographic unit, OTP, together with the staff of the Institute. The selected documents contained information about killings, woundings or natural deaths from six Sarajevo municipalities<sup>11</sup> (approx. **40,000**). After selection, original documents were sent out for computerisation.

Data entry and scanning of the questionnaires commenced on 1 October 2001 in the ICTY Field Office in Zagreb. The data entry and scanning processes were successfully carried out in the period from 1 October to 31 December 2001 by six data entry clerks and two scanning staff. In late October 2001, a mission to Zagreb was undertaken by the demographic unit, OTP, to quality-control the data entry process at the early stage of the project, pick up the errors, correct them and, taking these errors into consideration, to set the standards required for the further work. The objectives of the mission were fully achieved.

### **3.3 Duplicate Removal**

After initial cleaning of erroneously entered empty records, the collection had 40,204 records depicting casualties as reported while the survey was conducted. Then, **31** records with no information about any incident, including one person that was killed in the World War II, were deleted. Afterwards, a duplicate check was performed.

Duplicated records<sup>12</sup> are often seen in war-related sources due to imperfect reporting and limited or absent data quality control. The presence of duplicates can affect statistics by unjustifiably inflating their level. Thus, duplicate removal is a necessity in surveys like HSS-1994, especially that reliability of figures plays an extremely important role in this case.

In the duplicate check, the following criteria were used:

**First name, last name, initial of father's name and year of birth** – 2,798 records were removed and 2,537 kept, of which 52 after updating information about events encountered by individuals.

**Last name, year of birth and three first letters of a first name** – 338 records were removed and 615 kept, of which 50 after updating information about events.

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<sup>11</sup> Municipalities: Centar, Novi Grad, Novo Sarajevo, Ilidža, Stari Grad and Vogošća, all areas being largely (not entirely) located within the confrontation lines at the time of the survey (mid-1994).

<sup>12</sup> Sometimes the same record appears in a database more than one time (or even more than twice). Reasons for duplicates are different depending on the specificity of a source. Also in HSS-1994, different respondents could report one the same person several times. This was largely related to frequent changes in the households' composition due to population movements during the war. Also mistakes of interviewers could be the cause for duplicates. In the duplicate control, we first identify all possible duplicates. Then, only unique records are kept and all other deleted. Before deleting the duplicates, we check whether we can improve the unique records by adding information from records to delete. Moving information from one record to another is called "up-dating".

We expected few more duplicated records left in the database, but as finding them automatically seemed to be very complicated at this stage, they had been left for the matching process, when they could be uncovered more easily. During the matching process another 15 duplicates in the 1991 census table were found. Finally, the collection was left with 37,022 unique records, of which 24,197 depict wounded persons, 7,879 - killed persons and 4,981 - those who died naturally. Thirty-five of those who were killed or died naturally were reported as being wounded before.

### 3.4 Recoding of Variables

In the preparatory stage, preceding the analytical phase, several variables underwent a thorough quality control, consistency check-up and re-coding. Some new variables were also added. The most significant variables, which later were used in the analysis and which had their values modified, are as follows<sup>13</sup>:

- *OpstinaOfResidence (q.1)*: valid names accepted, otherwise corrected
- *LocalCommunitOfResidencey (q.1)*: valid names accepted, otherwise corrected, lacking information on a local community updated using address or sequence of questionnaire numbers
- *SameAddress (q.2a)*, *MovedFromAddress (q.2b)*, *MovedFromOpstina (q.2b)*, *RefugeesDPsFromAddress (q.2c)*, *RefugeesDPsFromOpstina (q.2c)*: mutual consistency checked, valid municipal names accepted, otherwise re-coded
- *CurrentOpstinaCode (q.1)*, *MovedFromOpstinaCode (q.2b)*, *RefugeeDPsOpstinaFromCode (q.2c)*: created by using official municipal codes (5 digits), with code 00000 for unknown municipalities, 99999 for countries abroad (including other former Yugoslavia) and 19200 for unspecified municipalities in Sarajevo<sup>14</sup>
- *Gender (q.3, 5, 6, or 12)*: recoded into (M)ales / (F)emales / (U)nknown sex
- *YearBorn (q.3, 5, 6, or 12)*: consistency checked (range 1874-1994 accepted)
- *Killed (yes/no, q.5)*: consistency assured with other variables on killed persons
- *DateOfDeath (q.5)*: cleaned and logically controlled<sup>15</sup>

<sup>13</sup> Variables' names express their meaning. The names should be read together with the questionnaire attached in Annex 2 or the list of questions included in Section 3.1.

<sup>14</sup> On the basis of these checks, an assessment of the 1991 municipality of residence was made, stored as a new variable *BestOpstina*. And thus, if a person didn't report anything about his place of residence or reported that the household didn't change the place of residence, the current municipality was assumed to be also the pre-war one. If it was stated that the household moved from another location, this municipality was taken as a priority. If reporting was inconsistent, the furthest possible municipality was taken as the 1991 municipality of residence, providing that it was not empty. In any case, valid municipal codes had priority towards the unknown cases (00000 or 19200). All inconsistent information was manually checked.

<sup>15</sup> Several dates were recoded into *unknown* dates (00-00-0000): (a) possible, but outlying values of day/month/year combinations; (b) impossible day/month/year combinations (e.g. date of death later than date of survey or earlier than the year of birth); (c) impossible dates (e.g. days bigger than 30 or 31, months larger than 12), or event dates later than September 1994. In any case, a *minimum correction strategy* was applied. Whenever possible, the dates were re-coded using information about similar cases (i.e. the same period, place and cause of event). In such cases, frequency distributions were used. If additional information was unavailable, typical typing errors were considered, like "anything-10-1994" instead of "anything-01-1994", etc.). *DateOfQuestioning* has also been cleaned, obtaining consistent values, with most dates in the range May 1994 -

- *CauseOfDeath* (q.5): cleaned (spelling) and regrouped into *NewCoD*
- *PlaceOfDeath* (q.5): cleaned (spelling) and regrouped into *NewPoD*
- *StatusOfDeceased* (q.5): cleaned, allowing only: Civilian / Soldier / Unknown
- *Wounded* (yes/no, q.6): consistency with other variables on wounded persons assured
- *DateOfWound1st* (q.6): cleaned and logically controlled
- *CauseOfWound1st* (q.6): cleaned (spelling) and regrouped into *NewCoW1*
- *PlaceOfWound1st* (q.6): cleaned (spelling) and regrouped into *NewPoW1*
- *StatusOfWounded1st* (q.6): cleaned, allowing only: Civilian / Soldier / Unknown
- *NaturallyDied* (yes/no, q.12): consistency assured with other variables on natural deaths
- *DateOfNatDeath* (q.12): cleaned and logically controlled
- *DateOfQuestionning*: cleaned and logically controlled.

Note that *Wounding1st* denotes that an individual was wounded first time. Several persons were wounded two or three times. In this report we only study the overall number of wounded persons and do not discuss the number of times a person was wounded altogether.

Descriptive variables, such as cause or place of death or wounding, were obtained from open-ended questions, thus re-coding had to be more complex than cleaning only. Details of re-coding of these variables are therefore more thoroughly explained in the next section.

### 3.5 Matching Results

This section is devoted to the attempts made to match persons from the HSS-1994 collection with the 1991 population census. Generally speaking, matching is searching for the same individuals in different sources by comparing personal information in these individuals' records. Persons can be uniquely identified by their identification numbers (ID), or, when IDs are unavailable, by a set of characteristics such as names, date and place of birth, place of residence etc. If matching is done with a population census, we can speak about verifying the identity of individuals.

We tried to match the HSS-1994 records with the 1991 population census for Bosnia and Herzegovina. Matching criteria were applied as indicated above. Some of the criteria were less strict with regard to names (e.g. initials, or three first letters, of first or father's names instead of full names). For less strict criteria, manual control was additionally performed for all records, in other cases – only for those of the lethal cases which matched with survivors (represented in the 1997/98 voters list) the coherence of match was checked.

Altogether, 30,086 records have been matched (20,686 wounded persons, 5,711 killed and 3,612 naturally died), which makes about 81,3% of the total of 37,022 persons from the HSS-1994

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September 1994 (with a break in July). In logical controls, comparisons were made between dates of events and dates of survey. As errors are inherent in all variables, dates of events were given a higher priority than the *DateOfQuestionning*.

collection. For 77 records the evidence is inconsistent, i.e. we also found them on our lists of survivors. We excluded them from the analysis.



## **Section 4. Mortality Database of Bakije Funeral Home and Auxiliary Sources Used in This Report**

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As mentioned in Section 1 and 2, we used several other sources of information, such as the Bakije Mortality Database and Mortality Database of Muslims against Genocide, the 1991 population census for Bosnia and Herzegovina, and official lists of fallen soldiers from ABH and VRS. All these sources are summarised in this section.

Note that the number and types of sources used for this report are exceptional. We are dealing here with a war situation, when usually only limited and deficient information is available. Despite of this fact, we were able to collect and process a large number of sources, some of them (e.g. the census, lists of fallen soldiers) were fully complete and of a high or reasonable quality. Through linking mortality sources with the census and lists of fallen soldiers we proved that the quality and validity of our mortality sources, including the HSS-1994, are fairly acceptable. This result allows considering population losses estimated from the mortality sources as reliable too.

### **4.1 Mortality Database of Bakije Funeral Home**

This source contains business records collected by the Bakije Funeral Home from Sarajevo during the years 1992-95. The Bakije Funeral Home is the largest and oldest (since 1923) Muslim funeral home in Sarajevo. They bury Muslims. Other funeral homes in Sarajevo bury Croats, Serbs or all ethnic groups. During the war, Bakije operated in the area within the front lines in Sarajevo, most likely in the municipalities of Centar, Novi Grad, Novo Sarajevo, and Stari Grad. They buried persons reported dead by their families, or collected bodies from the area of conflict.

The (Access) database includes three data tables: DZENAZE (FUNERALS), LICA (PERSONS; the reporting household members of the deceased), and PORODI(CA) (HOUSEHOLDS of the deceased; represented by household heads). DZENAZE and LICA contain personal details (names, fathers' name, date and place of birth, date of death, place of burial, sex and civilian-soldier divide), PORODI(CA) holds details related to households. Dates with unknown day and/or month are reported as 01/01/.\*. Causes of death and places of death are lacking in the Bakije database.

The number of records (i.e. persons) in this database is 12,867, of which 3,517 are marked with letter 'b' (=borac; i.e. soldier), and 9,350 records with letter 'c' (=civilian). These records cover the period from January 1992 to August 1996. The number of records for 1996 is less than in the respective period in 1992-1995. Generally, we have 11,546 records from the period from January 1992 to December 1995 (3,414 soldiers and 8,132 civilians), and 1,319 records covering the period from January 1996 to August 1996 (102 soldiers and 1,217 civilians). Two records are illegible (obvious mistakes in the year of death). Regarding the period from September 1992 to August 1994 the respective numbers are the following: total: 6,266, soldiers: 2,024, and civilians: 4,242.

## 4.2 Mortality Database of Muslims against Genocide

MAG is the acronym for "The Association of Muslims Against Genocide", a non-governmental organisation operating in Sarajevo. It collected data (including cause of death) on persons killed during the war in BiH, initially in Sarajevo but later in other areas as well. Volunteers collected data from a variety of sources, such as relatives, neighbours, hospitals, ambulances, newspapers, and community contacts all over the country. Some 90 % of the information come from eyewitnesses. Each death is recorded on a separate form and entered into a database. The same deaths may be reported by different persons and may also be mentioned in newspapers, hospital records, etc. Thus, there are often several completed forms for the same death. There is however good control of duplicates in the database. Deaths of all ethnic groups are collected but it is not unlikely that there is an under-registration of deaths among non-Muslims. The procedures for collecting, entering and checking seem to be convincing and the comparisons we have made with other sources indicate that the MAG data are of a very good quality. Until 2001 about 35,000 forms have been entered, covering about 26,600 victims in Bosnia. Approximately 9,500 records report one of the ten municipalities<sup>16</sup> belonging to the (pre-war) Sarajevo area as the place of death.

## 4.3 The 1991 Population Census

The census was taken in spring 1991 (officially per March 31, 1991), just before the outbreak of hostilities in the country. The census contains information about a number of variables for each person enumerated. These include name and surname, father's name, household number, personal ID number (*matični broj*: JMBG), sex, date and place of birth, municipality and place of residence, occupation, ethnicity, mother tongue, religion, educational attainment, number of children born (for women only), and many other variables. The census gives us the possibility of confirming the identity of casualties of Sarajevo. We used it in matching with sources containing death reports.

The overall data quality is good, however a large quantity of names are misspelled, due to poor optical scanning of the original census questionnaire and no subsequent checking. To eliminate the misspelling we have developed special software for checking and correcting the names, with the help of experts familiar with naming traditions in the region. A second data quality problem is that a number of records do not include the full 13-digit personal ID number, the *matični broj*, introduced in the former Yugoslavia in 1981. The sources about deaths do not include any ID either, thus matching must be based on personal information such as names, date and place of births, father's name etc.

## 4.4 Lists of Fallen Soldiers of ABiH

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<sup>16</sup> The ten municipalities of the pre-war Sarajevo area are the following: Centar, Hadžići, Ilidža, Ilijaš, Novi Grad, Novo Sarajevo, Stari Grad, Pale, Trnovo and Vogošća.

This is a complete list of killed soldiers and other military personnel from the official records of the Army of Bosnia and Herzegovina. The following seven regions are included: Bihać, Goražde, Mostar, Sarajevo, Travnik, Tuzla, and Zenica. The data include soldiers' names, ID (i.e. JMBG) numbers, places of birth and residence, military affiliation (army/police/ministry of defence) and cause of death. The database was provided by the Ministry of Defence of the Federation of Bosnia and Herzegovina. The database covers the whole territory of Bosnia and Herzegovina. Data quality is very good.

#### **4.5 Lists of Fallen Soldiers of VRS**

This list of fallen soldiers was obtained from the Ministry of Defence of Republika Srpska. The soldiers were members of the Serbian Army (VRS) and died during the war. Items such as their names, dates of birth, municipality of residence and birth, date of death, and cause of death are included. Also this database covers the entire territory of Bosnia and Herzegovina. Data quality is very good as well.

## Section 5. Absolute Measures of Population Losses Obtained from HSS-1994

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In this section we present absolute numbers of the killed and wounded population that experienced these events in the period from 10 September 1992 to 10 August 1994 in the area within the front lines in Sarajevo (see Table 1 in Section 1 and also repeated below). The statistics are obtained from one single source: the Households Survey of Sarajevo, 1994. We believe that this source is relatively complete and large. The survey was meant to cover the *entire* population of Sarajevo that lived within the front lines at mid-1994. But it is not exhaustive<sup>17</sup> and therefore the numbers discussed in this section should be seen as minimum numbers (i.e. “at least”). Additional sources, such as Bakije Mortality Database or MAG Mortality Database, could have been used together with HSS-1994. However, each of the additional sources has deficiencies that would decline the quality of produced statistics. Bakije, for instance, does not include information about causes of death, which would prevent us from distinguishing between natural and violent deaths, and in particular from proving which deaths were related and which were not to the siege of Sarajevo. MAG database reports places of death as a municipality only, thus we would have to include larger areas in our analysis than the area within front lines. The estimated number of deaths that occurred within front lines would be inflated by the improper definition of the study area.

In Section 3.3 we mentioned a total of 37,022 records in HSS-1994, of which 24,197 were wounded persons, 7,879 - killed persons and 4,981 - those who died naturally. Thirty-five of those who were killed or died naturally were reported as being wounded before. The figures presented in Section 3.3 represent the complete outcome of HSS-1994. The area and period covered by these figures are not all relevant to the GALIĆ case, and must be adjusted to satisfy the requirements of the GALIĆ sample.

The HSS-1994 was expected to cover the within-front-lines area of Sarajevo and the period from approximately 1 January 1992 to 30 September 1994. Reporting of events was meant to be retrospective but not beyond the conflict period. In practice, the respondents also reported some marginal numbers of events that occurred in other periods or at other places. The irrelevant events had to be excluded from the analysis of casualties of the siege. After excluding the irrelevant events, there were 6,055 killings, 21,681 woundings, and 4,967 natural deaths reported within front lines in Sarajevo for the period from January 1992 to September 1994 (unknown dates included).

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<sup>17</sup> The HSS-1994 survey certainly covered a large fraction of the population in this area but it is uncertain that the coverage was complete. The access to certain places could be impossible due to the war situation in Sarajevo, the selection of the survey population was not based on the population register as is usually done in censuses, but on the basis of population records of local communities. The communities kept these records for their own purposes (such as administrative tasks or distribution of international aid) but did not have the legal obligation of up-dating the records by registering vital events, such as deaths, births, or marriages, or in-coming or out-going population.

**Table 3. An overview of summary statistics from the Households Survey of Sarajevo, 1994**

Variables	Variables' Categories	Killed		Wounded	
		Number	Percent	Number	Percent
Sample Size	Overall Total	3798	100.00	12919	100.00
Sex	Men	3127	82.33	10438	80.80
	Women	670	17.64	2477	19.17
	Unknown	1	0.03	4	0.03
Age (years)	0-4	22	0.58	69	0.53
	5-9	79	2.08	234	1.81
	10-17	194	5.11	948	7.34
	0-17	295	7.77	1251	9.68
	18-69	3397	89.44	11473	88.81
	70+	85	2.24	179	1.39
	Unknown	21	0.55	16	0.12
Ethnicity	Croats	135	3.55	452	3.50
	Muslims	2340	61.61	8715	67.46
	Others	330	8.69	1391	10.77
	Serb	158	4.16	633	4.90
	Unknown	835	21.99	1728	13.38
Status:	Civilians	1399	36.84	5093	39.42
Reported in HSS94	Soldiers	2381	62.69	7774	60.17
	Unknown	18	0.47	52	0.40
Status:	Civilians	1732	45.60	na	na
External Definition	Soldiers	2062	54.29	na	na
	Unknown	4	0.11	na	na
	<i>Of Soldiers:</i>	<i>Of 2062:</i>			
	<i>ABH</i>	<i>1577</i>	<i>41.52</i>	na	na
	<i>VRS</i>	<i>1</i>	<i>0.03</i>	na	na
	<i>HSS94</i>	<i>484</i>	<i>12.74</i>	na	na
Year of Event	1992	1201	31.62	3923	30.37
	1993	2196	57.82	7897	61.13
	1994	401	10.56	1099	8.51
Opština of Event	Centar	369	9.72	1504	11.64
	Ilidža	856	22.54	2626	20.33
	Novi Grad	1053	27.73	3817	29.55
	Novo Sarajevo	265	6.98	1089	8.43
	Stari Grad	507	13.35	1423	11.01
	Vogošća	175	4.61	391	3.03
	Sarajevo unsp.	573	15.09	2069	16.02
Cause of Event	Shelling	2160	56.87	8009	61.99
	Sniping	699	18.40	3111	24.08
	Other Firearms	529	13.93	1199	9.28
	Other Casualties	410	10.80	600	4.64

**Table 3. - Continued: Civilians**

Variables	Variables' Categories	Killed		Wounded	
		Number	Percent	Number	Percent
Sample Size	Overall Total	1399	100.00	5093	100.00
Sex	Men	782	55.90	2802	55.02
	Women	617	44.10	2291	44.98
	Unknown	0	0.00	0	0.00
Age (years)	0-4	22	1.57	69	1.35
	5-9	79	5.65	233	4.57
	10-17	166	11.87	848	16.65
	0-17	267	19.09	1150	22.58
	18-69	1040	74.34	3769	74.00
	70+	83	5.93	172	3.38
	Unknown	9	0.64	2	0.04
Cause of Event	Shelling	932	66.62	3405	66.86
	Sniping	253	18.08	1296	25.45
	Other Firearms	101	7.22	288	5.65
	Other Casualties	113	8.08	104	2.04

In order to create an appropriate sample for the GALIĆ case, a sub-period of the siege from 10 September 1992 to 10 August 1994 was selected and the area of events was constraint to be within the front lines. All events that occurred outside the siege period or siege area and siege-relevant events from outside the indictment period were excluded from the GALIĆ sample. In addition, in order to present conservative statistics, also completely or partly unknown dates of events (especially unknown year, or unknown month in 1992 or 1994) were excluded as well.

Imposing the above-mentioned restrictions on the survey data, led us to the numbers presented above in Table 1. The table presents essential results on the killed and wounded population. In the discussion below, we first discuss killings, and then woundings. We also make several references to more detailed results available from Annexes 3 and 4.

### 5.1 Killed Population

The total number of killed persons is 3,798, and includes 670 women and 3127 men (sex was unavailable for 1 person). There were 295 children and youngsters (age 0 to 17 years). About 34% of them were below 10 years of age and 66% at age from 10 to 17 years.

**Table 4. Ethnic Composition of Persons Killed Within Front Lines in Sarajevo<sup>18</sup>, 10.09.1992-10.10.1994, versus the 1991 Population Census**

Ethnicity	1991 Census		Household Survey, Sarajevo 1994			
	Number (Observed)	Percent	No Killed (Observed)	Percent	No Killed (Adjusted)	Percent
Croats	32246	7.10	135	3.55	173	4.56
Muslims	224339	49.38	2340	61.61	2999	78.97
Serbs	126113	27.76	330	8.69	423	11.14
Others	71621	15.76	158	4.16	203	5.33
Unknown	0	0	835	21.99	0	0
Total	454319	100.00	3798	100.00	3798	100.00

Source: Statistički Godišnjak Republike Bosne i Hercegovine, 1992. RBH, Državni Zavod za Statistiku, Sarajevo, maj 1992

Note: In the census data the six municipalities (Centar, Ilidža, Novi Grad, Novo Sarajevo, Stari Grad and Vogošća) are shown as entire areas, in HSS-1994 data only parts of the same six municipalities are included.

Most of the killed population were Muslims (2340 persons, which is about 62% of all killed, or as much as 79%, if the number of unknown ethnicity victims (835) is re-distributed proportionally to the ethnic composition of victims of specific ethnicity). Other ethnic groups are represented much less frequently among the killed. This outcome can be a result of the ethnic composition within the front lines in Sarajevo at mid-1994, different than the 1991 ethnic composition of the Sarajevo Six. The survey can also be slightly biased towards the Muslim population<sup>19</sup>. Generally, however, the ethnic structure of killings probably does not indicate targeting of any particular ethnic group.

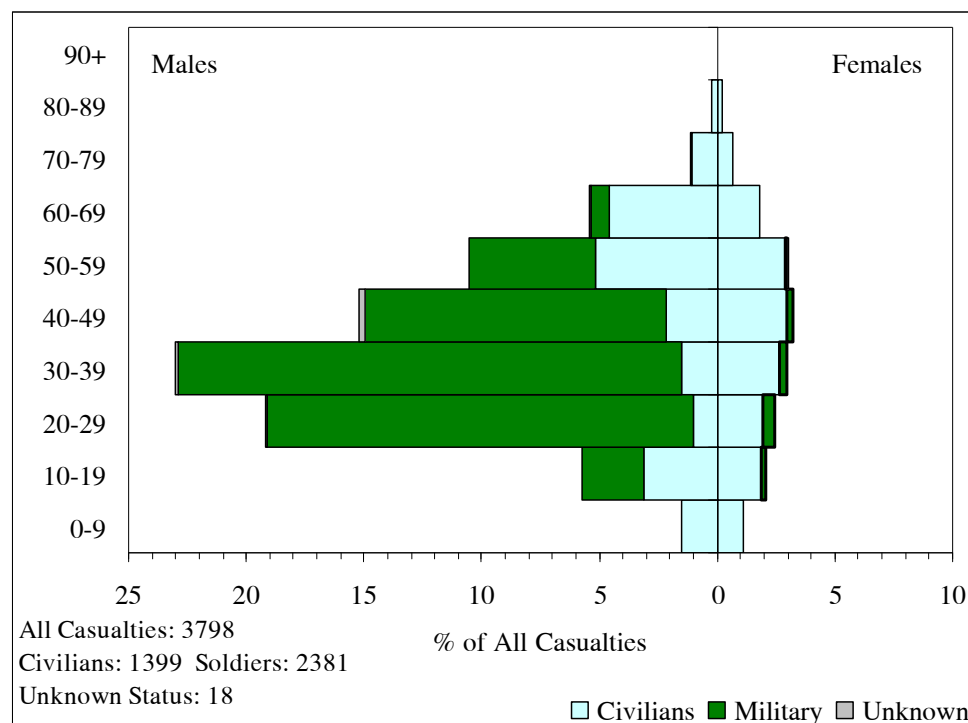
An essential distribution of those killed is into civilians and soldiers. Information about the civilian-soldier divide (hereafter *the status*) comes from question 5 (6 for the wounded), where for every person the status is explicitly requested. Respondents reported the status without having it proved to the interviewers by the means of any official documents (thus, it was a self-reported status). Also the distinction of civilians and soldiers does not mean that a person of a military status was killed while engaged in combat.

<sup>18</sup> Ethnicity (and religion) of those who died or got wounded was mostly unavailable from HSS-1994, where only ethnicity (and religion) of those household members was reported who were alive and stayed with the household at the moment of the interview. The source for ethnicity shown in Table 3 is the 1991 population census. Through the matching of records from HSS-1994 with census records we established individual-level links for persons reported dead or wounded. Through the links we could increase our information about the casualties by accessing census items such as ethnicity, religion, education etc. As the matching process was not 100% successful (matching rate was about 80%), for some 20% of the (unlinked) victims no ethnicity was obtained.

<sup>19</sup> The ethnic composition of those living within the front lines in 1994 could include more Muslims than the one observed in the 1991 population census for six municipalities included in Table 4. The reason for this could be the Muslim DPs who moved into Sarajevo in early stages of the war. However, it is also possible that the access of survey interviewers to minority groups, such as Serbs, Croats, other ethnicities, was perhaps more difficult than access to the Muslim majority.

There were 1399 civilians reported killed in HSS-1994 and 2381 soldiers. The status of 18 persons was unknown. The ratio of civilian to military victims was as 1 to 1.7 meaning that on average one civilian was killed per every 1.7 killed soldiers. Note that this result only describes the structure of killings within the HSS-1994 survey population and does not say anything about differences in *death intensity* between non-combatants and combatants. In order to assess such differences we would need to know the size of both populations at the time when they were exposed to the risk of being killed. Such information is unavailable to us.

**Figure 1. Sex, Age, and Civilian-Soldier Distributions of Those Killed Within Front Lines in Sarajevo, 10.09.1992-10.08.1994**



Note: \*From 10.09.1992 to 10.08.1994

Figure 1 shows the structure of the survey population by three characteristics: age, sex and status. Obviously, the vast majority of the killed were male soldiers (about 63% of the whole survey population, while civilians made up approximately 37%, see also Annex 3). (Male) soldiers died mainly at age 18-39 (41%), 40-59 (18%), and to a lesser extent also at 10-17 (1%). The fraction of female soldiers was negligible. The most killed civilians were also men. About 5% of the study population of men were killed at age 50-59, another 5% at 60-69, and 3% at age 10-17. About 9% of female civilians were killed at age from 30 to 59 and about 2% from age 10 to 17 years.

Note that the figures discussed above include considerable numbers of civilians: children (267, age from birth to 17 years), women (617) and the elderly (83, age 70+). Still these numbers are understated due to the subjective definition of the status. The actual numbers were likely higher than those in



Table 1. In order to understand why too many soldiers were reported and too few civilians, it is good to realise that during the siege those who had guns or other weapons were commonly seen as soldiers. A number of (male) teenagers, or elderly men, were customarily considered soldiers even though they were too young or too old to become members of the army. A second reason for inflating the number of soldiers is that families hoped to obtain a post-mortal pension to which only soldiers' families were entitled.

In order to illustrate the scale of possible differences in the number of killed civilians and soldiers, we applied an alternative definition of the status by using official lists of fallen soldiers provided by the Ministries of Defence of the FBH and RS. After establishing links between the HSS-1994 records and the records on the lists of fallen soldiers, we assigned the status "soldier" to all dead soldiers included in the official lists, and the status "civilian" to all those casualties who were not found among the fallen soldiers. We were able to do so for those records from HSS-1994 that had links established with the census (80% of HSS-1994 data). For about 20% of the HSS-1994 records (unlinked ones), the subjective self-reported status was kept. The result of this exercise is reported in Table 1 under "Status: External Definition". In this case the number of killed civilians is higher than previously by 333 and the number of killed soldiers is lower than previously by 319 persons.

Note that the above approach cannot be applied to the wounded population as the official lists include only soldiers who were killed, and there is no information on the lists about those wounded.

**Table 5. Monthly and Daily Average of Persons Killed Within Front Lines in Sarajevo, 10.09.1992-10.08.1994**

Year	Civilians	Soldiers	All	C:S Ratio
<i>Monthly</i>				
1992	105.00	192.75	300.25	1 : 1.84
1993	63.50	112.50	176.50	1 : 1.77
1994	28.33	35.17	63.67	1 : 1.24
<i>Daily</i>				
1992	3.67	6.73	10.48	1 : 1.83
1993	2.04	3.65	5.71	1 : 1.80
1994	0.93	1.15	2.09	1 : 1.24

*Note: In 1994, June is the last month included*

In order to examine the timing of killing, we analysed yearly, monthly and daily numbers of the killed (for monthly and daily figures see Annex 3). Table 1 only shows the annual totals. Note that only one year (1993) is included in the survey as a complete year, 1992 is represented by 4 months, and 1994 by 8 months. In addition to that, the events that occurred in July and August of 1994 are certainly underrepresented in survey statistics. This is caused by the timing of interviews that were mainly taken in May and June of 1994 (87% of all interviews were completed already in the end of June; in Table 5 the averages for 1994 were therefore calculated up to June, July and August were excluded). All in all, the annual totals reported in Table 1 should be taken with caution. Although the highest number of

casualties is reported for 1993, the monthly and daily numbers of the killed, shown in Table 5, suggest that people got killed most intensively in the year 1992, then in 1993, and at last in 1994. This observation applies to both civilians and soldiers and also to all casualties jointly. The ratio of civilian to military deaths is also the highest in 1992 (about 1 to 1.8) and the lowest in 1994 (1 to 1.2). The patterns are the same irrespectively whether monthly or daily indicators are considered.

In Section 5.3 we continue the theme of timing by associating the daily distribution of casualties with certain well-known incidents reported by external sources.

Two last issues mentioned in Table 1 are the place (i.e. opština) and cause of event. In HSS-1994 questions related to these items were open-ended. This means that any answer could be given by respondents and they did not have to choose from a standardised list of possible answers. Interviewers were instructed that as detailed answers as possible were most welcome. As a result of this approach, hundreds and thousands of responses were obtained. The original responses had to be re-coded and structured in order to synthesise the responses in a uniform approach.

Regarding the places of events, respondents usually reported names of local communities within the survey area or common names of particular locations within Sarajevo. We also saw names of municipalities different than “Sarajevo Six” or even countries other than Bosnia and Herzegovina. Some places were non-specific, such as: airport, *pista*, apartment, hospital, Kasarna Maršal Tito etc. We developed a system of codes for the reported place names, in which every place was re-coded into a local community. If a place was located outside the front lines, the code of a municipality in Bosnia or country code was assigned. If a place could not be identified in terms of a local community, but we knew it was located within the front lines, one of the non-specific codes was used: “opština-within front lines”, “opština-other” or “opština-unspecified”. A team of our Bosnian colleagues coming from Sarajevo or its surroundings did assigning particular places to local communities. We also used maps of local communities drawn by local authorities from Sarajevo. In this way we were able to propose a classification of places that were available at the level of local communities. The Federal Institute for Statistics in Sarajevo provided us with a bridging system for linking local communities with municipalities. Thus, also grouping the events by municipality became possible.

Table 1 shows that most persons were killed in Novi Grad, Ilidža and Stari Grad. Again these absolute numbers should not be taken too literally: death intensities (not death numbers) must be used in order to reliably assess the differences among the six municipalities. This is done in Section 6 for the population that used to live in the six municipalities during the 1991 population census.

A similar re-classification and re-coding approach was applied to cause of death reporting. The many individual responses obtained in HSS-1994 were organised in a consistent system of a limited number of cause-of-death categories. The standardised categories are presented in Table 1 and also in many more detailed tables attached in Annex 3.

The basic principle of the re-classification of causes of death was to keep the categories, such as shelling, sniping, shooting, or cold steel, slaughtered, tortured, human shield, execution etc., unchanged. Many of these categories were reported with spelling mistakes, or slight differences in

wording. In such cases we just re-coded the different names into one standardised name. Secondly, for causes reported rather broadly a number of uniform general codes were proposed (e.g. wounding, war operations, war conditions, other accident, or just unspecified). In the final stage we distinguished a number of meaningful groups of causes that could be used in presenting summary statistics on causes of death. These groups and sub-categories within the groups are shown in Table 6 below.

**Table 6. Persons Killed Within Front Lines in Sarajevo, 10.09.1992-10.08.1994,  
Number by Cause of Death**

<i><b>Civilians, Soldiers and Unknown Status</b></i>				
<b>Causes Of Death</b>	<b>Women</b>	<b>Men</b>	<b>Unk Sex</b>	<b>Total</b>
Firearms - Shelling	468	1692	0	2160
Firearms - Sniper	103	595	1	699
Firearms - Shooting	26	202	0	228
Firearms - Other and Unspecified	27	274	0	301
- <i>Firearms - anti-aircraft machinegun</i>	1	31	0	32
- <i>Firearms - M-84 and the like</i>	2	9	0	11
- <i>Firearms - unspecified</i>	24	234	0	258
Direct Casualties of War	10	179	0	189
- <i>Cold steel/slaughtered/tortured</i>	4	10	0	14
- <i>Execution</i>	3	4	0	7
- <i>Human shield</i>	0	4	0	4
- <i>Disappeared</i>	2	11	0	13
- <i>Other casualties - wounding</i>	0	4	0	4
- <i>Other casualties - war operations</i>	1	146	0	147
Indirect Casualties of War	3	22	0	25
- <i>Stepped on mine</i>	3	16	0	19
- <i>Other casualties - war conditions</i>	0	6	0	6
Other casualties - unspecified	8	42	0	50
Accidents and Violence	19	63	0	82
- <i>Other - traffic accident</i>	3	16	0	19
- <i>Other - other accident</i>	6	15	0	21
- <i>Other - suicide</i>	5	5	0	10
- <i>Other - violent</i>	5	27	0	32
Unknown/Unspecified	6	58	0	64
<b>Total</b>	<b>670</b>	<b>3127</b>	<b>1</b>	<b>3798</b>

The first group includes causes related to firearms. Three basic categories in this group are shelling, sniping and other firearms (“shooting” and “other and unspecified” taken together). The total number of deaths from these three categories is 3,388 out of the overall 3,798 deaths (1,286 civilians out of the total of 1,399 deaths of civilians). Only 410 deaths are caused by other factors (113 deaths of civilians). The “other factors” include causes grouped as follows:

- direct casualties of war
- indirect casualties of war
- other casualties (unspecified)
- accidents and violence
- unknown causes.

Note that the above groups include causes that are different than firearms. Altogether the *non-firearms causes* were responsible for about 11% of killings (410 deaths). Most of them were reported under *direct casualties of war* (189 deaths), thus as a victim of cold steel, slaughter, torture, execution, human shield, late consequence of wounding etc. In Table 6 also some 82 deaths are reported under causes generally called *accidents and violence*. This group includes cause-of-death categories such as accidents (including traffic accidents), suicide and violent deaths. These death categories can be seen as external causes of death, and actually are also reported in populations that are not exposed to armed conflicts. However, many accidents reported in the HSS-1994 survey were strictly conflict-related, such as frequent gas explosions, building collapses, accidents related to road deficiencies, lack of traffic signs or regulations, damages of cars and the similar. For these reasons we kept the group accidents and violence among the causes of killing.

Death rates by cause of death, presented in Section 6, provide information about death intensity by cause of death.

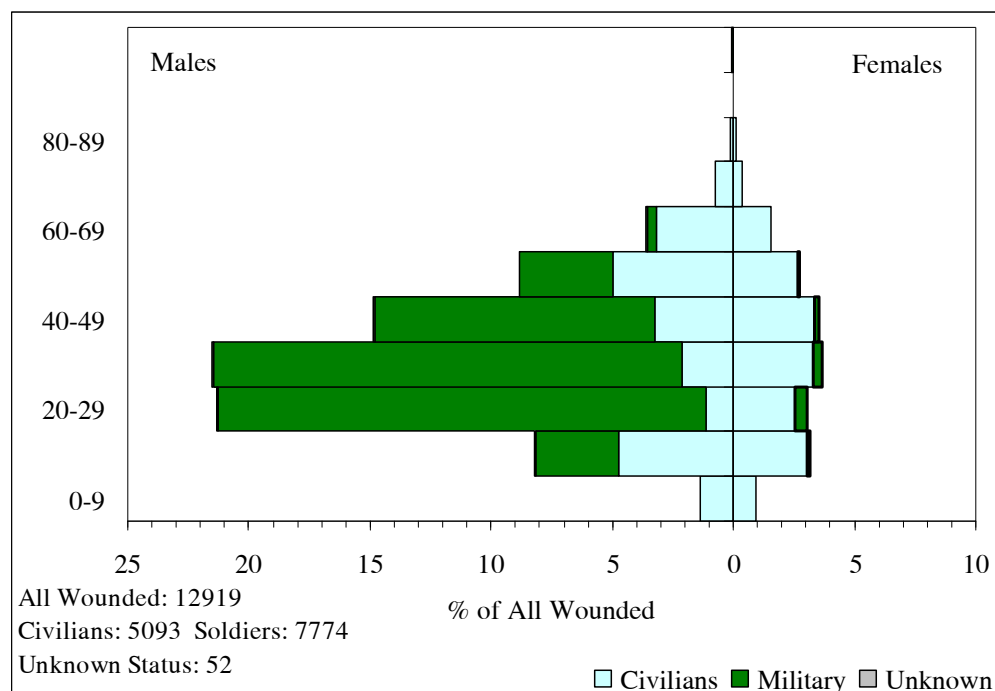
## 5.2 Wounded Population

The numbers obtained for the wounded population are characterised by the same patterns as those for the killed (Figure 2 and Tables 7 and 8 below). The numbers of the wounded are however much higher than the numbers of the killed (the overall ratio of the killed to wounded is 1 to 3.4).

The total number of wounded persons was 12,919, of which 5,093 were civilians. There were 1,250 wounded children at age 0 to 17 years (1,150 civilians), and 179 wounded elderly at age 70 or more years (172 civilians).

Some 8,009 persons were wounded by shelling (3,405 civilians), 3,111 persons by sniping (1,296 civilians), and 1,199 by other firearms (288 civilians). Some 600 persons were wounded by other causes (among them 104 civilians).

**Figure 2. Sex, Age and Civilian-Soldier Distributions of Those Wounded Within Front Lines in Sarajevo, 10.09.1992-10.08.1994**



**Table 7. Monthly and Daily Average of Persons Wounded Within Front Lines in Sarajevo, 10.09.1992-10.08.1994**

Year	Civilians	Soldiers	All	C:S Ratio
<i>Monthly</i>				
1992	342.50	633.00	980.75	1:1.85
1993	254.75	353.08	609.83	1:1.39
1994	72.17	95.50	168.33	1:1.32
<i>Daily</i>				
1992	11.65	21.50	33.32	1:1.84
1993	7.90	10.88	18.70	1:1.38
1994	4.27	3.70	6.13	1:0.87

*Note: In 1994, June is the last month included*

**Table 8. Persons Wounded Within Front Lines in Sarajevo, 10.09.1992-10.08.1994,  
Number by Cause of Death**

Causes Of Wounding	Women	Men	Unk Sex	Total
Firearms - Shelling	1681	6326	2	8009
Firearms - Sniper	604	2505	2	3111
Firearms - Shooting	4	37	0	41
Firearms - Other and Unspecified:	135	1023	0	1158
- <i>Firearms - anti-aircraft machinegun</i>	38	182	0	220
- <i>Firearms - M-84 and the like</i>	2	12	0	14
- <i>Firearms - unspecified</i>	95	829	0	924
Direct Casualties of War	11	215	0	226
- <i>Cold steel/slaughtered/tortured</i>	1	10	0	11
- <i>Execution</i>	0	0	0	0
- <i>Human shield</i>	0	4	0	4
- <i>Disappeared</i>	7	28	0	35
- <i>Other casualties - war operations</i>	3	173	0	176
Indirect Casualties of War	5	118	0	123
- <i>Stepped on mine</i>	3	95	0	98
- <i>Other casualties - war conditions</i>	2	23	0	25
Other casualties - unspecified	0	4	0	4
Accidents and Violence:	9	47	0	56
- <i>Other - traffic accident</i>	4	24	0	28
- <i>Other - other accident</i>	4	20	0	24
- <i>Self-inflicted</i>	1	3	0	4
Unknown/Unspecified	28	163	0	191
Total	2477	10438	4	12919

### 5.3 Timing of Killing and Wounding

In this section we discuss daily numbers of killing and wounding in the given area in Sarajevo in the period from 10-09-1992 to 10-8-1994. The numbers of killed and wounded persons are shown separately for civilians and soldiers. In order to reveal an association between the events observed for civilians and soldiers, we analyse the correlation of these two time series.

All records for which the exact date of event was unknown had to be excluded from the analysis of timing. The total number of killed persons during the given time period, both civilians and soldiers, whose date of death was known, is 3,652. The total number of killed civilians is 1,328 and such a number for soldiers is 2,308. There are also 16 records, for which the status was unknown. In our database we also have records of 11,580 wounded persons (with known dates of wounding), out of

which 4,585 were civilians and 6,950 were soldiers. Some 45 records are of unknown status. Our time-series consist of 700 observations (i.e. days). In the given period (700 days) on average more than 5 people got killed every day and more than 16 got wounded. The standard deviation is accordingly 6.5 and 17 events. The maximum number of people killed on one single day is 55. The maximum number of people wounded on one day is 107.

The charts with daily distributions of killing and wounding are attached in Annex 3 (A3.15 and A3.16) and 4 (A4.15 and A4.16). For a better clarity, we divided the period from 10 September 1992 to 10 August 1994 into two parts, each relating to a sub-period of about one year. The first part shows the period from 10-09-1992 to 30-09-1993 (A3.15 and A4.15) and the second from 01-10-1993 to 10-08-1994 (A4.16 and A4.16).

The above-mentioned figures show that from 10-Sep-1992 to early February 1994, incidents were happening every day. From February 1994 to the end of August 1994 the number of killed and wounded persons decreased significantly. In July and August it is, to some extent, due to the character of our data, as was mentioned in Section 3.1 (majority of events were reported before July 1994). While examining the charts, we can easily recognise some significant dates, when there were much more killed or wounded persons than on average. These days are listed in Tables 9 to 14. When we compare the timing of killed civilians with the timing of fallen soldiers in terms of correlation between them, we obtain the correlation coefficient<sup>20</sup> equal 0.47. It shows the positive correlation between these two time-series. Correlation coefficient between the number of wounded soldiers and civilians is 0.65. It is again positive, but both those numbers are relatively small. That means that the death of civilians was not necessarily caused by the same reasons as soldiers. The existing evidence of dates when a lot of civilians were killed and only a small number of soldiers, (Tables 9 to 14), supports this conclusion statistically.

Figure A3.15 presents the total number of **killed** civilians, soldiers and the total number of all persons killed in the period 10-09-1992 to 30-09-1993. For this period Table 9 lists all days when more than 24 people were killed (dates are sorted by the total number of casualties). As an addition to Table 9, Table 10 that shows all events when 10 or more civilians were killed (dates sorted by the number of civilian casualties).

Figure A4.15 likewise shows the total number of **wounded** civilians, soldiers and the total number of all persons wounded in the same period (10-09-1992 to 30-09-1993). As for killing, also for wounding two additional tables are made: one reporting dates when more than 64 persons were wounded (Table 11; dates sorted by Total), and one with dates when more than 30 civilians were wounded (Table 12; dates sorted by Civilians).

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<sup>20</sup> A correlation coefficient is a measure of association (or similarity) between two series. It can take values from -1 to +1. Negative values denote an inverse relationship (increase-decrease), positive values denote a parallel relationship (increase-increase or decrease-decrease). The "0" value means no correlation, -1 or +1 a maximum correlation.

Finally Tables 13 and 14 below are based on data shown in Figures A3.16 (killing) and A4.16 (wounding) and display dates selected from the period from 01.10.1993 to 10.08.1994. Tables 13 and 14 show only dates selected due to the number of killed or wounded civilians.

**Table 9. Days When More than 24 Persons Were Killed (Sorted by Total)**

Date	Civilians	Soldiers	Total
30-May-93	16	39	55
27-Jul-93	12	31	43
04-Dec-92	8	32	40
27-Jan-93	8	27	36
14-Dec-92	4	30	34
12-Dec-92	4	27	31
14-Sep-92	6	23	29
03-Jul-93	6	23	29
05-Dec-92	6	22	28
18-Sep-92	10	17	27
07-Dec-92	3	24	27
08-Dec-92	3	23	27
12-Jun-93	14	12	26
03-Dec-92	8	17	25
24-Jul-93	6	19	25

**Table 10. Days When 10 or More Civilians Were Killed (Sorted by Civilians)**

Date	Civilians	Soldiers	Total
30-May-93	16	39	55
12-Jun-93	14	12	26
18-Oct-92	14	8	22
19-Oct-92	13	10	23
5-Oct-92	13	7	20
27-Jul-93	12	31	43
31-Oct-92	12	10	22
12-Jul-93	12	1	13
1-Oct-92	11	2	13
18-Sep-92	10	17	27

Numbers of casualties used as limits for selecting dates shown in Tables 9 to 14 were chosen based on a visual assessment of timing patterns in Figures A3.15, A3.16, A4.15, and A4.16. The selected dates can be seen as some kind of extreme days when extraordinarily high numbers of casualties occurred. Thus, Tables 9 to 14 give an overview of dates when likely most incidents (and most consequences of these incidents) took place. Figures A3.15, A3.16, A4.15, and A4.16 indicate that incidents in which



people were killed or wounded were much more frequent in the first considered year (September 1992 to September 1993) than in the second. Thus, we mainly pay attention to this particular period.

**Table 11. Days When More Than 64 Persons Were Wounded (Sorted by Total)**

Date	Civilians	Soldiers	Total
14-Sep-92	33	74	107
01-Jun-93	46	59	105
17-Sep-92	22	78	100
18-Sep-92	26	73	99
10-Oct-92	38	59	97
08-Dec-92	13	71	85
30-May-93	30	51	81
04-Dec-92	22	58	80
05-Dec-92	4	71	75
15-Sep-92	35	39	74
12-Dec-92	30	42	72
21-Mar-93	33	38	71
04-Jul-93	18	52	70
07-Dec-92	5	62	67
05-Oct-92	29	36	65
03-Jul-93	34	31	65

**Table 12. Days When More Than 30 Civilians Were Wounded (Sorted by Civilians)**

Date	Civilians	Soldiers	Total
01-Jun-93	46	59	105
18-Oct-92	41	21	62
10-Oct-92	38	59	97
15-Sep-92	35	39	74
03-Jul-93	34	31	65
14-Sep-92	33	74	107
21-Mar-93	33	38	71
22-Sep-92	32	20	52
20-Sep-92	31	23	55
22-Mar-93	31	16	48

From September 1992 to September 1993 (Tables 9 and 11), there were 15 days when more than 24 persons were killed per day (the maximum was 55 deaths on 30 May 1992), and 15 days when more than 64 persons were wounded (the maximum of 107 wounded persons on 14 September 1992). When the rank order of the dates listed in these two tables is compared, the dates with the highest numbers of casualties are different for killing and wounding. Some association can be seen for all persons jointly (practically mainly for soldiers, who are the major component of these totals). September 1992, December 1992, and May 1993 are the months when high numbers of both daily killing and wounding

were observed. On 4, 5, 8 and 12 December 1992 we observe respectively: 40, 28, 27, 31 killed and 80, 75, 85, 72 wounded persons. On 14 September 1992 there were 29 killed and 107 wounded, and 30 May 1993 was the day of 30 killed and 81 wounded. These persons were killed or wounded in many different incidents spread all over the city.

Tables 9 and 11 also prove that the overall number of daily casualties (killing and wounding) was more strongly associated with military than with civilian victims. (This conclusion is also largely valid for the second year of the siege, not shown here). Therefore, we additionally separately analyse dates when most civilians were killed (Tables 10, 12, 13 and 14).

In Tables 10 and 12 we show 10 dates characterised by more than 10 killed civilians or more than 30 wounded civilians on average each day from 10 September 1992 to 30 September 1993. In the second year of the siege (1 October 1993 to 10 August 1994, Tables 13 and 14), there were 11 days with daily numbers of killed civilians higher than 5 and 5 days with more than 20 civilians wounded.

**Table 13. Days When 6 or More Civilians Were Killed**

Dates	Civilians	Soldiers	Total
5-Feb-94	45	14	60
3-Jan-94	12	6	18
16-Oct-93	8	7	15
9-Nov-93	8	3	11
9-Dec-93	8	3	11
4-Feb-94	8	1	9
16-Oct-93	8	7	15
10-Nov-93	7	9	16
4-Jan-94	7	9	16
7-Jan-94	6	2	8
8-Jan-94	6	8	14

**Table 14. Days When More Than 20 Civilians Were Wounded**

Dates	Civilians	Soldiers	Total
05-Feb-94	84	17	101
09-Nov-93	35	5	40
10-Nov-93	25	16	41
31-Dec-93	25	8	34
16-Oct-93	21	19	40

In the first year (10 September 1992 to 30 September 1993), the maximum number of killed civilians was 16 on 30 May 1993 and of civilians wounded was 46 on 1 June 1993. The highest numbers of killed/wounded civilians in the second year (1 October 1993 to 10 August 1994) were, respectively, 45 and 84, both on 5 February 1994.

It is clear from Tables 10 and 12, and also from Tables 13 and 14, that there were days when a high number of killed/wounded civilians was associated with a relatively low number of military casualties. This confirms the conclusion presented earlier in this section that civilians were becoming victims not necessarily when soldiers were killed or wounded. This would suggest that the losses of the population were perhaps caused by mechanisms other than those accounting for killing or wounding soldiers.

Finally, we discuss some well-known incidents linking them with our data. Generally, the number of killed civilians would be much higher if we used external definition of status instead of self-reported status.

- **01.06.1993:** We can find this date in Table 11 and Table 12. On that day there were 46 civilians and 59 soldiers wounded. From our data we also know that 7 civilians and 11 soldiers were killed on that day. It is a day with the biggest number of wounded civilians in the period 10-09-1992 to 30-09-1993.
- **12.07.1993:** This date can be found in Table 10. On this day there were 12 civilians killed and 1 soldier. The number of killed civilians is much higher than the number of killed soldiers.
- **22.01.1994:** The number of killed people was 8 of which 4 were civilians and 4 soldiers. There were 6 civilians wounded and 3 soldiers.
- **04.02.1994:** Table 13 shows the number of killed persons on that day. There were 8 civilians killed and 1 soldier. Again, the number of killed civilians is much higher than the number of killed soldiers.
- **05.02.1994:** The numbers are available from Tables 13 and 14. The number of killed civilians was 45 and wounded civilians 84. These numbers were the highest in the whole period from 10 September 1992 to 10 August 1994. There were also 14 killed soldiers and 17 wounded.

## Section 6. Relative Measures of Population Losses for Persons Enumerated in the 1991 Population Census

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Demographic event rates (e.g. death or wounding rates) relate the number of particular events to the number of population exposed to the risk of experiencing these events. They describe intensity of events (death or wounding) and therefore are better suited for comparisons of processes, populations or areas than absolute numbers. Because of small numbers of deaths, mortality rates (especially by cause of death) are expressed per (at least) 1,000 or 100,000 population.

In this section we discuss event rates for the casualties of Sarajevo. We calculate “within-front-lines rates” for those killed or wounded within the mid-1994 front lines in the period from 10 September 1992 to 10 August 1994. To calculate these rates we need the number of relevant events and the size of the population exposed to these events (hereafter *population at risk*). The number of events is the one from HSS-1994 as discussed in Section 5. The population at risk is more difficult to obtain.

The latest reliable population figures are those from the 1991 census, and are only available for the six *entire* municipalities. While using the census figures we are unable to distinguish the within-front-lines area of Sarajevo<sup>21</sup>. By relating the events from HSS-1994 to the census figures for the Sarajevo Six, the events are taken for an area that is much smaller than the area of six municipalities. This implies that the rates (i.e. “within-front-lines rates”) are severely underestimated.

A second problem is the census population itself, which is not the same as the population at risk in the considered period. Population movements were massive in Sarajevo from March 1991 to mid-1994, many persons left the city and many moved in. Moreover, every death and birth changed the population exposed. We do not have information about these changes and cannot accordingly adjust the 1991 census population. We believe, however, that we can use the 1991 census population to obtain a reasonable approximation of the population at risk within the front lines area in the period 1992-94.

In order to do so, we considered the survey population of the HSS-1994, which was about 340,000 individuals. We checked the composition of this population from the point of view of where they lived at the time of the 1991 population census. We were interested in the fraction of individuals in the HSS-1994 survey population who used to live in Sarajevo Six during the 1991 census. If this fraction were large, we could assume that the basic distributions of the survey population, such as age, sex, ethnicity, municipality of residence etc. were the same in HSS-1994 as in the census. Knowing the total size of the survey population of HSS-1994 and the percentage distributions from the census, we could extrapolate all distributions in the HSS-1994 survey population, and then calculate all rates.

The fraction of the original census population in the HSS-1994 survey population was obtained in two procedures:

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<sup>21</sup> In order to reconstruct the within-front-lines area of Sarajevo from the 1991 census, we would need a local community reported as the place of residence in 1991. Such an item is unavailable from the census data.

- Those event records from HSS-1994 that had links with census records (30,086 out of the total 37,022) and the (linked) event records from HSS-1994 where municipality of residence in 1991 was one of the Sarajevo Six (26,641 out of 30,086) had been compared. The fraction obtained from this approach (i.e. 26,641/30,086) equalled **88.54** percent.
- The fraction of DPs/Refugees (17.25%) and of the Sarajevo Six population enumerated in the 1991 census (**82.75%**) were calculated from the pilot study of HSS-1994. The pilot was just a sub-sample of HSS-1994 data that contained 4,434 households (15,028 persons) from two municipalities of Sarajevo: Stari and Novi Grad. The pilot sample was randomly selected and included two types of questionnaires: those with and without events. All questionnaires reported the population at risk as well. The availability of complete population data made it possible to calculate the required fraction. The pilot was completed at OTP in July-August 2001 in order to assess the quality of the HSS-1994 data.

The fractions obtained in both procedures were large (88.54 and 82.75%; the mean of the two is 85.65%), and we could safely assume that the vast majority of the HSS-1994 survey population was the same as in the 1991 census. We therefore decided to extrapolate demographic distributions of the HSS-1994 survey population (in total 340,000 individuals), such as age, sex, ethnicity, (1991) municipality of residence, by applying to it the percentage distributions of the 1991 census for the Sarajevo Six<sup>22</sup>.

In order to define the rates as correctly as possible, we calculated them for those *who got killed or wounded within the mid-1994 front lines in the period from 10 September 1992 to 10 August 1994 and who lived in the Sarajevo Six during the 1991 population census*. Technically, it is possible by taking the **matched** records on events from HSS-1994 and relating them to the 1992-94 population at risk (340,000 individuals) **corrected by two factors**:

- 85.65% for the fraction of those originating from the 1991 census in HSS-1994
- 81.30% for the matching rate of the HSS-1994 with the 1991 census.

This group of casualties is slightly smaller from those discussed in Section 5. The casualties of the siege presented in Table 1 also include those who moved into Sarajevo from other municipalities of Bosnia and Herzegovina.

Note that rates can also be calculated for all reported events (coming from the original Sarajevo population and for DPs/Refugees reported in HSS-1994), and relating them to the whole population at risk (340,000 individuals, no correction factors). However, the rates for those enumerated in the 1991 census are much more reliable than the rates for the whole survey population, and still can be extrapolated over the whole population living within the front lines at mid-1994.

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<sup>22</sup> This procedure is a bit problematic, especially when estimating the ethnic composition of the survey population. Even though the majority of the survey population lived in Sarajevo in 1991, the newcomers were mainly Muslims from other municipalities in Bosnia or other countries. This is why the ethnic composition of the survey population likely included a higher fraction of Muslims than it was in 1991.

**Table 15. Death Rate for the Sarajevo Six: 1991 and 1990-91**

Municipality	Deaths		Population 1991	Death Rate	Death Rate
	1990	1991		1991	1990-91
Centar	722	870	79286	1097.29	2007.92
Ilidža	357	334	67937	491.63	1017.12
Novi Grad	642	599	136616	438.46	908.39
Novo Sarajevo	712	681	95089	716.17	1464.94
Stari Grad	451	453	50744	892.72	1781.49
Vogošća	142	135	24647	547.73	1123.87
Six Municipalities	3026	3072	454319	676.2	1342.23

*Note: Death Rate is given per 100,000 population*

**Table 16. Event Rates for the Within-Front-Lines Area of Sarajevo and the period from 10 September 1992 to 10 August 1994**

Variables	Variables' Categories	Killing Rate	Natural Death Rate	Wounding Rate	Overall Death Rate
Total No.	Overall	1153.27	1059.98	4411.72	2213.25
Sex	Men	1969.23	1199.71	7254.54	3168.94
	Women	376.55	926.96	1705.61	1303.51
Age	0-4	210.55	30.08	684.28	240.62
	5-9	323.44	16.45	1513.04	339.89
	10-17	725.99	43.56	3709.82	769.55
	0-17	485.71	32.16	2350.71	517.87
	18-69	1438.16	921.27	5374.41	2359.43
	70+	530.86	11365.20	1278.89	11896.05
Ethnicity	Others	838.53	793.85	3569.68	1632.38
	Croats	799.82	1545.91	2668.04	2345.73
	Muslims	1822.10	1390.19	6883.98	3212.30
	Serbs	239.20	504.29	958.31	743.49
Opština	Centar	854.27	1422.97	3886.56	2277.24
	Ilidža	1006.63	496.27	3338.52	1502.90
	Novi Grad	1347.55	857.66	5473.01	2205.21
	Novo Sarajevo	957.87	1107.09	3658.04	2064.96
	Stari Grad	1540.62	1998.65	5299.44	3539.27
	Vogošća	1399.97	458.88	4262.12	1858.84
Cause of Event	Shelling	662.75	na	2743.02	662.75
	Sniping	220.78	na	1057.44	220.78
	Other Firearms	154.50	na	415.80	154.50
	Other Casualties	115.24	na	195.45	115.24

Table 15 shows reference rates for the Sarajevo Six for 1991 and also for a two-year period 1990-1991<sup>23</sup>. The 1990-91 rates are used as a baseline standard for comparisons with the rates of population losses from September 1992 to August 1994.

The overall killing rate is about 1153 deaths per 100,000 population, which is approximately 86% of the overall death rate for six municipalities in 1990-91 (1342 per 100,000; hereafter the SS90-91 death rate). Remarkable differences were obtained between the rates for men and women (1969 vs. 377 deaths per 100,000). Whereas the death intensity of men was about 147% of the SS90-91 death rate, the one of women was 28 percent (the male rate was 5.23 times higher than the female one). The killing rates for children 0-17 years old (486 per 100,000) and the elderly (531 per 100,000) are high and equal about 36% and 40% of the SS90-91 death rate. The highest death intensity was however obtained for those at age 18 to 69 (1438 per 100,000), whose death rate was about 107% of the SS90-91 rate.

Among the six municipalities, death intensity was the highest in Stari Grad (115% of the SS90-91 rate), second highest was in Vogošća (104%) and third highest in Novi Grad (100%).

Finally, the death rates for causes of death show that shelling, responsible for most deaths, was most intensive among all causes of death and its death rate equalled about 49% of the SS90-91 death rate.

A similar pattern (not identical though) is seen in the rates of wounding, which are however much higher than those of killing. The overall wounding rate (4412 per 100,000) was 329% of the death rate for Sarajevo in 1990-91. But the male-female difference in the wounding rate was smaller than the one for killing, the rate for men being 4.25 times higher than the one for women (5.23 is the respective male-female ratio for killings).

With respect to age, the wounding rate was the highest for those at 18-69 years of the overall death (5374 per 100,000 population, which was 400% of the rate for Sarajevo in 1990-91). The wounding rate for those from 10 to 17 years old was second highest (3710 per 100,000, and 276% of the SS90-91 rate). Children and the elderly suffered considerably from wounding: age group 0-17 was characterised by the rate of wounding equal 2351 per 100,000 which was about 175% of the SS90-91 death rate. The age group 70+ had the wounding rate of 1279 per 100,000, equal about 95% of the reference death rate for Sarajevo in 1990-91.

The rate of wounding was the highest in the Novi Grad municipality (408% of the SS90-91 death rate), Stari Grad (395%), and Vogošća (318%).

Shelling caused on average 2743 woundings per every 100,000 population, which was more than the SS90-91 death rate (204% of this rate).

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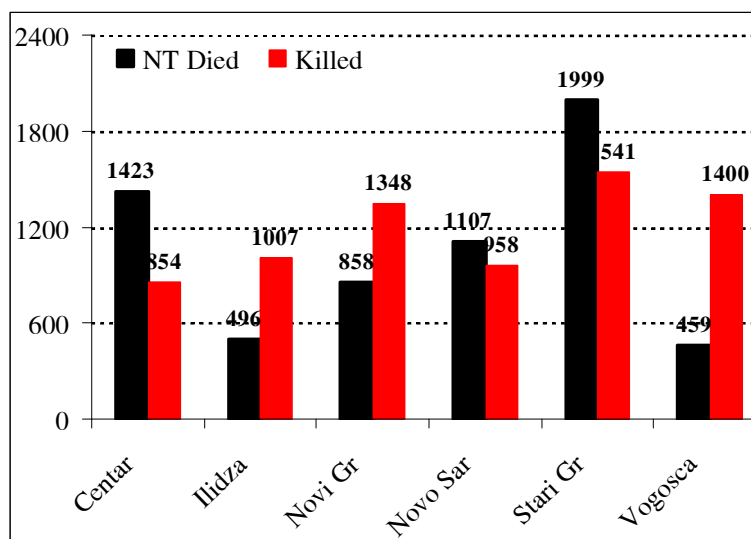
<sup>23</sup> The reference population of 1990-91 rates is the 1991 census population. This is fully correct, as the 1991 census population is located the middle of the period of 1990-1991. The purpose of the calculation of two-year rates is to produce measures that are comparable (as a reference) with the rates for the two-year period from September 1992 to August 1994.

**Table 17. Ratios of the Event Rates for the Within-Front-Lines Area of Sarajevo and the period from 10 September 1992 to 10 August 1994, and the 1990-91 Deaths Rate for Sarajevo Six**

Variables	Variables' Categories	Killing	Natural Death	Wounding	Overall Death
Total No.	Overall	0.86	0.79	3.29	1.65
Sex	Men	1.47	0.89	5.40	2.36
	Women	0.28	0.69	1.27	0.97
Age	0-4	0.16	0.02	0.51	0.18
	5-9	0.24	0.01	1.13	0.25
	10-17	0.54	0.03	2.76	0.57
	0-17	0.36	0.02	1.75	0.39
	18-69	1.07	0.69	4.00	1.76
	70+	0.40	8.47	0.95	8.86
	Others	0.62	0.59	2.66	1.22
Ethnicity	Croats	0.60	1.15	1.99	1.75
	Muslims	1.36	1.04	5.13	2.39
	Serbs	0.18	0.38	0.71	0.55
	Others	0.62	0.59	2.66	1.22
Opština	Centar	0.64	1.06	2.90	1.70
	Ilidža	0.75	0.37	2.49	1.12
	Novi Grad	1.00	0.64	4.08	1.64
	Novo Sarajevo	0.71	0.82	2.73	1.54
	Stari Grad	1.15	1.49	3.95	2.64
	Vogošća	1.04	0.34	3.18	1.38
Cause of Event	Shelling	0.49	na	2.04	0.49
	Sniping	0.16	na	0.79	0.16
	Other Firearms	0.12	na	0.31	0.12
	Other Casualties	0.09	na	0.15	0.09

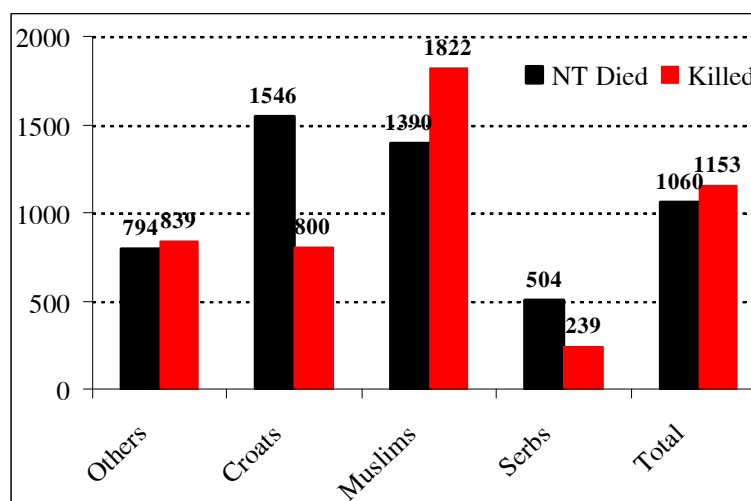


**Figure 3. Death Rates of Those Naturally Died and Killed in Sarajevo, 1992-94, by Municipality of Residence in 1991**



Importantly, the overall death rate for natural deaths was 1060 per 100,000 population and was lower than the killing rate (1153 per 100,000). The same pattern was also obtained for three (out of six) municipalities (Ilidža, Novi Grad, and Vogošća; see Figure 3). Also for Muslims (and Others), who were best represented among all ethnic groups in the HSS-1994 survey, the pattern is the same (see Figure 4).

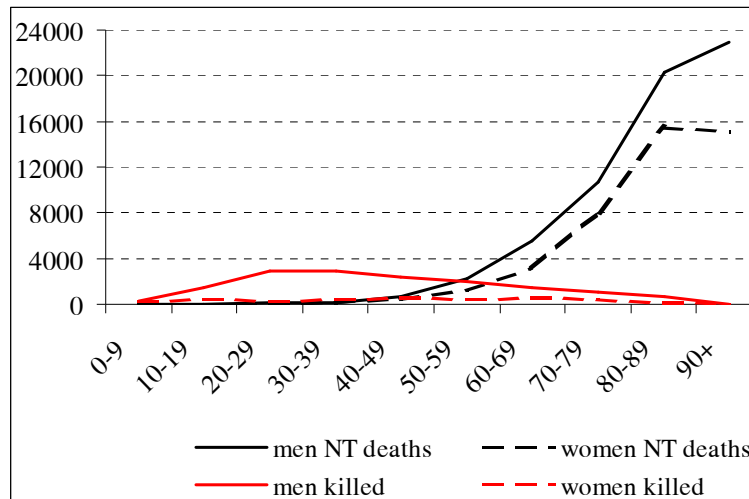
**Figure 4. Death Rates of Those Naturally Died and Killed in Sarajevo, 1992-94, by Ethnicity**



Finally, Figure 5 shows the age profiles of those killed and those naturally died. There is a distinctive difference between the profiles of killings and natural deaths. The rates of natural deaths increase rapidly with age (especially after age 40 years), with highest values associated with the highest ages.

The killing rates show an entirely different pattern, the most affected ages are those between 20 and 69 years for men and between 40 to 69 for women. The age pattern of those killed confirms the violent nature of the killings, which must be seen as population losses caused by the siege.

**Figure 5. Death Rates of Those Naturally Died and Killed in Sarajevo, 1992-94, By Ten-Year Age Groups and Sex**



Note that the overall death rate for the within-front-lines area of Sarejvo for 10.09.1002-10.08.1994 equalling 2213 deaths per 100,000 population is by 65% higher than the 1990-91 death rate for the Sarajevo six. More than a half of this rate (52%) are killings that would have never happened if there were no war in Bosnia.

## **Section 7. The Estimated Overall Number of the Population Killed Within Front Lines in Sarajevo from 10 September 1992 to 10 August 1994**

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In this section we estimate the overall number of persons killed within the 1994 front lines in Sarajevo in the period from 10 September 1992 to 10 August 1994. The estimation is based on two independent sources: the 1994 Households Survey of Sarajevo and Bakije Funeral Home in Sarajevo. The sources, although large, are incomplete, but there is a large overlap between them. These data are therefore suited for applying a statistical tool, the so-called capture – recapture method (Marks, Seltzer, Krotki, 1974; see also Annex 6), to obtain a statistical estimator of the overall number of killed persons.

Our estimation consists of three steps:

- In the first step, we only estimate the overall number of Muslim deaths, for the mortality data from the Bakije Funeral Home contain only records for Muslims. (HSS-1994 includes Muslims and all other ethnic groups.) A next problem with Bakije database is that it does not contain information about causes of death and we cannot distinguish between killed and naturally deceased persons. Thus, when using both sources at the same time, we can only estimate the total number of both killings and natural deaths for Muslims.
- In the second step of estimation, we apply the actual distribution of killings and natural deaths among the entire HSS-1994 survey population to split the estimator of the total number of deaths for Muslims into killings and natural deaths. It means that we first calculate the proportion of those killed among the whole population in HSS-1994, and then we multiplied the estimator of all deaths among Muslims by this factor. That gave us the estimated number of Muslims who got killed within the 1994 confrontation lines from 10.09.1992 to 10.08.1994. In the same way we used the proportion of natural deaths to obtain the estimated total number of natural deaths for Muslims.
- Finally, we extrapolate the results obtained for Muslims over the remaining ethnic groups. In order to do so, we assume that the ethnic composition of the estimated overall number of all killed remains the same as the ethnic composition of persons reported killed in HSS-1994. Consequently, this reflects the assumption that the ethnic composition in HSS-1994 represents the ethnic composition of all killings in the whole population living within the front lines at that time (10.09.1992 to 10.08.1994).

In practice, we proceed by obtaining the total number of Muslims killed or naturally died within the front lines in Sarajevo in the time period from 10.09.1992 to 10.08.1994 from the HSS-1994 (**4,067** persons<sup>24</sup>). Then, we do the same using the mortality database of the Bakije Funeral Home (**4,060** persons) and, finally, we calculate the overlap between those two sources (number of records that

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<sup>24</sup> The numbers mentioned in this paragraph and used in the calculations discussed in this section are all the so-called linked (or matched) records. The numbers of linked records in each source are lower than the numbers of all records available from each source (by about 20%, which is the matching rate). The matching, however, was a precondition of obtaining the overlap of the HSS-1994 and Bakije databases and also the ethnicity of casualties (as defined in the 1991 population census). These features were needed to apply the capture-recapture method.

appear in both collections; **2,764**). We then apply the capture – recapture method to these numbers and obtain an estimator of the total number of Muslims killed or naturally died in Sarajevo within the given period of time (**5,974** persons; see Annex 6 for calculation details).

**Table 18. Overall Number of Persons Killed within Front Lines in Sarajevo, 10.09.1992 – 10.08.1994**

Ethnic group	HSS-1994 Survey (linked records only)	Estimator
Muslims	2340	3437
Serbs	158	232
Croats	135	198
Others	330	485
Total	2963	4352

*Note: All estimators rounded to integers*

**Table 19. Overall Number of Natural Deaths Within Front Lines in Sarajevo, 10.09.1992 – 10.08.1994**

Ethnic group	HSS-1994 Survey (linked records only)	Estimator
Muslims	1727	2537
Serbs	315	463
Croats	242	355
Others	289	425
Total	2573	3780

*Note: All estimators rounded to integers*

**Table 20. Overall Number of Killings and Natural Deaths Within Front Lines in Sarajevo, 10.09.1992 – 10.08.1994**

Ethnic group	HSS-1994 Survey (linked records only)	Estimator
Muslims	4067	5974
Serbs	473	695
Croats	377	553
Others	619	910
Total	5536	8132

*Note: All estimators rounded to integers*

The above result (i.e. 5,974 persons) means, that HSS-1994 collection (reporting 4,067 killings) contains 68.08% of the whole population of killed or naturally died people. Knowing that, we

completed steps 2 and 3 as described in the beginning of this section. In step 2 we distributed the estimate for Muslims into killings and natural deaths. In step 3, in order to obtain the estimators of all killed (or naturally died) persons for other ethnic groups, we increased the actual numbers of persons killed (or naturally died) in every ethnic group taken from the HSS-1994 by 46.89%. The results are shown in Tables 18 to 20.

Summing up, the estimated overall number of persons killed within the front lines in Sarajevo in the given period is **4,352**, of which 3,437 persons were of Muslim ethnicity, 232 were Serbs, 198 Croats and 485 of other ethnic groups. The estimated total is higher than the total obtained from the 1994 Households Survey of Sarajevo (**3,798**) by 554 persons.

## References:

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### Data sources:

- Households Survey on the Free Territory of Sarajevo, 1994 (*HSS-1994*), Institute for research of War Crimes and International Law, Sarajevo
- Bakije Mortality Database (*Bakije*), Bakije Funeral Home, Sarajevo
- Mortality Database of Muslims against Genocide (*MAG*), Muslims against Genocide, Sarajevo
- The 1991 Population Census for Bosnia and Herzegovina
- Official List of Fallen Soldiers from ABH, Ministry of Defence of the Federation of Bosnia and Herzegovina
- Official List of Fallen Soldiers from VRS, Ministry of Defence of Republika Srpska

### Capture-recapture estimation:

Y. Bishop, Fienberg and Holland, Discrete Multivariate Analysis: Theory and Practice, Cambridge, Mass.: MIT Press, 1975,

E. Marks, W. Seltzer, K. Krotki, 1974: Population Growth Estimation: Handbook of Vital Statistics Measurement. Quoted after: Political Killing in Kosovo/Kosova, March-June 1999.

Political Killings in Kosova/Kosovo, March-June 1999 (Washington: ABA-CEELI and AAAS, 2000)

P. Spiegel, P. Salama, 2000, War and Mortality in Kosovo, 1998-1999: An Epidemiological Testimony. Lancet 2204 (355).

Capture-recapture Webpage: <http://www.pitt.edu>

## **ANNEX 1**

Survey Area:

Classification of Local Communities

Table A1.1 Classification of Local Communities constituting the Survey Area

Number	Municipality	Local Community	Number	Municipality	Local Community
1	Centar	Bjelave	46	Novi Grad	Dobrinja D-5
2	Centar	Breka	47	Novi Grad	Dobrinja I
3	Centar	Centar	48	Novi Grad	Dobrinja II-A
4	Centar	Ciglane	49	Novi Grad	Dobrinja II-B
5	Centar	Crni vrh i Gorica	50	Novi Grad	Dobrinja III-A
6	Centar	Džidžikovac	51	Novi Grad	Dobrinja III-B
7	Centar	Džidžikovac II	52	Novi Grad	Dolac
8	Centar	Hrastovi I	53	Novi Grad	Naselje heroja
9	Centar	Hrastovi II	54	Novi Grad	Olimpijsko selo
10	Centar	Koševo I	55	Novi Grad	Otoka
11	Centar	Koševo II	56	Novi Grad	Saraj polje
12	Centar	Koševsko brdo	57	Novi Grad	Staro Hrasno
13	Centar	Koševsko brdo I	58	Novo Sarajevo	Avdo Hodžić
14	Centar	Marijin Dvor	59	Novo Sarajevo	Blagoje Parović
15	Centar	Mejtaš I	60	Novo Sarajevo	Bratstvo-Jedinstvo
16	Centar	Mejtaš II	61	Novo Sarajevo	Danilo Đokić
17	Centar	Park	62	Novo Sarajevo	Donji Pofalići
18	Centar	Skenderija	63	Novo Sarajevo	Gornji Pofalići
19	Centar	Soukbunar	64	Novo Sarajevo	Hrasno brdo
20	Centar	Trg Oslobođenja	65	Novo Sarajevo	Ivan Krndelj
21	Centar	Višnjik	66	Novo Sarajevo	Kumrovec
22	Ilidža	Butmir	67	Novo Sarajevo	Omer Maslić
23	Ilidža	Hrasnica I	68	Novo Sarajevo	Trg Heroja
24	Ilidža	Hrasnica II	69	Novo Sarajevo	Velešići
25	Ilidža	Sokolovići	70	Stari Grad	Širokača
26	Ilidža	Stup I	71	Stari Grad	Baščaršija
27	Ilidža	Stup II	72	Stari Grad	Babića Bašta
28	Ilidža	Stupsko brdo	73	Stari Grad	Bistrik
29	Novi Grad	Švrakino selo I	74	Stari Grad	Gazin Han
30	Novi Grad	Švrakino selo II	75	Stari Grad	Hrid - Jarčedoli
31	Novi Grad	Švrakino selo III	76	Stari Grad	Kovači
32	Novi Grad	Čengić vila	77	Stari Grad	Logavina I
33	Novi Grad	Alipašin most I	78	Stari Grad	Logavina II
34	Novi Grad	Alipašin most II	79	Stari Grad	Mahmutovac
35	Novi Grad	Alipašino polje	80	Stari Grad	Medrese I
36	Novi Grad	Alipašino polje A-I	81	Stari Grad	Medrese II
37	Novi Grad	Alipašino polje A-II	82	Stari Grad	Mjedenica
38	Novi Grad	Alipašino polje B-I	83	Stari Grad	Sedrenik
39	Novi Grad	Alipašino polje B-II	84	Stari Grad	Sumbuluša
40	Novi Grad	Alipašino polje C-I	85	Stari Grad	Toka - Džeka
41	Novi Grad	Alipašino polje C-II	86	Stari Grad	Trg Oslobođenja II
42	Novi Grad	Aneks	87	Stari Grad	Vratnik
43	Novi Grad	Briješće	88	Vogošća	Hotonj
44	Novi Grad	Buća Potok	89	Vogošća	Kobilja Glava
45	Novi Grad	Dobrinja C-5			



## **ANNEX 2**

### The Questionnaire

REPUBLIKA BOSNA I HERCEGOVINA

Institut za izražavanje zločina protiv čovječnosti i međunarodnog prava  
SARAJEVO

UPITNIK

ZA POPIS PORODIČNIH DOMAĆINSTAVA NA SLOBODNIM PODRUČJIMA GRADA SARAJEVA U 1994. GODINI

Br. Nb 075505

1. Sadašnja adresa porodičnog domaćinstva: a) Opština Novi Grad  
b) Mjesna zajednica Dobrinja 1 c) Ulica i broj Žikice Jovanovića Španca br. 6

2. Porodično domaćinstvo:

- a) živi na istoj adresi na kojoj je živjelo i prije rata;  
b) tokom rata, u okviru slobodnih teritorija RBiH, preselilo sa adrese: \_\_\_\_\_, opština \_\_\_\_\_;  
c) izbjeglice, ili raseljeni iz: adresa \_\_\_\_\_, opština \_\_\_\_\_

3. Članovi porodičnog domaćinstva koji sada žive na slobodnim područjima grada Sarajeva (pod a) se upisuje nosilac porodičnog domaćinstva):

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	SRODSTVO SA NOSIOČ.	NACIO- NALNOST	VIERO- ISPOVIJEST
a)	<u>Dedović (Midhat) Aziz</u>	<u>1939</u>	<u>suprug</u>	<u>Bosnjak</u>	<u>Islamista</u>
b)	<u>Dedović (Rahman) Sejda</u>	<u>1953</u>	<u>sin</u>	<u>Bosnjak</u>	<u>Islamista</u>
c)	<u>Dedović (Aziz) Hatid</u>	<u>1972</u>	<u>sin</u>	<u>Bosnjak</u>	<u>Islamista</u>
d)	<u>Dedović (Aziz) Muamera</u>	<u>1977</u>	<u>kćerka</u>	<u>Bosanka</u>	<u>Islamista</u>
e)	<u>Dedović (Meho) Suhrija</u>	<u>1920</u>	<u>majka</u>	<u>Bosanka</u>	<u>Islamista</u>
f)					
g)					

4. Članovi porodičnog domaćinstva koji su izbjegli, odnosno raseljeni, van Sarajeva, ili su ostali na području RBiH koje je pod kontrolom agresora:

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	SRODSTVO SA NOSIOČ.	NACIONA- LNOŠT	VIERO- ISPOVIJEST	GDJE SADA ŽIVI
a)	<u>Dedović (Meho) Suhrija</u>	<u>1920</u>	<u>majka</u>	<u>Bosanka</u>	<u>Islamista</u>	<u>kod sina</u>
b)						
c)						
d)						
e)						
f)						
g)						

5. Poginuli u porodičnom domaćinstvu tokom agresije

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	SRODS- TVO SA NOSIOČ.	DATUM POGIBIJE	MIJESTO POGIBIJE	NAČIN POGIBIJE	CIVIL - BORAC
a)							
b)							
c)							

6. Ranjeni u porodičnom domaćinstvu tokom agresije

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	SRODS- TVO SA NOSIOČ.	DATUM RANJAV.	MIJESTO RANJAV.	NAČIN RANJAVANJA	CIVIL - BORAC
a)	<u>Dedović (Midhat) Aziz</u>	<u>1939</u>		<u>20.06.1992</u>	<u>Dobrinja</u>	<u>granata</u>	<u>borac</u>
b)							
c)							

7. Nestali u porodičnom domaćinstvu tokom agresije

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	MJESTO NESTANJA	NAČIN NESTANJA	CIVIL - BORAC
a)					
b)					
c)					

8. Članovi porodičnog domaćinstva koji se nalaze ili su bili u logoru ili zatvoru tokom agresije

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	LOGOR - ZATVOR (NAZIV I MJESTO)	OD - DO
a)				
b)				
c)				

9. Invalidi u porodičnom domaćinstvu usljed ratnih dejstava

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	OPIS INVALIDITETA	CIVIL - BORAC
a)				
b)				
c)				

10. Živorodeni u porodičnom domaćinstvu tokom agresije

	PREZIME (IME OCA) I IME	ROĐENJA (datum)	POL	GDJE JE ROĐENJA
a)				
b)				

11. Mrtvorodeni u porodičnom domaćinstvu tokom agresije

a) NE; b) DA, koliko \_\_\_\_\_

12. Umrli u porodičnom domaćinstvu tokom agresije

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	UMRO-LA (datum)	SRODSTVO SA NSC.	SAHRANJENJA (MJESTO)
a)					
b)					
c)					

13. Stambeni uslovi u kojima sada živi porodično domaćinstvo u Sarajevu

- a) U vlastitom stanu/kući od prije agresije;  
b) Vlastiti stan/kuća je uništen ili napušten zbog agresorskih dejstava - porodično domaćinstvo uselilo u drugi stan/kuću;  
c) Nije imalo stan/kuću - porodično domaćinstvo uselilo u drugi stan/kuću tokom agresije;  
d) Stanuje u kolektivnom smještaju sa ostalim izbjeglicima i raseljenim licima;  
e) Izbjeglice ili raseljena lica smješteni kod rodbine;  
f) Ostalo \_\_\_\_\_

14. Da li je porodica (njeni stariji članovi ili roditelji) bila u izbjeglištvu u II svjetskom ratu (1941-1945)?

b) NE; a) DA, izbjegla iz Goražda u Brčko od 1943 do 1946

15. Da li je porodično domaćinstvo izgubilo nekog od bliske rodbine u II svjetskom ratu?

	PREZIME (IME OCA) I IME	GODINA ROĐENJA	KAO VOJNIK (KOJE VOJSKE)	CIVIL (GDJE I KAKO)
a)	<u>Đedović (Šerif) Midhat</u>	<u>1912</u>		
b)				
c)				

U ime porodičnog domaćinstva podatke dao: Đedović Sejda, srodstvo sa nosiocem supruga

Datum popisa 30.05.1994.

Upitnik popunio Nuhanović Fikreta

# REPUBLIKA BOSNA I HERCEGOVINA

Institut za iztraživanje zločina protiv čovječnosti i međunarodnog prava  
Sarajevo  
*Institute for the Research of Crimes Against Humanity and International Law, Sarajevo*

## UPITNIK

### QUESTIONNAIRE

#### ZA POPIS PORODIČNIH DOMAĆINSTAVA NA SLOBODNIM PODRUČJIMA GRADA SARAJEVA U 1994. GODINI *Survey of households in the free territory of Sarajevo in 1994*

- 1) Sadašnja adresa porodičnog domaćinstva: a)

Opština \_\_\_\_\_  
*Current address family/household: Municipality*

b) Mjesna zajednica \_\_\_\_\_ c) Ulica i broj \_\_\_\_\_  
*Community Address*

- 2) Porodično domaćinstvo

*Members of Family/household*

a) Živi na istoj adresi na kojoj je živjelo I prije rata;  
*same address as before the war*

b) Tokom rata, u okviru slobodnih teritorija RBiH, preselilo sa adrese: \_\_\_\_\_;  
*During the war moved within the free territories of BiH, from this address*  
\_\_\_\_\_, opština \_\_\_\_\_  
*municipality*

c) Izbjeglice, ili raseljeni iz: adresa \_\_\_\_\_, opština \_\_\_\_\_  
*Refugees or displaced from: address municipality*

- 3) Članovi porodičnog domaćinstva koji sada žive na slobodnim područjima grada Sarajeva (pod a) se upisuje nosilac porodičnog domaćinstva):

	<i>Members of F/HH</i>	<i>who reside in the free territory</i>	<i>of Sarajevo (under a)</i>	<i>the head of the F/HH.</i>	
	PREZIME (ime OCA) IME	GODINA ROĐENJA	SRODSTVO SA NOSIOC	NACIONALNOST	VJEROISPOVJEST
	<i>Last name (father's name) first</i>	<i>Year of birth</i>	<i>Position in F/HH</i>	<i>Ethnicity</i>	<i>Religion</i>
a)	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____
d)	_____	_____	_____	_____	_____
e)	_____	_____	_____	_____	_____
f)	_____	_____	_____	_____	_____

- 4) Članovi p porodičnog domaćinstva koji su izbjegli, odnosno raseljeni, van Sarajeva, ili su ostali na području RbiH koje je pod kontrolom agresora:

*Members of F/HH who fled, were displaced, from Sarajevo, or who remained in the territory controlled by the aggressor:*

	PREZIME (IME OCA) I IME	GODINA RODENJA	SRODSTVO SA NOSIOC.	NACIONALNOST	VJEROISPOVJEST	GDJE SADA ŽIVI
	<i>Last name (father's name) first</i>	<i>Year of birth</i>	<i>Position in F/HH</i>	<i>Ethnicity</i>	<i>Religion</i>	<i>Current residence</i>
a)	_____	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____	_____
d)	_____	_____	_____	_____	_____	_____
e)	_____	_____	_____	_____	_____	_____
f)	_____	_____	_____	_____	_____	_____

- 5) Poginuli u porodičnom domaćinstvu tokom agresije.  
*Killed members of F/HH during aggression.*

	PREZIME (ime OCA) IME	GODINA RODENJA	SRODS. SA NSC.	DATUM POGIBIJE	MAJESTO POGIBIJE	NAČIN POGIBIJE	CIVIL-BORAC
	<i>Last name (father's name)</i>	<i>Year of birth</i>	<i>Position in F/HH</i>	<i>Date of death</i>	<i>Place of death</i>	<i>Cause of death</i>	<i>Civilian-Soldier</i>
a)	_____	_____	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____	_____	_____

## 6) Ranjeni u prordičnom domaćinstvu tokom agresije.

Wounded (members of F/HH) during aggression.

	PREZIME (ime OCA) I ME Last name (father's name)	GODINA RODENJA Year of birth	SRODS. SA NSC. Position in F/HH	DATUM RANJAV Date of injury	MAJESTO RANJAV Place of injury	NAČIN RANJAVANJA Cause of injury	CIVIL-BORAC Civilian-Soldier
a)	_____	_____	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____	_____	_____

## 7) Nestali u porodičnom domaćinstvu tokom agresije.

Missing (members of F/HH) during aggression.

	PREZIME (IME OCA) I IME Last name (father's name) First name	GODINA RODENJA Year of birth	MJESTO NESTANKA Place of disappearance	NAČIN NESTANKA Cause of disappearance	CIVIL-BORAC Civilian-Soldier
a)	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____

## 8) Članovi porodičnog domaćinstva koji se nalaze ili su bili u logoru ili zatvoru tokom agresije.

Members of F/HH who were detained in prison or camp during aggression.

	PREZIME (IME OCA) I IME Last name (father's name) First name	GODINA RODENJA Year of birth	LOGOR – ZATVOR (NAZIV I MJESTO) Place of detention (prison/camp)	OD – DO From - Until
a)	_____	_____	_____	_____
b)	_____	_____	_____	_____
c)	_____	_____	_____	_____

## 9) Invalidi u prodičnom domaćinstvu usljed ratnih dejstava.

Invalid/handicapped mebers of F/HH because of war.

	PREZIME (IME OCA) I IME Last name (father's name) First name	GODINA RODENJA Year of birth	OPIS INVALIDITETA Description of invalidacy	CIVIL-BORAC Civilian-Soldier
a)	_____	_____	_____	_____
b)	_____	_____	_____	_____
c)	_____	_____	_____	_____

## 10) Živorodeni u porodičnom domaćinstvu tokom agresije.

Persons born during the aggression.

	PREZIME (IME OCA) I IME Last name (father's name) First name	ROĐEN-A (datum) Born (date)	POL Gender	GDJE JE ROĐEN-A Place of birth
a)	_____	_____	_____	_____
b)	_____	_____	_____	_____

## 11) Mrtvorodeni u porodičnim domaćinstvu tokom agresije.

Still births (members of F/HH) during aggression.

a) NE; no b) DA, koliko yes, How many? \_\_\_\_\_

## 12) Umrli u porodičnom domaćinstvu tokom agresije.

Died (members of F/HH) during aggression.

	PREZIME (IME OCA) I IME Last name (father's name) First name	GODINA RODENJA Year of birth	UMRO-LA (Datum) Died on (date)	SRODSTVO SA NSC. Relation to head of F/HH	CIVIL-BORAC Civilian-Soldier
a)	_____	_____	_____	_____	_____
b)	_____	_____	_____	_____	_____
c)	_____	_____	_____	_____	_____

## 13) Stambeni uslovi u kojima sada živi porodično domaćinstvo u Sarajevu.

Current housing conditions of F/HH in Sarajevo.

- a) U vlastitom stanu/kući od prije agresije;  
Owns apartment since before the aggression
- b) Vlastiti stan/kuća je uništen ili napušten zbog agresorskih dejstava – porodično domaćinstvo uselilo u drugi stan/kuću;  
Own house/apt. destroyed or abandoned because of aggression – F/HH moved to a new house/apartment
- c) Nije imalo stan/kuću – porodično domaćinstvo uselilo u drugi stan/kuću tokom agresije;  
Did not have own house/apt. but F/HH moved to another during the aggression.
- d) Stanuje u kolektivnom smeštaju sa ostalim izbjeglim i raseljenim licima;  
Shared house/apt. with other refugees during aggression
- e) Izbjeglike ili raseljena lica smješteni kod rodbine;  
Refugees and displaced residing with F/HH.
- f) Ostalo others \_\_\_\_\_

## 14) Da li je porodica (njeni stariji članovi ili roditelji) bila u izbjeglištvu u II svjetskom, ratu (1941-1945)?

Has any member of F/HH (elder/parents) been displaced in the 2<sup>nd</sup> World War?

b) NE; a) DA, izbjegla

iz \_\_\_\_\_ u \_\_\_\_\_ od \_\_\_\_\_ do \_\_\_\_\_  
from (location) to (location) since until

15) Da li je porodično domaćinstvo izgubilo nekog od bliske rodbine u II svjetskom ratu?

*Did any immediate member of the family die in WWII?*

	PREZIME (IME OCA) I IME <i>Last name (father's name) First name</i>	GODINA ROĐENJA <i>Year of birth</i>	KAO VOJNIK (KOJE VOJSKE) <i>Soldier? (w/c army?)</i>	CIVIL (GDJE I KAKO) <i>Civilian (where and how)?</i>
a)	_____	_____	_____	_____
b)	_____	_____	_____	_____
c)	_____	_____	_____	_____

U ime porodičnog domćinstva, podatke dao: \_\_\_\_\_, srodstvo sa  
nosiocem \_\_\_\_\_

*On behalf of the F/HH, data was given by:*

*relationship to head of F/HH*

Datum popisa \_\_\_\_\_

Upitnik

popunio \_\_\_\_\_

*Survey filled in by*

*Date of signature*

## **ANNEX 3**

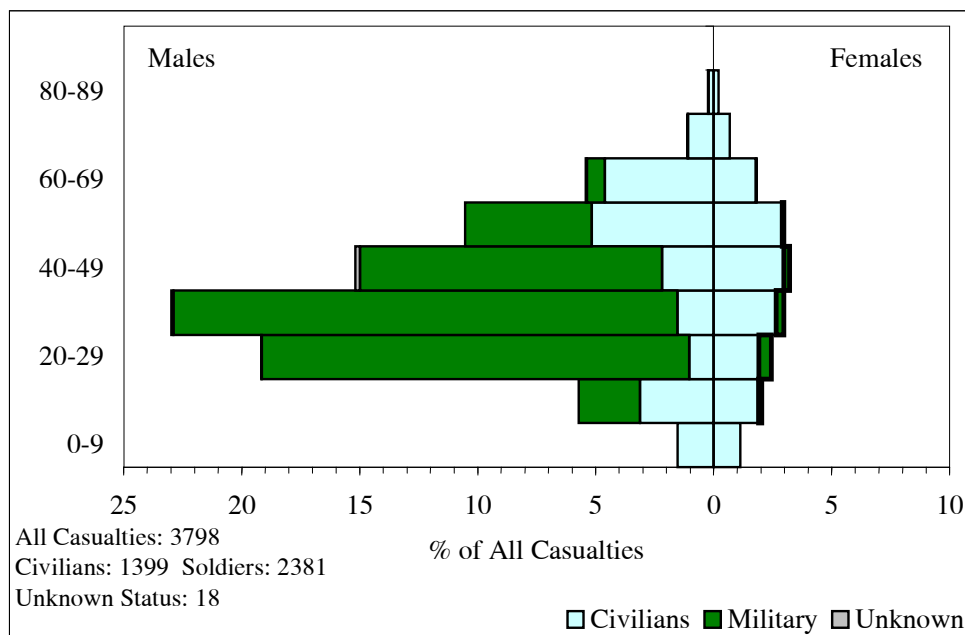
### **Statistics of the Killed Population Obtained from HSS-1994**

A3.1 Population Killed Within Front Lines in Sarajevo, 1992-94\*,  
Absolute Number by Age and Sex

Civilians, Soldiers, and Unknown Status				
Age At Death	Women	Men	Unk Sex	Total
0-9	43	58	0	101
10-19	79	217	0	296
20-29	93	728	0	821
30-39	113	873	0	986
40-49	122	577	0	699
50-59	114	400	0	514
60-69	69	206	0	275
70-79	26	42	0	68
80-89	8	9	0	17
90+	0	0	0	0
Unk Age	3	17	1	21
Total	670	3127	1	3798

*\*From 10.09.1992 to 10.08.1994*

A3.2 Sex, Age and Civilian-Soldier Distribution of Persons Killed Within Front  
Lines in Sarajevo, 1992-1994\*, Percent of All Casualties





A3.3 Sex and Age Distribution of Persons Killed Within Front Lines in Sarajevo, 1992-1994\*, Absolute Number and Percent of All Casualties

<i><b>Civilians</b></i>					<i><b>Civilians</b></i>			
Age At Death	Women	Men	Unk Sex	Total	Age At Death	Women	Men	Unk Sex
0-9	43	58	0	101	0-9	1.13	1.53	0.00
10-19	72	118	0	190	10-19	1.90	3.11	0.00
20-29	73	39	0	112	20-29	1.92	1.03	0.00
30-39	101	58	0	159	30-39	2.66	1.53	0.00
40-49	113	83	0	196	40-49	2.98	2.19	0.00
50-59	110	196	0	306	50-59	2.90	5.16	0.00
60-69	68	175	0	243	60-69	1.79	4.61	0.00
70-79	26	41	0	67	70-79	0.68	1.08	0.00
80-89	8	8	0	16	80-89	0.21	0.21	0.00
90+	0	0	0	0	90+	0.00	0.00	0.00
Unk Age	3	6	0	9	Unk Age	0.08	0.16	0.00
Total	617	782	0	1399	Total	36.84		

<i><b>Soldiers</b></i>					<i><b>Soldiers</b></i>			
Age At Death	Women	Men	Unk Sex	Total	Age At Death	Women	Men	Unk Sex
0-9	0	0	0	0	0-9	0.00	0.00	0.00
10-19	6	99	0	105	10-19	0.16	2.61	0.00
20-29	20	688	0	708	20-29	0.53	18.11	0.00
30-39	12	811	0	823	30-39	0.32	21.35	0.00
40-49	9	486	0	495	40-49	0.24	12.80	0.00
50-59	3	204	0	207	50-59	0.08	5.37	0.00
60-69	0	29	0	29	60-69	0.00	0.76	0.00
70-79	0	1	0	1	70-79	0.00	0.03	0.00
80-89	0	1	0	1	80-89	0.00	0.03	0.00
90+	0	0	0	0	90+	0.00	0.00	0.00
Unk Age	0	11	1	12	Unk Age	0.00	0.29	0.03
Total	50	2330	1	2381	Total	62.69		

<i><b>Unknown Status</b></i>					<i><b>Unknown Status</b></i>			
Age At Death	Women	Men	Unk Sex	Total	Age At Death	Women	Men	Unk Sex
0-9	0	0	0	0	0-9	0.00	0.00	0.00
10-19	1	0	0	1	10-19	0.03	0.00	0.00
20-29	0	1	0	1	20-29	0.00	0.03	0.00
30-39	0	4	0	4	30-39	0.00	0.11	0.00
40-49	0	8	0	8	40-49	0.00	0.21	0.00
50-59	1	0	0	1	50-59	0.03	0.00	0.00
60-69	1	2	0	3	60-69	0.03	0.05	0.00
70-79	0	0	0	0	70-79	0.00	0.00	0.00
80-89	0	0	0	0	80-89	0.00	0.00	0.00
90+	0	0	0	0	90+	0.00	0.00	0.00
Unk Age	0	0	0	0	Unk Age	0.00	0.00	0.00
Total	3	15	0	18	Total	0.47		

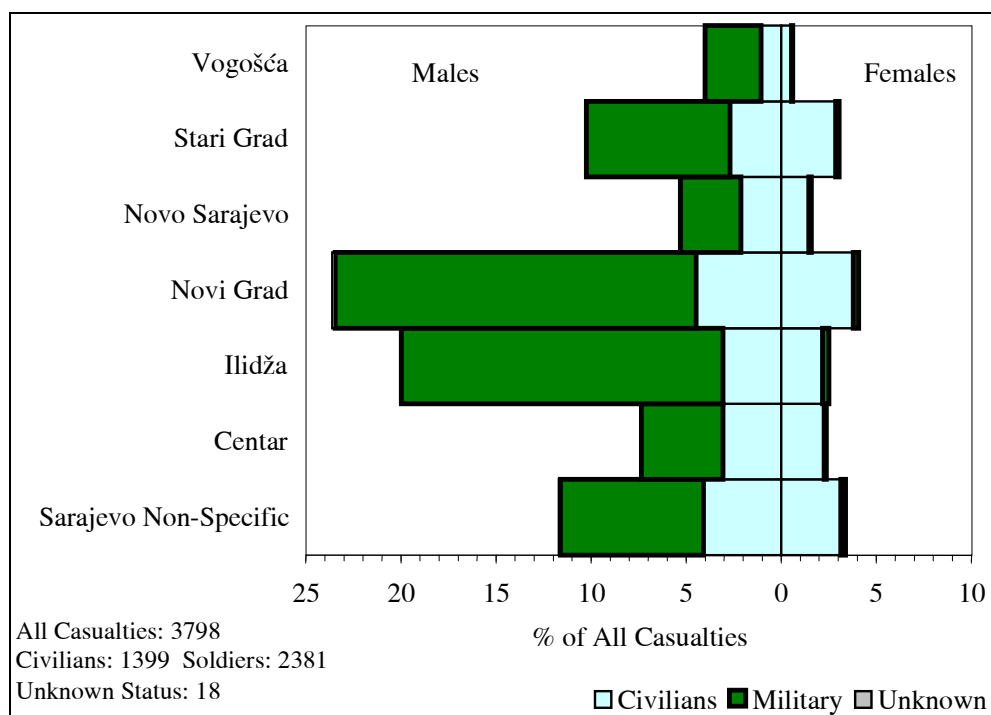
\*From 10.09.1992 to 10.08.1994

A3.4 Persons Killed Within Front Lines in Sarajevo, 1992-94\*, Absolute Number by Municipality of Death and Sex

Opstina of Death	Women	Men	Unk Sex	Total
Centar	90	279	0	369
Ilidža	95	761	0	856
Novi Grad	156	897	0	1053
Novo Sarajevo	61	204	0	265
Stari Grad	116	390	1	507
Vogošća	23	152	0	175
Sarajevo Non-Specific	129	444	0	573
<b>Total</b>	<b>670</b>	<b>3127</b>	<b>1</b>	<b>3798</b>

\*From 10.09.1992 to 10.08.1994

A3.5 Persons Killed Within Front Lines in Sarajevo, 1992-94\*, Percent of All Casualties by Municipality of Death, Sex and Civilian-Soldier Status



\*From 10.09.1992 to 10.08.1994

A3.6 Sex and Municipality of Death Distribution of Persons Killed Within Front Lines in Sarajevo, 1992-94\*, Absolute Number and Percent of All Casualties

<i><b>Civilians</b></i>					<i><b>Civilians</b></i>			
Opstina of Death	Women	Men	Unk Sex	Total	Opstina of Death	Women	Men	Unk Sex
Centar	86	117	0	203	Centar	2.26	3.08	0.00
Ilidža	83	116	0	199	Ilidža	2.19	3.05	0.00
Novi Grad	144	170	0	314	Novi Grad	3.79	4.48	0.00
Novo Sarajevo	55	81	0	136	Novo Sarajevo	1.45	2.13	0.00
Stari Grad	109	102	0	211	Stari Grad	2.87	2.69	0.00
Vogošća	21	40	0	61	Vogošća	0.55	1.05	0.00
Sarajevo Non-Specific	119	156	0	275	Sarajevo Non-Specific	3.13	4.11	0.00
Total	617	782	0	1399	Total	13.11	16.48	0.00

<i><b>Soldiers</b></i>					<i><b>Soldiers</b></i>			
Opstina of Death	Women	Men	Unk Sex	Total	Opstina of Death	Women	Men	Unk Sex
Centar	4	162	0	166	Centar	0.11	4.27	0.00
Ilidža	12	643	0	655	Ilidža	0.32	16.93	0.00
Novi Grad	11	721	0	732	Novi Grad	0.29	18.98	0.00
Novo Sarajevo	5	120	0	125	Novo Sarajevo	0.13	3.16	0.00
Stari Grad	7	287	1	295	Stari Grad	0.18	7.56	0.03
Vogošća	2	112	0	114	Vogošća	0.05	2.95	0.00
Sarajevo Non-Specific	9	285	0	294	Sarajevo Non-Specific	0.24	7.50	0.00
Total	50	2330	1	2381	Total	1.08	53.84	0.03

<i><b>Unknown Status</b></i>					<i><b>Unknown Status</b></i>			
Opstina of Death	Women	Men	Unk Sex	Total	Opstina of Death	Women	Men	Unk Sex
Centar	0	0	0	0	Centar	0.00	0.00	0.00
Ilidža	0	2	0	2	Ilidža	0.00	0.05	0.00
Novi Grad	1	6	0	7	Novi Grad	0.03	0.16	0.00
Novo Sarajevo	1	3	0	4	Novo Sarajevo	0.03	0.08	0.00
Stari Grad	0	1	0	2	Stari Grad	0.00	0.03	0.00
Vogošća	0	0	0	0	Vogošća	0.00	0.00	0.00
Sarajevo Non-Specific	1	3	0	4	Sarajevo Non-Specific	0.03	0.08	0.00
Total	3	15	0	19	Total	0.05	0.32	0.00

\*From 10.09.1992 to 10.08.1994

A3.7 Persons Killed Within Front Lines in Sarajevo, 1992-94\*, Absolute Number by Cause of Death and Sex

<b><i>Civilians, Soldiers and Unknown Status</i></b>				
<b>Causes Of Death</b>	<b>Women</b>	<b>Men</b>	<b>Unk Sex</b>	<b>Total</b>
Firearms - Shelling	468	1692	0	2160
Firearms - Sniper	103	595	1	699
Firearms - Shooting	26	202	0	228
Firearms - Other and Unspecified	27	274	0	301
- <i>Firearms - anti-aircraft machinegun</i>	1	31	0	32
- <i>Firearms - M-84 and the like</i>	2	9	0	11
- <i>Firearms - unspecified</i>	24	234	0	258
Direct Casualties of War	10	179	0	189
- <i>Cold steel/slaughtered/tortured</i>	4	10	0	14
- <i>Execution</i>	3	4	0	7
- <i>Human shield</i>	0	4	0	4
- <i>Disappeared</i>	2	11	0	13
- <i>Other casualties - wounding</i>	0	4	0	4
- <i>Other casualties - war operations</i>	1	146	0	147
Indirect Casualties of War	3	22	0	25
- <i>Stepped on mine</i>	3	16	0	19
- <i>Other casualties - war conditions</i>	0	6	0	6
Other casualties - unspecified	8	42	0	50
Accidents and Violence	19	63	0	82
- <i>Other - traffic accident</i>	3	16	0	19
- <i>Other - other accident</i>	6	15	0	21
- <i>Other - suicide</i>	5	5	0	10
- <i>Other - violent</i>	5	27	0	32
Unknown/Unspecified	6	58	0	64
<b>Total</b>	<b>670</b>	<b>3127</b>	<b>1</b>	<b>3798</b>

\*From 10.09.1992 to 10.08.1994

A3.8 Civilians Killed Within Front Lines in Sarajevo, 1992-94\*, Absolute Number by Cause of Death and Sex

<i><b>Civilians</b></i>			
<b>Causes Of Death</b>	<b>Women</b>	<b>Men</b>	<b>Total</b>
Firearms - Shelling	439	493	932
Firearms - Sniper	99	154	253
Firearms - Shooting	21	34	55
Firearms - Other and Unspecified:	20	26	46
- <i>Firearms - anti-aircraft machinegun</i>	1	4	5
- <i>Firearms - M-84 and the like</i>	0	0	0
- <i>Firearms - unspecified</i>	19	22	41
Direct Casualties of War	8	13	21
- <i>Cold steel/slaughtered/tortured</i>	4	8	12
- <i>Execution</i>	2	2	4
- <i>Human shield</i>	0	2	2
- <i>Disappeared</i>	2	1	3
- <i>Other casualties - wounding</i>	0	0	0
- <i>Other casualties - war operations</i>	0	0	0
Indirect Casualties of War	3	8	11
- <i>Stepped on mine</i>	3	2	5
- <i>Other casualties - war conditions</i>	0	6	6
Other casualties - unspecified	8	14	22
Accidents and Violence:	14	28	42
- <i>Other - traffic accident</i>	3	9	12
- <i>Other - other accident</i>	5	6	11
- <i>Other - suicide</i>	3	3	6
- <i>Other - violent</i>	3	10	13
Unknown/Unspecified	5	12	17
<b>Total</b>	<b>617</b>	<b>782</b>	<b>1399</b>

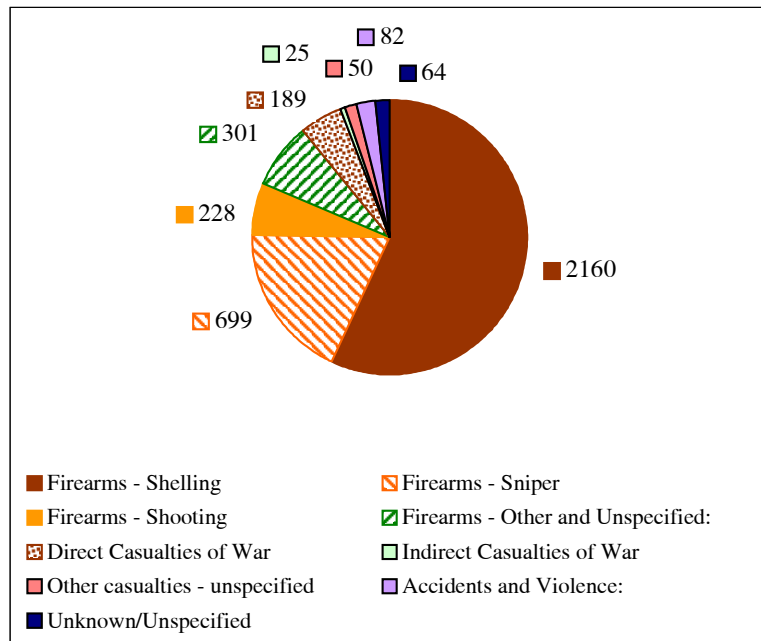
\*From 10.09.1992 to 10.08.1994

A3.9 Soldiers Killed Within Front Lines in Sarajevo, 1992-94\*, Absolute Number by Cause of Death and Sex

<b><i>Soldiers</i></b>				
<b>Causes Of Death</b>	<b>Women</b>	<b>Men</b>	<b>Unk Sex</b>	<b>Total</b>
Firearms - Shelling	29	1192	0	1221
Firearms - Sniper	4	441	1	446
Firearms - Shooting	5	168	0	173
Firearms - Other and Unspecified:	7	248	0	255
- <i>Firearms - anti-aircraft machinegun</i>	0	27	0	27
- <i>Firearms - M-84 and the like</i>	2	9	0	11
- <i>Firearms - unspecified</i>	5	212	0	217
Direct Casualties of War	1	163	0	164
- <i>Cold steel/slaughtered/tortured</i>	0	2	0	2
- <i>Execution</i>	0	1	0	1
- <i>Human shield</i>	0	2	0	2
- <i>Disappeared</i>	0	10	0	10
- <i>Other casualties - wounding</i>	0	4	0	4
- <i>Other casualties - war operations</i>	1	144	0	145
Indirect Casualties of War	0	14	0	14
- <i>Stepped on mine</i>	0	14	0	14
- <i>Other casualties - war conditions</i>	0	0	0	0
Other casualties - unspecified	0	28	0	28
Accidents and Violence:	3	34	0	37
- <i>Other - traffic accident</i>	0	7	0	7
- <i>Other - other accident</i>	1	9	0	10
- <i>Other - suicide</i>	0	1	0	1
- <i>Other - violent</i>	2	17	0	19
Unknown/Unspecified	1	42	0	43
<b>Total</b>	<b>50</b>	<b>2330</b>	<b>1</b>	<b>2381</b>

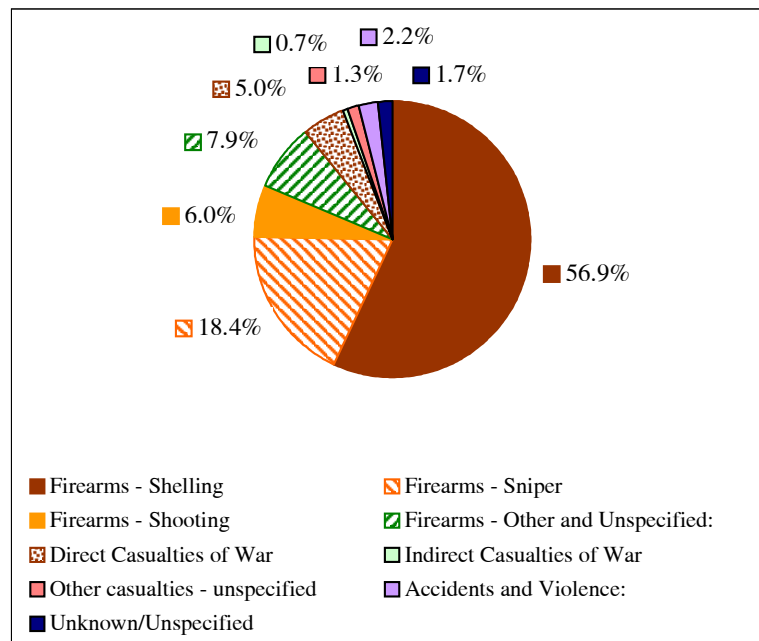
\*From 10.09.1992 to 10.08.1994

A3.10a Persons Killed in Sarajevo, 1992-94\*, Number by Cause of Death



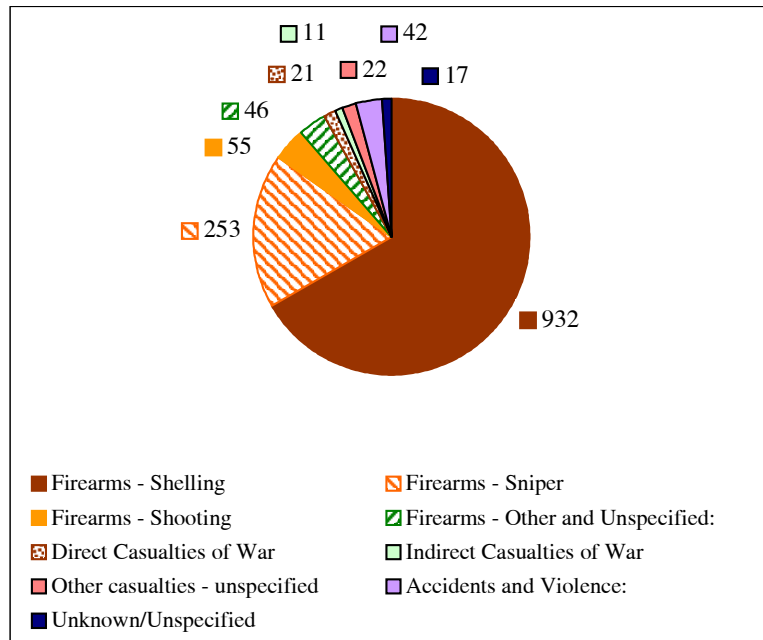
\*Within Front Lines, from 10.09.1992 to 10.08.1994

A3.10b Persons Killed in Sarajevo, 1992-94\*, Percent by Cause of Death



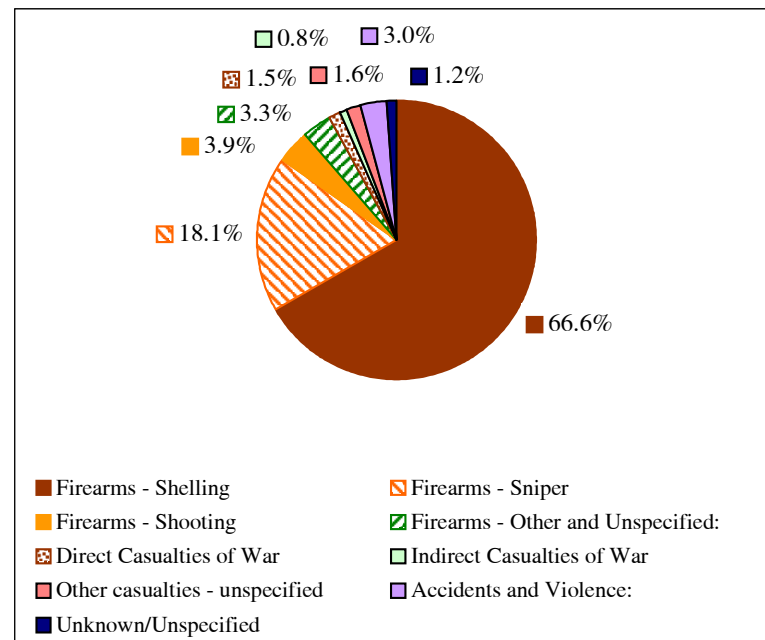
\*Within Front Lines, from 10.09.1992 to 10.08.1994

A3.11a Civilians Killed in Sarajevo, 1992-94\*, Number by Cause of Death



\*Within Front Lines, from 10.09.1992 to 10.08.1994

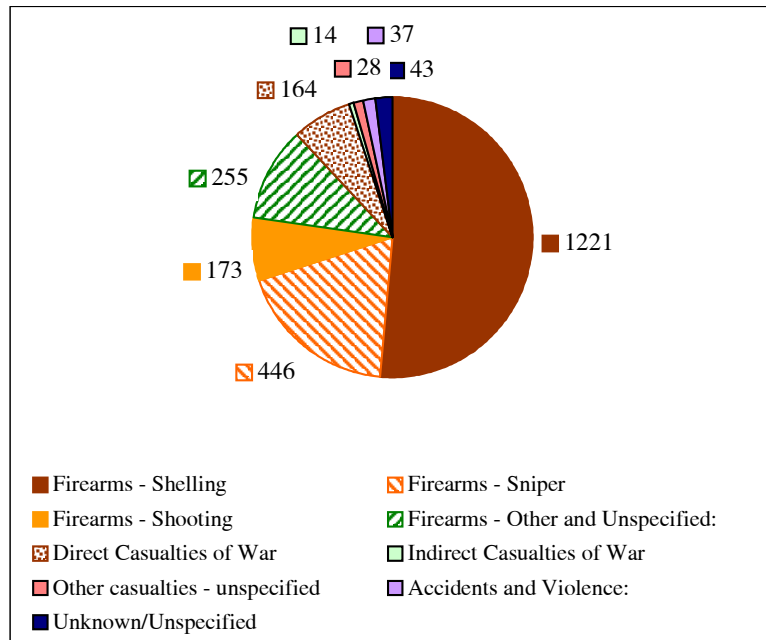
A3.11b Civilians Killed in Sarajevo, 1992-94\*, Percent by Cause of Death



\*Within Front Lines, from 10.09.1992 to 10.08.1994

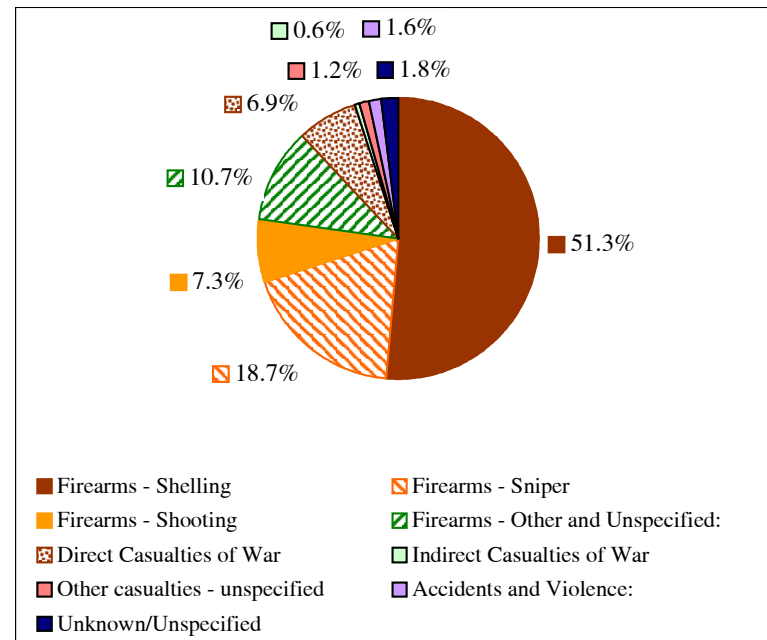


A3.12a Soldiers Killed in Sarajevo, 1992-94\*, Number by Cause of Death



\*Within Front Lines, from 10.09.1992 to 10.08.1994

A3.12b Soldiers Killed in Sarajevo, 1992-94\*, Percent by Cause of Death



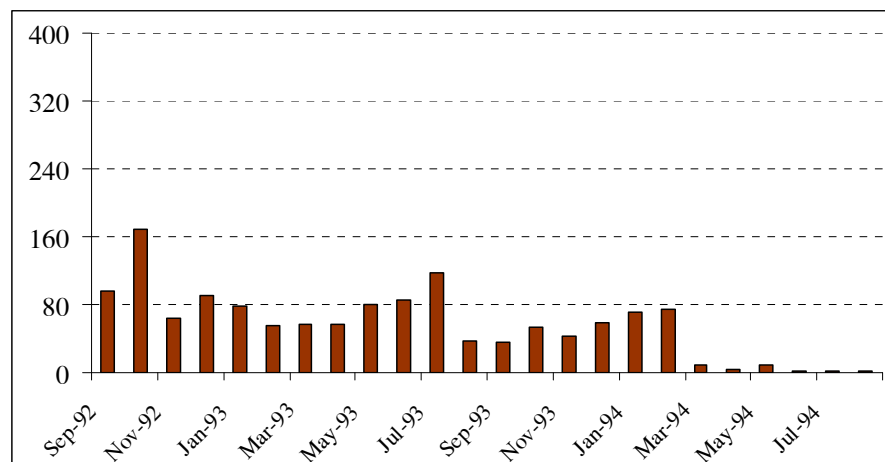
\*Within Front Lines, from 10.09.1992 to 10.08.1994

A3.13 Monthly Number of Persons Killed Within Front Lines in Sarajevo,  
From 10-09-1992 to 10-08-1994, by Civilian-Soldier Status

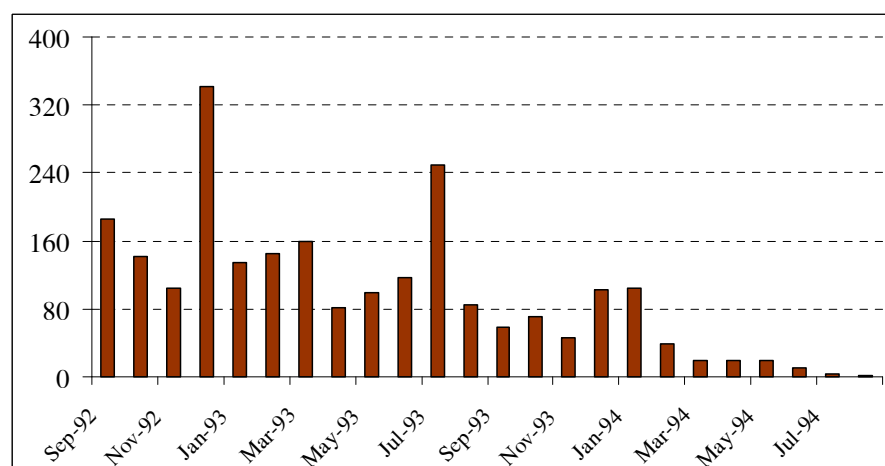
Time	Civilian	Soldiers	Unk Status	Total
Sep-92	96	185	1	282
Oct-92	169	141	5	315
Nov-92	64	104	1	169
Dec-92	91	341	3	435
Jan-93	79	135	2	216
Feb-93	56	146	0	202
Mar-93	57	159	1	217
Apr-93	57	81	0	138
May-93	80	100	0	180
Jun-93	86	117	0	203
Jul-93	118	249	0	367
Aug-93	38	85	0	123
Sep-93	35	59	0	94
Oct-93	54	70	0	124
Nov-93	43	46	1	90
Dec-93	59	103	2	164
Unk 1993	38	39	1	78
Jan-94	72	105	0	177
Feb-94	74	39	1	114
Mar-94	9	19	0	28
Apr-94	4	19	0	23
May-94	9	19	0	28
Jun-94	2	10	0	12
Jul-94	1	3	0	4
Aug-94	1	2	0	3
Unk 1994	7	5	0	12
Total	1399	2381	18	3798

A3.14 Monthly Number of Persons Killed Within Front Lines  
in Sarajevo, from 10-09-1992 to 10-08-1994

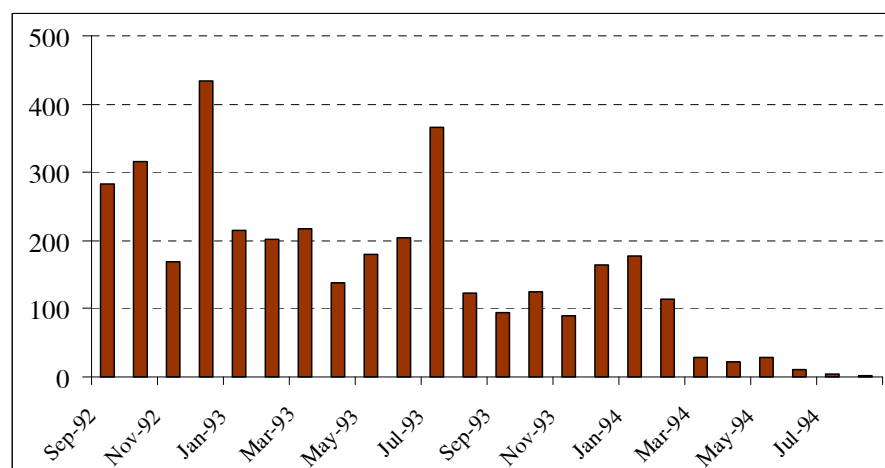
**Civilians**



**Soldiers**

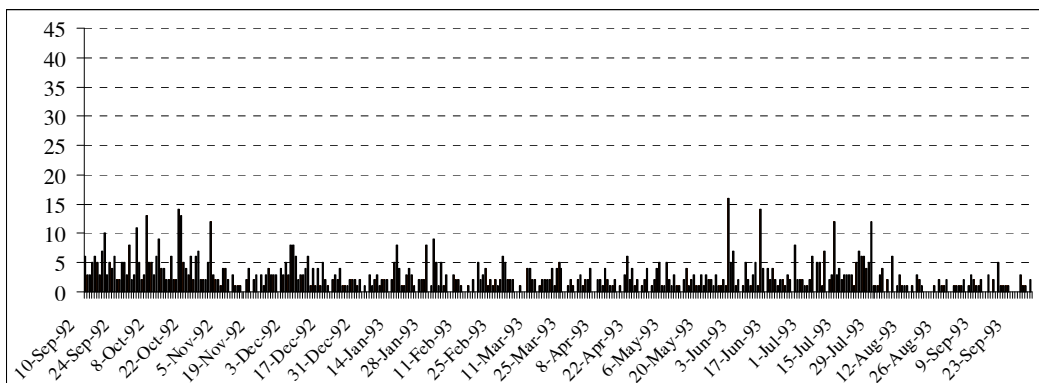


**All Killed**

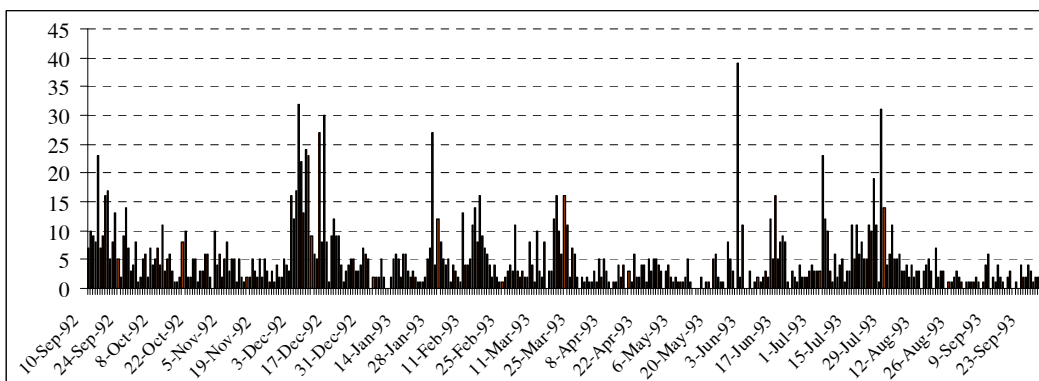


A3.15 Daily Number of Persons Killed Within Front Lines in Sarajevo,  
from 10-09-1992 to 30-09-1993

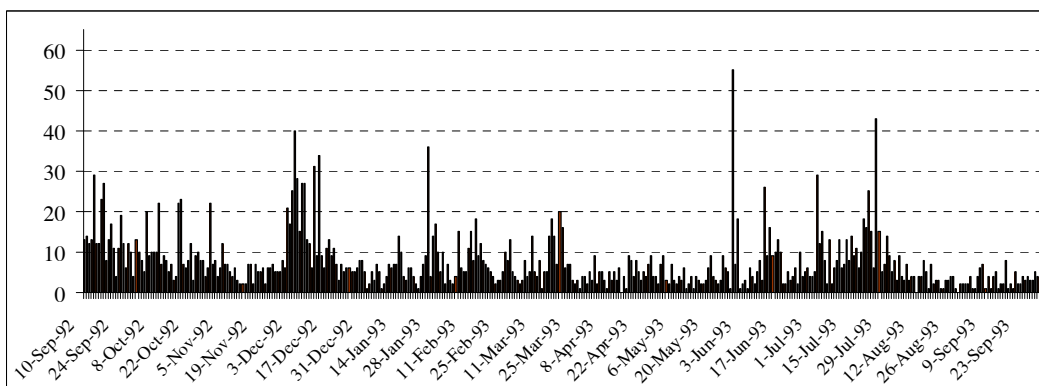
*Civilians*



*Soldiers*

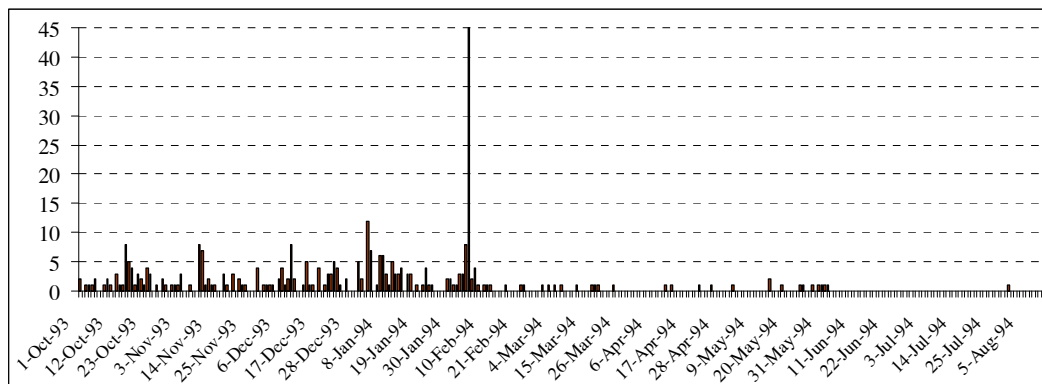


*All Killed*

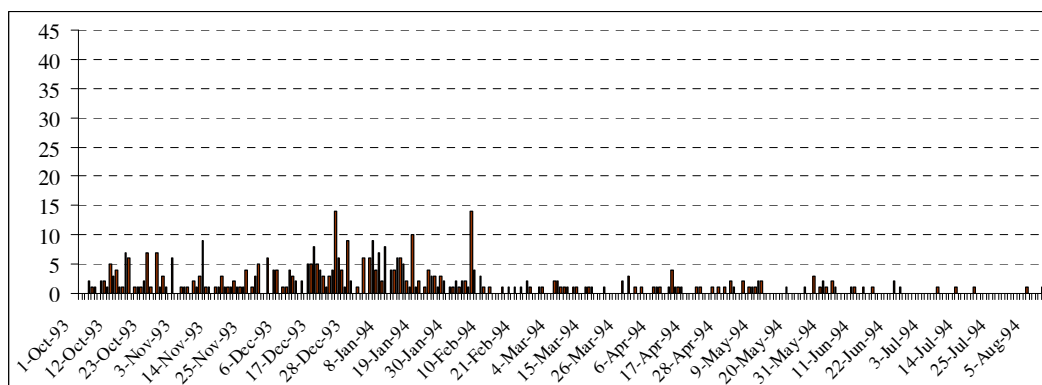


A3.16 Daily Number of Persons Killed Within Front Lines in Sarajevo,  
from 01-10-1993 to 10-08-1994

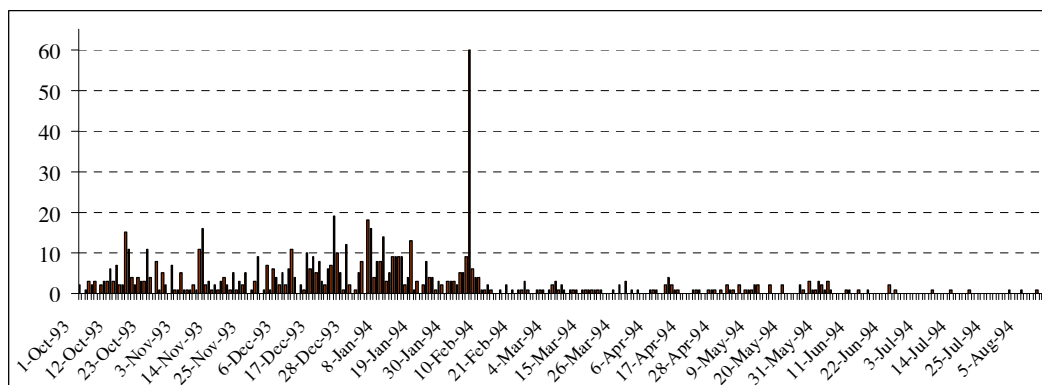
**Civilians**



**Soldiers**



**All Killed**



## **ANNEX 4**

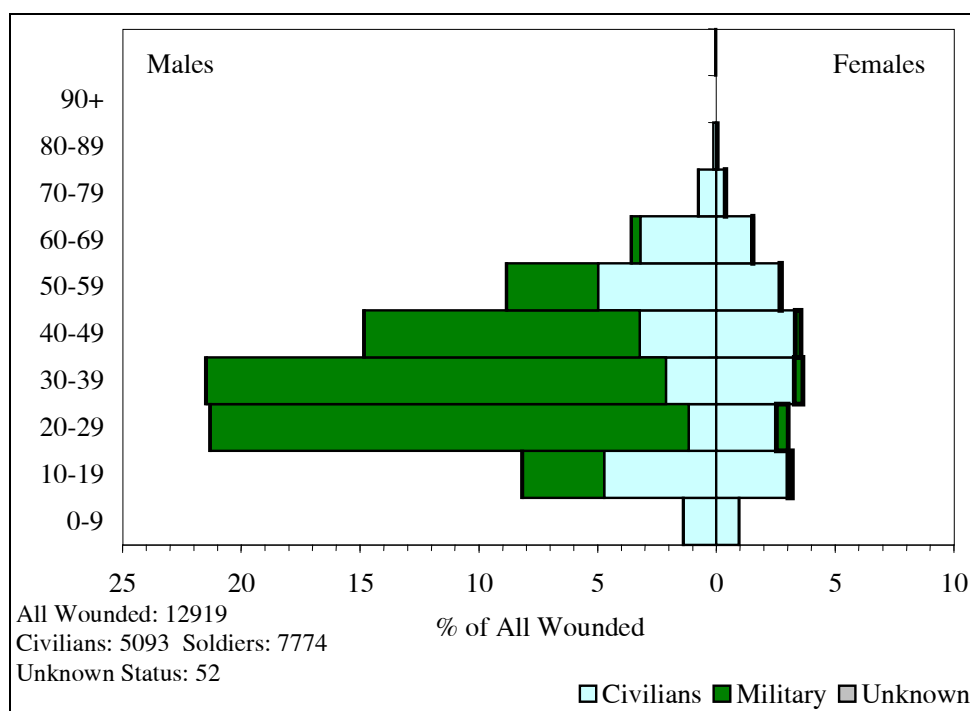
### **Statistics of the Wounded Population Obtained from HSS-1994**

A4.1 Population Wounded Within Front Lines in Sarajevo, 1992-94\*, Absolute Number, by Age and Sex

Civilians, Soldiers, and Unknown Status				
Age*	Women	Men	Unk Sex	Total
0-9	123	180	0	303
10-19	412	1061	0	1473
20-29	393	2759	0	3152
30-39	472	2780	0	3252
40-49	459	1921	0	2380
50-59	355	1145	0	1500
60-69	199	465	0	664
70-79	50	100	0	150
80-89	11	17	0	28
90+	0	1	0	1
Unk Age	3	9	4	16
Total	2477	10438	4	12919

*Note: Age\* is Age at Wounding*

A4.2 Sex, Age and Civilian-Soldier Distribution of Persons Wounded Within Front Lines in Sarajevo, 1992-1994\*, Percent of all Casualties



A4.3 Sex and Age Distribution of Persons Wounded Within Confrontation Lines in Sarajevo, 1992-1994\*, Absolute Number and Percent of All Casualties

Civilians					Civilians			
Age*	Women	Men	Unk Sex	Total	Age in 94	Women	Men	Unk Sex
0-9	122	180	0	302	0-9	0.94	1.39	0.00
10-19	389	609	0	998	10-19	3.01	4.71	0.00
20-29	326	149	0	475	20-29	2.52	1.15	0.00
30-39	423	275	0	698	30-39	3.27	2.13	0.00
40-49	429	417	0	846	40-49	3.32	3.23	0.00
50-59	345	645	0	990	50-59	2.67	4.99	0.00
60-69	196	414	0	610	60-69	1.52	3.20	0.00
70-79	48	96	0	144	70-79	0.37	0.74	0.00
80-89	11	16	0	27	80-89	0.09	0.12	0.00
90+	0	1	0	1	90+	0.00	0.01	0.00
Unk Age	2	0	0	2	Unk Age	0.02	0.00	0.00
Total	2291	2802	0	5093	Total	39.42		

Soldiers					Soldiers			
Age*	Women	Men	Unk Sex	Total	Age in 94	Women	Men	Unk Sex
0-9	0	0	0	0	0-9	0.00	0.00	0.00
10-19	23	444	0	467	10-19	0.18	3.44	0.00
20-29	65	2602	0	2667	20-29	0.50	20.14	0.00
30-39	47	2496	0	2543	30-39	0.36	19.32	0.00
40-49	30	1496	0	1526	40-49	0.23	11.58	0.00
50-59	8	495	0	503	50-59	0.06	3.83	0.00
60-69	2	47	0	49	60-69	0.02	0.36	0.00
70-79	2	4	0	6	70-79	0.02	0.03	0.00
80-89	0	1	0	1	80-89	0.00	0.01	0.00
90+					90+	0.00	0.00	0.00
Unk Age	1	9	2	12	Unk Age	0.01	0.07	0.02
Total	178	7594	2	7774	Total	60.17		

Unknown Status					Unknown Status			
Age*	Women	Men	Unk Sex	Total	Age in 94	Women	Men	Unk Sex
0-9	1	0	0	1	0-9	0.01	0.00	0.00
10-19	0	8	0	8	10-19	0.00	0.06	0.00
20-29	2	8	0	10	20-29	0.02	0.06	0.00
30-39	2	9	0	11	30-39	0.02	0.07	0.00
40-49	0	8	0	8	40-49	0.00	0.06	0.00
50-59	2	5	0	7	50-59	0.02	0.04	0.00
60-69	1	4	0	5	60-69	0.01	0.03	0.00
70-79	0	0	0	0	70-79	0.00	0.00	0.00
80-89	0	0	0	0	80-89	0.00	0.00	0.00
90+	0	0	0	0	90+	0.00	0.00	0.00
Unk Age	0	0	2	2	Unk Age	0.00	0.00	0.02
Total	8	42	2	52	Total	0.40		

Note: Age\* is Age at Wounding

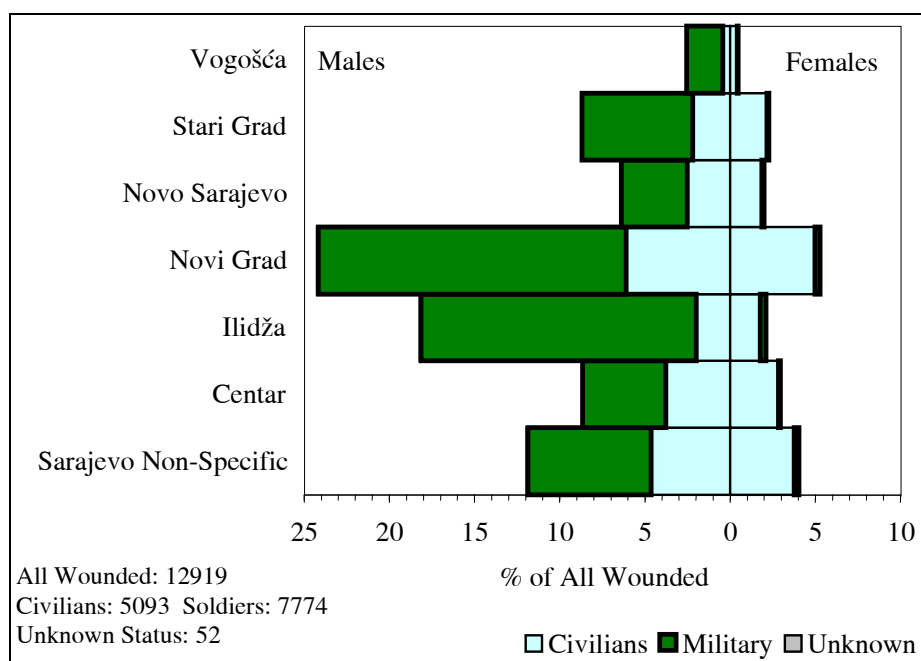


A4.4 Persons Wounded Within Front Lines in Sarajevo, 1992-94\*, Absolute Number by Municipality of Death, Sex and Civilian-Soldier Status

Opstina of Wounding	Women	Men	Unk Sex	Total
Centar	380	1122	2	1504
Ilidža	271	2355	0	2626
Novi Grad	684	3132	1	3817
Novo Sarajevo	259	829	1	1089
Stari Grad	296	1127	0	1423
Vogošća	62	329	0	391
Sarajevo Non-Specific	525	1544	0	2069
<b>Total</b>	<b>2477</b>	<b>10438</b>	<b>4</b>	<b>12919</b>

\*From 10.09.1992 to 10.08.1994

A4.5 Persons Wounded Within Front Lines in Sarajevo, 1992-94\*, Percent of All Casualties by Municipality of Death, Sex and Status



\*From 10.09.1992 to 10.08.1994

A4.6 Sex and Municipality of Death Distribution of Persons Wounded Within Front  
Lines in Sarajevo, 1992-94\*, Absolute Number and Percent of All Casualties

<i><b>Civilians</b></i>					<i><b>Civilians</b></i>			
Opstina of Wounding	Women	Men	Unk Sex	Total	Opstina of Wounding	Women	Men	Unk Sex
Centar	366	489	0	855	Centar	2.83	3.79	0.00
Ilidža	229	258	0	487	Ilidža	1.77	2.00	0.00
Novi Grad	642	787	0	1429	Novi Grad	4.97	6.09	0.00
Novo Sarajevo	240	326	0	566	Novo Sarajevo	1.86	2.52	0.00
Stari Grad	278	285	0	563	Stari Grad	2.15	2.21	0.00
Vogošća	51	57	0	108	Vogošća	0.39	0.44	0.00
Sarajevo Non-Specific	485	600	0	1085	Sarajevo Non-Specific	3.75	4.64	0.00
Total	2291	2802	0	5093	Total	17.73	21.69	0.00
<i><b>Soldiers</b></i>					<i><b>Soldiers</b></i>			
Opstina of Wounding	Women	Men	Unk Sex	Total	Opstina of Wounding	Women	Men	Unk Sex
Centar	14	630	2	646	Centar	0.11	4.88	0.02
Ilidža	41	2086	0	2127	Ilidža	0.32	16.15	0.00
Novi Grad	41	2335	0	2376	Novi Grad	0.32	18.07	0.00
Novo Sarajevo	17	501	0	518	Novo Sarajevo	0.13	3.88	0.00
Stari Grad	18	838	0	856	Stari Grad	0.14	6.49	0.00
Vogošća	11	272	0	283	Vogošća	0.09	2.11	0.00
Sarajevo Non-Specific	36	932	0	968	Sarajevo Non-Specific	0.28	7.21	0.00
Total	178	7594	2	7774	Total	1.38	58.78	0.02
<i><b>Unknown Status</b></i>					<i><b>Unknown Status</b></i>			
Opstina of Wounding	Women	Men	Unk Sex	Total	Opstina of Wounding	Women	Men	Unk Sex
Centar	0	3	0	3	Centar	0.00	0.02	0.00
Ilidža	1	11	0	12	Ilidža	0.01	0.09	0.00
Novi Grad	1	10	1	12	Novi Grad	0.01	0.08	0.01
Novo Sarajevo	2	2	1	5	Novo Sarajevo	0.02	0.02	0.01
Stari Grad	0	4	0	4	Stari Grad	0.00	0.03	0.00
Vogošća	0	0	0	0	Vogošća	0.00	0.00	0.00
Sarajevo Non-Specific	4	12	0	16	Sarajevo Non-Specific	0.03	0.09	0.00
Total	8	42	2	52	Total	0.06	0.33	0.02

\*From 10.09.1992 to 10.08.1994

A4.7 Persons Wounded Within Front Lines in Sarajevo, 1992-94\*, Absolute Number by Cause of Death and Sex

Causes Of Wounding	Women	Men	Unk Sex	Total
Firearms - Shelling	1681	6326	2	8009
Firearms - Sniper	604	2505	2	3111
Firearms - Shooting	4	37	0	41
Firearms - Other and Unspecified:	135	1023	0	1158
- <i>Firearms - anti-aircraft machinegun</i>	38	182	0	220
- <i>Firearms - M-84 and the like</i>	2	12	0	14
- <i>Firearms - unspecified</i>	95	829	0	924
Direct Casualties of War	11	215	0	226
- <i>Cold steel/slaughtered/tortured</i>	1	10	0	11
- <i>Execution</i>	0	0	0	0
- <i>Human shield</i>	0	4	0	4
- <i>Disappeared</i>	7	28	0	35
- <i>Other casualties - war operations</i>	3	173	0	176
Indirect Casualties of War	5	118	0	123
- <i>Stepped on mine</i>	3	95	0	98
- <i>Other casualties - war conditions</i>	2	23	0	25
				0
Other casualties - unspecified	0	4	0	4
Accidents and Violence:	9	47	0	56
- <i>Other - traffic accident</i>	4	24	0	28
- <i>Other - other accident</i>	4	20	0	24
- <i>Self-inflicted</i>	1	3	0	4
Unknown/Unspecified	28	163	0	191
Total	2477	10438	4	12919

\*From 10.09.1992 to 10.08.1994

A4.8 Civilians Wounded Within Front Lines in Sarajevo, 1992-94\*,  
Absolute Number by Cause of Wound and Sex

***Civilians***

Causes Of Wounding	Women	Men	Total
Firearms - Shelling	1571	1834	3405
Firearms - Sniper	559	737	1296
Firearms - Shooting	3	4	7
Firearms - Other and Unspecified:	116	165	281
- <i>Firearms - anti-aircraft machinegun</i>	32	49	81
- <i>Firearms - M-84 and the like</i>	2	1	3
- <i>Firearms - unspecified</i>	82	115	197
Direct Casualties of War	8	11	19
- <i>Cold steel/slaughtered/tortured</i>	0	3	3
- <i>Execution</i>	0	0	0
- <i>Human shield</i>	0	1	1
- <i>Disappeared</i>	6	4	10
- <i>Other casualties - war operations</i>	2	3	5
Indirect Casualties of War	2	8	10
- <i>Stepped on mine</i>	2	5	7
- <i>Other casualties - war conditions</i>	0	3	3
- <i>Other casualties - unspecified</i>	0	0	0
Accidents and Violence:	8	11	19
- <i>Other - traffic accident</i>	4	6	10
- <i>Other - other accident</i>	4	5	9
- <i>Self-inflicted</i>	0	0	0
Unknown/Unspecified	24	32	56
Total	2291	2802	5093

\*From 10.09.1992 to 10.08.1994

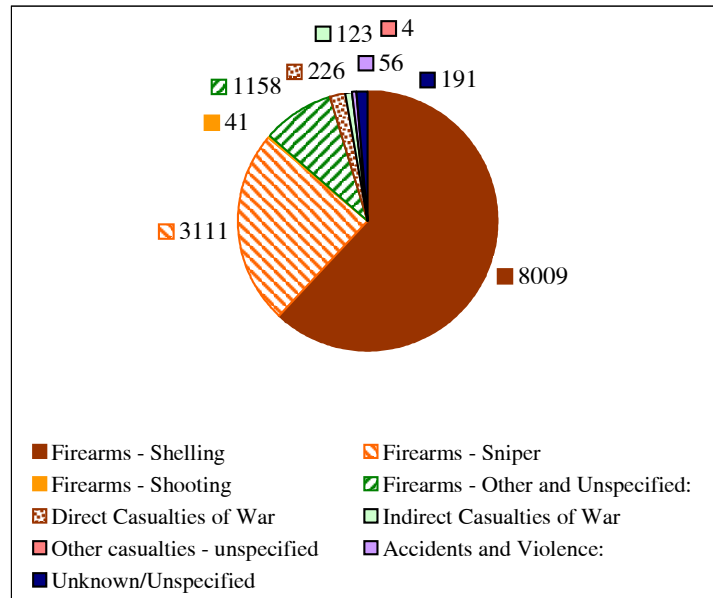
A4.9 Soldiers Wounded Within Front Lines in Sarajevo, 1992-94\*,  
Absolute Number by Cause of Wound and Sex

***Soldiers***

Causes Of Wounding	Women	Men	Unk Sex	Total
Firearms - Shelling	105	4471	1	4577
Firearms - Sniper	45	1759	1	1805
Firearms - Shooting	1	33	0	34
Firearms - Other and Unspecified:	18	857	0	875
- <i>Firearms - anti-aircraft machinegun</i>	6	133	0	139
- <i>Firearms - M-84 and the like</i>	0	11	0	11
- <i>Firearms - unspecified</i>	12	713	0	725
Direct Casualties of War	2	200	0	202
- <i>Cold steel/slaughtered/tortured</i>	0	6	0	6
- <i>Execution</i>	0	0	0	0
- <i>Human shield</i>	0	2	0	2
- <i>Disappeared</i>	1	23	0	24
- <i>Other casualties - war operations</i>	1	169	0	170
Indirect Casualties of War	3	108	0	111
- <i>Stepped on mine</i>	1	89	0	90
- <i>Other casualties - war conditions</i>	2	19	0	21
- <i>Other casualties - unspecified</i>	0	4	0	4
Accidents and Violence:	1	36	0	37
- <i>Other - traffic accident</i>	0	18	0	18
- <i>Other - other accident</i>	0	15	0	15
- <i>Self-inflicted</i>	1	3	0	4
Unknown/Unspecified	3	126	0	129
Total	178	7594	2	7774

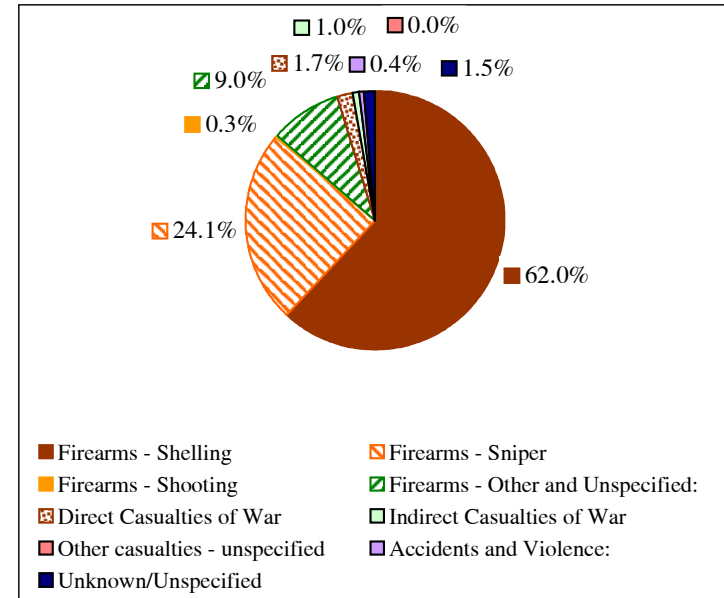
\*From 10.09.1992 to 10.08.1994

A4.10a Persons Wounded in Sarajevo, 1992-94\*, Number by Cause of Wounding



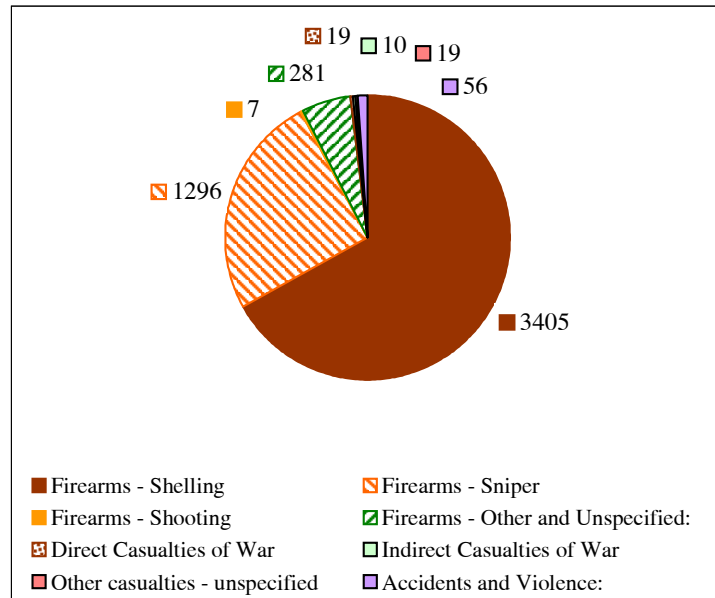
\*Within Front Lines, From 10.09.1992 to 10.08.1994

A4.10b Persons Wounded in Sarajevo, 1992-94\*, Percent by Cause of Wounding



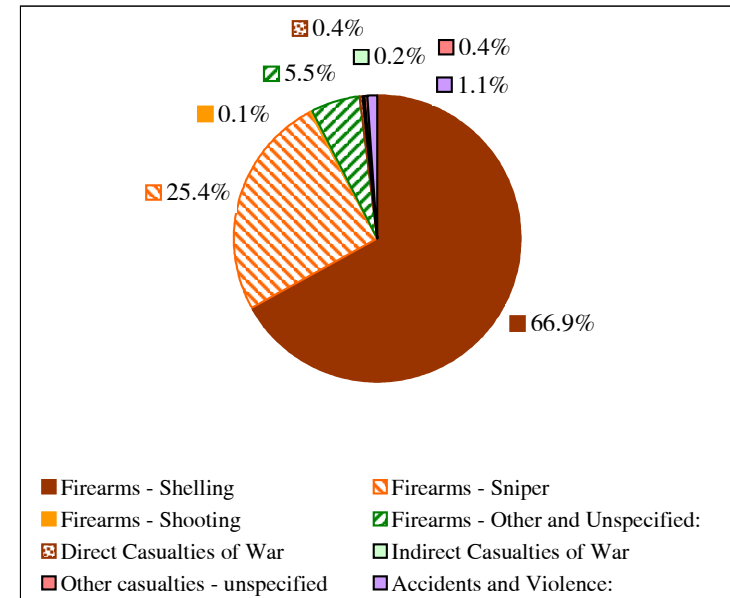
\*Within Front Lines, From 10.09.1992 to 10.08.1994

A4.11a Civilians Wounded in Sarajevo, 1992-94\*, Number by Cause of Wounding



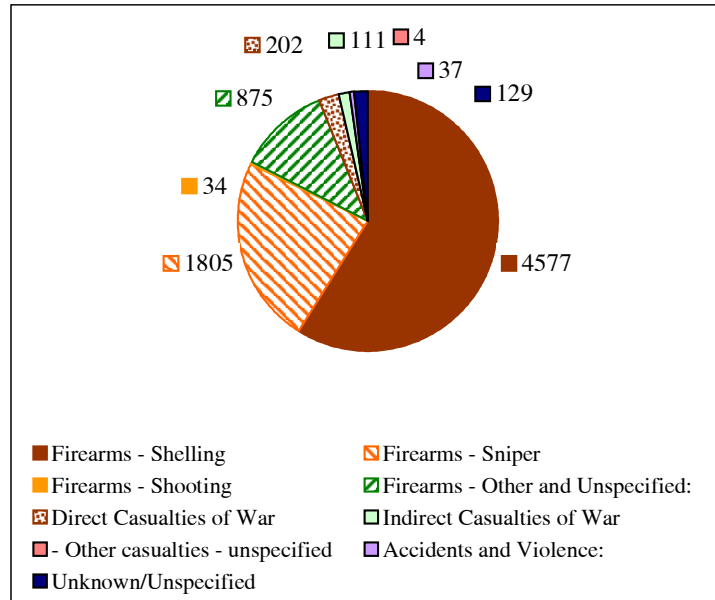
\*Within Front Lines, From 10.09.1992 to 10.08.1994

A4.11b Civilians Wounded in Sarajevo, 1992-94\*, Percent by Cause of Wounding



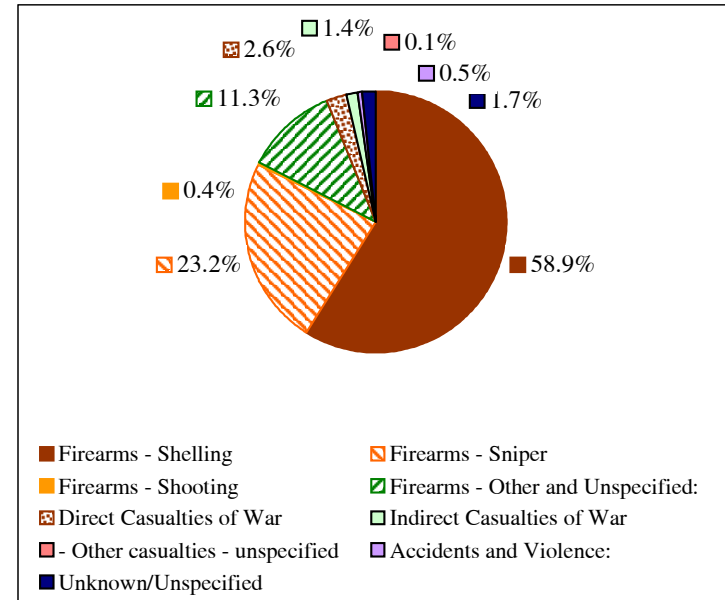
\*Within Front Lines, From 10.09.1992 to 10.08.1994

A4.12a Soldiers Wounded in Sarajevo, 1992-94\*, Number by Cause of Wounding



\*Within Front Lines, From 10.09.1992 to 10.08.1994

A4.12b Soldiers Wounded in Sarajevo, 1992-94\*, Percent by Cause of Wounding



\*Within Front Lines, From 10.09.1992 to 10.08.1994

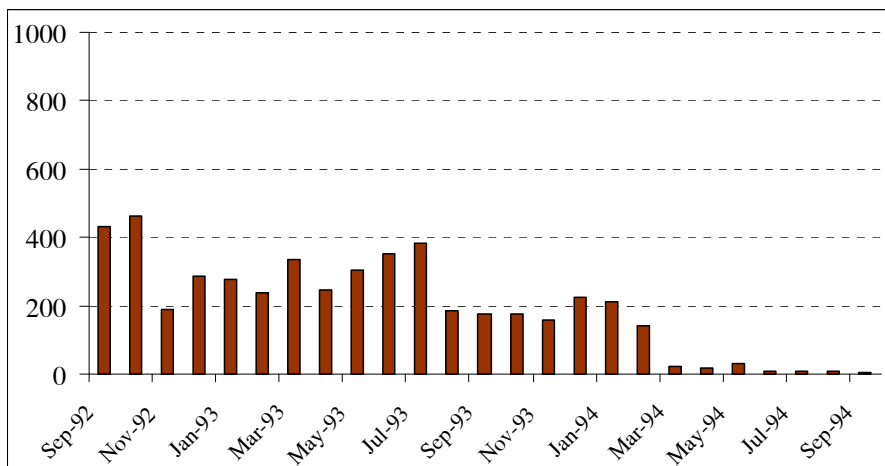


A4.13 Monthly Number of Persons Wounded Within Front Lines in Sarajevo,  
From 10-09-1992 to 10-08-1994, by Civilian-Soldier Status

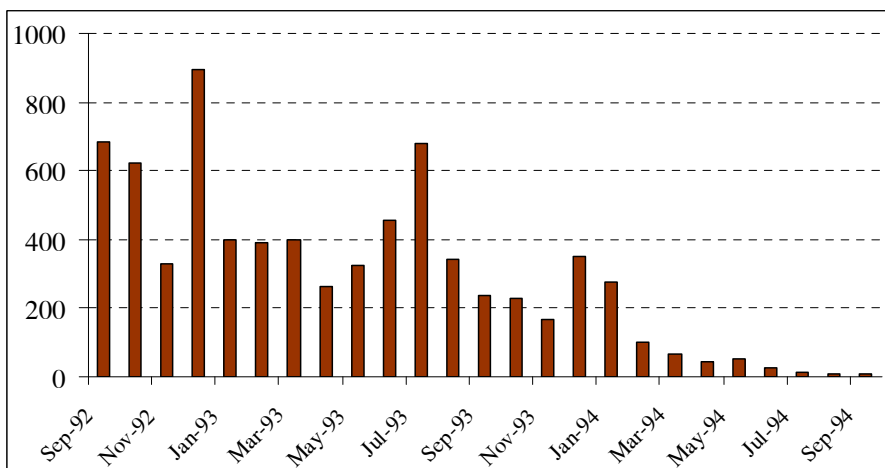
Time	Civilian	Soldiers	Unk Status	Total
Sep-92	432	686	6	1124
Oct-92	464	624	4	1092
Nov-92	189	328	4	521
Dec-92	285	894	7	1186
				0
Jan-93	279	400	0	679
Feb-93	236	391	4	631
Mar-93	335	398	2	735
Apr-93	247	262	1	510
May-93	302	324	2	628
Jun-93	352	456	3	811
Jul-93	382	681	1	1064
Aug-93	186	342	2	530
Sep-93	177	235	1	413
Oct-93	178	227	4	409
Nov-93	160	168	1	329
Dec-93	223	353	3	579
Unk 1993	202	374	3	579
Jan-94	212	278	2	492
Feb-94	143	103	1	247
Mar-94	23	65	0	88
Apr-94	16	46	0	62
May-94	30	54	1	85
Jun-94	9	27	0	36
Jul-94	7	12	0	19
Aug-94	7	9	0	16
Unk 1994	14	28	0	42
Total	5090	7765	52	12907

A4.14 Monthly Number of Persons Wounded Within Front Lines  
in Sarajevo, from 10-09-1992 to 10-08-1994

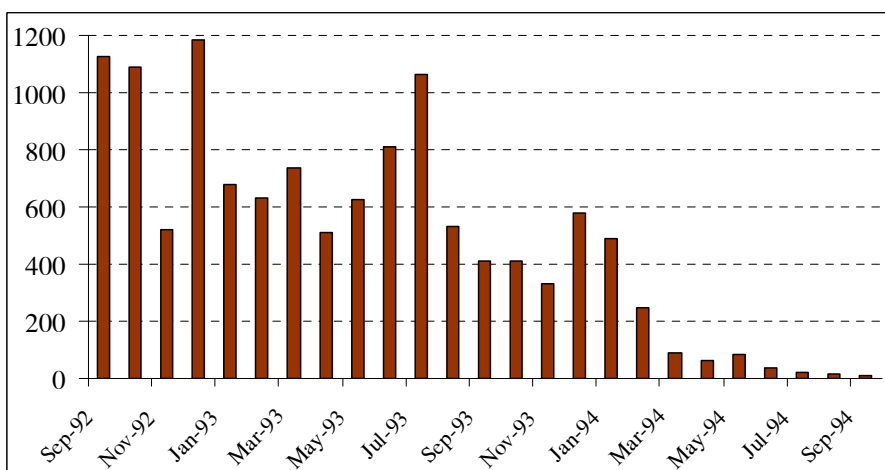
***Civilians***



***Soldiers***

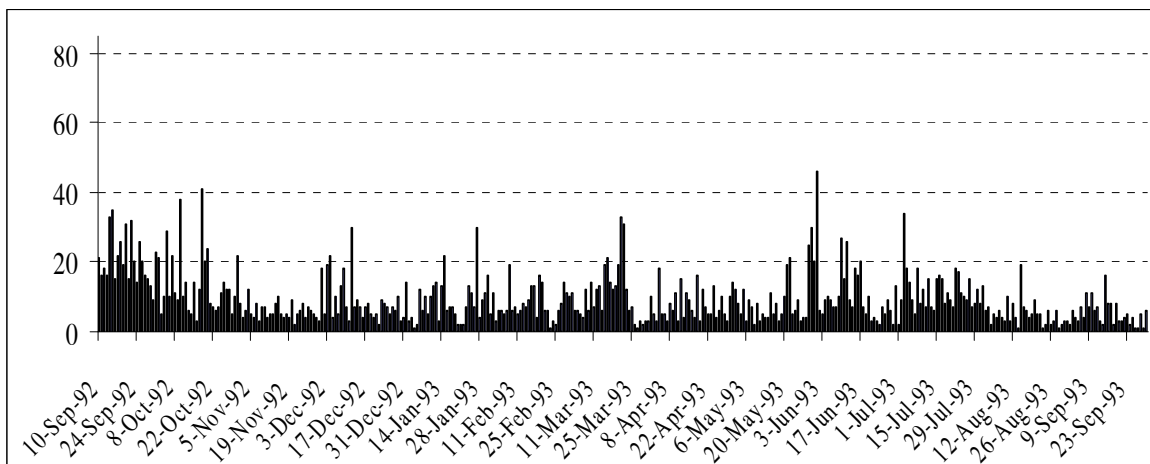


***All Wounded***

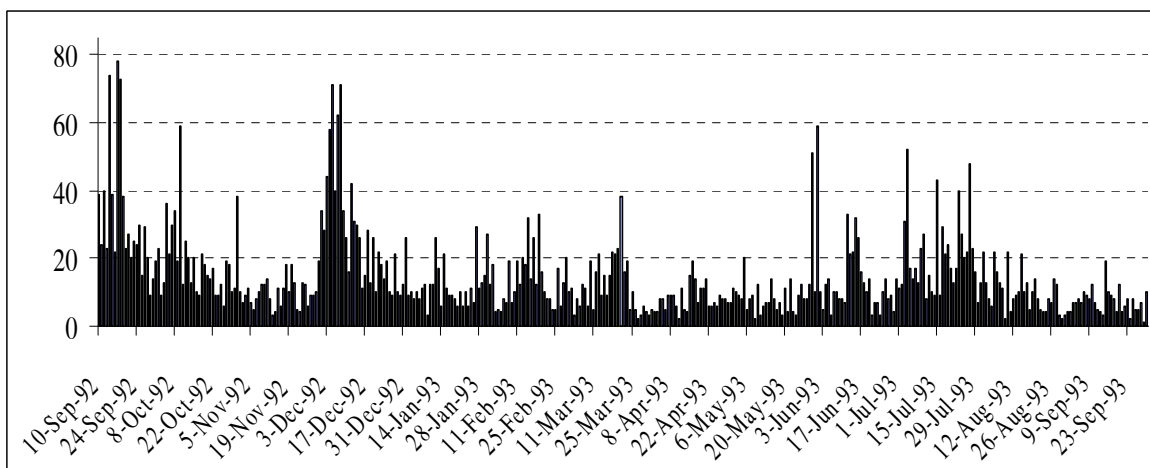


A4.15 Daily Number of Persons Wounded Within Front Lines in Sarajevo,  
from 10-09-1992 to 30-09-1993

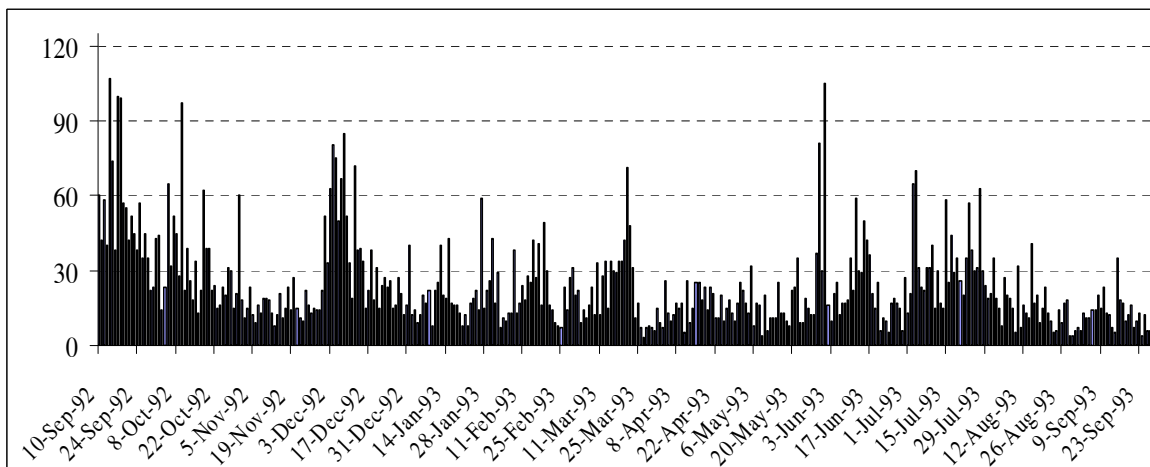
**Civilians**



**Soldiers**

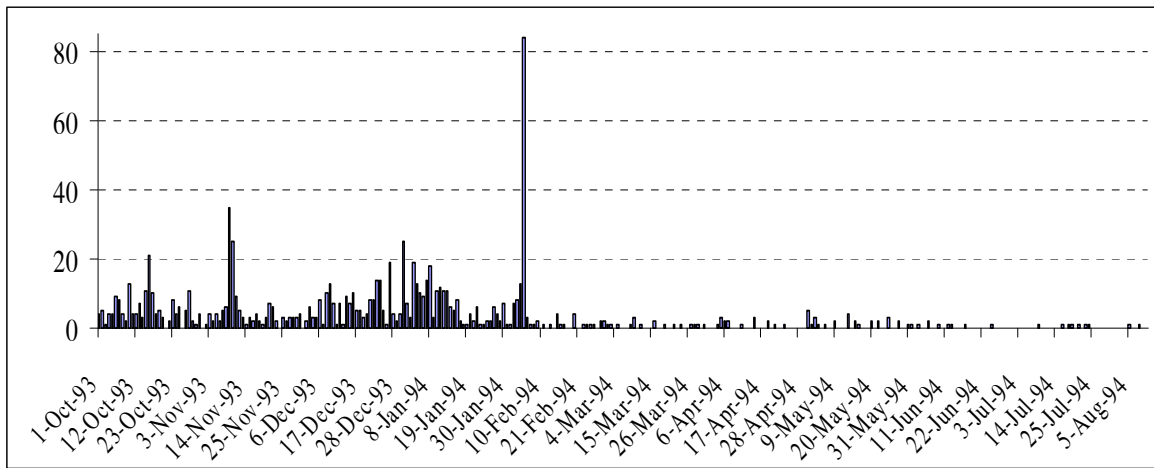


**All Wounded**

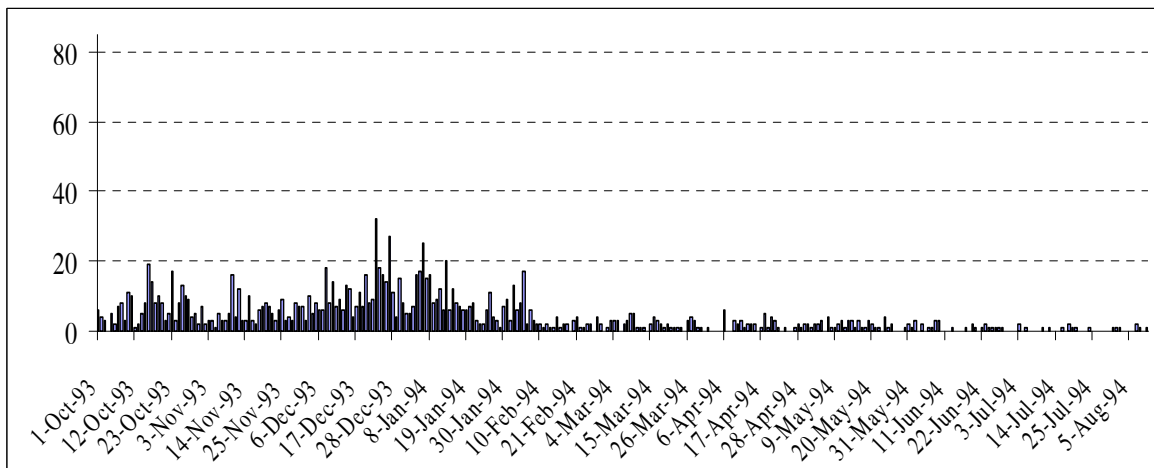


A4.16 Daily Number of Persons Wounded Within Front Lines in Sarajevo,  
from 01-10-1993 to 10-08-1994

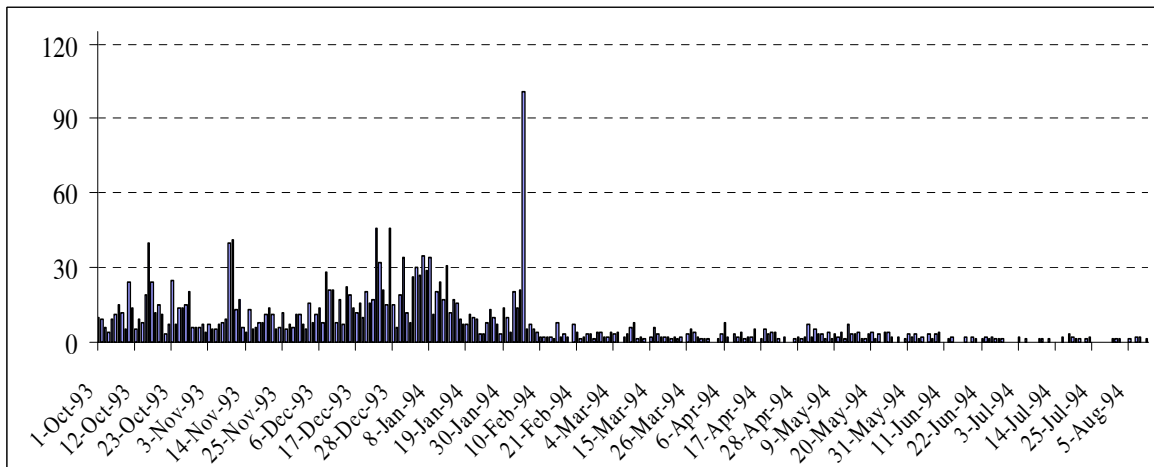
**Civilians**



**Soldiers**



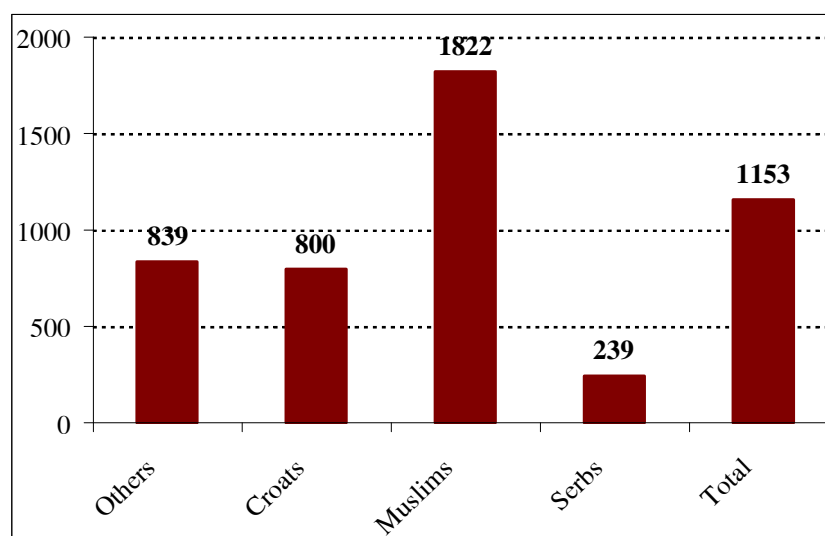
**All Wounded**



## **ANNEX 5**

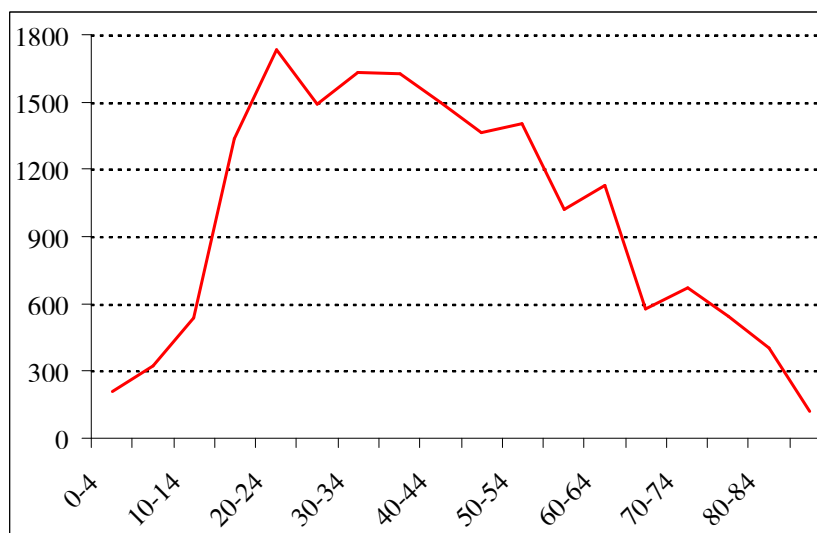
### **Demographic Rates of Killing, Wounding and Natural Death in Sarajevo**

A5K.1 Death Rates of Persons Killed in Sarajevo, 1992-94\*, by Ethnicity



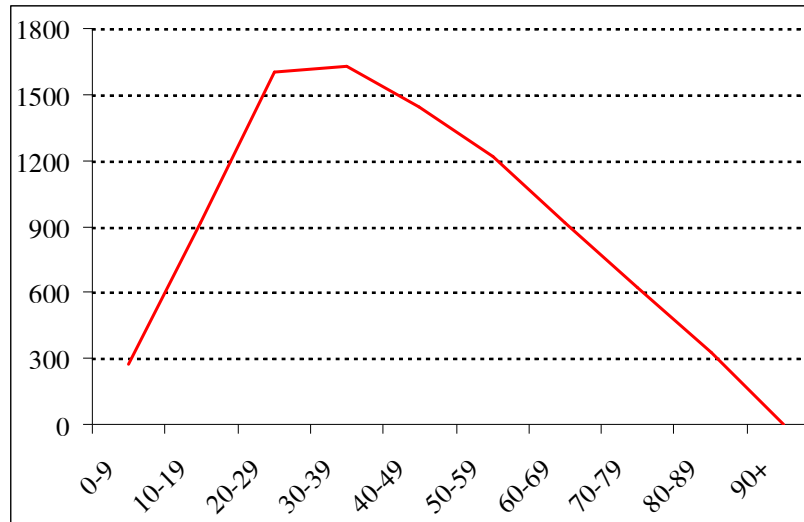
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.2 Death Rates of Persons Killed in Sarajevo, 1992-94\*, by Five-Year Age Groups



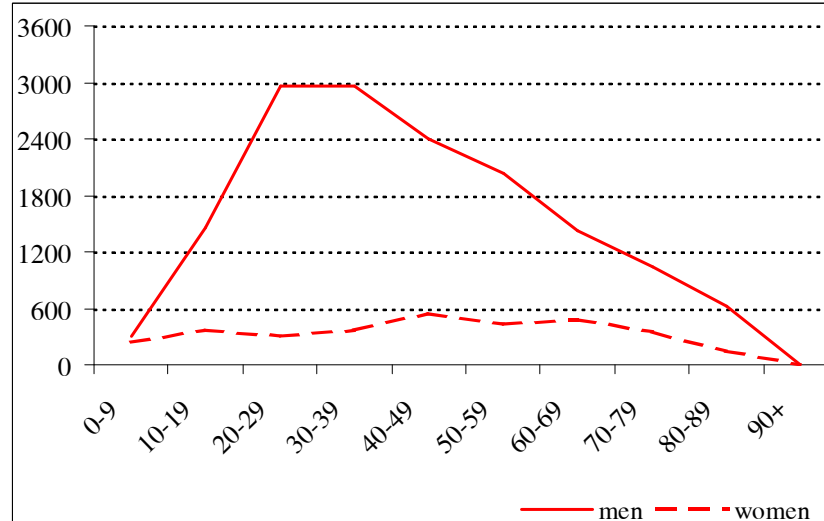
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.3 Death Rates of Persons Killed in Sarajevo, 1992-94\*, by Ten-Year Age Groups



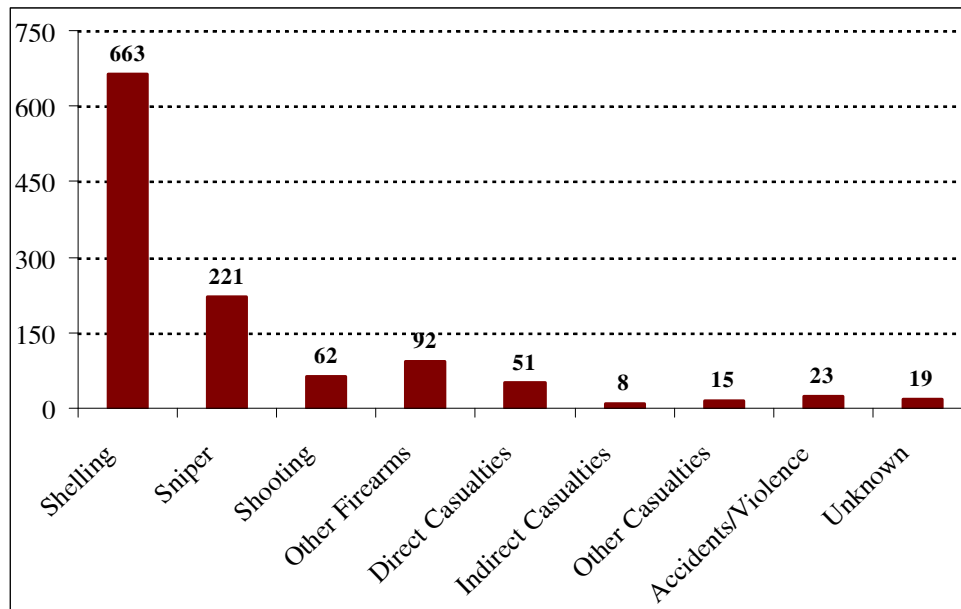
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.4 Death Rates of Persons Killed in Sarajevo, 1992-94\*, by Ten-Year Age Groups and Sex



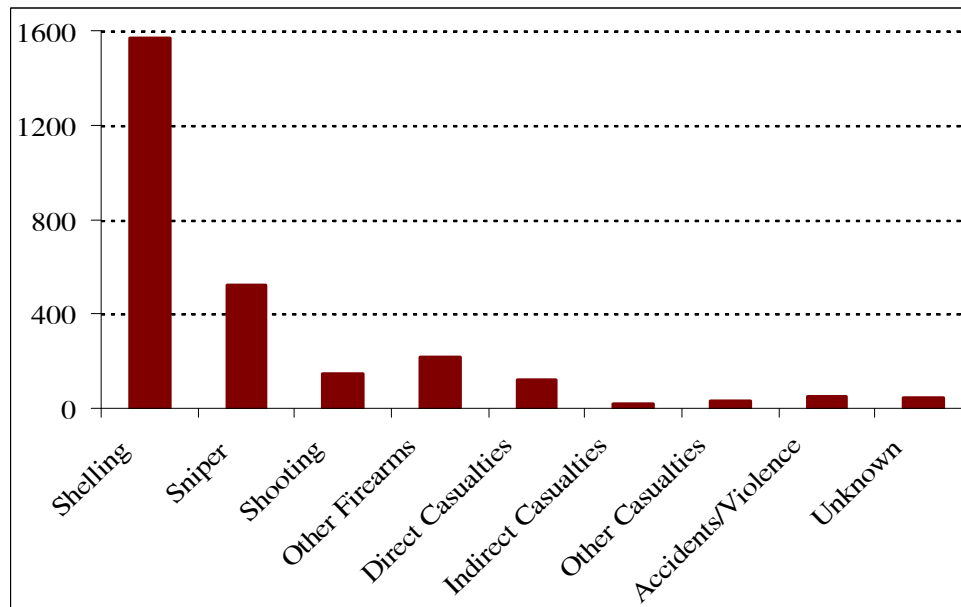
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.5 Death Rates of Persons Killed in Sarajevo, 1992-94\*, by Cause of Death



\* Within Front Lines, from 10.09.1992 to 10.08.1994

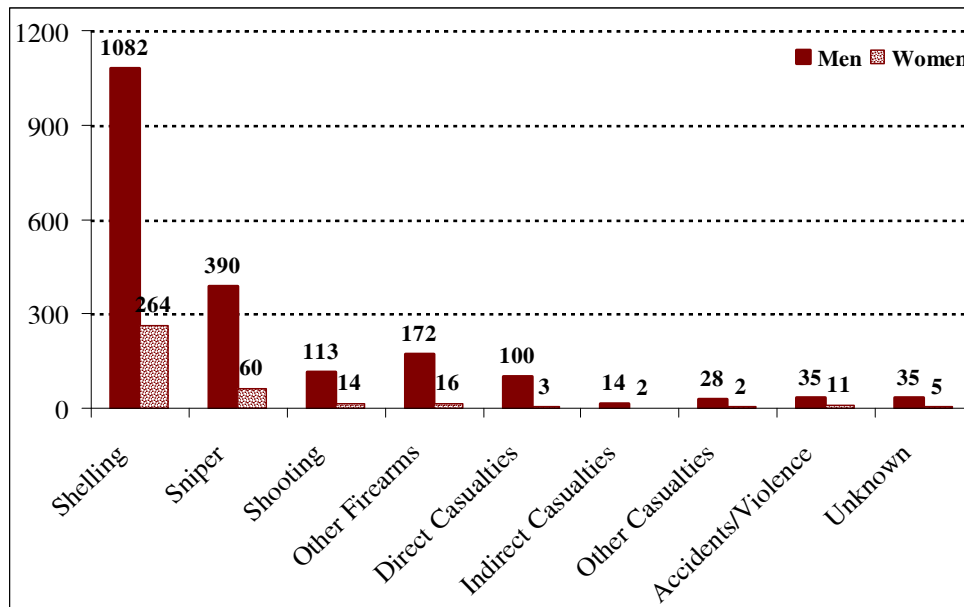
A5K.6 Absolute Number of Persons Killed in Sarajevo, 1992-94\*, by Cause of Death



\* Within Front Lines, from 10.09.1992 to 10.08.1994

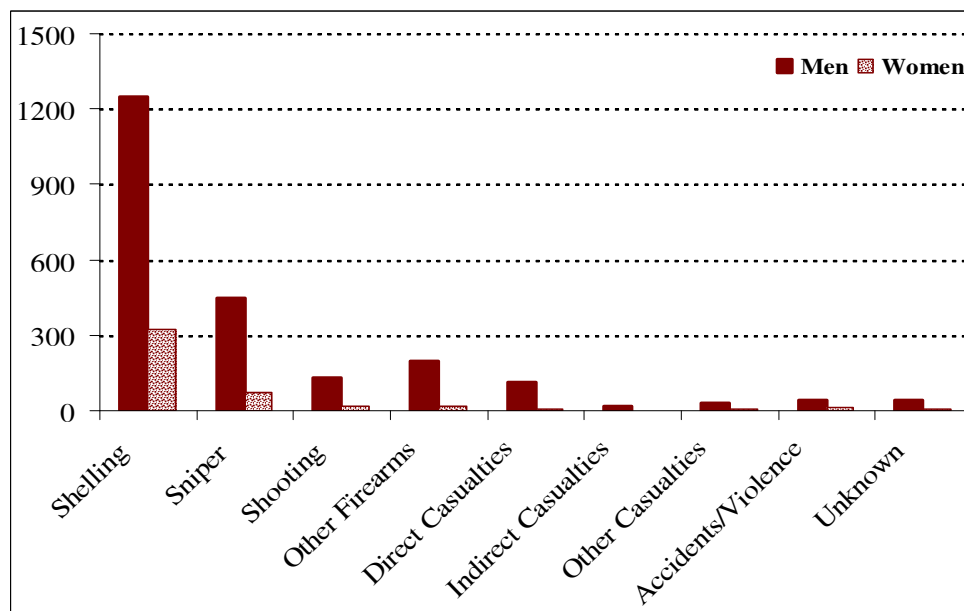


A5K.7 Death Rates of Persons Killed in Sarajevo, 1992-94\*, by Cause of Death and Sex



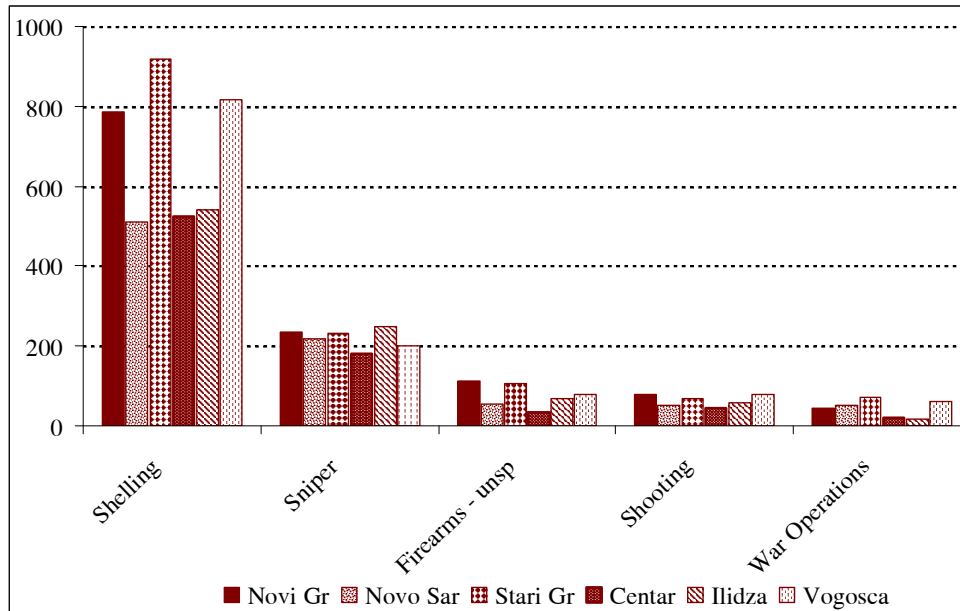
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.8 Absolute Number of Persons Killed in Sarajevo, 1992-94\*, by Cause of Death and Sex



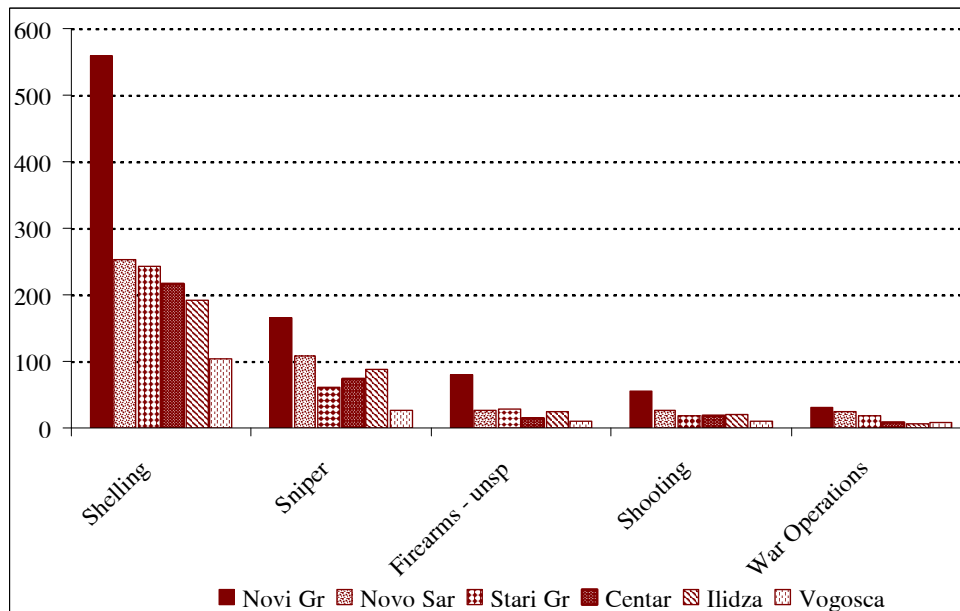
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.9 Five Most Significant Causes of Death in Sarajevo, 1992-94\*,  
Death Rates per 100,000 Population



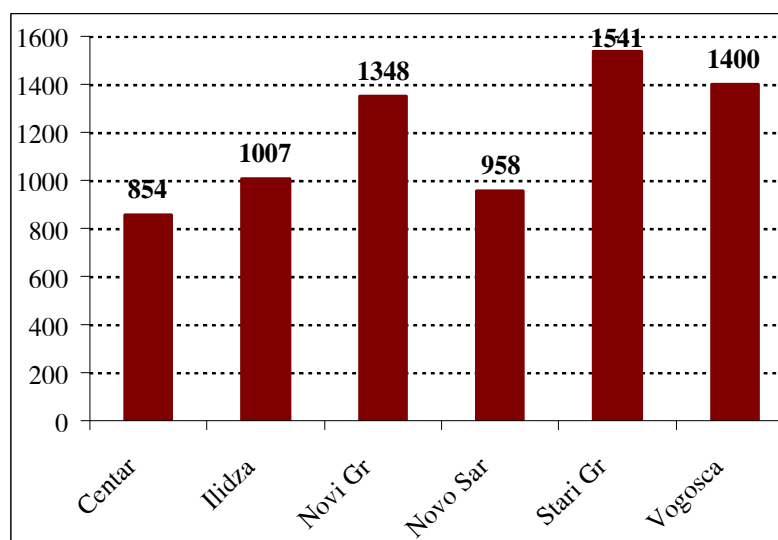
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.10 Five Most Significant Causes of Death in Sarajevo, 1992-94\*,  
Absolute Number of Deaths



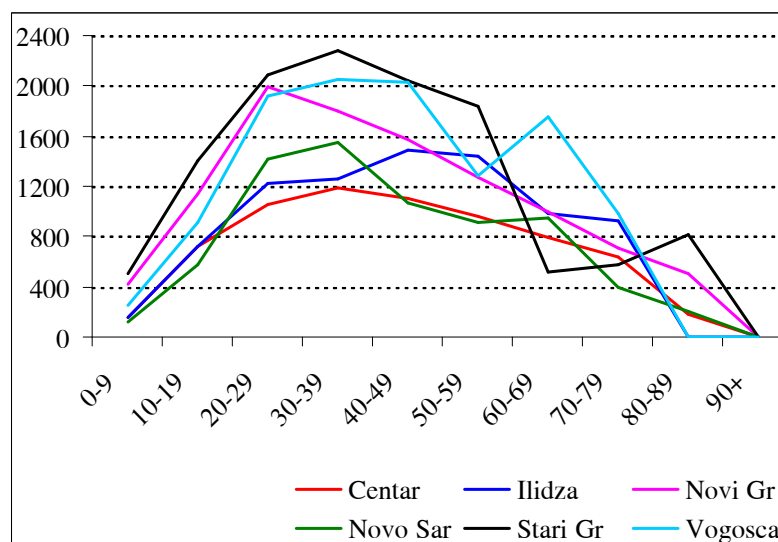
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.11 Death Rates of Persons Killed in Sarajevo, 1992-94\*,  
By Municipality of Residence in 1991



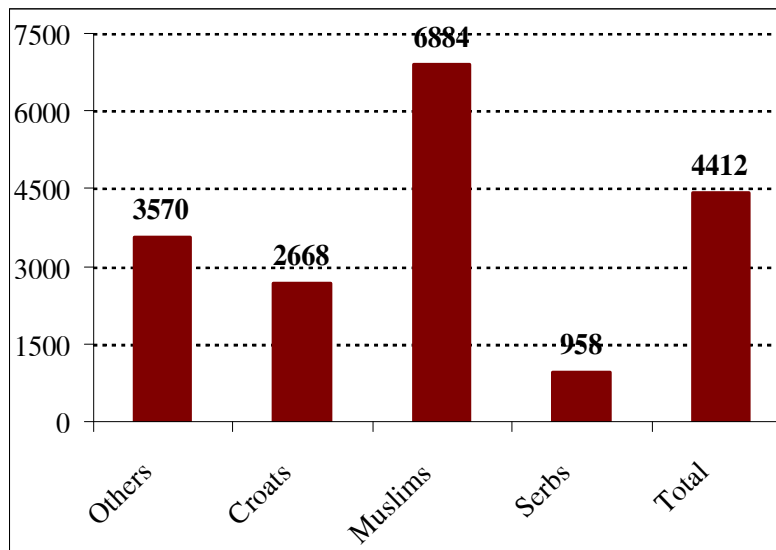
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5K.12 Death Rates of Persons Killed in Sarajevo, 1992-94\*,  
By Municipality of Residence in 1991 and Age



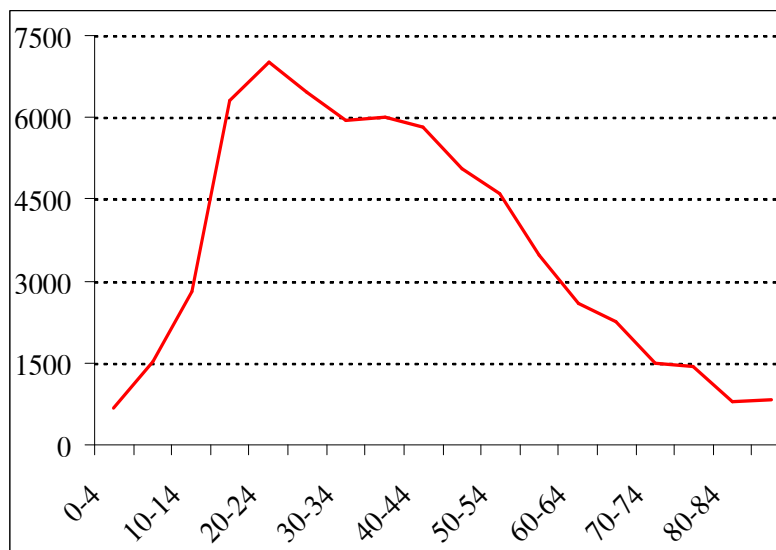
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.1 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*,  
by Ethnicity



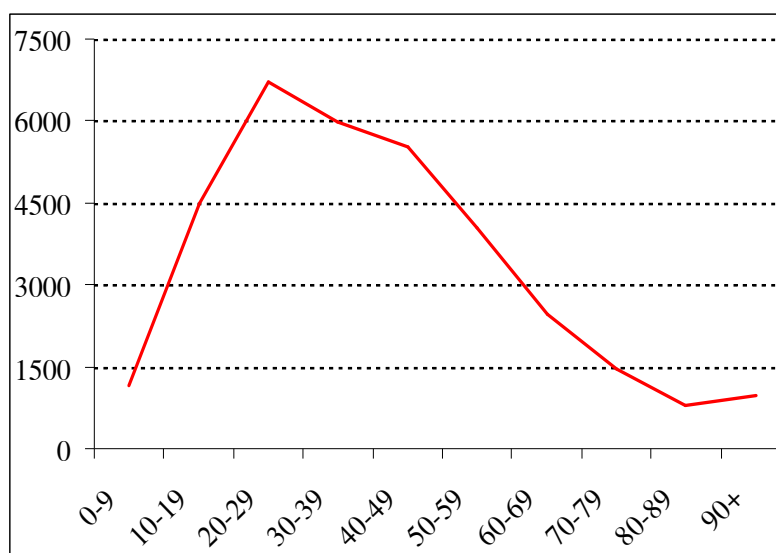
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.2 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*,  
by Five-Year Age Groups



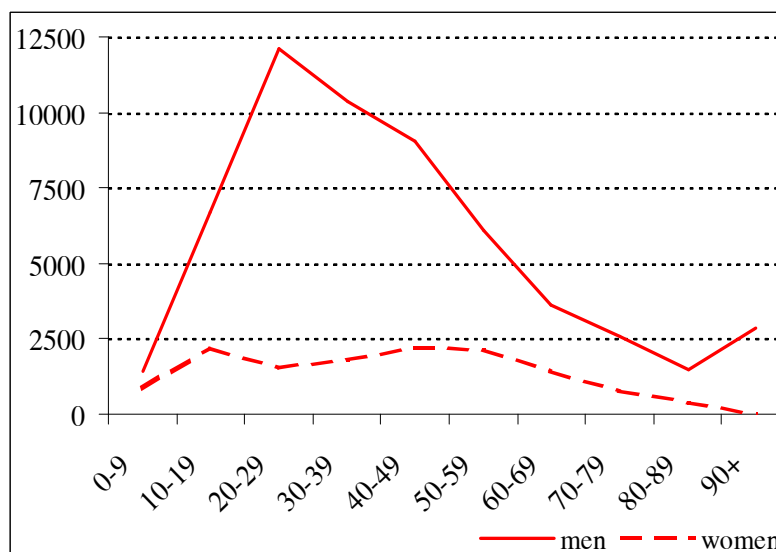
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.3 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*,  
by Ten-Year Age Groups



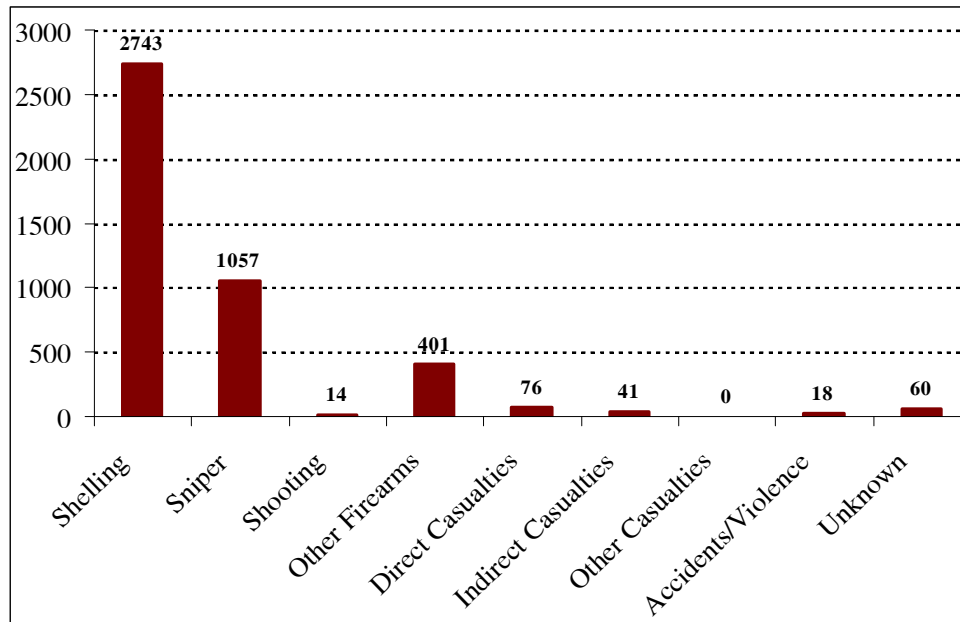
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.4 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*,  
by Ten-Year Age Groups and Sex



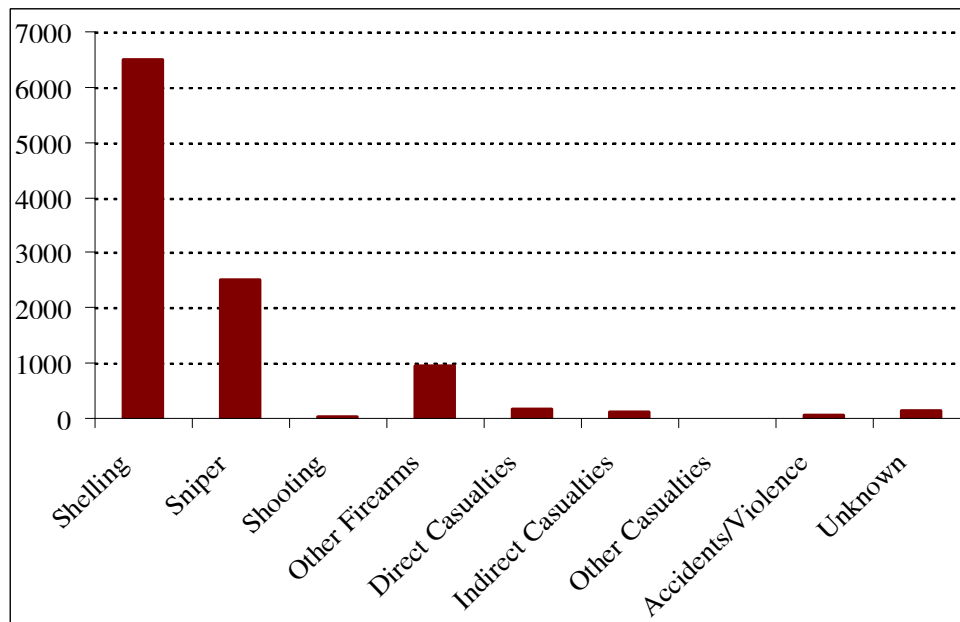
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.5 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*, by Cause of Wounding



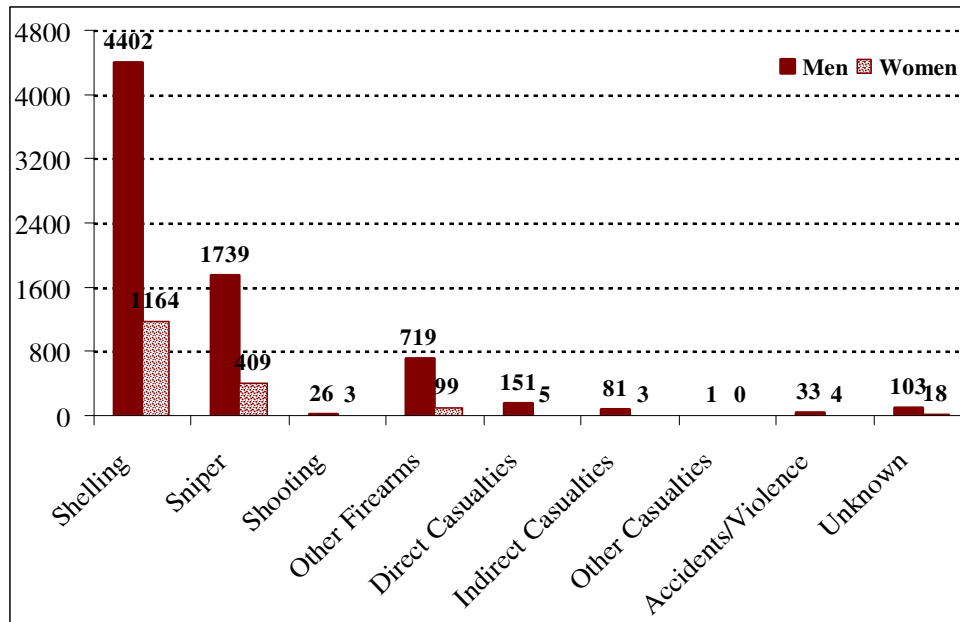
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.6 Absolute Number of Persons Wounded in Sarajevo, 1992-94\*, by Cause of Wounding



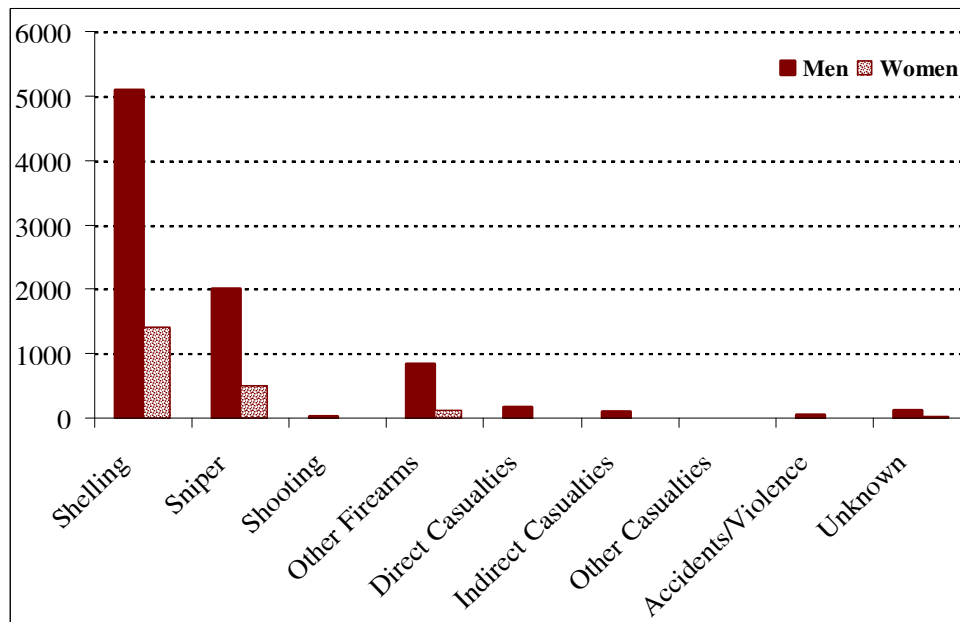
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.7 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*, by Cause of Wounding and Sex



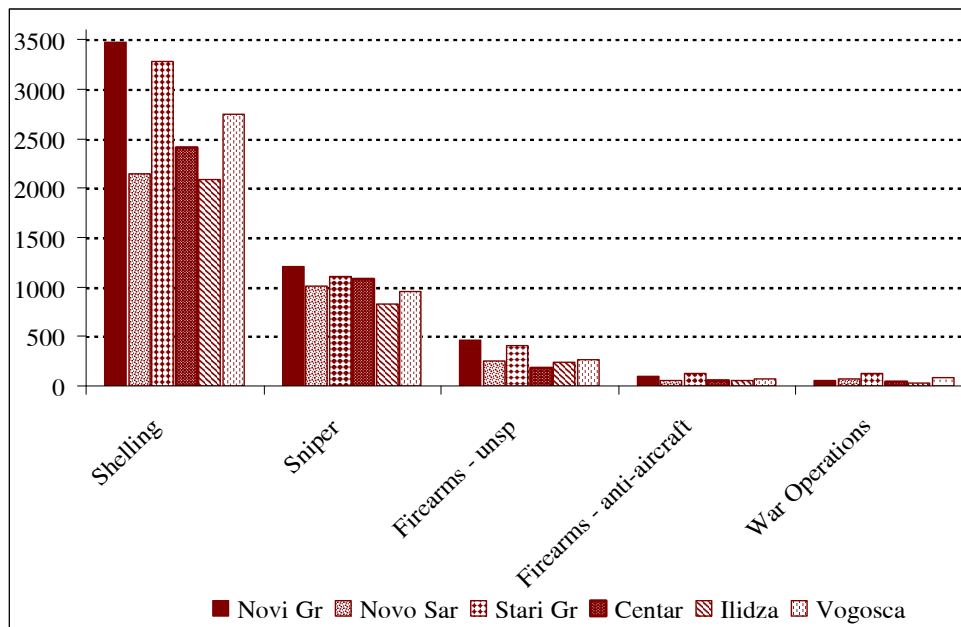
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.8 Absolute Number of Persons Wounded in Sarajevo, 1992-94\*, by Cause of Wounding and Sex



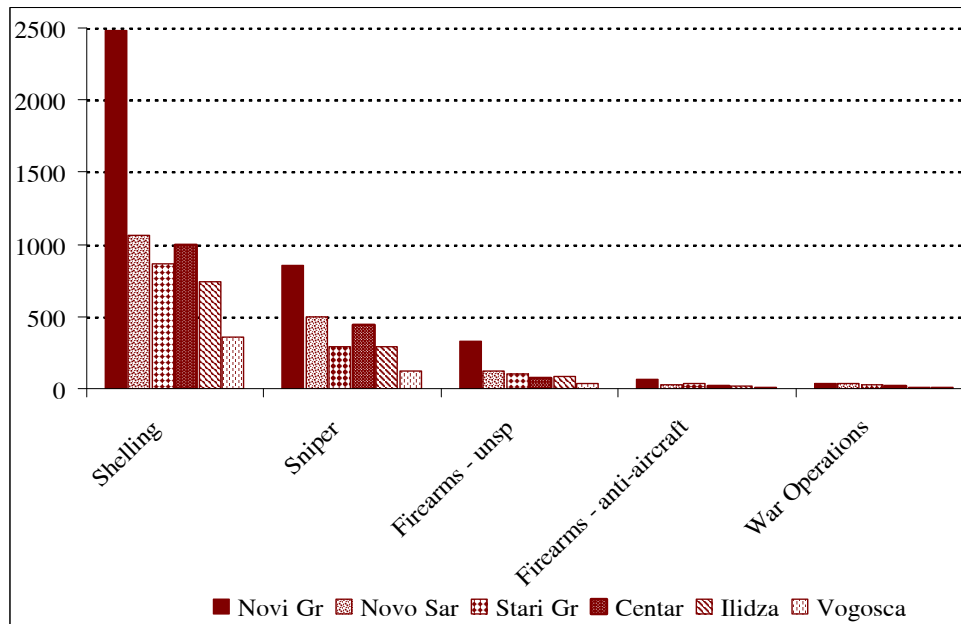
\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.9 Five Most Significant Causes of Wounding in Sarajevo, 1992-94\*,  
Wounding Rates per 100,000 Population



\* Within Front Lines, from 10.09.1992 to 10.08.1994

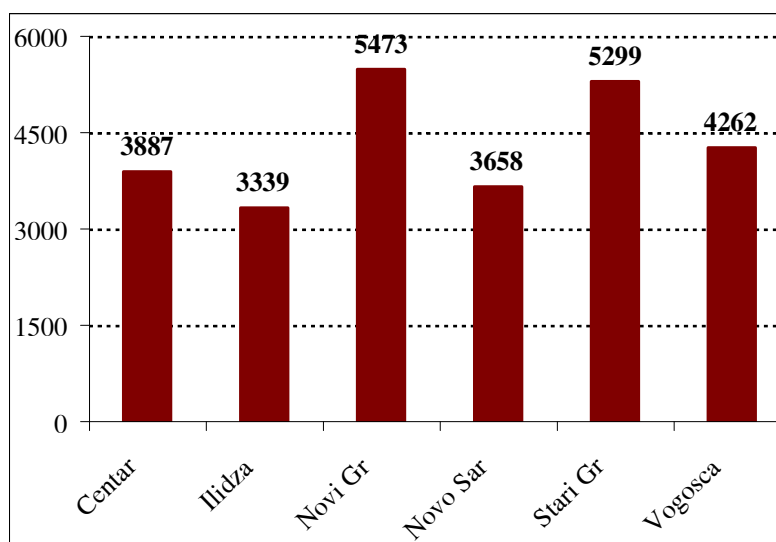
A5W.10 Five Most Significant Causes of Wounding in Sarajevo, 1992-94\*,  
Absolute Number of Wounded Persons



\* Within Front Lines, from 10.09.1992 to 10.08.1994

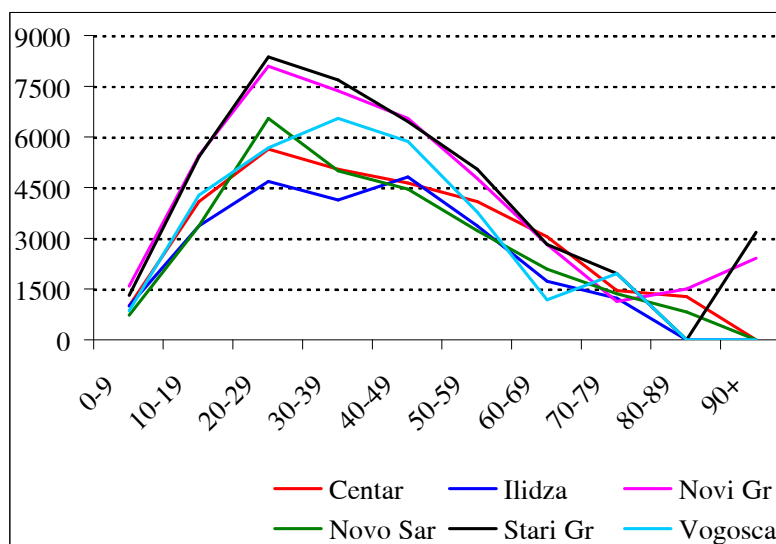


A5W.11 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*,  
By Municipality of Residence in 1991



\* Within Front Lines, from 10.09.1992 to 10.08.1994

A5W.12 Wounding Rates of Persons Wounded in Sarajevo, 1992-94\*,  
By Municipality of Residence in 1991 and Age



\* Within Front Lines, from 10.09.1992 to 10.08.1994

## **ANNEX 6**

Statistical Foundation of the Analysis:  
The Capture – Recapture method

## Statistical Foundation of the Analysis: The Capture – Recapture method

The capture – recapture method was originally proposed for estimating the unknown size of animal populations. Since then it has been then adopted by many other research disciplines. In this annex we present the rationale of this method and explain how we used it in our study.

The capture – recapture method is applied when we deal with a population of unknown size and our task is to estimate the total number of members of this population. We do this in two steps. First, we randomly select a sample from this population, mark all captured individuals, put them back to the original population and allow them to mix up with the rest of the population. Every individual should have the same probability of being captured as the others. In the second step we select a next random sample. The two samples should be drawn independently. Thus, the probability that an individual is re-captured in sample 2 has nothing to do with the fact, whether or not it was captured and marked in sample 1. From the mathematical point of view the independence of two events means, that the probability of occurring two events jointly is equal to the probability of occurrence of the first event multiplied by the probability of occurrence of the second event. We can write it that way:

$$P(A \cap B) = P(A) \cdot P(B).$$

Having selected the second sample, we count the re-captured individuals in it. Note that the “re-captured” individuals are those of all captured in sample 2 who previously were also captured (and marked) in sample 1. The underlying principle of the capture – recapture method is that the share of re-captured individuals in sample 2 estimates the share of captured (and marked) individuals from sample 1 in the whole population. Because the number of marked individuals in the whole population is known (from step 1) and also the estimated share of the marked individuals in the population is known (from step 2), we can calculate the total number of individuals in the population. We do this by dividing the number of marked individuals by their estimated share in the population.

If  $N$  denotes the total number of individuals in the population,  $p$  is the estimated share of all marked individuals in the population (i.e. the share of re-captured individuals in the second sample), and  $N_1$  is the number of individuals marked in step 1 (i.e. those captured in sample 1), we obtain<sup>1</sup>:

$$\hat{N} = \frac{N_1}{p}. \quad (1)$$

If  $N_2$  is the number of individuals in the second sample and  $N_{12}$  for the number of re-captured individuals from the second sample (i.e. those also captured and marked in the first sample) we get, that:

$$p = \frac{N_{12}}{N_2}. \quad (2)$$

The estimated total size of the population can be therefore also expressed as:

$$\hat{N} = \frac{N_1 N_2}{N_{12}}. \quad (3)$$

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<sup>1</sup> A hat above  $X$  means that it is an estimated value.

All this reasoning makes sense if the samples are large as is the overlap between both samples (i.e. the number of re-captured individuals in the second sample)<sup>2</sup>.

The objective of Section 6 was to estimate the total number of persons killed in Sarajevo during the given period of time. We had two samples at our disposal, the 1994 Household Survey of Sarajevo (*HSS-1994*) and the Bakije database (*Bakije*). The sources were large and there existed a significant overlap between them. We considered HSS-1994 as the first sample and all record from HSS-1994 as captured and marked. The Bakije database was considered the second sample. (Note, that it makes no difference which source is chosen as “first” and which as “second”; the problem is symmetric.) We then counted the “re-captured” records in the Bakije database. This means that we measured the overlap of the two sources. Under the realistic assumption that both sources were created independently<sup>3</sup>, we recalled that the share of “re-captured” records in the Bakije database is the same as the share of “captured” records (from HSS-1994) in the whole population and applied Equation 3 to obtain the total number of killed persons.

Samples 1 and 2 (i.e. our sources) are characterised below:

Table A6.1. Overview of the Size and Overlap of Sources used in the Capture-Recapture Estimation of the Overall Total of Persons Killed Within Front Lines in Sarajevo from 10.09.1992 to 10.08.1994

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Killed or naturally died Muslims identified in:	
DAPS:	4067 ( $N_1$ ),
Bakije:	4060 ( $N_2$ ),
Overlap:	2764 ( $N_{12}$ ).

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In order to estimate the total number of Muslims killed or naturally died within front lines in Sarajevo during the given period, the *capture – recapture* method was applied. The estimator of this total was given by the equation:

$$\hat{N} = \frac{N_1 N_2}{N_{12}}$$

Where:

$N_1, N_2$  : size of the sample 1 and 2, accordingly,

$N_{12}$  : size of the overlap.

Using the data given in Table 1 we obtained the total number of Muslim deaths (killings and natural deaths) equal  $\hat{N} = 5973.958$ . We also produced a confidence interval for this estimator. The variance of the estimator is given by the equation:

$$Var(\hat{N}) = \frac{N_1 N_2 (N_1 - N_{12})(N_2 - N_{12})}{N_{12}^2 (N_{12} - 1)}.$$

---

<sup>2</sup> What is “large” or “small” is quite subjective, but we will not discuss this case, while our samples are bigger than 4000, which is definitely not small.

Using the data from Table 1 we calculated, that  $Var(\hat{N}) = 1320.969$ . The interval displayed below contains with the probability of 95% the unknown total number of population:

$$\left( \hat{N} - 1.96\sqrt{Var(\hat{N})}; \hat{N} + 1.96\sqrt{Var(\hat{N})} \right)$$

In our case it means, that:

$$P(5902.722 < N < 6045.195) = 0.95,$$

and the total number of killed or naturally died Muslims in Sarajevo in analysed period of time is (with the probability of 95%) **between 5903 and 6045**.

### References:

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- E. Marks, W. Seltzer, K. Krotki, 1974: Population Growth Estimation: Handbook of Vital Statistics Measurement. Quoted after: Political Killing in Kosovo/Kosova, March-June 1999.
- Political Killings in Kosova/Kosovo, March-June 1999 (Washington: ABA-CEELI and AAAS, 2000)
- P. Spiegel, P. Salama, 2000, War and Mortality in Kosovo, 1998-1999: An Epidemiological Testimony. Lancet 2204 (355).
- Capture-recapture Webpage: <http://www.pitt.edu>

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<sup>3</sup> The independence of sources means that the fact, that a record is reported in HSS-1994, does not change the chance of being included in the Bakije database, and *vice-versa*.