

## **Death Toll in the Siege of Sarajevo, April 1992 to December 1995 A Study of Mortality Based on Eight Large Data Sources**

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The subject of this report is the overall death toll of the siege of Sarajevo from April 1992 to December 1995. The numbers presented in this report have been obtained for an area that we call *Sarajevo Six*, which covers the territory of six municipalities of Sarajevo: Centar, Ilidža, Novi Grad, Novo Sarajevo, Stari Grad, and Vogošća. The municipalities were analysed according to the pre-war (as of 1991) territorial division of Bosnia and Herzegovina.

Eight large and reliable sources (i.e. lists of dead) have been used in obtaining the statistics presented in this report:

- The FIS Mortality Database, 1992-1995, established by the Federal Institute for Statistics (FIS) in Sarajevo through a backwards collection of individual death records from vital events registration system in Bosnia and Herzegovina,
- The ICRC and PHR Lists of Missing Persons for Bosnia and Herzegovina, 1992-1995, established by the International Committee of Red Cross (ICRC) and a non-governmental American organisation Physicians for Human Rights (PHR),
- The MAG Mortality Database, 1992-95, established by a non-governmental Bosnian organisation Muslims against Genocide (MAG),
- The HSS-94 Mortality Database, 1992-1994, established at OTP from original survey questionnaires obtained in mid-1994 through interviewing approximately 85,000 households living at that time on the territory within the front lines in Sarajevo, the survey was designed and conducted by the Research Institute for War Crimes and International Law in Sarajevo,
- The Bakije List of death records, 1992-1995, established by the Bakije Funeral Home in Sarajevo, the largest and oldest Muslim funeral home in the city,
- The ABH List of Fallen Soldiers, 1992-95, obtained from the Ministry of Defence of the Federation of Bosnia and Herzegovina,
- The VRS List of Fallen Soldiers, 1992-95, obtained from the Ministry of Defence of Republika Srpska,
- The HVO List of Fallen Soldiers, 1992-95, obtained from the Ministry of Defence of the Federation of Bosnia and Herzegovina,

In addition to the eight sources on mortality, we also used the 1991 population census for Bosnia and Herzegovina. The census served as a reference for all death records listed in our mortality sources and as a base for matching all death records together, merging the sources, and establishing one large list of unique death records related to the siege of Sarajevo.

As regarding the method of analysis, individual death records relevant to the siege of Sarajevo were extracted from each mortality source and merged together. A long list of all relevant records was made. As the mortality sources do overlap with one another, the list of merged sources included duplicated records. The duplicated records were eliminated through studying the matches of death records with the census records of the same persons. If a given person included in the census was linked with his/her death record reported in more than one mortality source, it was clear that only one

death record could be included in the list of merged sources. All duplicated records were therefore deleted, and the record reported in the most reliable mortality source remained on the list of merged sources. The overview of overlapping records also helped improve the completeness and the quality of records.

Before the analysis started, we made an assessment of the sources reporting civilians and concluded that the rank order of the sources from the most to the least informative and reliable is the following: FIS, ICRC-PHR, MAG, HSS-94, Bakije. The lists of fallen soldiers had priority above any other source. Note that establishing the hierarchy of sources had nothing to do with their overall quality, which is relatively good for every source. The hierarchy was mainly needed for elimination of duplicates. For example, if one the same death was reported in all five sources, the most reliable record (i.e. FIS record) remained in our database and all other records were deleted.

All sources and methods are discussed more extensively in the Annex.

Below, in Tables 1a and 1b, we present the key statistics on the death toll of the siege of Sarajevo.

Table 1a.

Key Statistics of the Siege of Sarajevo, 1992-1995  
Minimum Numbers - Linked Records

Death Categories	Count	Percent
Soldiers	3,686	24.1
Civilians, war-related	4,015	26.2
Civilians, not-related	6,715	43.9
Civilians, other deaths	893	5.8
<b>Total</b>	<b>15,309</b>	<b>100.0</b>

Table 1b.

Key Statistics of the Siege of Sarajevo, 1992-1995  
Minimum Numbers - Corrected Linked Records

Death Categories	Count	Percent
Soldiers	4,548	24.1
Civilians, war-related	4,954	26.2
Civilians, not-related	8,285	43.9
Civilians, other deaths	1,102	5.8
<b>Total</b>	<b>18,888</b>	<b>100.0</b>

Note:

Average Matching Rate: 0.766  
Correction Factor: 1.234

The final estimated mortality statistics of the siege are presented in Table 1b, while Table 1a serves merely as a basis for understanding how the final numbers were obtained. Table 1 shows only the records linked with the 1991 census. Figures in Table 1b are adjusted for the incomplete matching rate (see further in the report).

According to Table 1b, the estimated overall number of deaths in the area of *Sarajevo Six* from April 1992 to December of 1995 is 18,888. This number includes four death categories: war-related deaths of civilians (4,954), war-related deaths of soldiers (4,548), deaths of civilians that occurred as natural and we consider them not related to war (8,285), and a number of deaths of civilians, which could not be classified as war-related or war-unrelated (1,102). In total, we estimated that there were 9,502 direct casualties of the siege (civilians and soldiers: 4,954 and 4,548).

The overall number of deaths in *Sarajevo Six* in April 1992-December 1995 (18,888), and the number of siege casualties (9,502), were obtained *starting* from a list of *all possibly relevant records*, that contained 43,258 entries (among which duplicates, see Annex, Summary of Sources). We made this list by putting together all possibly relevant records reported in any of the five sources: FIS, ICRC-PHR, MAG, HSS-94 and Bakije. By a possibly relevant record we understood a death record reported for the *Sarajevo Six* area and the period from January 1992 to December 1995, as well as records with unknown month of death. Including a broader reporting period (the war started in April 1992), was dictated by the fact that many deaths before April 1992 resulted from incidents related to the later

conflict, and we wanted to make an assessment of these deaths as well. The records reported as of January-March 1992 or with unknown month of death in 1992 are however excluded from Table 1b.

Of the 43,258 deaths, 33,548 records have been matched with the census, and the resulting average matching rate was 76.6 percent. Of the 33,548 matched records (possibly relevant but including duplicates), 15,309 records have been identified as unique records relevant to the siege area (Sarajevo Six) and siege period (April 1992 to December 1995). Table 1a shows the distribution of the 15,309 records by the type of death category. The Section “Summary of Sources” in Annex contains the year-and-month of death distribution for each death category.

Table 1a contains, therefore, statistics obtained from the list of merged sources after the elimination of duplicates. Table 1a contains *only* linked records, and leaves the unlinked records aside. According to the average matching rate of mortality sources with the 1991 census, which equals 76.6%, approximately 23.4% of records are not included in Table 1a. In order to compensate for the related loss of information, we increased the numbers from Table 1a by 23.4% and obtained the final statistics reported in Table 1b, which covers all available unique death records identified in our sources. It is also worth noting that this number does not include the doubtful cases of possible survivors, i.e. persons both reported as war casualties and later reported for example in post-war voter registers.

Note that in order to eliminate duplicates we had to link mortality sources with the 1991 census. Searching for duplicates only in mortality lists would not be optimal, as the information about individuals is limited in these sources to their death records, which are sometimes incomplete or have other deficiencies. Census records are much more extensive and enable us to compare many more items - personal characteristics of the deceased. Moreover, only matching records against the census makes it possible to study the overlap of sources, which is essential for checking the consistency of records between the sources. The matching rate was, however, lower than 100%, due to spelling mistakes and other data deficiencies (see Annex: Methods of Analysis). On average we were able to match with the 1991 census approximately 76.6% of records in every mortality source, the remaining 23.4% was left unlinked. The correction factor applied in adjusting the figures from Table 1a was therefore equal 1,234.

The figures in Table 1b are the minimum (“at least”) numbers, obtained on the basis of five sources, with three additional sources (three lists of fallen soldiers) used to distinguish between civilians and militaries. Additional sources would increase these numbers, but likely not considerably. The coverage of our sources is relatively good and every new source would bring relatively little improvement in terms of new unique records.

Finally, the list of war-related casualties of the Sarajevo siege is the longest among the lists ever presented for the Bosnian war before the ICTY. It contains 9,502 individual names, and is still incomplete. Note that the list for Srebrenica, the largest reliably identified incident so far, contains 7,475 names.

## ANNEX

1. Overview of Sources
2. Methods of Analysis

## ANNEX

### 1. Overview of Sources

#### Mortality Database of the Federal Institute for Statistics (FIS), 1992-95

The data on war-time mortality, coming from the regular life events registration (known also as vital statistics), from the territories under the control of the FBiH government army and of HVO, was collected and computerised by the Federal Institute for Statistics in a project run at FIS in Sarajevo in the first half of 2002. In the framework of this project all existing death records from the period 1992-1995 were collected from local vital events offices and transferred to FIS in Sarajevo, where a group of data entry clerks computerised the material under the supervision of the head of Population Statistics Division of FIS. A professional Access-format database is the outcome of this project.

The original death forms, (i.e. questionnaires that are compulsorily completed at the time of death), contained an extensive information on a person's particulars (name, date and municipality of birth, sometimes full *matični broj*, municipality of residence, ethnicity, etc.), as well as date, place (settlement and municipality), circumstances and cause of death. The data was entered from the original paper forms (death reporting forms), of which many were accompanied by death certificates, what enabled to provide information on a medical cause of death<sup>1</sup>. Originally, the collection consisted of 74,539 records. During the processes of data preparation and matching, 137 duplicates were deleted (mostly using FN, IniFaN, LN and DoB variables) in addition to those removed already during the computerisation project at FIS (2,693), so the data table was left with 74,402 unique records. Note, that although several other (not many, though) records may be still duplicated, they have been not excluded from the collection due to some remaining level of uncertainty.

The number of records, relevant to the Sarajevo Six area in 1992-1995 (from January 1992 to December 1995), reported in the FIS database is 15,547, of which 12,724 have been matched with the 1991 census, resulting in the matching rate of 81.8 percent.

#### ICRC and PHR Lists of Missing Persons

The International Committee of the Red Cross (ICRC) does an impressive effort during armed conflicts and other crises to reunite persons with their families. For this purpose they publish lists of persons that are reported missing to the ICRC. The ICRC lists contain the following items: personal particulars of those missing, date and place of disappearance, age at disappearance, particulars of the reporting person etc. The ICRC list is primarily a list of missing and not dead people. It is generally assumed, however, that most (if not all) of these people are dead. The ICRC itself also expressed this opinion<sup>2</sup>.

The work of ICRC in Bosnia and Herzegovina has so far resulted in four editions of their list of missing persons (4<sup>th</sup> edition published in 1998) and an addendum containing about 1,000 additional entries (published in 2000). In the third and fourth editions they have also included a section on persons who "are known to be dead, but whose mortal remains are yet to be recovered by their families".

*The Consolidated ICRC-PHR list* of missing persons is based on the fourth edition of the ICRC list from 1998 and data from an American non-governmental organisation Physicians for Human Rights

<sup>1</sup> Coding of the 10<sup>th</sup> Revision of the International Classification of Diseases (ICD-10) was applied, a current WHO standard for the purposes of statistical reporting of death events.

<sup>2</sup> From the introduction to "*Missing persons on the territory of Bosnia and Herzegovina*", Fourth edition issued on 30.06.1998 – by alphabetical order, International Committee of the Red Cross. Place of publication not given (probably Sarajevo).

(PHR). The PHR did a similar type of work as ICRC. In Bosnia they were active in Srebrenica region and produced their list of missing for this region. Helge Brunborg and Henrik Urdal have merged these two data sources in order to produce the "Report on the number of missing and dead from Srebrenica" presented in the case of KRSTIĆ. The ICRC-PHR table created by Brunborg and Urdal contains 19,692 records, where 12,423 records are unique to the ICRC list, 6,980 records are found on both lists and 289 records are found on the PHR list only.

In the year 2002, we up-dated the 1998 ICRC list by appending the records reported in the Addendum to the 4<sup>th</sup> edition of the ICRC list, by downloading files from the ICRC website on 18.04.2002. 616 HTML files containing a list of missing persons in an alphabetic order were received. These lists were converted to Excel format and imported to Access database. The up-dated ICRC-PHR database includes 20,612 records.

The number of records, relevant to the Sarajevo Six area in 1992-1995 (from the period from January 1992 to December 1995), reported in the up-dated ICRC-PHR lists is 761, of which 570 have been matched with the 1991 census, resulting in the matching rate of 74.9 percent.

### **Mortality Database of Muslims against Genocide**

MAG is the acronym for "The Association of Muslims Against Genocide", a non-governmental organisation operating in Sarajevo. MAG collected death records (including personal particulars, such as names, father's name, date of birth etc., and death characteristics, i.e. date, place, and 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 came 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 was, however, a good control of duplicates in the MAG 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 2002 about 40,000 forms have been entered, covering 34,378 victims in Bosnia. Approximately 9,500 records report one of the ten municipalities<sup>3</sup> belonging to the (pre-war) Sarajevo area as the place of death.

The number of records, relevant to the Sarajevo Six area and from the period from January 1992 to December 1995, reported in the MAG database is 8,173, of which 6,616 have been matched with the 1991 census, resulting in the matching rate of 80.9 percent.

### **The Households Survey Sarajevo - 1994 (HSS-94)**

*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), in these parts of the besieged Bosnian capital, which were under control of the BiH government army (the territory within front lines at mid-1994). The survey was designed, co-ordinated and executed by the Sarajevo Research Institute for War Crimes and International Law (hereafter *the Institute*), led by Prof. Smail Ćekić, 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 located within the front lines in Sarajevo. Practically only parts of six municipalities: Centar, Novi Grad, Stari Grad, Novo Sarajevo, Ilidža and Vogošća, were covered by the survey. The questionnaires used in the survey are related to households and households members (i.e. persons); i.e. one questionnaire contains information about one household. The most essential

<sup>3</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.

items covered in the survey include killed, wounded, and naturally died persons. Many more items (such as household size at the interview, displacements, refugees, living conditions, detained and missing persons, live and stillbirths in the household since the beginning of 1992 etc.) are available as well. According to the authors of HSS-1994, approximately 85,000 households living within the front lines in Sarajevo at mid-1994 participated in the survey. An assumption, that each household consisted of 4 members<sup>4</sup>, gives a survey population of approximately 340,000 individuals, which is 75% of the 1991 census population of the Sarajevo Six.

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.

The survey material was requested by OTP to produce statistics about population losses in Sarajevo. We concentrated on three most significant events: killing, natural death and wounding, which brought us to establishing a database of approximately 40,000 records (all three types of events). The records of the population exposed to risk (in total some 340,000 individuals) have not been computerised, as processing such a large quantity of information would be too time consuming and too costly. The data processing project was conducted at OTP.

The total number of deaths reported in HSS-94 was 12,860 (both killings and natural deaths jointly), of which 7,232 deaths were found relevant to the within-front-lines area of Sarajevo Six and the period from September 1992 to December 1995 (see GALIĆ report). The overall matching rate for HSS-94 was 81.3 percent (for both deaths and woundings), for deaths alone the matching rate was lower and equalled 73 % (9,387 matched out of 12,860 deaths of both killings and natural causes jointly).

More details about the HSS-94 are available from E. Tabeau, M. Żótkowski and J. Bijak, (2002) *“Population Losses in the “Siege” of Sarajevo, 10 September 1992 to 10 August 199”* (hereafter called the GALIĆ report).

### **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) Bakije database includes three data tables: DZENAZE (FUNERALS), LICA (PERSONS; the reporting household members of the deceased), and PORODI(CE) (FAMILIES of the deceased; represented by family 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(CE) 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 much less than in the respective

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<sup>4</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 we can quote the UNHCR (United Nations High Commissioner for Refugees) figure of DPs (displaced persons) and refugees living still in the Sarajevo Six, which is 72,372 persons.



period in 1992-1995. Generally, we have 11,545 records from the period from January 1992 to December 1995 (3,414 soldiers and 8,132 civilians). The matching rate for those reported in the period is 72.4 % (8,359 matched out of 11,545).

### **The List of Fallen Soldiers of ABiH**

Seven diskettes with original MS Excel spreadsheets containing lists of the (government-controlled, i.e. mainly Bosniak) Army of Bosnia and Herzegovina (*Armija Bosne i Hercegovine*, hereafter: ABiH) soldiers and other military personnel killed during the 1992-1995 conflict were obtained from the Federal Ministry of Defence on 10 May 2001. Originally, the collection consisted of 28,285 records. The original files, containing information on a person's name, date and municipality of birth, full *matični broj*, municipality of residence, military evidence, district and type of a unit, as well as date and cause of death (no place of death available), were merged and converted into the MS Access format. During the process of data preparation, 258 duplicates were deleted, so the data table was left with 28,027 unique records.

Altogether, 25,255 records were matched so far, which makes about 90,1% of the total of 28,027 persons found in the ABiH records of killed soldiers and other military personnel. Such a good outcome was achieved due to very good data quality, and mainly to the consistent presence of the personal ID number, the *JMBG*.

### **The List of Fallen Soldiers of HVO**

Ten diskettes with original MS Excel spreadsheets and MS Word documents containing lists of the Bosnian Croat army of the Croatian Defence Council (*Hrvatsko Vijeće Odbrane*, HVO) soldiers and other military personnel killed during the 1992-1995 conflict, as well as 17 pages of the list on paper for the Žepče region, were obtained from the Federal Ministry of Defence in May 2002. The Žepče list was computerised and added to the folder with original files. The original files, containing information on a person's name, date and municipality of birth, full *matični broj*, municipality of residence, as well as date and cause of death (no place of death available), were merged and converted into the MS Access format. Originally, the collection consisted of 7,085 records. During the process of data preparation, 396 duplicates were deleted, so the data table was left with 6,689 likely unique records.

Altogether, 5,904 records have been matched, which makes about 88,3% of the total of 6,689 persons found in the HVO records of killed soldiers and other military personnel. It is also worth stressing that in the database includes some records with post-war date of death, but these sometimes have cause of death listed as "consequences of wounding" etc. Summing up, the HVO list is less reliable than the ABH list of fallen soldiers.

### **The List of Fallen Soldiers of VRS**

The original text file containing a list of Republika Srpska Army (*Vojska Republike Srpske*, hereafter: VRS) soldiers and other military personnel killed during the 1992-1995 conflict was obtained from the RS Ministry of Defence on 12 December 2000. Originally, the collection consisted of 14,251 records. The original file, containing information on a person's name, date and place of birth, (sometimes) *matični broj*, place of residence as well as date and cause of death (no place of death available), was converted into the MS Access format. During the process of data preparation, 14 duplicates were deleted, so the data table was left with 14,237 records that seem to be unique. Data quality is good.

Altogether, 11,166 records have been matched with the census, which makes about 78,4% of the VRS collection.

### Summary of Sources

An overview of records reported in the period from January 1992 to December 1995 in 5 sources (FIS, ICRC-PHR, MAG, HSS-94, and Bakije) is given below. The number of all records relevant to the Sarajevo Six area and reported on five lists is 43,258, of which 33,548 have been matched with the 1991 census resulting in the average matching rate of 76.6 percent. The 43,258 records include duplicates, which have been eliminated through links with the census (see next section). The list of unique records is much shorter and contains 16,247 records covering the period from *January* 1992 to December 1995 (all matched), of which 15,309 records cover the period from *April* 1992 to December 1995. After correcting the latter number of 15,309 by the average matching rate, the new total number of deaths in Sarajevo Six area from April 1992 to December 1995 is 18,888 unique records. This number covers all categories of deaths: war-related civilians, war-related soldiers, civilians not related to war, and other deaths.

Table A1. Overview of Death Records Relevant to Sarajevo Six Area, January 1992- December 1995  
By Source and Matching Status

Merged Sources	All Relevant	Matched	Rate
FIS	15,547	12,724	81.8
ICRC-PHR	761	570	74.9
MAG	8,173	6,616	80.9
HSS-94	7,232	5,279	73.0
Bakije	11,545	8,359	72.4
Total 5 Sources	43,258	33,548	76.6

Note that the three lists of fallen soldiers do not include the item “place of death”. We therefore only used these lists as reference regarding the status (civilian versus soldier) for the casualties reported in the five remaining sources. The records reported on the lists of fallen soldiers and at the same time at any of the lists based on FIS, ICRC-PHR, MAG, HSS-94, or Bakije, have been included in the analysis as soldiers, all remaining records have been taken as civilians.

Table A2. Summary of the Overlap of Sources Reporting Deaths for Sarajevo Six Area from January 1992 to December 1995, (Matched Records Only)

Overlapping Sources	Records
5 sources	3
4 sources	2,130
3 sources	3,627
2 sources	5,428
unique FIS	3,503
unique ICRC	70
unique MAG	343
unique HSS-94	186
unique Bakije	957
Total	16,247



In Table A2, we show the overlap of sources after elimination of duplicates. In Table A2 the 16,247 unique records obtained for Sarajevo Six area from January 1992 to December 1995 are distributed according to the number of sources where the records were reported. We can see that the vast majority of records were reported in more than one source, which increases the reliability of reported deaths.

In the following four tables (A3 to A6), we show the distribution of the 16,247 death records (covering the period from January 1992 to December 1995) according to time of death (year and month). Each table is related to one death category (war-related civilians, war-related soldiers, war-unrelated civilians, and other deaths). It is shown in these tables how many records are related to the months from January 1992 to March 1992, or have an unknown month of death in 1992. These records had been excluded from statistics referring to the war period covering the time span from April 1992 to December 1995. After excluding the irrelevant dates of death, the overall number of deaths in the period from April 1992 to December 1995 became 15,309. This number is reported in the main text in Table 1a.

Table A3. Fallen Soldiers by Year and Month of Death (MoD), Sarajevo Six Area, 1992-1995

MoD	1992	1993	1994	1995	Total
00	1				1
01	4	127	90	10	231
02	7	128	36	7	178
03	5	135	23	17	180
04	54	70	19	14	157
05	246	87	17	37	387
06	415	91	10	101	617
07	175	210	12	51	448
08	273	53	16	36	378
09	244	46	20	9	319
10	137	64	12	17	230
11	97	42	16	6	161
12	309	97	8	2	416
Total	1967	1150	279	307	3703

Included in analysis: 3686 records

Excluded from analysis: 17 records (1992: 00, 01, 02, 03)

Table A4. War-Related Deaths of Civilians by Year and Month of Death (MoD), Sarajevo Six Area, 1992-1995

MoD	1992	1993	1994	1995	Total
00	8	2	1		11
01	7	144	110	10	271
02	6	115	91	6	218
03	7	120	11	12	150
04	58	76	15	21	170
05	293	107	22	45	467
06	525	103	15	76	719
07	227	181	9	80	497
08	297	60	14	66	437
09	241	41	19	11	312
10	227	68	11	5	311
11	106	66	19	9	200
12	174	85	12	9	280
Total	2176	1168	349	350	4043

Included in analysis: 4,015 records

Excluded from analysis: 28 records (1992: 00, 01, 02, 03)

Table A5. War-Unrelated Deaths of Civilians by Year and Month of Death (MoD), Sarajevo Six Area, 1992-1995

MoD	1992	1993	1994	1995	Total
01	301	247	145	159	852
02	292	186	130	156	764
03	243	189	147	135	714
04	150	124	130	140	544
05	182	126	149	154	611
06	185	119	135	135	574
07	183	112	104	161	560
08	179	114	104	141	538
09	167	108	91	107	473
10	211	137	98	156	602
11	174	153	128	139	594
12	251	158	138	178	725
Total	2518	1773	1499	1761	7551

Included in analysis: 6,715 records

Excluded from analysis: 836 records (1992: 00, 01, 02, 03)

Table A6. Other Deaths of Civilians by Year and Month of Death, Sarajevo Six Area, 1992-1995

MoD	1992	1993	1994	1995	Total
01	16	40	17	25	98
02	16	23	7	40	86
03	25	20	4	27	76
04	27	17	10	28	82
05	14	12	6	21	53
06	21	7	30	24	82
07	12	12	28	25	77
08	21	9	15	14	59
09	25	2	23	25	75
10	26	9	30	23	88
11	29	10	25	21	85
12	22	10	43	14	89
Total	254	171	238	287	950

Included in analysis: 893 records

Excluded from analysis: 57 records (1992: 00, 01, 02, 03)

## 2. Methods of Analysis

The analysis discussed in this report consisted of the following steps:

- mortality sources to be used had been identified and reviewed (i.e. checked, cleaned, structured, duplicates removed),
- mortality sources had been matched with the 1991 population census and an overview of links between the sources had been made,
- all records *possibly relevant* to the siege had been extracted from all mortality sources according to the membership in the Sarajevo Six area and having the year of death reported as of between 1992 and 1995 (any month of death),
- a list of possibly relevant records had been made,
- duplicates had been removed through analysing the overview of links between the sources,
- the status of any record shown to belong to at least one list of fallen soldiers had been marked as “soldier”, all remaining records as “civilians”,
- the list of records relevant to the siege of Sarajevo (belonging to the Sarajevo Six area and having date of death between April 1992 and December 1995) had been extracted from the list of all possibly relevant records with eliminated duplicates,
- basic demographic distributions of the records on the list of records relevant to the siege had been made in order to check the correctness of final figures.

The essential step of our analysis was matching death records with the 1991 population census. We summarise this step more specifically below.

### **Matching**

The essential term in matching is a record of information. One record in a given data set describes one individual and is a collection of his/her characteristics on a number of items, such as for example the personal identification number (JMBG), first name, family name, father’s name, date of birth etc.

To link two individual data sets, we employed a multi-step procedure. Steps consisted of comparisons between the two sets of related individual-level data records (such as the population census and a given mortality source). Slightly differing criteria were used in every next step and the population available for next round of matching shrank after each step. In other words, once a number of records had been matched in two related data sets, these records were first marked and then excluded from the next round of matching. In the new step, the matching criterion applied was modified in order to capture new matches. All matched records were always marked in every round of matching, such that in the end we could easily identify them in the database and use them in querying. For less strict matching criteria, manual checks were additionally performed on the matched records, in order to ensure the good quality and reliability of the whole matching process.

More details about matching sources with the population census can be obtained from Annex C of the expert report: *Ethnic Composition, Internally Displaced Persons and Refugees from 47 Municipalities of Bosnia and Herzegovina, 1991 to 1997-98*, by E. Tabeau, M. Żótkowski, J. Bijak, and A. Hetland, prepared for the case of SLOBODAN MILOŠEVIĆ – BOSNIA AND HERZEGOVINA (IT-02-54).