

KILLED PERSONS RELATED TO THE SIEGE OF MOSTAR: A STATISTICAL ANALYSIS OF THE MOSTAR WAR HOSPITAL BOOKS AND THE MOSTAR DEATH REGISTRIES

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1. BACKGROUND

The main objective of the activities summarized in this report was to obtain reliable statistics on deaths caused by armed incidents during the siege of Mostar from May 1993 to (around) April 1994, and to analyze the patterns inherent in these deaths (by age, sex, military status, time, geographic area etc.). The report was requested from the Demographic Unit by the Prosecution team preparing the case of PRLIĆ et al. (IT-04-74).

The report focuses on the killed persons from the area of East Mostar. The area is much smaller than the pre-war municipality of Mostar. East Mostar was located on the east side of Neretva river, including a narrow strip of buildings on the west bank, where the most Bosnian Muslims moved to in result of the HVO actions against Non-Croats on 9-10 May 1993. The Muslim enclave in East Mostar was separated from the rest of the town by the HVO-ABH confrontation line running north and south along the Bulevar and Šantićeva Street, to the west of the Neretva river. The enclave was surrounded by the Croat forces at the north and south, with Bosnian Serb forces to the east.

Sources that contain information about specific places of death within East Mostar are infrequent. The most existing sources include place of death reported as a municipality, (such as the pre-war Mostar), which makes it impossible to distinguish between deaths from East Mostar versus outside it. Two sources could be used for this type of analysis, however, the Mostar War Hospital Books and the Mostar Death Registries. This report contains results of a statistical analysis of these two sources.

Records from the Mostar War Hospital Books (hereafter: WH) include both the killed and wounded persons, altogether almost 6,000 entries of which 472 are of killed persons, from the territory of East Mostar and the period from 9 May 1993 to 25 May 1994. The War Hospital records were collected by the Prosecution investigation team and copies of five original War Hospital Protocol Books are registered with the Evidence Unit. A detailed discussion of this source is available from the expert report on wounded persons – victims of the siege of Mostar.¹

Records on deaths reported in the Mostar Death Registries (hereafter: DR) were also collected by the Prosecution investigation team and submitted to the Evidence Unit. In total ten registration books were submitted: from Bijelo Polje, Blagaj (2), Dreznica, Jablanica, and

¹ E. Tabeau, 2006, "Wounded Persons Related to the Siege of Mostar: A Statistical Analysis of the Mostar War Hospital Books." An expert report prepared for the PRLIĆ case (IT-04-74).

Mostar (5). The books contain jointly 1,383 records that cover deaths that occurred in the area of in total 11 municipalities in Bosnia (most of them from the Herceg-Bosna region including Mostar; out of 862 deaths in Bosnia, 853 deaths were in Herceg-Bosna), a few deaths from outside Bosnia (4) and a relatively high number of deaths from an unknown location (517). Almost all deaths occurred during the Bosnian conflict period (1992-95; 1,370). The few remaining deaths are either from outside of the conflict period or have an unknown date of death. Obviously, this source contains many more records than only those related to the siege of Mostar. For this analysis a sample of relevant records was extracted from the Mostar Death Registries according to the criteria of relevance to the siege.

In order to distinguish between civilians and soldiers, for this report we also used the Military Records of Soldiers and other Military Personnel Killed during the Bosnian war. These lists cover completely all three armies (ABH, HVO and VRS) and the entire war period (April 1992 to December 1995), and were provided to the OTP by the (FBH and RS) Ministries of Defence. The total number of records in the three lists is about 48,500 (about 28,000 from ABH, 14,000 from VRS, and 6,500 from HVO). Also these lists are available from the Evidence Unit.

This report comprises the following sections:

1. Background
2. The Mostar Death Registries: Summary of the Source
3. Siege-Related Deaths Reported Independently in the Mostar War Hospital Books and Mostar Death Registries
4. Siege-Related Deaths Reported in the Two Sources Merged Together
5. Final Conclusions

The Herceg-Bosna conflict is understood in this report as the facts and events referred to in the Indictment of the case IT-04-74, that occurred on the territory of eight Herceg-Bosna municipalities (Čapljina, Gornj Vakuf, Jablanica, Ljubuški, Mostar, Prozor, Stolac, and Vareš) in the time period from November 1991 to (around) April 1994). The siege of Mostar is an episode of the conflict in Herceg-Bosna that took place in the town of Mostar and its surroundings between 9 May 1993 and 12 April 1994, when an agreement was signed by the Herceg-Bosna/HVO representatives and the Muslim side in Split, Croatia.

2. THE MOSTAR REGISTRIES OF DEATH: SUMMARY OF THE SOURCE

The Death Registries of the municipality of Mostar, (hereafter: DR), were (and still are) maintained by the legal administration organs of Bosnia-Herzegovina in Mostar. The death registration was (and is) a part of the broader vital events registration system concerning not only deaths but also births, marriages and marriage dissolution. This kind of systems is common in almost every country in the world.

The basic principle of how the death registration system operates is the following. Shortly after the occurrence of death, statistical agencies have to take a record of it, based on the compulsory notification from the family of the deceased. For statistical purposes, every death is described in terms of date, place, and cause of death. Personal details, such as the first and family names, date and place of birth, place of residence, education, profession etc. are reported as well. (Socio-economic characteristics are not always provided, however). A physician, other trained medical personnel, or a coroner must declare the cause of death as a medical category on the basis of the International Classification of Diseases and Conditions

Leading to Death (ICD) provided by the World Health Organisation. (Currently, the 10th revision of the classification is used throughout the world, before 1991 it was the 9th Revision). The ICD allows us to distinguish between diseases, or fatal health conditions, and external causes of death (i.e. accidents and violent deaths). These standards were also applied in the former Yugoslavia, including Bosnia and Herzegovina and the Mostar municipality as part of it. However, during the difficult times of the 1990s conflict, statistical and administration authorities in the municipalities were not always in the position to achieve a satisfactory level of death reporting by the citizens. The conflict had a negative effect on the quality of death registration from this period.

Already since 1993, the municipality of Mostar was practically divided in two larger administrative areas: Mostar West and Mostar East, according to the division of the city as a result of the conflict. Starting in 1993 thus, the Croat and Bosniak authorities kept their vital events registration separately; each authority only in their area of responsibility. Since 1995 this division was official. Each of the two larger administrative areas were sub-divided into a number of smaller (newly created) municipalities. Around the fall of 1997, the FBH part of Mostar (studied in this report) was officially divided in six new municipalities. Three municipalities were controlled by the Bosniaks (Mostar Stari Grad, Mostar Sjever and Mostar Jug) and three by the Croats (Mostar Jugozapad, Mostar Jugoistok, and Mostar Zapad). The status of the seventh extremely small area of Mostar Central District, (predominantly Muslim before the war), was less straightforward being more a special area than a regular municipality.

The Death Registries used in our study basically cover the administrative area of East Mostar, equivalent to the area of the three new municipalities controlled by the Bosniak authorities. Deaths are reported in the period of the conflict in Bosnia and Herzegovina (1992-95), with an exception of a very few deaths reported in 1991, 1996 and 1998, or with unknown date of death (a total of 8 records). The registries were provided to the OTP in February 2001, by the AID agency from Sarajevo, in the form (paper copies) as they were kept by the administration authorities of Mostar. The Death Registries kept by the municipal boards of the HZHB from 1993 onward have not been used in our study. The following registries were provided from the area of Mostar (with a total number of pages equal to 534):

1. Death Register - Mostar I (100 pages)
2. Death Register - Mostar II (100 pages)
3. Death Register - Mostar III (65 pages)
4. Death Register - Mostar k-3 (25 pages)
5. Death Register - Blagaj / municipality of Mostar (42 pages)
6. Death Register - Blagaj / municipality of Mostar (43 pages)
7. Death Register - Drežnica / municipality of Mostar (46 pages)
8. Death Register - Bijelo Polje / municipality of Mostar (33 pages)
9. Death Register - Mostar / registers (70 pages)

In addition to the Mostar registries listed above, also the Death Registry from Jablanica (a municipality bordering Mostar Sjever) was provided which mainly contained records of deaths from Jablanica, (not exclusively though; some records were related to other areas including Mostar). The Jablanica Death Register was included in this study as well.

The information available from the Death Registries was computerised (partly by the OTP Investigations Team, partly by the Demographic Unit) and a searchable database was established. The database contains the following items; (except of “East Mostar” all items are original):

Table 1. Overview of Data Items Available from the Death Registries

Data Items	Data type	Description
No	Number	ID given in the Death Register
FN	Text	First name
FaN	Text	Father's name
LN	Text	Surname
Sex	Text	Sex: 1 – male, 2 – female
DoB	Text	Date of birth
PoB	Text	Place of birth
PoR	Text	Place of residence
MoR	Text	Municipality of residence
JMBG	Text	Personal identification number
DoD	Text	Date of death
PoD	Text	Place of death
CoD	Text	Cause of death
East Mostar	Yes/No	Is the location in East Mostar?
Source	Text	Which Death Register

The item “East Mostar” was created by investigators of the Prosecution investigation team on the basis of studying the individual places of death reported in the Death Registries and checking their location on maps and confirming this with witnesses of the conflict. Only a limited number of places could be classified in this way as “East Mostar”; a number of places could not. So the places not marked as “East Mostar” are not necessarily from outside of East Mostar. Although the “Not East Mostar” category mainly refers to the records of deaths from outside East Mostar, the records from East Mostar which for various reasons have not been marked as “East Mostar” are contained under this category as well.

The quality of the personal data was reasonably good, in the majority of cases first, last and fathers' names were included, as well as dates and places of birth and death. In a few cases the personal identification number (JMBG) was also reported. The information about the death was more deficient, especially about the causes of death. This was despite of the fact that a medical certificate was normally required to register a death and report the date, place and cause of death. In many cases, this requirement could not be fulfilled, especially in 1993 when the intensity of the siege made it hardly possible to the authorities to send doctors to every single death case that occurred in Mostar.

There were 1,383 records in total in all 10 Registries, where 63 came from the Bijelo Polje registers; 143 from Blagaj registers; 77 from Drežnica; 306 from Jablanica and 794 from Mostar registers.

In the remainder of this section we discuss the coverage and data quality issues. We also formulate the criteria of relevance of records from the Death Registries to the siege of Mostar. Note that such criteria are not needed for the War Hospital records, which only concern deaths from the East Mostar area.

Below we include an overview of major data deficiencies in the Death Registries. In this overview all reported deaths are included, also those from outside East Mostar and even outside the Herceg-Bosna area. Out of all death records, a selection is eventually made of records relevant to the siege period (May 1993 - April 1994) and East Mostar area (hereafter “the siege of Mostar” or “the siege”).

Note that in this section we pay attention to the records relevant to the entire area of Herceg-Bosna and the period from November 1991 to April 1994. The siege of Mostar is seen here as an episode of the Herceg-Bosna conflict.

2.1 A majority of deaths reported in the Death Registries occurred in the Herceg-Bosna municipalities (853 out of 1,383 deaths). The number of deaths reported in the Mostar municipality alone is 581. In addition to this, a few records are of deaths from outside the Herceg-Bosna area (9) or even outside Bosnia and Herzegovina (4). A large number of records have no place of death reported (517). Obviously, the total of 1,383 reported deaths cannot be taken as war-related deaths from HB; also because not all these deaths occurred in the conflict period.

2.2 Dates of death basically cover the period from November 1991 to December 1995, with a few dates from 1996 (3), 1998 (1) or unknown (4); the dates are broader than the period of the Herceg-Bosna conflict. Deaths consistent with the Herceg-Bosna conflict period comprise 1,316 individuals, and 1,140 deaths are from 1993 alone. Not all those deaths occurred in the HB area, however.

2.3 A high number of deaths have no cause of death reported (1,251 out of 1,383). A vast majority of deaths with unknown causes occurred in 1993 (1,065 out of 1,251), and 573 of those 1,065 also in the indictment area. Further, exactly 132 records include cause of death. Among the reported causes, the violent war-related causes are the largest category (89; killed/killed in action, shelling, gunshots, wounding). The natural causes (37) are the second largest. Noteworthy, several natural causes could have happened because of lack of or insufficient health services available at the time of conflict. No distinction is possible, however, between the natural causes from this point of view.

2.4 Based on the observations from paragraphs 2.1 to 2.3 and the necessity of possessing a full list of personal details about every victim we formulated the criteria of records' validity. As a minimum, the availability of the following items was required for a record to become a valid one in this study:

- all names (first, family, father's)
- year of birth
- year of death
- relevance to the indictment period
- relevance to the indictment area
- not being duplicated

In the first step, the time and area validity was defined for the entire conflict in Herceg-Bosna.² All valid records were then searched through in the next step in order to select records related to the siege of Mostar.

Note as well that no restriction was imposed as to the availability of the cause of death. Studying causes of death will be done later in the stage of producing final statistics on siege-related deaths of East Mostar, where a distinction will be made between minimum number of war-related deaths and a more realistic estimate of the overall number of war-related deaths and their causes.

² The territory of eight Herceg-Bosna municipalities (Čapljina, Gornj Vakuf, Jablanica, Ljubuški, Mostar, Prozor, Stolac, and Vareš) and the time period from November 1991 to April 1994).

Table 2 below summarises the results of applying the validity requirements onto the records reported in the ten Death Registries. Out of all 1,383 records, only 773 records can be seen as relevant and valid to the conflict in Herceg-Bosna. All other records must be excluded from the analysis as either too poor or irrelevant. The largest group of excluded records is because of deaths coming from an unknown location or from outside of the indictment area (a total of 525; alone or in combination with other deficiencies). Exactly 53 records are excluded because the month of death is either earlier than November in 1991 or later than April 1994. 10 records are excluded as duplicates (alone or in combination with other deficiencies; together with 1 record with an unrelated YoD, the total is 54 records excluded; see Table 2).

Among the excluded records, some 517 have an unknown place of death. Of these 517 entries, (after excluding duplicates) exactly 484 records remain with dates of death in the siege-of-Mostar period (May 1993 to April 1994). These 484 records might be potentially relevant to the siege of Mostar but have to be excluded from the analysis due to the missing place of death. This loss of information is very considerable.

Table 2. Criteria of Records' Relevance to the Indictment Period and Area

Validity	Duplicate	Surname	FirstName	FaName	YoB	YoD	IndictArea	Total
Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	773
No*	No	Yes	Yes	Yes	Yes	No	Yes	54
No	No	Yes	Yes	Yes	Yes	Yes	No	375
No	No	Yes	Yes	Yes	Yes	No	No	1
No	No	Yes	Yes	Yes	No	Yes	Yes	4
No	No	Yes	Yes	Yes	No	Yes	No	4
No	No	Yes	Yes	Yes	No	No	Yes	1
No	No	Yes	Yes	No	Yes	Yes	Yes	14
No	No	Yes	Yes	No	Yes	Yes	No	107
No	No	Yes	Yes	No	No	Yes	Yes	1
No	No	Yes	Yes	No	No	Yes	No	13
No	No	Yes	Yes	No	No	No	No	1
No	No	Yes	No	Yes	Yes	Yes	No	2
No	No	Yes	No	Yes	No	Yes	No	2
No	No	Yes	No	No	Yes	Yes	No	2
No	No	No	Yes	Yes	Yes	Yes	No	4
No	No	No	Yes	Yes	No	Yes	No	1
No	No	No	Yes	No	Yes	Yes	No	1
No	No	No	No	No	No	Yes	Yes	1
No	No	No	No	No	No	Yes	No	12
No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	5
No	Yes	Yes	Yes	Yes	Yes	Yes	No	1
No	Yes	Yes	Yes	Yes	No	Yes	No	1
No	Yes	Yes	Yes	No	Yes	Yes	No	3
Total								1,383

Note: "No" on YoD stands for records rejected due to the year or month of death unrelated to the Indictment period (MoD <11 in 1991, MoD >4 in 1994)

2.5 All in all, the number of deaths (from all causes; including the few natural deaths) reported within the Indictment area and Indictment period was 773 (Tables 2 and 3). Most of these deaths were most likely conflict-related.³

³ For the 773 Indictment-related deaths, the following causes were actually reported:

Violent war-related:	85 (killed, gunshots, wounded, shelling)
Violent possibly war-related:	3 (murder, accident, suicide)
Natural deaths	18
Unknown causes:	672

Table 3. Overview of Valid Records by Municipality of Death and Relevance to the Siege in East Mostar

MoD Name	East Mostar		Total
	No/Unk	Yes	
Čapljina	11	0	11
Jablanica	227	0	227
Mostar	135	389	524
Prozor	5	0	5
Stolac	6	0	6
Total	384	389	773

The total given for the Mostar municipality is 524 records (see Tables 3 and 4), out of which only 373 records fall under the strict requirement of being relevant to the siege of Mostar (i.e. death occurred in the East Mostar in the period from May 1993 to April 1994).

Table 4. Overview of Valid Records from Mostar by Date and Place of Death: Mostar vs. East Mostar

YearD	MonthD	East Mostar		Total
		No/Unk	Yes	
1991	11	1		1
1991	12	1		1
1992	1	1		1
1992	2	4		4
1992	3	2		2
1992	4		1	1
1992	5	2	3	5
1992	6	5	2	7
1992	7	4	1	5
1992	8	1	1	2
1992	10	1		1
1992	11	3	1	4
1992	12	1	1	2
1993			1	1
1993	1	2	1	3
1993	3	5	2	7
1993	4	11	2	13
1993	5	5	19	24
1993	6	6	18	24
1993	7	24	48	72
1993	8	15	78	93
1993	9	10	74	84
1993	10	11	40	51
1993	11	7	41	48
1993	12	2	33	35
1994	1	6	5	11
1994	2	3	11	14
1994	3	1	4	5
1994	4	1	2	3
Total	1993-94	91	373	464
Total	1991-94	135	389	524

Notes:

1. "Not/Unk" relates to records that were not from East Mostar or could not be assigned to East Mostar

2. The term “Total 1993-94” covers only the siege period from May 1993 to April 1994

The **373** records reported as in the East Mostar and falling under the siege period (May 1993-April 1994) are considered as relevant valid records to be used in the analysis of victims of the siege.⁴

3. SIEGE-RELATED DEATHS REPORTED INDEPENDENTLY IN THE WAR HOSPITAL BOOKS AND DEATH REGISTRIES

In this section a comparison is made of the siege-related death records reported in the Mostar Death Registries and in the Mostar War Hospital Books. The two sources are considered independent in this section, to study how large their agreement is. It is, however, very likely that the two sources report a large group of the same records (overlapping records). Also it is certain that each of the sources contains unique records that are not included in the other one. In the final analysis in Section 4, we produce statistics based on the merged sources: Mostar Death Registries, Mostar War Hospital Books and Military Records of Fallen Soldiers (ABH and VHO), in an attempt to estimate the actual number of victims of the siege.

Studying the agreement of the two sources was done in order to assess their level of consistency. Consistent sources would show us very similar or just the same demographic and death patterns of the deceased which could then be seen as reliable descriptions of the siege. In the case of consistent sources the missing aspects of one source, (e.g. missing causes of death in the Death Registries), could be estimated by extrapolating the same aspects available in the second source (in the War Hospital Books). On the other hand, inconsistent sources would point out differences in the demographic and death patterns and raise doubts about the reliability of the sources and the reality of the siege.

3.1 In total 472 death records are reported in the War Hospital books and 373 records in the Death Registries (Table 5). There exist several explanations for this difference, for example, that some deaths from the War Hospital could have been reported to authorities outside the Mostar area, moreover, the authorities could have been different than Bosniak. For these reasons the number of 373 DR records is lower than the 472 WH records. In addition to that, some DR deaths were never registered in the War Hospital as the deceased did not die in the Hospital.

Regarding the year of death both sources consistently report that the most East Mostar deaths occurred in 1993 (90.5% in WH and 94.1% in DR).

Table 5. The Number of Siege-Related Deaths Reported in the Mostar War Hospital Books and in the Mostar Death Registries by Year of Death

YearD	WH	DR
EM-93	427	351
EM-94	45	22
Total	472	373

EM stands for East Mostar

⁴ The end of the siege period is consequently mentioned throughout this report as April 1994, and no records are reported for May 1994 in the Death Registries. The records from the Mostar War Hospital Books (discussed in the next section) do include, however, some deaths from the first two decades of May 1994 which are reported too. The number of these deaths is very low (2 out of 472).

3.2 The reporting of causes of death is summarized in Table 6. Violent war-related causes (gunshots, killed, shelling, wounding) comprise 263 cases in WH records (55.7%) and only 28 cases in the DR records (7.5%). Natural deaths and accidents are not reported at all in the WH Books whereas there are 12 such deaths (3.2%) included in the DR Books. Finally, the unknown causes of death comprise a large number of cases in both sources (44.3% in WH and 89.3% in DR); although it is clear much more information about specific causes is available from the WH Books. Note as well that the unknown causes from the WH Books are in fact related to **killed persons** for whom the specific causes of killing were unavailable. In the case of a large overlap of the two sources, (i.e. a large number of the same records reported in both sources), causes of death reported in the WH Books can be extrapolated onto the records from the DR Books.

Table 6. Causes of Siege-Related Deaths Reported in the Mostar War Hospital Books and in the Mostar Death Registries

CAUSE OF DEATH	WH	DR	CAUSE OF DEATH	WH	DR
Accident	0	1	Accident	0.0	0.3
Gunshots	49	6	Gunshots	10.4	1.6
Killed	0	6	Killed	0.0	1.6
Natural Death	0	11	Natural Death	0.0	2.9
Shelling	214	14	Shelling	45.3	3.8
Unknown	209	333	Unknown	44.3	89.3
Wounding	0	2	Wounding	0.0	0.5
Total	472	373	Total	100	100

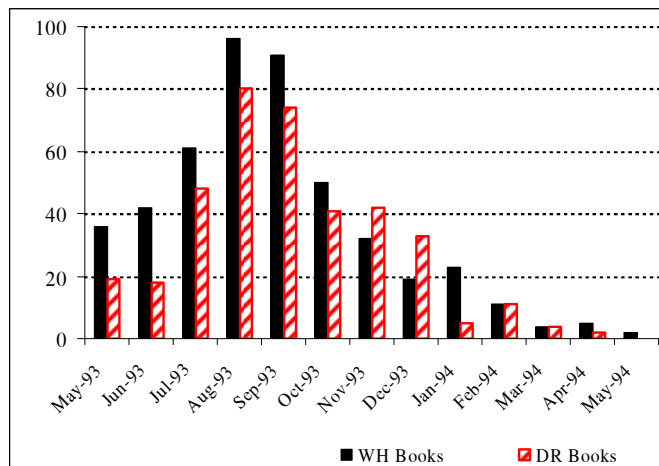
Regarding the year of death of cases with the unknown causes, again most deaths are reported for 1993 in both sources (188 out of 209 in WH and 324 out of 333 in DR). This further confirms that the fact of not reporting the cause of death was most certainly related to the circumstances of the siege, especially its intensity and difficulties in inspecting every single death case by the doctors.

3.3 A very high consistency of timing of deaths is seen between the two sources (Table 7 and Figure 1).

Table 7. Timing of Siege-Related Deaths Reported in the Mostar War Hospital Books and in the Mostar Death Registries. By Month and Year of Death

East Mostar records in WH			East Mostar records in DR		
YearD	MonthD	Count	YearD	MonthD	Count
93	May-93	36	1993	May-93	19
93	Jun-93	42	1993	Jun-93	18
93	Jul-93	61	1993	Jul-93	48
93	Aug-93	96	1993	Aug-93	78
93	Sep-93	91	1993	Sep-93	74
93	Oct-93	50	1993	Oct-93	40
93	Nov-93	32	1993	Nov-93	41
93	Dec-93	19	1993	Dec-93	33
94	Jan-94	23	1994	Jan-94	5
94	Feb-94	11	1994	Feb-94	11
94	Mar-94	4	1994	Mar-94	4
94	Apr-94	5	1994	Apr-94	2
94	May-94	2	1994	May-94	0
Total	93-94	472	Total	All	373

Figure 1. Victims Reported in WH vs. DR Books by Month and Year of Death



The monthly number of reported deaths is usually slightly higher in the WH Books and lower in DR Books, (except for November-December 1993 when the DR Books reported more deaths than the WH Books). A particularly high difference is seen between the two sources in May-June 1993, just at the beginning of the siege and at the time when the actual separation of the Croat and Bosniak administration just took place. This suggests an underreporting of deaths in the Bosniak part of the death registration system, which started to operate more properly only after a few months after the separation, likely after July 1993 onwards. Another reason for underreporting of DR deaths in this period is the intensity of the siege.

Generally, according to both sources the most victims died in 1993, especially in the months of August and September. The number of deaths per month clearly increased from May 1993 to August-September 1993, and thereafter slowly declined until April 1994.

3.4 The age and sex patterns of victims are remarkably similar based on each source (Table 8 and Figure 2), men being much more often reported dead than women. Men died mainly at ages from about 18 to 65 whereas women's age at death was rather uniformly distributed.

Figure 2. Age and Sex Distribution of Siege-Related Victims Reported in the Mostar War Hospital Books and in the Mostar Death Registries

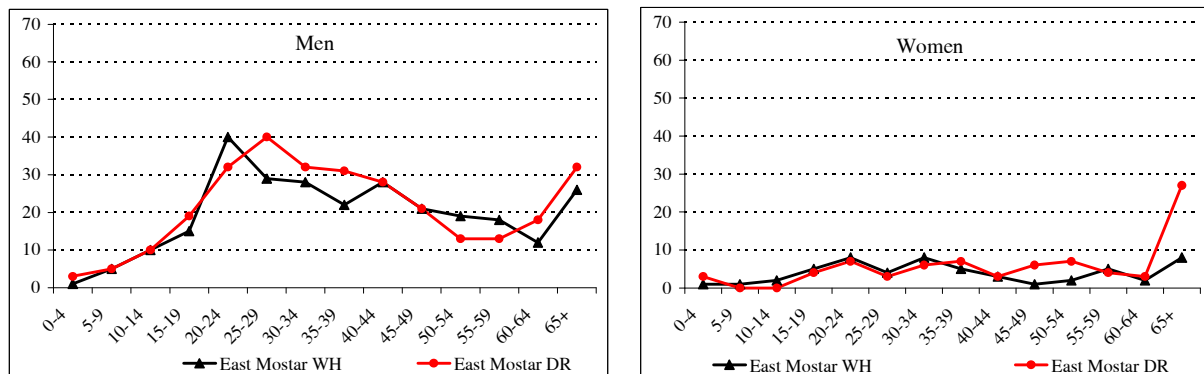


Table 8. Age and Sex Distribution of Siege-Related Victims Reported in the Mostar War Hospital Books and in the Mostar Death Registries

East Mostar records in WH					East Mostar records in DR				
Age(5)	Men	Women	Unk	Total	Age(5)	Men	Women	Total	
0-4	1	1	0	2	0-4	3	3	6	
5-9	5	1	0	6	5-9	5	0	5	
10-14	10	2	0	12	10-14	10	0	10	
15-19	15	5	0	20	15-19	18	4	22	
20-24	40	8	1	49	20-24	32	7	39	
25-29	29	4	0	33	25-29	40	3	43	
30-34	28	8	1	37	30-34	32	5	37	
35-39	22	5	0	27	35-39	31	7	38	
40-44	28	3	0	31	40-44	28	3	31	
45-49	21	1	0	22	45-49	21	6	27	
50-54	19	2	0	21	50-54	13	7	20	
55-59	18	5	2	25	55-59	13	4	17	
60-64	12	2	0	14	60-64	18	3	21	
65+	26	8	0	34	65+	32	25	57	
Unk	101	32	6	139	Unk	0	0	0	
Total	375	87	10	472	Total	296	77	373	

3.5 A comparison of causes of death of men and women seems to be of particular importance. The question is whether or not women died equally frequently of violent war-related causes as men.

Table 9. Sex Distribution of Causes of Death of Siege-Related Victims Reported in the Mostar War Hospital Books and in the Mostar Death Registries

East Mostar records in WH					East Mostar records in DR				
CoD	Men	Women	Unk	Total	CoD	Men	Women	Total	
Accident	0	0	0	0	Accident	1	0	1	
Gunshots	43	6	0	49	Gunshots	4	2	6	
Killed	0	0	0	0	Killed	6	0	6	
Nat Death	0	0	0	0	Nat Death	5	6	11	
Shelling	165	45	4	214	Shelling	8	6	14	
Unknown	167	36	6	209	Unknown	271	62	333	
Wounding	0	0	0	0	Wounding	1	1	2	
Total	375	87	10	472	Total	296	77	373	

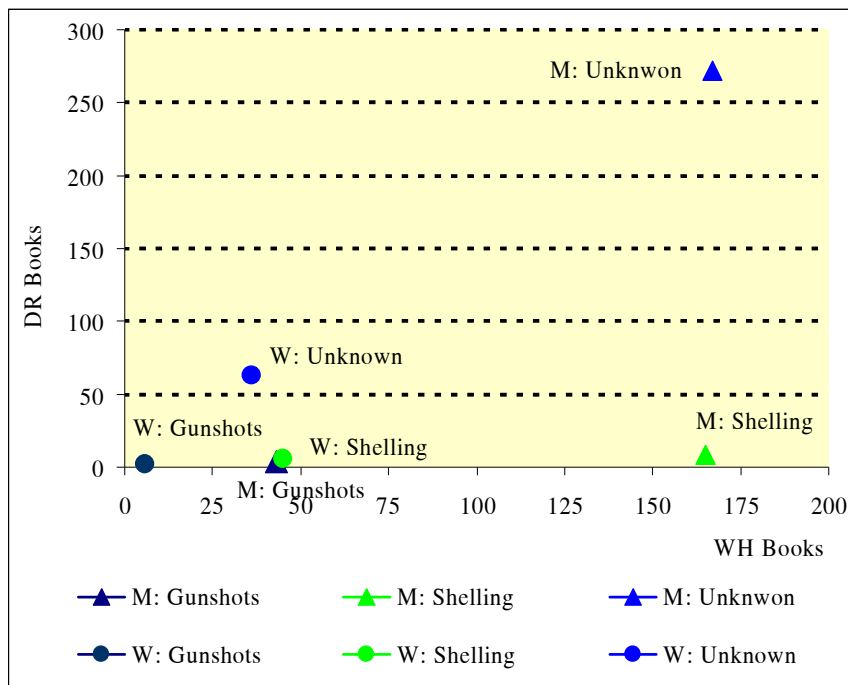
Note:

War Hospital Books		
Causes	Men	Women
Violent No	208	51
Violent %	55.5	58.6
Unk %	44.5	41.4

Death Registries Books		
Causes	Men	Women
Violent No	19	9
Violent %	6.4	11.7
Unk %	91.6	78.8

In both sources women are reported (in relative percentage terms) to have died of violent war-related causes a bit more frequently than men (see “*Note*” under Table 9). However, both sources agree that, in absolute terms, these were men who died on the first place of violent war-related causes. Regarding the unknown causes, the WH Books lack about 45% (men) and 41% (women) of causes whereas the DR Books do not report about 92% of causes for men and about 79% causes remain unknown for women in the DR Books.

Figure 3. Reporting of Major Causes of Death in the Mostar War Hospital Books and in the Mostar Death Registries



The high percent of unknown causes in the Death Registries puts the reliability of the calculated sex-specific percent of violent causes under doubt (6.4% for men versus 11.7% for women). The same percentages obtained from the War Hospital Books suggest a rather uniform distribution of these causes among men and women (55.5% for men vs. 58.6% for women), which might be a better estimate (as less causes are missing on the WH Books).

All in all, as summarized in Figure 3,⁵ the major categories of violent war-related causes, (gunshots and shelling), are much better reported in the WH Books and the unknown causes are more frequent in the DR Books. The sex distribution of violent causes (based on the WH Books) suggests that both sexes died equally frequently of these causes.

3.6 The last overview in this section is of the ethnicity and status of victims, (status only based on the WH Books). Ethnicity is included in the WH Books as an item created on the basis of names reported in this source (surnames and first names). This was done by native speakers that cooperated with the Prosecution team with this regard. Ethnicity in the DR Books is also a created item; (originally not reported in this source), created on the basis of the ethnicity distribution of names reported in the 1991 Population Census in Bosnia. In the Census, a given name can be associated with one or more ethnic affiliation. The ethnic affiliation prevailing in the 1991 census for this given name was taken as the best estimator of the missing ethnicity report for the person carrying this name in the DR Books.

⁵ Figure 3 is a scatter chart showing the level of reporting of three major causes (shelling, gunshots and unknown) for men and women in the WH and DR books. If all marked points were located on the diagonal, the levels of reporting were equal in the WH and DR. The points under the diagonal indicate a higher reporting level in the WH Books and the points above the diagonal a higher level in the DR Books.

Table 10. Ethnicity of Siege-Related Victims Reported in the Mostar War Hospital Books and in the Mostar Death Registries

Ethnicity	WH	DR	Ethnicity	WH	DR
Muslim	345	318	Muslim	95.3	87.6
Croat	17	17	Croat	4.7	4.7
Serb	0	24	Serb	0.0	6.6
Other	0	4	Other	0.0	1.1
Unknown	110	10	Unknown	na	na
Total	472	373	Total	100.0	100.0

Table 10 summarizes the ethnicity distribution of victims in both sources. The sources are again consistent in reporting the ethnic Muslims as the largest group of victims (95.3 and 87.6 percent).

Table 11. Status of Siege-Related Victims Reported in the Mostar War Hospital Books

Status in WH	Number	Percent
Civilian	160	48.5
Detainee	12	3.6
Military	158	47.9
Unknown	142	na
Total	472	100.0

Finally, Table 11 gives an overview of the status of victims reported in the WH Books.⁶ This item is unavailable from the DR Books. The fractions (and absolute numbers) of civilian and military victims are almost the same, so it seems that even an (approximate) fifty-fifty distribution can be considered as appropriate.

Major conclusions from the results discussed in this section are the following:

- Both sources are highly consistent with regard to the overall number of reported deaths, age and sex distribution of the victims, and the time and (partly) cause-of-death patterns,
- Timing of deaths reported in each source is practically the same. The timing shows an increase in deaths from May 1993 to the highest numbers of deaths in the months of August and September 1993 and a decline afterwards until April 1994. This pattern is totally opposite to the seasonality pattern usually observed in mortality from natural causes. The seasonal mortality change is characterized by a systematic maximum of deaths in the winter and early spring months and a minimum in the summer and fall months.
- The fact that the observed timing is contradictory to the expected seasonality pattern in mortality suggests that causes of death of those that died during the siege of Mostar were completely different than natural causes. Only violent war-related causes could result in the dramatic increases in mortality in Mostar in the summer and fall of 1993.
- The reported causes of death are unfortunately poor in both sources but in particular in the Death Registries.
- In both sources (especially in the DR Books), the reporting of causes of death is particularly deficient in 1993, especially in the first months of the siege, most likely due to the extremely difficult circumstances and high intensity of the siege and organizational problems of the death registration system.

⁶ An external definition of status was used as described in the (Tabeau) report on wounded persons related to the siege of Mostar.

- Next to the causes of death, also the status (civilian vs. military) of victims is practically not available from the Death Registries. This must be carefully taken into account when producing estimates of victims by cause and status.
- Despite of these deficiencies, and because of a high degree of consistency of the two sources it is, however, fully justified to consider them as two reliable samples describing the same population of victims of the siege.
- The sources should be therefore combined and used jointly for producing a better more complete description of the victims of the siege.

4. SIEGE-RELATED DEATHS REPORTED IN THE TWO SOURCES MERGED TOGETHER

In this section we discuss the results of an analysis based on two sources, the War Hospital Books and the Death Registries, merged together. Combining the sources in one list is much more appropriate than analysing every source separately. Statistics produced from combined sources which have been cleaned from duplicated records, are much more complete and reliable.

Although many more mortality sources are available at the Demographic Unit, we used only two sources in this study, (WH and DR Books), as no more sources reported specific places of death within East Mostar. All other sources we have in our disposal report the place of death as a municipality, which implies that studying deaths from a small area of East Mostar is impossible. In order to provide a more complete picture of the victims killed in the entire Mostar municipality (and also in the entire Herceg-Bosna region) an additional study is planned to be submitted separately.

Because only two sources have been used in this study, it is rather certain that the statistics we produced are incomplete. It is difficult to assess to level of incompleteness, but some qualitative statements (by others) about the victimization in the siege of Mostar are available and can be compared with our numbers based on the records from War Hospital Books and Death Registries.

Details of merging the two East Mostar sources are explained below. Generally, the following steps were completed during the merging:

- Both sources (as a whole; DR=1,383 and WH=about 6,000) were first checked for duplicates within each source. Duplicates have been eliminated (10 from DR and 15 from WH Books).
- Death Registries (all 1,383 records) were matched with the ABH and HVO lists of fallen military personnel. Exactly 466 records were marked as militaries of which exactly 181 records are valid and related to the siege of Mostar.
- All War Hospital records, (those of the wounded and those of the dead individuals), were matched with the lists of fallen soldiers (ABH and HVO). A small number of wounded persons not marked as dead in the WH Books were successfully linked with the records of fallen soldiers. The dates of death and treatment in the War Hospital were compared. Only the unique records with consistent dates were taken for analysis (89; of which 31 records overlapped with fallen soldiers in DR). The matched records of fallen soldiers (58 after excluding the overlap with DR)) were accepted as additional records of deaths from East Mostar.
- In the main merging procedure, the Death Registries were considered the base source (i.e. the beginning for the merge). Reasons for this included the fact that the quality of

reporting names and other personal and death related details is higher in the Death Registries than in the War Hospital Books.

- Records from the War Hospital Books and additional records of fallen soldiers were appended to the records from Death Registries.
- Overlapping (or duplicated) records, i.e. records repeated in one, two or more sources, were eliminated from the consolidated list (in total 319).
- The consolidated list obtained at this stage (1,625) contained not only records from East Mostar but also many other records unrelated to the siege. In the next step of our project, we made a selection of valid reliable records that were at the same time relevant to the siege (539 siege-related).

In the remainder of this section we explain the criteria for selecting valid siege-related records (539) from the consolidated list of deaths reported in the WH and DR Books (1,625) and present siege statistics obtained from the selected 539 records.

4.1 The selection procedure is summarized in Table 12 below.

Table 12. An Overview of the Criteria for Records' Selection for the Analysis of Siege-of-Mostar Related Deaths

No.	Validity	Duplicate	East Mostar	YoD/MoD	War-Related Cause	Surname	First Name	YoB	Total
1	yes	no	yes	yes	yes	yes	yes	yes	539
2	no	no	yes	yes	yes	yes	yes	no	54
3	no	no	yes	yes	yes	yes	no	yes	1
4	no	no	yes	yes	yes	yes	no	no	2
5	no	no	yes	yes	yes	no	yes	no	1
6	no	no	yes	yes	yes	no	no	no	2
7	no	no	yes	yes	no	yes	yes	yes	13
8	no	no	yes	no	yes	yes	yes	yes	54
9	no	no	yes	no	no	yes	yes	yes	5
10	no	no	no	yes	yes	yes	yes	yes	694
11	no	no	no	yes	yes	yes	yes	no	19
12	no	no	no	yes	yes	yes	no	yes	4
13	no	no	no	yes	yes	yes	no	no	1
14	no	no	no	yes	yes	no	yes	yes	3
15	no	no	no	yes	yes	no	no	no	12
16	no	no	no	yes	no	yes	yes	yes	7
17	no	no	no	no	yes	yes	yes	yes	188
18	no	no	no	no	yes	yes	yes	no	3
19	no	no	no	no	yes	yes	no	no	1
20	no	no	no	no	yes	no	yes	yes	2
21	no	no	no	no	yes	no	yes	no	1
22	no	no	no	no	yes	no	no	no	1
23	no	no	no	no	no	yes	yes	yes	18
Total 2-23									1,086
24	no	yes	yes	yes	yes	yes	yes	yes	230
25	no	yes	yes	yes	yes	yes	yes	no	82
26	no	yes	yes	no	yes	yes	yes	yes	1
27	no	yes	no	yes	yes	yes	yes	yes	5
28	no	yes	no	yes	yes	yes	yes	no	1
Total 24-28									319
Overall Total									1,944

The selection criteria comprised three groups of items:

- Duplicates (only unique records were accepted)

- Relevance to the siege area and siege period (death in East Mostar from May 1993 to April 1994)
- Availability of detailed personal information (at least: names and year of birth)

In addition to the above criteria, cause of death was required to be either war-related or unknown. Deaths from natural causes, accidents, suicide, or just reported as “died” were excluded from the records approved for this analysis. Records with the unknown causes were taken as relevant, however. We believe that a vast majority (if not all) of these records were related to the siege. Because of the dramatic circumstances of the siege, its intensity and chaos, and the largely lacking or insufficient functioning of the state administration organs responsible for the registration of deaths many causes remained unreported in the sources used for this report, and especially in the Mostar Death Registries.

The above-mentioned procedure resulted in selecting **539 records** as valid and relevant to the siege. This number is the number of war-related deaths that can be linked directly to the siege of Mostar.

Regarding the rejected records, 319 were rejected as duplicates (alone or together with other deficiencies). Among the non-duplicated records, exactly 1,013 records were rejected as not adhering to the siege area and/or the siege period (again alone or in combination with other deficiencies). Also records with **unknown place of death** were rejected as part of this criterion; there were 517 such records, of which 484 had date of death consistent with siege period. Finally, 73 (non-duplicated) records were rejected because of poor personal information about the victims (names and/or year of birth).

Table 13. An Overview of Accepted Death Records by Source

Source	DR	WH	ABH	HVO	Total
Number	370	134	29	6	539

Out of the 539 accepted records, exactly 370 entered the consolidated list from the Death Registries, 134 from the War Hospital Books, 29 as the ABH records and 6 as HVO records (Table 13).

4.2 Table 14 summarizes the ethnicity of the persons that died during the siege of Mostar. Two types of statistics are given in this table: the minimum observed numbers of a given ethnic group and the estimated more complete numbers. The estimated numbers were obtained under the assumption that the individuals of unknown ethnicity have the same ethnic distribution as those with the well-reported observed ethnicity.

The most victims (87.8%) were of Muslim ethnicity. The minimum number of Muslim victims is 445 individuals and the more complete estimate is 473 persons (out of the total of 539 victims of the siege).

Table 14. Ethnicity Distribution of the Victims of the Siege

Ethnicity	Observed	Percent	Estimated	Percent
Muslim	445	87.8	473	87.8
Croat	36	7.1	38	7.1
Serb	22	4.3	23	4.3
Other	4	0.8	4	0.8
Unknown	32	na	na	na
Total	539	100.0	539	100.0

4.3 The civilian-military status of the victims was only available from the War Hospital Books and from Army records (ABH and HVO). The main source, the Mostar Death Registries, do not include this information.

The WH estimates of status (Table 11, Section 3, par. 3.6), report 48.5% (160) civilian victims and 47.9% (158) military victims. If detainees (12 persons or 3.6%) are considered as civilians, then the percent of civilian victims becomes 52.1% and their number 172 individuals. These percentages (52.1 and 47.9 percent), when applied to the total of 539 deaths, are equivalent to **281 civilians** and **258 militaries**.

The interval estimate for civilians is then from **172 to 281 persons**. The interval for militaries is from **158 to 258 individuals**. (The lower limits come from the WH Books; see Table 11 in Section 3)

Alternatively, the status can be estimated on the basis of matching of the consolidated list of 539 siege-related records with the lists of fallen military personnel (ABH and HVO). Death records successfully matched with the records of fallen soldiers can be then taken as militaries and all remaining records as civilians. The results of this approach are shown in Table 15 below.

Table 15. Distribution of the Victims of the Siege According to the Civilian-Military Status and Source

Source	Civilians	Militaries	Civilians (%)	Militaries (%)
War Hospital	78	56	58.2	41.8
Death Register	189	181	51.1	48.9
ABH	0	29	0.0	100.0
HVO	0	6	0.0	100.0
Total	267	272	49.5	50.5

Also in this approach about 50% death records are of civilians and 50% of militaries. In terms of absolute numbers, out of 539 siege-related deaths a minimum of the 267 deceased were civilians and a minimum of 272 were militaries.

4.4 Causes of Death of the victims of the siege are shown in Table 16.

Table 16. Distribution of the Victims of the Siege According to Cause of Death

Cause of Death	Observed	Percent	Estimated	Percent
Shelling	76	56.3	303	56.3
Killed	34	25.2	136	25.2
Gunshots	18	13.3	72	13.3
Wounding	6	4.4	24	4.4
Murdered	1	0.7	4	0.7
Unknown	404	na	na	na
Total	539	100.0	539	100.0

It is clear that a large number of deaths were reported without mentioning any cause of death at all (404). This does not mean that the unknown causes were unrelated to the siege. Most of these causes were associated with deaths that occurred in 1993 in the first (extremely intensive) months of the siege which were also characterized by serious problems with the registration of deaths.

Based on the assumption that the unknown causes would have the same distribution as the well-defined causes, the more complete estimates were produced and are shown in Table 16 together with the minimum numbers.

The *estimated* numbers in Table 16 are *not* fully reliable, however. Likewise the status, also the cause-of-death reporting is biased in the merged sources. The DR records, accepted as the first ones for the consolidated list, are at the same time extremely poor of reported causes of death. The reporting of causes is more reliable in the War Hospital Books.

Using the War Hospital Books we estimated in Table 6 (Section 3, par. 3.2) of this report the following:

- A minimum of 214 deaths of shelling (45.3%)
- A minimum of 49 deaths of gunshots (10.4%)
- A minimum of 209 deaths of unspecified violent cause (44.3%; covering cases like e.g. killed, murdered, wounded etc.)

When the above percentages are applied to the total of 539 deaths included in the consolidated list the following new estimates are obtained:

- 244 deaths of shelling
- 56 deaths of gunshots
- 239 deaths of unspecified violent causes

In consequence of this procedure the interval estimates of the major causes of death of the siege victims can be formulated:

Shelling was the foremost cause of death during the siege: 45.3% of individuals died of shelling; i.e. a minimum of **214 to 244** persons.

Another 10.4% (25.2+13.3) of deaths occurred because of being **gunshot**; from a minimum of **49 to 56** persons.

Remaining violent causes of unspecified character (44.3%) accounted for a minimum of **209 to 239** individuals.

4.5 The timing of deaths is discussed below in Table 17 and Figures 4 and 5. Generally, the intensity of siege was much higher in 1993 (especially in the summer) than in 1994. The most deaths occurred in the months of August and September 1993 (105 and 106, respectively). Since October 1993, a systematic decline is clearly seen in the number of deaths every month.

Table 17. Distribution of the Victims of the Siege According to Year and Month of Death

YoD	MoD	Observed
1993	May-93	28
1993	Jun-93	28
1993	Jul-93	68
1993	Aug-93	105
1993	Sep-93	106
1993	Oct-93	55
1993	Nov-93	50
1993	Dec-93	37
1994	Jan-94	30
1994	Feb-94	18
1994	Mar-94	8
1994	Apr-94	6
Total	All	539

Figure 4. Distribution of the Victims of the Siege According to Year and Month of Death

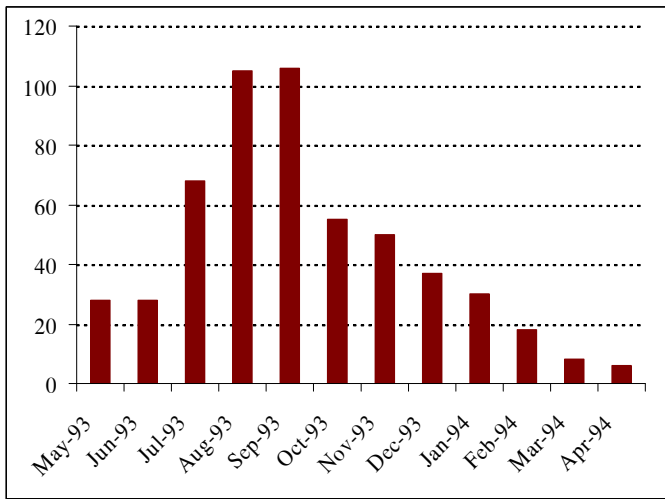
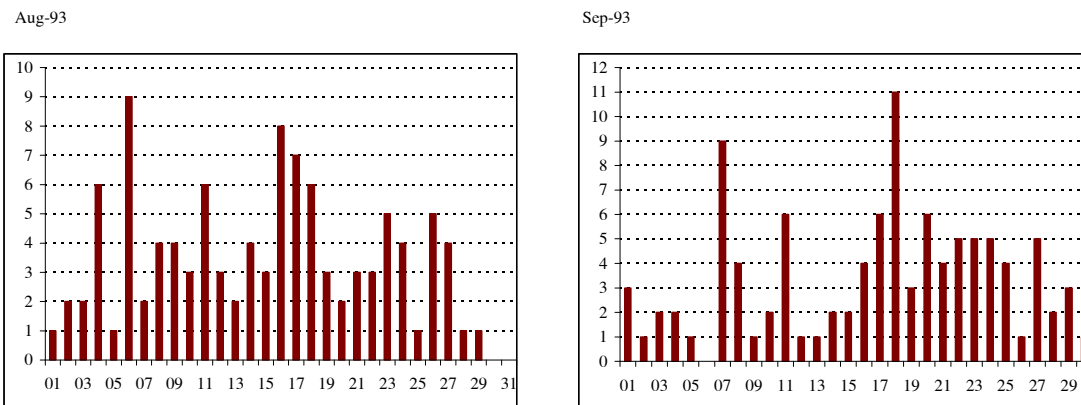


Figure 5. Distribution of the Victims of the Siege According to Day of Death in August and September 1993



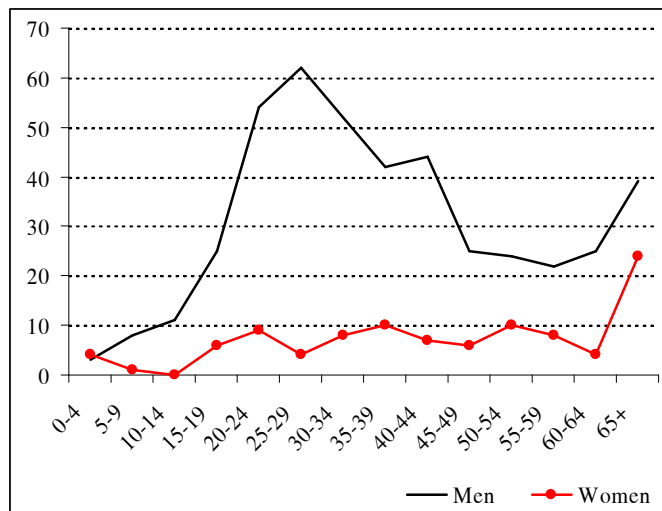
4.6 Finally, the sex and age distribution of victims is shown in Table 18 and Figure 6.

Table 18. Distribution of the Victims of the Siege According to Age and Sex

Age(5)	Men	Women	Unknown	Total
0-4	3	4	0	7
5-9	8	1	0	9
10-14	11	0	0	11
15-19	25	6	0	31
20-24	54	9	1	64
25-29	62	4	0	66
30-34	52	8	1	61
35-39	42	10	0	52
40-44	44	7	0	51
45-49	25	6	0	31
50-54	24	10	0	34
55-59	22	8	0	30
60-64	25	4	0	29
65+	39	24	0	63
Total	436	101	2	539

Men comprised 80.9% of all deaths (436), women 18.7% (101). The number of children and teenagers up to 19 years of age was 58 individuals (10.8%). Individuals at age from 20 to 64 years were the largest group (418 persons; 77.6%). 63 elderly persons at age 65 or more years died as well (11.7%).

Figure 6. Distribution of the Victims of the Siege According to Age and Sex



Most men died at ages from about 18 to 65 years. Striking is also a rapid increase in the number of male deaths after the age of 65 years. Generally, however, the age distribution of men is consistent with that of fallen soldiers.

Women died at all ages, but especially after 65 years. It is clear that the age pattern of women's deaths is not consistent with that of military personnel.

5. FINAL CONCLUSIONS

Below we summarize our major findings:

- The **minimum number** of persons that died during the siege of East Mostar (May 1993 to April 1994) is **539**. This total has been obtained from the consolidated list of two sources the War Hospital Books and the Death Registries. Duplicates and other deficient and/or unrelated records were excluded from this total.
- The minimum number of 539 deaths does not include deaths reported with an unknown place of death in the Death Registries. There were in total 517 such deaths, of which 484 records had the reported date of death from the siege-of-Mostar period (April 1993 to April 1994; duplicates excluded). These 484 records may have been relevant to the siege but are not reported under the minimum number.
- If the excluded 484 records are taken into account, **a new estimate** of the actual number of siege-related deaths becomes **1,023 deaths** of both civilians and soldiers (a minimum of 539 deaths plus an additional 484 deaths).
- 49.5% of siege-related deaths were of civilians (a minimum of 267 persons out of 539 deaths).
- 50.5% of deaths were of militaries (a minimum of 272 out of 539 deaths).
- Based on the consolidated list of the (minimum) 539 deaths, we estimated that 87.8% of deaths were of ethnic Muslims (a minimum of 445 to 473 persons out of 539 deaths).
- The timing of the 539 death shows a systematic increase in deaths from May 1993 to the highest numbers of deaths in August and September 1993 and a decline afterwards until April 1994. This pattern is totally opposite to the seasonality pattern usually observed in mortality from natural causes. The seasonal mortality change is characterized by a maximum of deaths in the winter and early spring months and a minimum in the summer and fall months.
- The fact that the observed timing of the siege-related deaths is contradictory to the expected seasonality pattern in mortality suggests that causes of death of those individuals that died during the siege of Mostar were completely different than natural causes. Only violent war-related causes could result in the dramatic increases in mortality in Mostar in the summer and fall of 1993.
- The reported causes of death are unfortunately poor in both sources but in particular in the Death Registries.
- In both sources (especially in the DR Books), the reporting of causes of death is particularly deficient in 1993, especially in the first months of the siege, most likely due to the extremely difficult circumstances, high intensity of the siege and organizational problems of the death registration system.
- Despite of the poor information about the causes of death we estimated (on the basis of War Hospital records) that the major causes included:
 - Shelling: 45.3% (a minimum of 214 to 244 deaths out of 539 deaths)
 - Gunshots: 10.4% (a minimum of 49 to 56 deaths out of 539 deaths)
 - Unspecified violent causes: 44.3% (a minimum of 209 to 239 out of 539 deaths)
- Using the consolidated list we also estimated the sex distribution of victims:
 - 80.9% were men (436 persons out of 539 deaths)
 - 18.7% were women (101 persons out of 539 deaths)
- Among the (minimum of) 539 victims there were children and youth below the age of 19 years: 58 persons, and the elderly at age 65 or more years: 63 persons.

- Finally, the most frequent age at death for men was 20 to 24 years whereas generally men very frequently died at 18 to 64 years of age. Women died uniformly at all ages from about 18 to 64 years.

We would like to stress that the above-mentioned statistics were obtained from a clearly conservative approach; very many records have been rejected because of missing information or deficiencies that perhaps could have been repaired. The final numbers presented in this report should be therefore seen as minimum numbers (i.e. “at least”). Opinions of other authors familiar with the siege of Mostar might show alternative statistics that are higher than our figures.