

Flygtningenævnets baggrundsmateriale

Bilagsnr.:	1736
Land:	Syrien
Kilde:	OHCHR - UN Office of the High Commissioner for Human Rights
Titel:	Civilian Deaths in the Syrian Arab Republic - Report of the United Nations High Commissioner for Human Rights
Udgivet:	28. juni 2022
Optaget på baggrundsmaterialet:	29. september 2022

Advance Unedited Version

Distr.: General
28 June 2022

Original: English

Human Rights Council

Fiftieth session

13 June–8 July 2022

Agenda items 4

Human rights situations that require the Council's attention

Situation of human rights in the Syrian Arab Republic

Civilian Deaths in the Syrian Arab Republic

Report of the United Nations High Commissioner for Human Rights

Summary

In its resolutions 46/22 and 49/27, the Human Rights Council requested the Office of the United Nations High Commissioner for Human Rights to resume its work to establish, document and publish the extent of civilian casualties in the Syrian Arab Republic, in cooperation with civil society, in order to fully assess the number of people killed as a result of 10 years of conflict. Building on previous efforts on casualty recording and reporting on the Sustainable Development Goals indicator 16.1.2 on conflict-related deaths, OHCHR presents its statistical analysis covering the period from March 2011 to March 2021.

I. Background

1. In its update to the Human Rights Council at its 48th session (A/HRC/RES/46/22), the Office of the United Nations High Commissioner for Human Rights (OHCHR) reported on casualties in the Syrian Arab Republic conflict based on a list of 350,209 identified individuals killed in the conflict between March 2011 to March 2021. More work was required to further analyze the data, including understanding how many of these deaths were civilians. On 1st April 2022, the Human Rights Council adopted resolution A/HRC/RES/49/27, noting with concern the number of people killed and emphasizing the importance of such comprehensive, verifiable and transparent records of the casualties of the conflict. The Human Rights Council also requested OHCHR to continue to document and publish civilian deaths and submit a report at its 50th session.

2. This report outlines and analyzes the results of OHCHR's work to produce a rigorous assessment of casualties during ten years of conflict in the Syrian Arab Republic, including through a statistical analysis of available data on conflict-related deaths. The data directly gathered by the UN, government entities and civil society organizations does not, and cannot be considered to, account for each and every casualty occurring in the Syrian Arab Republic conflict, owing to the major operational and practical challenges in collecting the necessary information in these circumstances of conflict. In response to the Human Rights Council's request, OHCHR has sought to address this gap through the use of established statistical techniques to provide a reliable estimate of the total civilian deaths that may have occurred during ten years of conflict – both documented and undocumented. The report, accordingly, includes both an enumeration of the documented conflict-related deaths, with yearly disaggregations by sex, age, the governorate where the death occurred, the cause of death by weapon type, actors alleged to have caused the deaths, and the civilian status of casualties, and statistical estimates to account for missing data on civilian deaths- undocumented and unidentified.

3. This statistical work builds on previous efforts in assessing **direct** conflict-related deaths, that is, deaths that resulted directly from war operations and where the acts, decisions and/or purposes that caused these deaths were in furtherance of or under the guise of armed conflict. They may have been caused by the use of weapons or other means and methods. For purposes of this report, the term 'casualties' is used to indicate deaths.¹ In 2013 and 2014, OHCHR commissioned three statistical analyses of documented killings in the Syrian Arab Republic.² In 2019, OHCHR reinforced its global engagement on casualty recording, monitoring and investigating incidents involving civilian casualties and resumed work on a statistical analysis to include the conflict in the Syrian Arab Republic in its global reporting on the Sustainable Development Goals indicator on conflict-related deaths (SDG indicator 16.1.2).³

4. This is the first time that OHCHR is able to report on civilian deaths resulting directly from the 10 years of conflict in the Syrian Arab Republic, including the total number of documented civilian deaths and the estimates of undocumented deaths. The massive figures in this report do not, however, include indirect deaths, namely those resulting mainly from loss of access to essential goods and services that was caused or aggravated by the conflict.

5. Monitoring and documenting conflict-related deaths are essential to help protect civilians and other potential victims, ensure better respect for international humanitarian and human rights law norms during and after the conflict and understand the patterns and consequences of armed conflicts for prevention purposes. Documenting individual cases is key to effectively realizing a range of fundamental human rights – knowing the truth, seeking accountability, and pursuing effective remedies. It can facilitate survivors' access to education, health care and property. It also supports and complements efforts to account for

¹ It should be noted that some casualty recording systems also include injured persons.

² <https://hrdag.org/wp-content/uploads/2013/02/Benetech-final-SY-report.pdf>;
<https://www.ohchr.org/Documents/Countries/SY/HRDAG-Updated-SY-report.pdf> ;
<https://www.ohchr.org/Documents/Countries/SY/HRDAGUpdatedReportAug2014.pdf>.

³ For more information on this indicator, see <https://www.ohchr.org/EN/Issues/Indicators/Pages/SDGindicators.aspx>.

missing people. In the Syrian Arab Republic's context, OHCHR has been engaged in various activities to address the issue of missing persons, from monitoring related violations and normative developments impacting the rights of victims, survivors and their families to cooperation with relevant actors and promoting the use of international human rights mechanisms.

II. Documenting deaths through casualty recording and statistical analysis

6. The United Nations started casualty recording as part of its ongoing monitoring and investigation work to identify patterns of harm to civilians in conflict situations. The systematic collection and verification of information on incidents of casualties enable the United Nations and other casualty recorders, as well as users of their data and analysis, to follow up on individual cases in support of victims and justice, while also giving a clearer sense of the severity and scale of the conflict and its developments. Casualty recording does not, as such, make findings about the lawfulness of the related deaths under international humanitarian or human rights law, but instead provides a factual description of the events that have taken place and personally identifiable data about the victim. This enables the United Nations to take steps to mitigate harm to civilians, including by engaging with the parties to the conflict themselves.

7. The operating environment in which casualty recording is undertaken is often challenging, with limitations in terms of access to the site of incidents and/or the area where casualties are being reported. In many contexts, and where civil society actors undertake casualty recording, efforts at real-time documentation and dissemination of information on victims, the circumstances of their death and those responsible can put the recorders themselves at risk. They also face multiple challenges in their documentation efforts, including the collapse of their usual networks of information as people are on the move, displaced or in areas where there is a general information shut-down; the limited, or lack of, access to mobile data, internet and electricity to collect and transmit information; limitations on their movements; and surveillance. Despite this, in many contexts, individuals and organizations seek to document at least some of the casualties taking place, frequently focusing on the deaths of civilians.

8. In the Syrian Arab Republic, OHCHR Syria Office has been conducting independent monitoring of the human rights situation throughout the country. It undertakes inquiries into the impact of armed conflict and violence on civilians and alleged human rights violations and abuses and violations of International Humanitarian Law (IHL), irrespective of when, where or by whom such violations or abuses were or are being committed. As OHCHR does not have access to the territory of the Syrian Arab Republic and hence cannot access directly the locations where incidents have taken place, it relies on remote monitoring via a range of techniques to gain information through reliable networks and sources.

9. While every effort is made to ensure that information on civilian casualties recorded by the OHCHR Syria Office is as comprehensive as possible, the data are not exhaustive of all incidents occurring in the Syrian Arab Republic.⁴ To address these limitations to the extent possible, the statistical analysis outlined below used integrated and more comprehensive information collected from multiple sources, including the Government of the Syrian Arab Republic, Syrian human rights groups and OHCHR's Syria office.

⁴ OHCHR Syria Office reports on incidents that exemplify human rights issues of concern. These incidents reflecting civilian casualties are not to be considered as comprehensive, due to the changing patterns of the conflict and the limited access to credible and/or reliable sources in many conflict-affected areas. Verifying all incidents occurring across the Syrian Arab Republic remains challenging and thus, the civilian casualties reported by OHCHR are only indicative and verified in accordance with OHCHR methodology.

10. OHCHR is the international "custodian agency" for the SDG indicator 16.1.2 on the number of conflict-related deaths per 100,000 population by sex, age, and cause of death⁵ and, as such, is responsible for methodological development, capacity building, compilation, and reporting for this indicator globally. This indicator is part of the SDG indicators framework adopted by the General Assembly in July 2017.⁶ OHCHR has developed a conceptual, methodological and data collection framework for this indicator based on international legal standards, existing statistical classifications, and the groundwork of established practices in casualty recording, as well as extensive consultations with relevant stakeholders. The methodology, has been approved by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs), composed of representatives of National Statistical Offices and regional and international UN agencies as observers. Under this indicator, OHCHR has been reporting data on 12 of the world's deadliest armed conflicts, including the Syrian Arab Republic, since 2020.

11. The conflict-related deaths presented in this report are not simply a set of abstract numbers. Casualty data represent individual human beings with families who belong to communities. The very purpose of the data collection effort is to strengthen the protection of these individuals and communities and respect for victims' rights, including their right to seek justice, truth and reparation.

III. Methodology

A. Data sources used

12. On 24 March 2021, the Human Rights Council adopted resolution A/HRC/RES/46/22, which requested OHCHR to resume its work to establish the extent of civilian casualties in the Syrian Arab Republic, in cooperation with civil society, in order to fully assess the number of people killed as a result of 10 years of conflict and to report on progress through an oral update to the Council at its forty-eighth session in September 2021. Pursuant to this mandate, in July 2021, OHCHR issued a call for submissions of available data on casualties during the 10 years of conflict in the Syrian Arab Republic.⁷ OHCHR also addressed via a Note Verbale the Permanent Mission of the Syrian Arab Republic to the United Nations Office at Geneva and Specialized Institutions in Switzerland, requesting any information on conflict-related deaths from March 2011 to March 2021.

13. To produce this report, OHCHR benefitted from the collaboration of a number of organizations that have been engaged in gathering information and documenting casualties over many years in the Syrian conflict in very challenging circumstances. Some of these had already contributed data for OHCHR reporting on the SDG conflict-related deaths indicator and OHCHR's previous reports on the Syrian Arab Republic. The sources used for this report and the corresponding periods for which they shared data with OHCHR are as follows:

1. Damascus Center for Human Rights Studies (DCHRS)⁸ – March 2011-December 2018.
2. Center for Statistics and Research–Syria (CSR-SY)⁹ – March 2011-March 2021.

⁵ See the Technical Guidance Note for this indicator, available at:

https://www.ohchr.org/sites/default/files/Documents/Issues/HRIndicators/SDG_Indicator_16_1_2_Guidance_Note.pdf.

⁶ See A/RES/71/313, E/CN.3/2020/2, Annex II and E/CN.3/2021/2, Annex. The indicator contribute to the measurement of target 16.1, aiming "to significantly reduce all forms of violence, and related death rates everywhere."

⁷ <https://www.ohchr.org/EN/Countries/MENARegion/Pages/SyriaCallSubmission10yearsofconflict.aspx>.

⁸ <http://dchrs.org/>.

⁹ <https://csr-sy.org/>.

3. Syrian Network for Human Rights (SNHR)¹⁰ – March 2011-March 2021.
4. Syrian Observatory for Human Rights (SOHR)¹¹ – March 2011-March 2021.
5. Violations Documentation Center (VDC)–March 2011 – February 2020¹².
6. Syrian Arab Republic Government records – March 2011-November 2012.
7. Syria Shuhada records¹³ – March 2011-May 2014.
8. OHCHR Syria records – January 2019-March 2021.

14. OHCHR has engaged bilaterally with DCHRS, CSR-SY, SNHR, SOHR, and VDC, to understand their methodology, including the categories used to disaggregate the data. OHCHR has been working with these organizations over time, and although their capacities have varied over the course of this 10-year period, they have maintained consistency in the quality and content of their respective records. OHCHR further contracted the Human Rights Data Analysis Group (HRDAG), the same organization to which it commissioned in 2013 and 2014 the statistical analyses of conflict-related deaths in the Syrian Arab Republic, to work with OHCHR statistical and data experts in analyzing the hundreds of thousands of records to be reviewed and compared to avoid duplication, while applying appropriate statistical techniques to account for the missing data in existing records and undocumented civilian deaths.¹⁴

B. Process and techniques used

15. The analysis undertaken used established statistical and computer science techniques composed of four main steps: 1) accessing and preparing records (data processing); 2) identifying records that refer to the same person who died (semi-supervised record linkage or data integration); 3) estimating missing fields from observed records of deaths (imputation), and 4) estimating undocumented deaths (multiple systems estimation). These four steps were carried out by the technical team in HRDAG, in close consultation with subject-matter experts in OHCHR. For details, see the technical note in Annex II of this report.

16. The first two steps of data processing and record linkage resulted in an enumeration of individuals with their full name, date and location of death. For many records, additional information was also available, including in relation to the identity of the persons who died, circumstances and the cause of death, the actors alleged to cause the deaths, and the status of the individual as a civilian or not. This integrated dataset was the basis for the findings regarding *documented* deaths in Section III of this report.

17. Documented deaths reflect what has been recorded by the relevant data sources. However, when hostilities are of higher intensity, documenting deaths becomes particularly challenging, and documentation that occurs at the time of events may not be fully representative of the actual scale of casualties taking place. Therefore, established statistical estimation techniques¹⁵, steps three on imputation and four on multiple systems estimation, have been applied to account for *undocumented deaths* to assist in drawing conclusions about patterns of casualties. Due to limited time and resources, the estimations focused on *civilian* deaths only.

¹⁰ <http://sn4hr.org/>.

¹¹ <https://www.syriahr.com/>.

¹² VDC is a project of the Syrian Center for Media and Freedom of Expression (SCM), <https://vdc-sy.net/>. The records were scraped from their website with permission.

¹³ Some of the records were downloaded by the Human Rights Data Analysis Group (HRDAG) with permission and some were shared by Syrian Shuhada. The records were used in the 2013 reports on killings in the Syrian Arab Republic commissioned by OHCHR.

¹⁴ HRDAG is a non-profit, non-partisan organization which applies scientific methods to the analysis of human rights violations around the world. They have provided their expertise to truth and reconciliation commissions, UN missions, human rights bodies, and international and domestic criminal tribunals. For more information, see <https://hrdag.org/>.

¹⁵ See Annex II for the technical notes on the methodology.

IV. Documented conflict-related deaths (2011-2021)

A. Overall documented deaths

18. Based on the information collected by the eight sources listed in the previous section, OHCHR finds a total of **350,209** unique, documented, identifiable casualties for the period 1 March 2011 through 31 March 2021. A casualty is considered identifiable if their full name, date of death, and the governorate in which they died have been recorded. Records missing any of this information are excluded from this analysis. The number of documented deaths by sex, age group, and governorate, actors alleged to have caused the deaths, the civilian status of casualties, and the cause of death by weapon type for each year are presented in Tables A1–A7 in the annex.

19. There were 27,126 deaths of children which means that, on average, one in every 13 deaths was a child. When comparing deaths of males and females (women and girls), one in every 13 deaths was a female (26,727). The greatest number of documented deaths was recorded in the Governorate of Aleppo, with 51,731 individuals who died. Other locations with very heavy death tolls recorded were Rural Damascus, with 47,483 deaths; Homs, with 40,986 deaths; Idlib, with 33,271 deaths; Hama, with 31,993 deaths; and Tartus, with 31,369 casualties recorded.

20. The data sources also provided some information describing the circumstances of the death and, in some cases, more detailed information on the cause of death, by type of weapons or means and methods used, as can be seen in Table A5 in the annex.¹⁶ The information provided does not give a comprehensive picture of the weapons and methods used in the conflict. For example, for 45,746 (13.1 per cent) deaths, the cause of death was unspecified or unknown. However, 122,931 (35.1 per cent) deaths were attributed to the use of *multiple weapons*, including in the context of incidents of clashes, ambush, storming and massacres. Other causes of death are, in decreasing order, *heavy weapons and explosive munitions*, with 81,640 (23.3 per cent) deaths; *small arms and light weapons*, 76,417 (21.8 per cent) deaths; *use of objects and other means* (including sexual violence, death in custody, torture, strangulation, mutilations, beheadings, and hanging), 12,259 (3.5 per cent) deaths; and *planted explosives and UXOs*, 9,184 (2.6 per cent) deaths. The documentation showed a total of 1,235 (0.4 per cent) deaths caused by *chemical, biological, radiological, or nuclear (CBRN) weapons*, with most of these deaths (893) recorded in 2013. Lastly, 643 (0.2 per cent) deaths were caused by *denial of access to/ destruction of objects indispensable for survival resulting directly from war operations*.

21. The Independent International Commission of Inquiry on the Syrian Arab Republic (henceforth the Commission) recorded numerous instances of indiscriminate use of airstrikes, bombings, and planted explosives by numerous actors, including in civilian-populated areas where the Commission did not find military objectives in the vicinity, such as markets, hospitals, schools and public spaces where civilians gathered in large numbers, which killed and injured civilians throughout the ten years of conflict. The Commission also recorded thousands of cases of civilians tortured, raped and subjected to other forms of sexual violence,

¹⁶ For the disaggregation of the ‘cause of death’, including types of weapons, the categories are based on the categories used for the SDG indicators 16.1.2. These categories build on the World Health Organization (WHO) International Classification of Diseases (ICD-11), the International Classification for Crime Statistics (ICCS), the International Committee of the Red Cross (ICRC) overview of weapons regulated by IHL, UN practice and OHCHR casualty recording. For more information see, https://www.ohchr.org/sites/default/files/Documents/Issues/HRIndicators/SDG_Indicator_16_1_2_Guidance_Note.pdf. The original records shared with OHCHR include 38,943 unique descriptions of causes of death. The 200 most frequently occurring causes of death were coded by hand, which accounted for the majority of the records. The remaining causes of death were categorized using keyword searches. Using this approach, the majority of the unique cause of death values to a cause of death category were mapped out. 3,286 values (about 8%) could not be matched due to insufficient information on the circumstances of the death. These were assigned to the ‘unknown’ category.

arbitrarily detained and forcibly disappeared or killed in detention.¹⁷ In 2013, the Commission documented a major attack with sarin-filled rockets on eastern Ghutah that killed, maimed, injured and terrorized Syrian civilians. The Commission also documented 38 separate instances of the use of chemical weapons, noting that each of them amounted to a war crime; 32 of these met its standard of proof for attribution to the Syrian Arab Republic government forces and 1 to ISIL. In the remaining 5 instances, the Commission could not attribute responsibility.¹⁸

22. The data sources that contributed to this analysis also provided certain information on the actors or groups alleged of causing the death, as can be seen in Table A6 in the annex. According to available data, 39.3 per cent of deaths (137,529) were allegedly caused by actions by the Government and its allies, 35.7 per cent (125,098) by non-State armed groups, which include anti-government groups (5.3 per cent, 18,519), Islamic factions (24.9 per cent, 87,039) and Islamic State (5.1 per cent, 17,868). 0.8 per cent of deaths (2,859) were allegedly caused by the coalition forces, and for 24.2 per cent (84,595) of the documented conflict-related deaths, the actors were recorded as unknown. It should be noted that to provide a more complete picture of the attribution of casualties to the various actors, more work would be required, including applying the estimation techniques detailed below.

B. Documented civilian deaths

23. For purposes of this report, civilian status is used as a factual category referring to persons who, based on available data and the methodology applied, were not members of the State armed forces nor directly participating in hostilities at the time of their death. For purposes of the statistical analysis, recorded deaths were classified as civilian if at least one source identified them as civilian, and no source identified them otherwise. Recorded deaths were classified as non-civilian if at least one source identified them as non-civilian, and no source identified them otherwise. Some of the records with missing information or with information contradicting that in other records may pertain to civilians. As a result, the records identifying casualties as civilians provide a minimum verifiable number and are certainly an undercount of the actual number of civilians who died. **Of the 350,209 deaths recorded, 143,350 or 40.9% were identified as civilians.** For a significant number of recorded deaths, 44,768 or 12.8 per cent, the sources have provided contradictory information about their status, while for 23,116 or 6.6 per cent, the status is unknown. Finally, 138,975 or 39.7 per cent have been categorized as non-civilian. Similar to the analysis of attribution above, a statistical estimation would enable a fuller understanding of the overall numbers of casualties – documented and undocumented – for both civilians and non-civilians.

V. Estimations for civilian deaths (2011-2021)

24. Two statistical estimation techniques, *imputation and Multiple Systems Estimation (MSE)*, were applied to estimate the total number of civilian deaths, which includes both the **documented** and the **undocumented** civilian deaths, with a measure of the uncertainty in the estimates. The imputation served to fill-in missing and contradictory information in the documented records of deaths. The information on fully documented civilian deaths and the imputed values were then used to estimate undocumented deaths through MSE. Consequently, an additional estimated **163,537¹⁹ civilian deaths** occurred that have **not been documented**. Even if these individuals whose death has not been documented cannot be named, they deserve to be counted. Accordingly, the total civilian casualties is estimated to be **306,887²⁰** with an approximate 95 per cent credible interval. This 95% credible interval

¹⁷ A/HRC/46/55.

¹⁸ A/HRC/46/54, paras 9 and 24 and 32; A/HRC/46/55; A/HRC/43/57, paras 22 and 24 and https://www.ohchr.org/sites/default/files/Documents/HRBodies/HRCouncil/CoISyria/COISyria_Chemical_Weapons.jpg.

¹⁹ For the undocumented civilians deaths, the credibility interval is between 138,093, and 194,621.

²⁰ This estimate is based on both records of deaths consistently identified as civilians across one or more

implies that, given the observed data and assuming that the model is correct, there is a 95% chance that the true number of civilian deaths is between 281,443 and 337,971. This figure means that the average daily death toll over ten years is an estimated 83 civilians, 15 of whom were females (women and girls), and 18 were children. The extent of the civilian casualties in the last ten years of conflict represents a staggering 1.5 per cent of the total population of the Syrian Arab Republic at the beginning of the conflict, raising serious concerns as to the failure of the parties to the conflict to respect international humanitarian law norms on the protection of civilians.

25. For the documented civilian deaths, the number of deaths mostly decreased after 2012. However, according to the estimated figures, while deaths were extremely high in 2012, they peaked in 2013, with a possible further spike in 2014-2015 before decreasing quite significantly in 2016. Between 2016-2018, it is possible that the civilian deaths increased again slightly. From 2018 onwards, both the documented and estimated figures show a continuous reduction in the number of civilian deaths. Figure 1 in the annex compares the documented civilian casualties (solid black line) and the estimated (dashed black line) for each year across the Syrian Arab Republic. The lighter grey shading around the dashed black line indicates the 95% credible interval for the estimates.

26. Explanation for the pattern of civilian deaths described above may be found in changes in the areas of influence by the different actors in the conflict. For example, the Commission reported that between 2012 and 2016, various armed groups and later United Nations designated terrorist groups²¹ gained control over increasing numbers of cities and towns with significant populations. The Government imposed sieges and bombarded areas of suspected opposition activity, including densely populated civilian areas.²² Several incidents of hostilities documented by the Commission also provide context to the estimated increase in civilian deaths in 2015, including the capture of Idlib by a coalition of non-State armed groups in March, the commencement of Russian military intervention, particularly with increased airstrikes in support of the Government in September, and the capture of a large amount of ISIL territory by the Kurdish-led armed groups supported by the international coalition in the north-east of the country.²³ The period 2016-2018 marked significant changes in the conflict, supporting the finding of a possible spike in hostilities, including the Government's recapture of eastern Aleppo after intense government shelling and airstrikes in late 2016, the use of sarin in Khan Sheykhun (Idlib) in April 2017, which prompted the first direct airstrikes on the Syrian Arab Republic Government facilities by the United States-led coalition, and the capture of Raqqah city, the de facto 'capital' of ISIL, by the Syrian Democratic Forces and its allies.²⁴ The Commission recorded eruptions in fighting in late 2019 and the first quarter of 2020 and warned that "without concerted, immediate action to further a permanent ceasefire and a good faith Syrian-led peace process, the conflict may yet descend to new levels of inhumanity."²⁵

27. In terms of disaggregation by governorate, the highest number of civilian deaths, documented and undocumented, was recorded in Rural Damascus (61,800), Aleppo (51,563), Deir ez-Zor (38,041), Idlib (36,536) and Homs (29,983).²⁶ Figure 2 in the annex shows a

data sources as well as imputed values for deaths with unknown or contradictory information on the civilian status. It excludes information from: Tartus in 2017, 2019, and 2020 and Damascus in 2021. These strata could not be estimated because there was not sufficient data to construct estimates using MSE. In total, these strata represent less than 0.01% of the total number of civilian deaths documented from 1 March 2011 through 31 March 2021. As this is a very small proportion of the total number of documented civilian deaths, the exclusion of these strata from the estimations does not impact the substantive conclusions about civilian deaths in the Syrian Arab Republic during this period. Additionally, there were no documented civilian deaths in Latakia in 2021 and Tartus in 2018 and 2021, so these results do not reflect the civilian deaths that may have been happening in those governorate and years, but was not documented by any of the data sources.

²¹ Hay'at Tahrir Al-Sham and ISIL.

²² A/HRC/46/54, para. 6.

²³ A/HRC/46/54, paras 11-12.

²⁴ A/HRC/46/54, paras 13-18.

²⁵ A/HRC/46/54, paras 19 and 21.

²⁶ With the following 95 per cent credible intervals between: 53,192; 73,592 (Rural Damascus); 46,315;

comparison of Daraa and Deir ez-Zor. The documented civilian deaths in both governorates are similar (the black bars are nearly the same height), but there are significantly more estimated undocumented civilian deaths in Deir ez-Zor. From 2014 until 2017, ISIL besieged the densely populated Government-held neighbourhoods of Deir es-Zor and launched widespread and systematic attacks against its civilian populations.²⁷ It is likely that due to the intensity of the crimes and terrorizing acts of ISIL, the documentation efforts became less representative of the scale of the hostilities occurring. For the disaggregation by age and sex, the estimated numbers confirmed what is typically known about conflicts: more adults than children die and more men than women.

28. For this report, it was not possible to undertake a statistical estimate of the cause of death and of the actors alleged of causing the death, based on the techniques described in Section III.B, which would have required additional time and resources. Furthermore, no analysis of indirect conflict-related deaths²⁸ is included, which would be crucial to fully account for the impact of the conflict.

VI. Conclusions and Recommendations

29. Over the past ten years, civilians have borne the brunt of the conflict, with an estimated **306,887 direct civilian deaths** occurring. This is more than double the number of civilian deaths organizations have been able to document in this ten years period, illustrating the magnitude of the impact of the conflict, as well as how statistical estimation techniques can reinforce the information derived from the documented casualties. It should be clear that this still represents only a portion of all deaths, as estimations of non-civilian casualties and of deaths resulting from the indirect effect of conflict, mainly through denial or reduced access to essential goods and services, would be required to complete a full picture of the loss of life endured. The number of civilian deaths, both documented and estimated, raises serious concerns as to the failure of the parties to the conflict to respect international humanitarian law norms on the protection of civilians.

30. The work done by casualty recorders in documenting individually verifiable information on each casualty is critical. The process is victim-centred, placing individuals, their families and communities at the centre by ensuring that those killed are not forgotten, and that information is available for accountability-related processes and to access a range of human rights. At the same time, taken collectively, data on casualties, the circumstances and the cause of their death help identify patterns of harm and shed light on behaviours that have the most adverse effect on civilians and, in some instances, on the identity of those responsible. Documenting conflict-related deaths in the midst of conflict is extremely difficult and potentially dangerous. **The consistent and systematic work of the individuals and groups that have documented casualties on the ground for the ten years of conflict in the Syrian Arab Republic should be acknowledged and supported.**

31. Documenting deaths directly complements efforts to account for missing persons, in particular those who went missing in the context of military operations. Given the vast number of missing persons in the Syrian Arab Republic, **OHCHR supports calls for the creation of an independent mechanism with a strong international mandate to clarify the fate and whereabouts of missing people, identify human remains, and provide support to relatives.**

32. To protect Syrian civilians – men, women and children – the hostilities must end. In the meantime, compliance with international humanitarian law and human rights law is the only way to prevent and alleviate their suffering. In particular:

58,616 (Aleppo); 29,221; 50,771 (Deir ez-Zor); 32,471; 41,869 (Idlib) and 26,920; 34,169 (Homs).

²⁷ A/HRC/46/54, paras 45 and 53.

²⁸ Indirect deaths are deaths resulting from a loss of access to essential goods and services (e.g. economic slowdown, shortages of medicines or reduced farming capacity that result in lack of access to adequate food, water, sanitation, health care and safe conditions of work) that are caused or aggravated by the situation of armed conflict.

(a) **The parties to the conflict should strictly abide by their international humanitarian law and human rights obligations and ensure the protection of civilians in their military operations**, including by avoiding the use of explosive weapons in populated areas (EWIPA);

(b) **The Government of the Syrian Arab Republic should:**

(i) **grant OHCHR immediate, full and unfettered access throughout the Syrian Arab Republic** to facilitate human rights monitoring, as well as casualty recording; and

(ii) **provide access to effective remedies and reparations for all victims and survivors**, including ensuring effective accountability and transitional justice mechanisms, with meaningful participation of victims and survivors to bring about a sustainable, inclusive and peaceful conclusion to the conflict;

33. Unless and until the conflict ends, there is a continued risk of civilian deaths. It is therefore critical that all States, the United Nations and civil society use all available means to end the conflict and support a transition to peace. Vulnerable groups will feel the impact of the conflict even after it ends. It is important that special measures, such as those usually afforded to war veterans and their families, be extended to support the livelihood and other opportunities of those who have lost a family member, and care and support for those suffering long-term conflict-related injuries.

34. The estimation of the undocumented deaths using available statistical tools complements and reinforces the information derived from the documentation of individual deaths and adds to the existing understanding of patterns of hostilities. Further analysis could be conducted on specific incidents; circumstances of death, such as during sieges or in custody; and particular periods, such as during negotiated ceasefires. The same estimation techniques could also be applied to other data available for Syria, namely on non-civilian deaths, enabling better comparisons of civilian and non-civilian deaths. Such rigorous statistical analyses can support court cases and other accountability or transitional justice mechanisms and be used for historical purposes and beyond. For these further estimations to be done and for estimated civilian casualties to be calculated in other contexts, **OHCHR would require additional resources to bolster its capacity to apply the statistical techniques used in this report, as well as to develop methodologies to estimate indirect deaths** for the conflict in the Syrian Arab Republic and other armed conflicts.

Annex I

Tables and Figures

Table A1: Documented deaths by year

<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>
10,105	60,873	58,532	46,593	49,959	45,117	34,331	23,372	12,324	7,729	1,274	350,209

Table A2: Documented deaths by governorate and year

	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>
Al-Hasaka	92	689	699	701	1,251	760	395	614	1,129	329	162	6,821
Aleppo	235	7,234	8,348	7,949	7,406	10,600	2,944	4,308	1,295	1,197	215	51,731
ar-Raqqah	44	587	922	624	468	1,015	2,514	859	713	284	69	8,099
As-Suwayda	106	878	1,034	1,109	1,611	1,268	689	279	42	64	21	7,101
Damascus	317	3,357	3,730	2,108	1,779	1,027	1,213	882	221	278	3	14,915
Daraa	1,190	3,908	4,367	3,764	3,204	1,812	1,665	1,279	305	404	156	22,054
Deir ez-Zor	405	3,785	2,415	2,778	2,157	2,468	3,286	2,900	1,543	735	290	22,762
Hama	1,424	5,809	4,455	3,946	4,064	3,398	4,099	1,729	2,082	845	142	31,993
Homs	3,062	9,374	7,474	4,946	5,544	4,801	3,734	1,243	272	501	35	40,986
Idlib	1,173	6,332	4,092	3,204	3,704	3,647	2,974	2,288	3,892	1,831	134	33,271
Latakia	775	4,440	4,023	3,477	5,347	4,672	3,368	808	625	876	9	28,420
Quneitra	48	420	686	722	547	375	290	56	18	25	17	3,204
Rural Damascus	714	10,058	11,407	6,833	7,000	4,361	2,804	4,070	141	74	21	47,483
Tartus	520	4,002	4,880	4,432	5,877	4,913	4,356	2,057	46	286	0	31,369

Table A3: Documented deaths by sex and year

	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>
Female	325	4,135	5,193	3,517	3,547	3,770	2,613	2,033	1,052	423	119	26,727
Male	9,778	56,082	51,557	41,354	45,651	41,300	31,698	11,139	4,877	2,787	1,154	297,377
Unknown	2	656	1,782	1,722	761	47	20	10,200	6,395	4,519	1	26,105

Table A4: Documented deaths by age group and year

	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>
Adult	8,713	53,202	48,809	39,351	43,627	38,225	29,004	6,759	3,212	1,586	1,065	273,553
Child	591	4,692	5,109	3,502	3,379	3,741	2,337	2,058	1,144	418	155	27,126

Unknown	801	2,979	4,614	3,740	2,953	3,151	2,990	14,555	7,968	5,725	54	49,530
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Table A5: Documented deaths by cause of death and year

	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>
Heavy weapons and explosives	175	15,612	15,582	11,547	11,023	12,144	7,464	4,968	2,095	823	207	81,640
Planted explosives and UXOs	109	892	966	1,094	1,146	1,450	1,723	777	593	245	189	9,184
Unspecified or unknown	2,662	8,644	5,960	5,980	5,158	3,905	3,501	4,890	3,095	1,656	295	45,746
Small arms and light weapons	6,660	21,326	19,424	12,205	6,838	4,801	2,616	1,182	535	385	445	76,417
Use of objects and other means²⁹	454	1,509	2,685	2,972	2,111	686	306	866	341	293	36	12,259
Chemical, biological, radiological, nuclear (CBRN)	0	11	893	48	100	31	107	36	9	0	0	1,235
Denial of access to/destruction of objects indispensable to survival resulting directly from war operations	16	66	100	62	101	144	107	31	15	0	1	643
Incendiary	3	20	22	1	16	12	6	5	22	10	15	132
Accidents	0	1	6	2	1	6	2	3	1	0	0	22
Multiple weapons used	26	12,792	12,894	12,682	23,465	21,938	18,499	10,614	5,618	4,317	86	122,931

Table A6: Documented deaths by actors/groups alleged of causing the death and year

	<i>2011</i>	<i>202</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>Total</i>
Government and allies	3,958	25,132	25,747	15,910	20,881	19,654	11,330	8,882	3,936	1,780	319	137,529
Coalition Forces³⁰	0	1	9	126	292	583	1,488	273	59	5	23	2,859
Non-state armed groups:												
Anti-government groups	1,211	6,537	3,812	3,156	1,786	1,031	494	381	71	37	3	18,519

²⁹ For example, sexual violence, death in custody, torture, strangulation, mutilations, beheadings, hanging.

³⁰ US-led coalition combating ISIL and including more than 60 countries.

Islamic Factions ³¹	1,425	12,088	10,057	10,002	19,527	17,326	15,235	836	315	158	70	87,039
Islamic State	4	315	1,762	3,511	3,680	3,593	3,230	1,168	188	277	140	17,868
Kurdish-led armed groups	0	0	1	2	77	157	186	199	244	71	42	979
Turkish affiliated armed groups	0	0	0	2	22	70	97	341	70	79	12	693
Others³²	0	0	0	0	0	1	0	0	3	85	39	128
Unknown	3,507	16,800	17,144	13,884	3,694	2,702	2,271	11,292	7,438	5,237	626	84,595

Table A7: Documented deaths by civilian status and year

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Unknown	1024	3120	3691	2289	2884	2869	2374	3044	1306	514	1	23,116
Contradictory	1697	12220	13923	10531	3094	1419	516	889	260	199	20	44,768
Civilian	5694	31075	25920	19123	17351	16239	10940	9055	4644	2526	783	143,350
Non-civilian	1690	14458	14998	14650	26630	24590	20501	10384	6114	4490	470	138,975

³¹ Al Nuusra, HTS, non-specific mentions to Islamic Factions and reports in which both Islamic Factions and ISIL were reported.

³² Israeli Forces and Jordanian Border Guard.

Figure 1: Documented and estimated civilian deaths over time

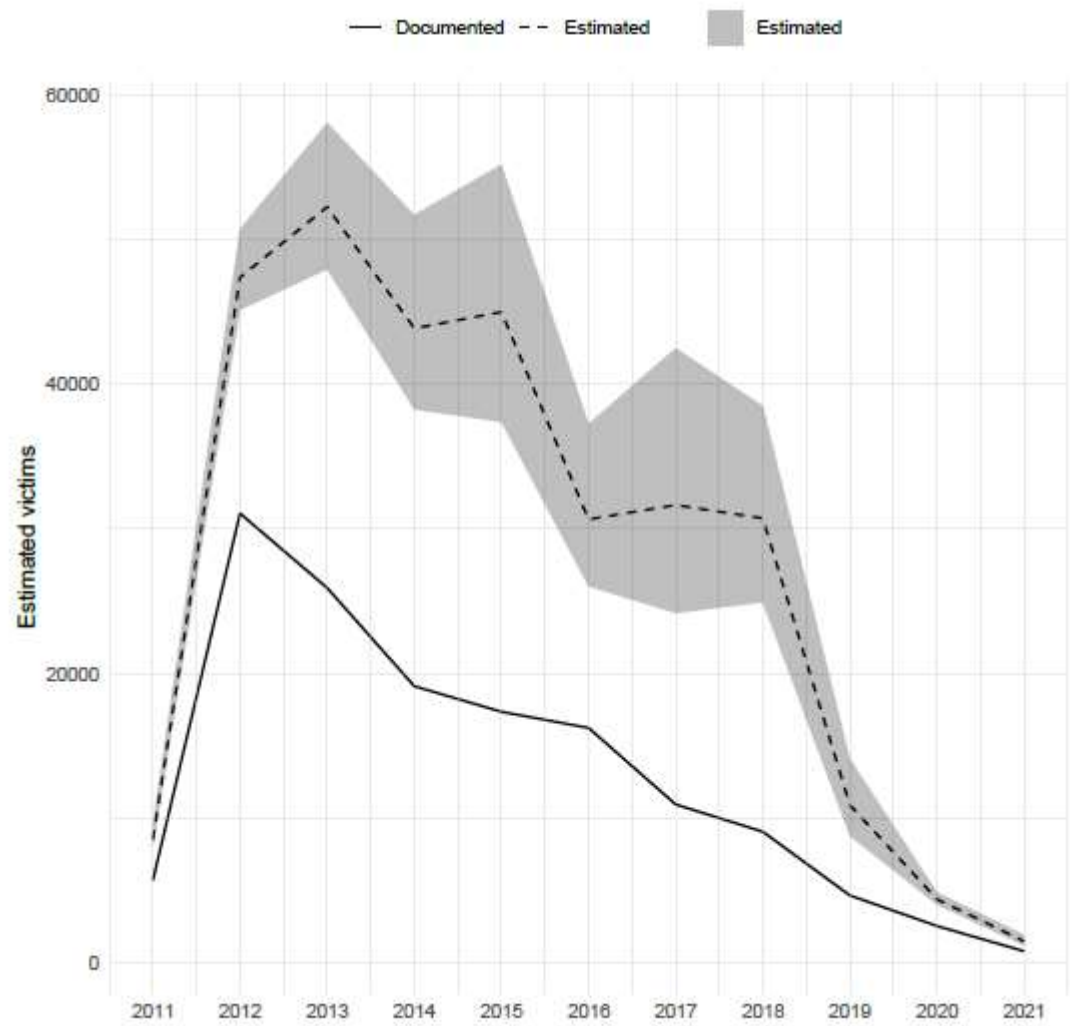


Figure 2: Documented and estimated civilian deaths by governorate

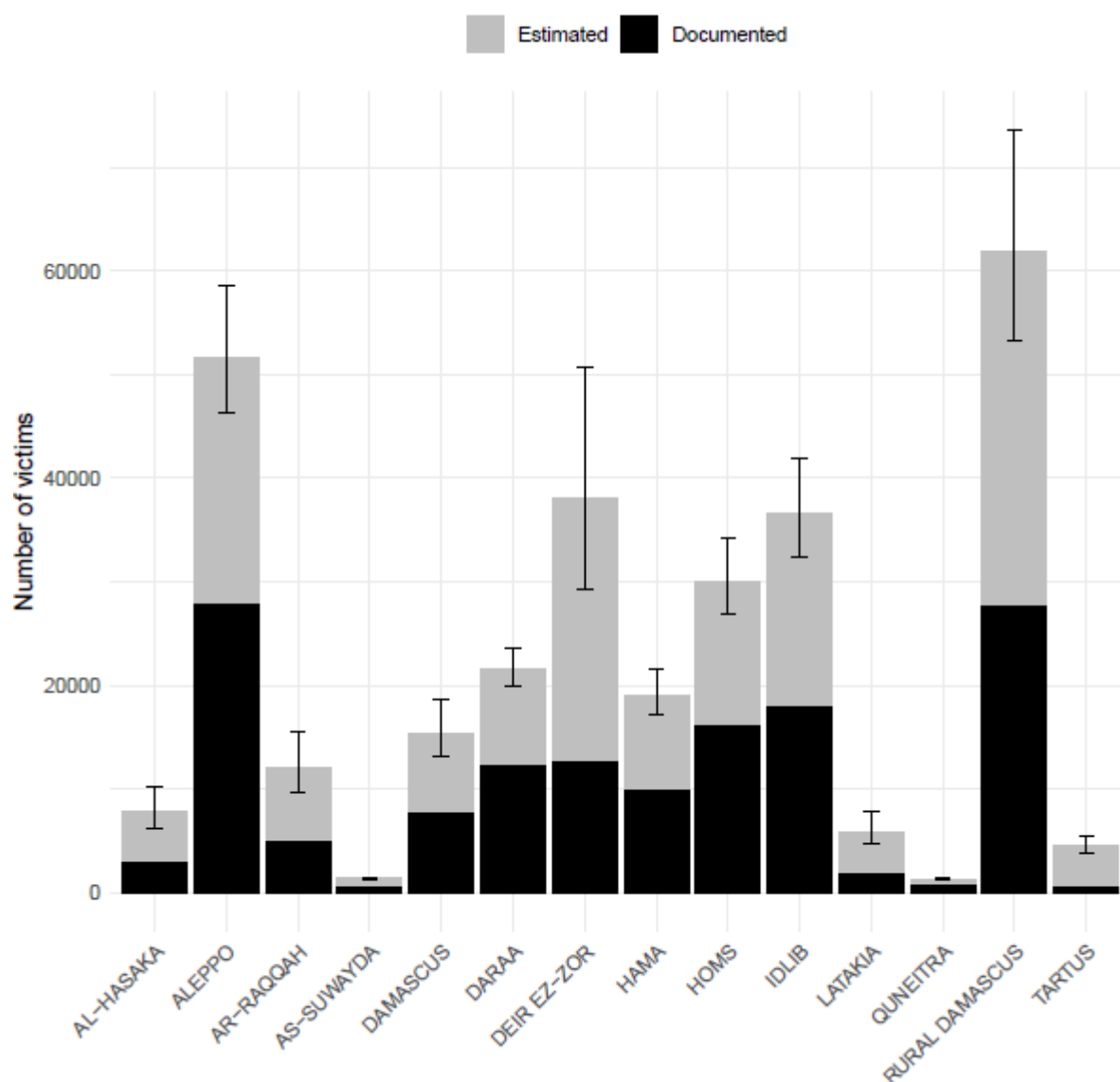


Figure 3: Documented and estimated civilian deaths by age group

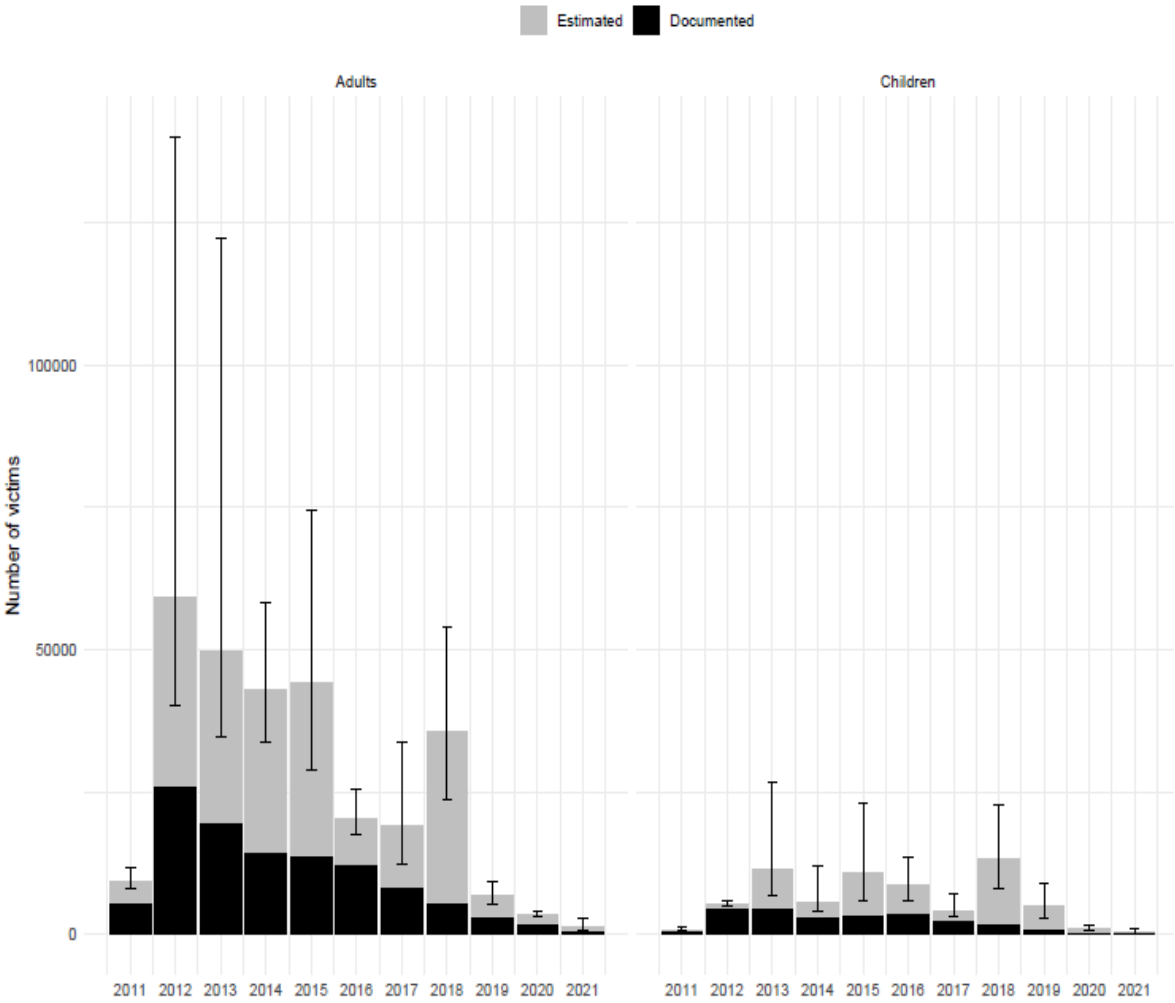
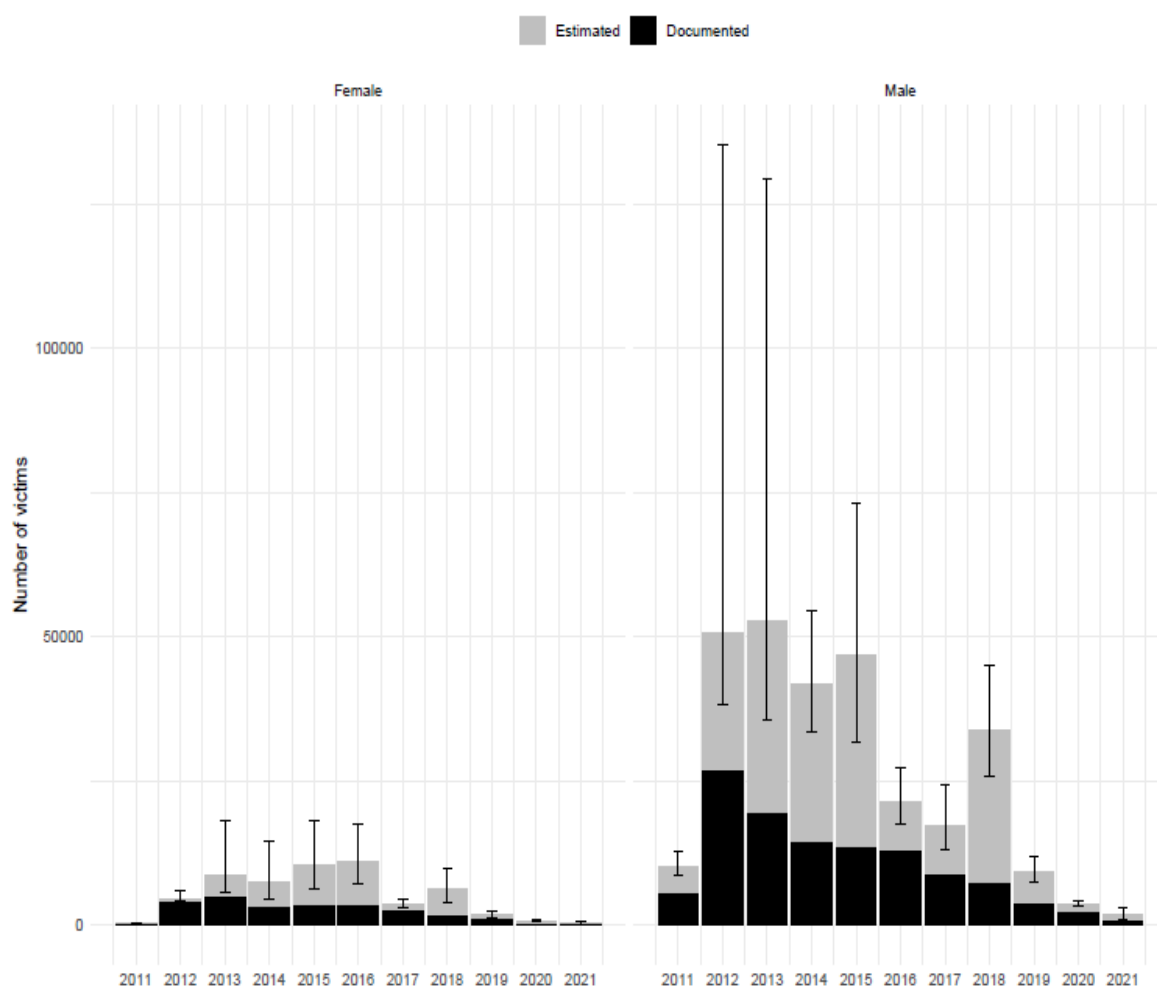


Figure 4: Documented and estimated civilian deaths by sex



Annex II

Technical notes on the methodology

1. On receipt of information from the different sources, the first step was to standardize all the records shared to manage the different formats and organization obtained ('data processing'). Data processing facilitates the systematic combination and review of all the records coherently. Records shared were predominantly in Arabic, but some contained a mix of English and Arabic. Content was then transliterated for review in English using coding and transliteration software. Analytical decisions were reviewed by expert Arabic speakers to ensure consistency in outcomes whether original Arabic content or English transliterations were used. This ensures that data processing allows tracing back any modifications made from the original data content to the final analysis-ready dataset, making it transparent, auditable, and replicable.³³

2. Once all the records had been processed and standardized, they were combined across all sources into one set ("pooled records"). Records without the deceased's full name and the date and location of the death were excluded from the analysis of documented deaths. The next step was to de-duplicate entries to ensure that a given individual was only included once. This was done using an established statistical and computer science method called "semi-supervised record linkage" (or 'data integration'). Using an iterative combination of human review and computer modelling, records that appeared to be the same or similar across several sources were combined. This approach also makes it possible to identify and link records that are likely to refer to the same person, even if the content of the records is not completely identical. For example, if a date of death varies by a few days or if a victim's name is reported slightly differently across sources.³⁴

3. The estimation of conflict-deaths in the Syrian Arab republic is based in part on the work done to understand documented deaths. The first two steps are, first accessing and preparing records for analysis through standardization (data processing) and then identifying records that refer to the same victim (record linkage). However, while records without the full name, date and location of death were excluded from the analysis of documented deaths, the estimation technique keeps all records and replaces missing information based on available information ('imputation'), and estimates undocumented deaths ('multiple systems estimation').

4. In other words, there are two kinds of missing data considered and accounted for in this analysis. The first missing data is specific pieces of information that are missing about a documented, identifiable victim, even after integrating all available information about them. For example, the name, date and location may be available, but not whether they were an adult or child or civilian or not. This kind of missing information is common in any statistical study, particularly in a statistical analysis of conflict-related deaths, and can be filled in through imputation.³⁵ There are several ways of doing statistical imputation. In this analysis, a model imputed the missing values by comparing records with missing information and similar records with that information. For example, if a particular record does not include information about the age, it may be imputed as an adult or as a child. This imputation process was repeated several times for each record, producing slightly different versions of the same

³³ See Price, Gohdes, and Ball (2016) for detailed inter-rater reliability results comparing English and Arabic reviewers, <https://hrdag.org/wp-content/uploads/2016/07/HRDAG-AI-memo.pdf>.

³⁴ For more information on the technical details, see Peter Christen's 2012 book *Data Matching: Concepts and Techniques for Record Linkage, Entity Resolution, and Duplicate Detection* is a canonical reference for this method and Megan Price, Anita Gohdes, and Patrick Ball. 2014. "Updated Statistical Analysis of Documentation of Killings in the Syrian Arab Republic: Commissioned by the Office of the UN High Commissioner for Human Rights." Human Rights Data Analysis Group. <https://www.ohchr.org/sites/default/files/Documents/Countries/SY/HRDAGUpdatedReportAug2014.pdf>.

³⁵ For a more detailed explanation of these two types of missing data and how they are accounted for in these analyses, see HRDAG's presentation on 'Estimating Undocumented Human Rights Violations in Conflict Settings' at the Women in Data Science conference.

record. This difference in the imputed values represents the uncertainty inherent in the imputation model: since data about this field was not recorded for this victim, it is not certain what is the correct answer. This uncertainty in the imputation was then propagated into the final uncertainty intervals. In this analysis, the imputation model had high statistical confidence, meaning more consistency was observed in the imputed value after multiple repetitions.³⁶

5. To augment the information that could be used in the analysis, natural language processing techniques were applied to unstructured text, such as notes, to extract additional information, for instance about the circumstances of the death, the victim or the group alleged of causing the death. Such information was then also used to impute missing information (serving as "support vectors"). This additional information thus helped improve the accuracy of the imputation model that was used to fill in missing values for civilian status, sex, and age group.

6. The final step used all the above information to estimate the total number of civilians who died. The estimation process applied, Multiple Systems Estimation (MSE), is a broad class of statistical tools explicitly designed to estimate the size of a hard-to-reach population based on multiple overlapping and not necessarily representative samples. Originally proposed in 1783 to study the size of the population of France, this class of tools has been developed and expanded since then and across a wide variety of fields, including ecology, demography, public health, and human rights research. This family of methods, applied to conflict-related deaths in the Syrian Arab Republic, allowed for calculating an estimate of the total number of civilians who died and constructing an uncertainty interval around the estimate.³⁷ The intuition behind MSE is based on the overlap of patterns in documentation across the data sources used. It estimated the "unobserved" pattern—how many victims were not reported by any of these data sources. The more often the same civilian deaths were reported across several of the sources, the closer the number of civilian deaths to the observed total. In contrast, fewer repeats imply a more significant number of unobserved civilian casualties.³⁸

³⁶ The imputation model is fit using a method called multivariate imputation by chained equations (Buuren and Groothuis-Oudshoorn 2011) with the predictive mean matching algorithm using the mice package in the statistical programming language R. Chapter 3.4 of Stef van Buuren's *Flexible Imputation of Missing Data* provides a useful overview of the predictive mean matching algorithm.

³⁷ For detailed examples of the use of this method for human rights cases, and particularly the verification of this approach, see Spiegel, Paul B, and Peter Salama. 2000. "War and Mortality in Kosovo, 1998–99: An Epidemiological Testimony." *The Lancet* 355 (9222): 2204–9; Iacopino, Vincent. 1999. *War Crimes in Kosovo: A Population-Based Assessment of Human Rights Violations Against Kosovar Albanians*. Physicians for Human Rights; Krüger, Jule, and Patrick Ball. 2014. "Evaluation of the Database of the Kosovo Memory Book." *Human Rights Data Analysis Group*. https://hrdag.org/wp-content/uploads/2015/04/Evaluation_of_the_Database_KMB-2014.pdf; Commission, Historical Clarification. 1999. "Guatemala: Memory of Silence." Guatemala City: Historical Clarification Commission; Ball, Patrick, and Megan Price. 2018. "The Statistics of Genocide." *CHANCE* 31 (1): 38–45; Zwierchowski, Jan, and Ewa Tabeau. 2010. "The 1992–95 War in Bosnia and Herzegovina: Census-Based Multiple System Estimation of Casualties' Undercount." *Berlin: Households in Conflict Network and Institute for Economic Research*, 539; Lum, Kristian, Megan Price, Tamy Guberek, and Patrick Ball. 2010. "Measuring Elusive Populations with Bayesian Model Averaging for Multiple Systems Estimation: A Case Study on Lethal Violations in Casanare, 1998–2007." *Statistics, Politics, and Policy* 1 (1); Roza Ángel, Valentina, and Patrick Ball. 2019. "Killings of Social Movement Leaders in Colombia: An Estimation of the Total Population of Victims - Update 2018." *Human Rights Data Analysis Group*; Ball, Patrick, and Frances Harrison. 2018. "How Many People Disappeared on 17–19 May 2009 in Sri Lanka?" *Human Rights Data Analysis Group*; Ball, Patrick, Sheila Coronel, Mariel Padilla, and David Mora. 2019. "Drug-Related Killings in the Philippines." *Human Rights Data Analysis Group*.

³⁸ This can be compared to finding out which of the two dark rooms is larger by using only rubber balls with special properties. The balls do not make any noise when they hit the walls, floor, or ceiling of the room, but when two or more balls collide, they make a clicking noise. In the first room, several clicks - *click, click, click* - could be heard after throwing the balls. Only one - *click* - could be heard in the second room after throwing the balls with the same force. Which room is larger? The second room must be larger; the balls had more space to spread out, so they collided less frequently than in

7. The results presented in this report are based on a specific MSE modelling approach called Bayesian Non-Parametric Latent-Class Capture-Recapture (LCMCR).³⁹ This approach was well-suited to handle the number of data sources used in this analysis and the varying time periods covered by each source. LCMCR was applied to the numerous datasets that were developed for the probabilistic imputation and combined the results using standard statistical rules. The final uncertainty intervals include both the uncertainty from imputation and the MSE.⁴⁰

the first room. Translating this analogy back to the language of MSE, the rubber balls represent the data sources, and the dark rooms represent the unknown size of the civilian conflict-related deaths to be estimated. In this language, a "collision" occurs when two or more of the sources documented the same civilian killed. This analogy is used in many of HRDAG's reports using MSE.

³⁹ Manrique-Vallier, Daniel. 2016. "Bayesian Population Size Estimation Using Dirichlet Process Mixtures." *Biometrics* 72 (4): 1246–54.

⁴⁰ For more information about combining estimation results constructed using data imputed using multiple imputation, see Gelman, Andrew, John B Carlin, Hal Steven Stern, David B Dunson, Aki Vehtari, and Donald B Rubin. 2014. *Bayesian Data Analysis*. New York: CRC Press.
<http://public.ebookcentral.proquest.com/choice/publicfullrecord.aspx?p=1438153>.