

# Global Violent Deaths (GVD) Database 2004–21, 2023 Update, Version 1.0

## Overview

The [Global Violent Deaths \(GVD\) database](#) integrates indicators on the major causes of lethal interpersonal and communal violence—intentional and unintentional homicides, killings in legal interventions, and direct conflict deaths—and combines them in a single violent deaths indicator. These indicators are also reported in a disaggregated format by the sex of the victim and the perpetration mechanism used to kill the victim. All such mechanisms are covered, while ‘deaths by firearms’ is a subset of the larger dataset. The GVD database tracks this information across 222 countries and territories worldwide yearly from 2004 and reports both crude counts and rates per 100,000 population. The input data is retrieved from reliable sources, such as governments, national and international organizations, trusted NGOs, and verified media outlets. Missing data points are estimated using the methods described in this document.

The [Small Arms Survey](#)—an associated programme of the Geneva Graduate Institute—updates the GVD database annually. The Survey works to strengthen the capacity of governments and arms control practitioners to reduce illicit arms flows and armed violence. This is done through three mutually reinforcing activities: the generation of policy-relevant knowledge, the development of authoritative resources and tools, and the provision of training and other services.<sup>1</sup>

The GVD database benefits from financial support from governments and organizations, and notably from its core donors, who are publicly disclosed [online](#). The Small Arms Survey follows rigorous procedures to ensure that the input data, the applied methodology used to compile the database, and the results are of reasonable quality. If the user encounters apparent errors, they should contact us via email at [media@smallarmssurvey.org](mailto:media@smallarmssurvey.org).

Regions, subregions, countries, and territories are defined based on the classification system used by the UN Statistical Division (2013 revision), except for Kosovo,<sup>2</sup> England and Wales, Northern Ireland, and Scotland. The names and designations reported in the database do not imply any sort of endorsement by the Small Arms Survey.

## Citation

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## Licence

The data in the GVD database may be used and redistributed in accordance with the terms of the [Creative Commons Attribution 4.0 International \(CC BY 4.0\) licence](#).

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<sup>1</sup> For more information on the Small Arms Survey’s current strategic vision, see Small Arms Survey. 2018. *Small Arms Survey 2019–23 Strategy for a World without Illicit Arms and Armed Violence*.

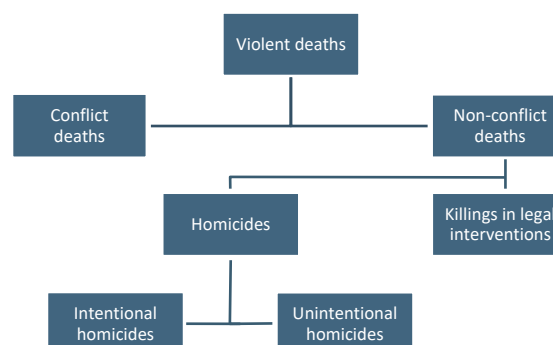
<sup>2</sup> The designation of Kosovo is without prejudice to positions on status and is in line with UN Security Council Resolution 1244 and the International Court of Justice Opinion on the Kosovo declaration of independence.

## Definitions

The indicators included in the GVD database provide a multifaceted overview of the burden of lethal interpersonal and communal violence, excluding suicide.<sup>3</sup> These indicators are defined below:

- **Violent deaths** combine the indicators of lethal outcomes of interpersonal and communal violence in conflict and non-conflict settings presented below.
- **Conflict deaths** document fatalities directly linked to violence occurring in an ongoing conflict. The GVD database does not include indirect conflict deaths.
- **Killings in legal interventions** refer to violent deaths resulting from the use of lethal force by government agents<sup>4</sup> and any other forms of legal killings, for instance, legal executions and killings in proportional self-defence. In contexts where extrajudicial killings by security forces personnel are unlikely to be reported as homicides, these deaths are also considered under this heading.
- **Intentional homicides:** An intentional homicide is an unlawful death purposefully inflicted on a person by another person.<sup>5</sup>
- **Unintentional homicides:** An unintentional homicide is an unlawful death accidentally inflicted on a person by another person.<sup>6</sup>

Figure 1 Indicators included in the GVD database



## Database description

The GVD database is presented in a tabular format stored in a comma-separated value (.csv) text file named 2023\_gvdDatabase\_1\_0.csv with the attributes presented in Table 1.

Table 1 Description of the GVD database attributes

Attribute	Description	Values
year	Year	Integer: from 2004 to 2021
country_code	ISO3 country code	Character: three digits code according to the <a href="#">ISO 3166-1 standard</a>
country_name	Country name	Character: name of the country or area defined according to the UN <a href="#">M49 standard</a>
country_subregion	UN subregion name	Character: name of the subregion defined according to the UN <a href="#">M49 standard</a>
country_region	UN region name	Character: name of the region defined according to the UN <a href="#">M49 standard</a>
population	Population	Character: female, male, or total population
indicator	Indicator	Character: violent death, intentional homicide, unintentional homicide, killing in legal intervention, or conflict death
mechanism	Mechanism	Character: firearm or all mechanisms
count	Count	Integer: from 0 to 78,353
rate	Rate per 100,000 population	Floating point with two decimals: from 0.00 to 644.69
source	Source type	Character: description of the type of source, for instance, 'National Police'
comment	Comment	Character: comment describing the data source or the estimation method

## Data sources

The GVD database incorporates data from various sources that is systematically collected and validated retroactively for the previous five years during each annual update. The type of data source generally depends on the kind of indicator, in particular:

<sup>3</sup> For more information on the GVD database, see Mc Evoy, Claire and Gergely Hideg. 2017. [Global Violent Deaths 2017: Time to Decide](#). Geneva: Small Arms Survey.

<sup>4</sup> UNODC (UN Office on Drugs and Crime). 2018. ['Arbitrary Deprivation of Life: Generally Applicable Principles.'](#)

<sup>5</sup> UNODC. 2013. ['Towards a Standardized Definition of Intentional Homicide for Statistical Purposes.'](#)

<sup>6</sup> [UNODC \(2013\)](#).

- **Homicide** data is retrieved, where possible, from national statistics (for instance, national crime statistics) and international institutions (for instance, the [UN Office on Drugs and Crime](#)).
- **Killings in legal interventions** data is retrieved, where possible, from national and regional statistics (for instance, the [UN Development Programme Infosegura](#) regional project) and NGOs (for instance, [Amnesty International](#)).
- **Direct conflict deaths** data is retrieved from national media outlets (for instance, as aggregated by the [Armed Conflict Location & Event Data](#) project) and international research institutions (for instance, the [Stockholm International Peace Research Institute](#)).

Population data used to derive rates is retrieved from the [2022 Revision of the World Population Prospects](#) produced by the UN Department of Economic and Social Affairs and the [United Kingdom National Statistical Office](#) for the nations belonging to the United Kingdom.

Data sources are validated by comparing multiple entries and ensuring temporal and geographical consistency. For instance, the data sources for outliers in a country's time series or a geographic region are thoroughly investigated to select the most credible data source. The data is entered and validated in a dedicated [Shiny](#) dashboard implemented using the [R](#) language and environment for statistical computing and graphics. The input data is stored in a [MongoDB](#) database.

## Estimation methods

Whenever a data point is missing, it is estimated using one of the methods below:

- **Filling missing counts based on counts for available sex attributes:** Whenever counts for only two of three sex attributes are available, the missing one is imputed using basic algebra. This procedure is used to fill missing male, female, and total counts for intentional homicides and killings in legal interventions in each country for different years and by different mechanisms.
- **Interpolating missing counts using a linear approximation:** Whenever a country's time series data is incomplete, counts for missing years are imputed using a linear approximation based on the years for which data is available. This procedure is used to estimate totals for each of the main composite indicators. Missing counts for sex- and mechanism-disaggregated data are imputed by applying interpolated ratios to ensure numerical consistency.<sup>7</sup>
- **Estimating missing counts using regional averages:** In countries where no time series data is available, rates are estimated using subregional yearly averages, or regional averages if the former are not available. Similar to the interpolation procedure, missing sex- and mechanism-disaggregated data points are estimated by applying estimated regional ratios to ensure numerical consistency. This procedure is used to impute missing male, female, and total counts for intentional homicides and killings in legal interventions in each country for different years and mechanisms.<sup>8</sup>
- **Estimating missing counts using global multipliers:** For unintentional homicides and sex- and mechanism-disaggregated conflict deaths for which there are limited data points, missing counts are estimated based on multipliers adopted in previous GVD database updates to ensure consistency with earlier versions. These multipliers are described in various Small Arms Survey publications.<sup>9</sup>

The imputation methods described above are implemented using the [R](#) language and environment for statistical computing and graphics.

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<sup>7</sup> UNODC. 2023. '[Data UNODC – Metadata Information: Intentional Homicide](#).'

<sup>8</sup> UNODC. 2023. '[Data UNODC – Metadata Information: Intentional Homicide](#).'

<sup>9</sup> See Small Arms Survey. 2020. '[Global Violent Deaths \(DVD\)](#).'

## Assumptions and limitations

The GVD database is built on the assumption that the input data is accurate. However, the Small Arms Survey acknowledges that external factors may have an impact on the accuracy of the input data, for instance, the functioning of a particular country's criminal justice system and the adoption of international statistical definitions at the national level. Accuracy can also be impacted by systematic under-reporting or over-reporting of violent deaths driven by political agendas.

The GVD database considers that the estimation methods listed above are appropriate. In addition, in each update of the database, the input data is collected retroactively for the previous five years. For this reason the values in the most recent update may differ from those in previous updates because of the availability of additional input data. In addition, the Small Arms Survey continually develops and periodically updates its estimation methods for missing data points, further limiting the comparability of different updates of the GVD database.

## Release history

- Global Violent Deaths (GVD) Database 2004–2021, 2023 Update, Version 1.0. <doi: [10.5281/zenodo.8215006](https://doi.org/10.5281/zenodo.8215006)>
  - This release covers the years from 2004 to 2021.
  - New data has been collected for the years between 2017 and 2021, including 2,591 data points on homicides, 2,511 data points on killings in legal interventions, and 261 data points on direct conflict deaths.
  - The estimation methods applied are the same as those used in the 2022 update of the GVD database, but the estimated counts and rates may slightly differ for some countries because of the availability of new data.