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The Global Struggle to Halve Violent Deaths by 2030

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Front cover photo

Protesters march during a rally against military rule in Khartoum, Sudan, 8 November 2022.

Source: Mohamed Nureldin Abdallah/Reuters

Overview

The year 2021 saw a concerning increase in global violent death rates after the relative calm of the Covid-19 pandemic era. While violent deaths in 2020 reached a historic low since 2004, 2021 marked a global increase of six per cent, halting the previous trend of improvement.

Intentional homicides remained stable, comprising two-thirds of all violent deaths, while conflict-related deaths surged, especially in Afghanistan and Myanmar, due to political upheavals. Firearms played a significant role—accounting for about 45 per cent of global violent deaths—albeit less than in previous years. Men disproportionately bore the brunt of violence, with death rates more than five times higher than those of women. Geographic patterns also revealed stark disparities. Asia and Africa exhibited the highest violent death rates, and regions such as Europe and Oceania experienced the lowest levels.

Forecasts for the 2030 horizon suggest a need for concerted efforts to prevent violence, as the ‘business-as-usual’ analysis—assuming that current trends remain—projects a continued increase in deadly violence.

Key findings

- The year 2021 saw a concerning six per cent rise in global deadly violence compared to 2020. Of the approximately 580,000 violent deaths, about 45 per cent were inflicted by firearms.
- Violence overwhelmingly and disproportionately affected men, with a rate of 12.27 victims per 100,000 population among men and boys versus 2.33 for women and girls.
- Compared to the 2015 benchmark of Agenda 2030, the number of intentional homicides has decreased by only 2.6 per cent.
- Just over a quarter of the world’s countries and territories are currently on track to meet SDG Target 16.1. Current trends suggest the world will miss this target by 2030.
- The year 2020 marked a high point in progress towards reducing violent deaths. From a rate of 7.0 violent deaths per 100,000 population that year, rates have since exhibited an upward trend, reaching 7.3 in 2021 and on track to reach 7.6 by 2030.

Introduction

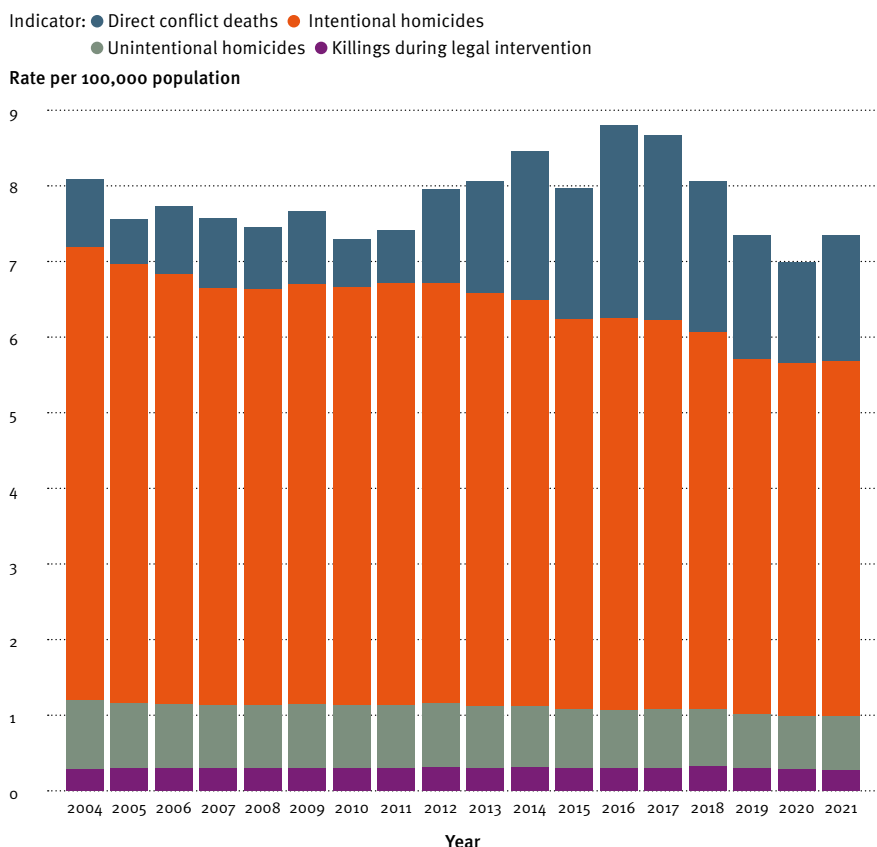
The 2021 update to the GVD database presents a concerning six per cent rise in global deadly violence compared to 2020. It is a significant setback in progress towards the Sustainable Development Goals (SDGs) Target 16.1, which commits all states to ‘significantly reduce all forms of violence and related death rates everywhere’ (IAEG, 2017). This recent surge in lethal violence is reminiscent of the peak in violent death rates observed in 2016, which was mainly attributed to devastating conflicts in Syria and Iraq—accounting for nearly a fifth of the record number of violent fatalities of that year.

The troubling inversion evidenced in the GVD database indicates that approximately 580,000 people, including 92,000 women and girls, died violently in 2021. This surge is primarily driven by conflict-related fatalities, which rose by 27,000 to a total of 131,000. The number of intentional homicide victims also increased—albeit not nearly as sharply—by 7,000 (or by 2 per cent), reaching 371,000. This uptick in the aggregated number disrupts a gradual five-year decline in violent death rates observed since the record of 8.8 violent deaths per 100,000 population in 2016, which gradually dropped to 7.0 in 2020, rising again to 7.3 in 2021 (see Figure 1).

Regionally, there are increasingly profound differences in the levels of deadly violence. Some parts of the world appear to be stuck in a vicious circle of insecurity and violence. Others, such as Europe and the Americas, continue their path towards the reduction of deadly violence, with an all-time low of 19,500 and 181,000 victims, respectively, in 2021 versus 21,000 and 187,000 in 2020. While Oceania saw a slight but steady increase from 1,700 violent deaths in 2020 to 1,800 in 2021, Asia and Africa experienced substantial increases, with 203,000 and 174,000 violent deaths, respectively, in 2021 alone compared to 180,000 and 156,000 in 2020.

A closer examination of 2021 sub-regional patterns reveals that the highest increase in violent deaths occurred in Asia, particularly parts of Western and Southern Asia, which are affected by ongoing conflicts. Southern Asia stood out as the region’s hotspot for both conflict deaths (accounting for 53 per cent of conflict victims in Asia) and intentional homicides (accounting for 63 per cent of intentional homicide victims in Asia). Africa exhibited a similar pattern, with conflicts affecting Western

Figure 1 Global annual rates of direct conflict deaths, homicides, and killings during legal interventions, 2004–21



Source: Small Arms Survey (2023)

Africa (38 per cent of conflict victims in Africa) and Eastern Africa (37 per cent).

At the national level, 2021 saw intentional homicides increase in 52 per cent of countries and territories, with variations across regions. Conflict deaths increased in almost all countries with active conflicts at that time. Notably, Myanmar saw a massive 1,600 per cent increase between 2020 and 2021, when the civil war accounted for an additional 10,000 victims over the two years.

The likelihood of achieving SDG Target 16.1 by 2030 appears increasingly challenging. Global violent death rates fell by only eight per cent between 2015 and 2021. Some regions, such as Western Asia and Northern Africa, came close to halving their violent death rates due to a drop in conflict deaths. The G5 Sahel Joint Force (G5 Sahel) countries, however, experienced a 50 per cent increase in lethal violence.

The 2021 data signals a growing divergence in patterns of lethal violence globally, with geographical disparities widening. Conflict continues to drive a rise in violent deaths, particularly in Asia and Africa, while some regions show declining violent deaths due to a drop in intentional homicides, initiated during Covid-19 lockdowns. This geographical

Box 1 GVD database data sources

The Small Arms Survey’s GVD database is arguably the most comprehensive global data set on lethal violence, incorporating information from diverse sources collected over the previous five-year period and validated retrospectively for each annual update. The choice of data sources varies depending on the indicator type. For instance, homicide data is sourced, where possible, from national and international institutions, while data on deaths during legal intervention is retrieved from national and regional statistics, and NGOs. Direct conflict deaths data is gathered from national media outlets and international research institutions.

The GVD database consolidates a multitude of international and national data sources covering violent deaths across 222 countries and territories for the period 2004–21. This breadth is intended to address potential reporting gaps in official data from national statistical offices. The use of multiple data sources also helps to ensure temporal and geographical consistency. Despite these efforts, gaps persist, often affecting multiple different sources, as some countries lack data available through international sources or readily available national statistics.

In the latest GVD update, nearly 29 per cent of data points were missing across all countries and territories for the reporting period, 2015–21 (see Figure 2). This implies that, in 29 per cent of cases, information on intentional homicides in a specific country for a particular year is not available from any source, including the United Nations Office on Drugs and Crime (UNODC). Importantly, missing data comprises 42 per cent of global data when disaggregated by the sex of the victim. This points to the failure of countries and states to systematically collect information on the SDG 16.1 indicators aimed at assessing the ‘number of victims of intentional homicide per 100,000 population, by sex and age’ (SDG 16.1.1) as well as ‘conflict-related deaths per 100,000 population, by sex, age and cause’ (SDG 16.1.2).¹

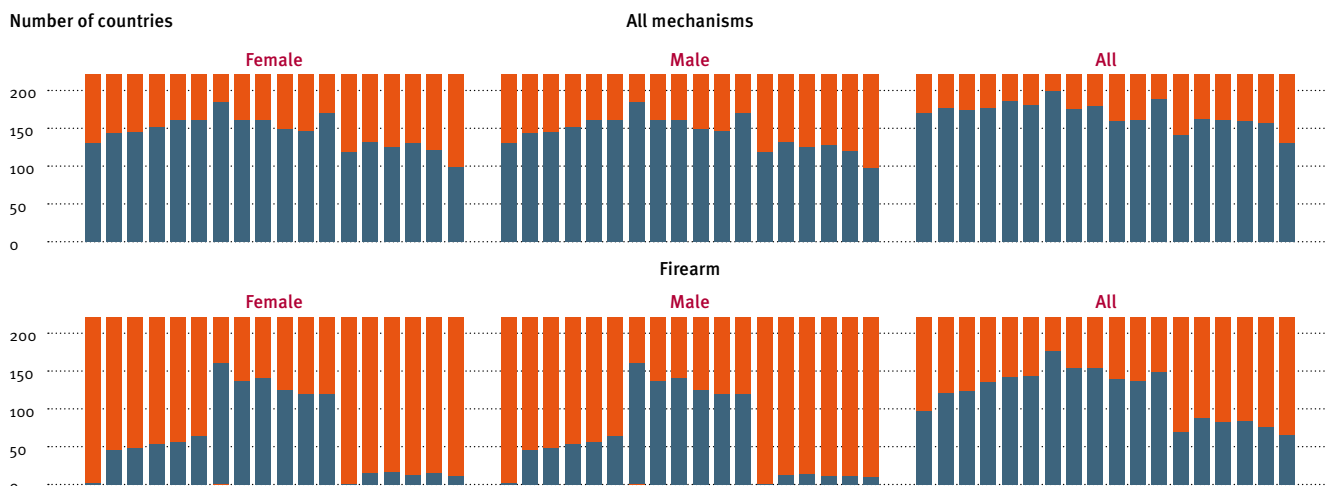
To address these gaps, the Survey uses several methods to estimate missing data points. These include imputing missing counts based on available sex attributes, interpolating missing counts using a linear approximation, and estimating missing counts using regional averages and, for specific categories with limited data points, global multipliers. These procedures are intended to ensure consistency and reliability in the absence of complete information.

The Survey’s latest GVD database update documents the estimation method employed for each missing data point in the database itself and in an ancillary ReadMe file. Both are permanently stored in an open-access data repository, to improve transparency and reproducibility (Small Arms Survey, 2023).

Figure 2 Availability of intentional homicide data sources by sex and killing mechanism, 2004–21, by country

Data sources: ● Available ● Unavailable

Number of countries



Source: Small Arms Survey (2023)

polarization in violent death patterns underscores the urgent need for concerted international efforts to prevent and mitigate the impact of conflict and all forms of violence, which frustrates progress towards SDG Target 16.1.

Violent deaths

The temporary gains of 2020, characterized by pandemic-related lockdowns and other restrictions, were eroded in 2021. Despite the expectation that positive changes to lifestyle triggered by Covid-19—particularly in the Northern Hemisphere and in regions such as Australia and New Zealand—would persist, these changes have proven short-lived. While 2020

was the most peaceful year since 2004 (as measured by the number of people killed violently per 100,000 individuals globally; see Figure 1), 2021 saw a regression to previous levels. This breaks a trend of continuous improvement seen since 2016; instead of a year-to-year decrease in violent death rates, in 2021 this rate increased by five per cent.

As shown in Figure 1, homicide rates stabilized in the period 2019–21, following a gradual decline since 2004. In 2021, some 371,000 individuals fell victim to intentional homicide (4.7 per 100,000 population), while 131,000 were direct conflict casualties.² The remainder—about 13 per cent of violence fatalities—died in unintentional homicides³ or during legal interventions.⁴

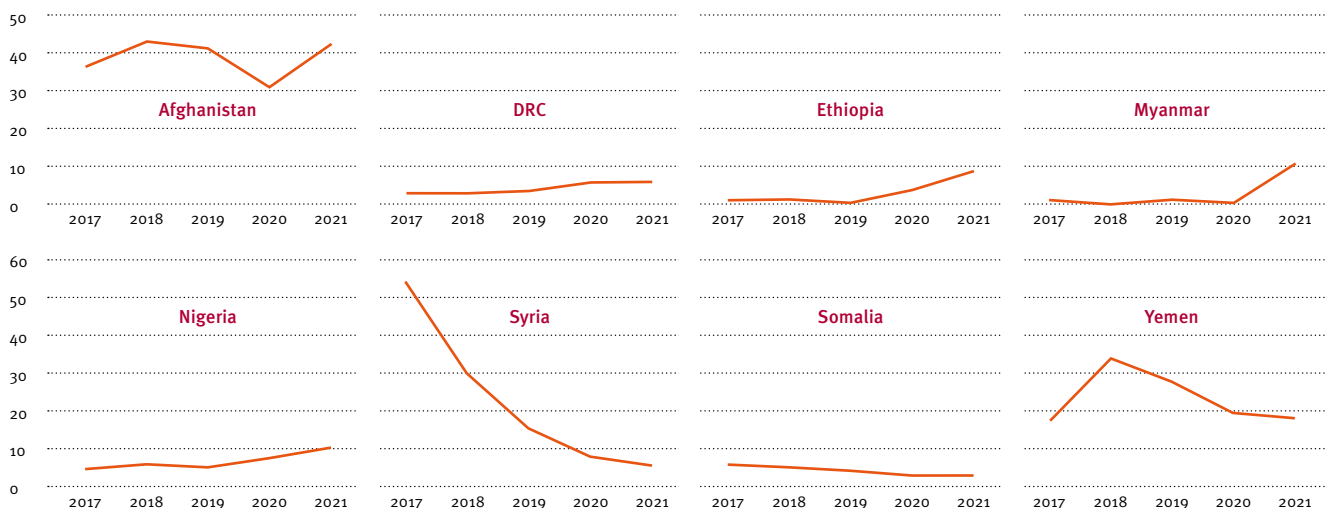
Direct conflict deaths

Although the percentage of violent deaths due to conflict—23 per cent in 2021—accounts for a relatively small proportion of all global violent deaths, it has a significant impact on the overall trends. The change in global violent death counts and rates is largely due to its variability over short periods.

Monitoring conflict-related deaths remains challenging for a variety of reasons, including the absence of universally agreed definitions and significant gaps in coverage, data collection standardization, verification procedures, and data disaggregation (Pavesi, 2017, p. 8). Accounting for indirect conflict deaths, despite Agenda 2030’s aim to system-

Figure 3 Five-year fatality trends in the eight deadliest conflicts of 2021

Number of deaths (thousands)



Source: Small Arms Survey (2023)

Table 1 Conflict death rates per 100,000 population in the 20 most affected countries

Rank	Country	Rate
1	Afghanistan	106.3
2	Yemen	55.8
3	Central African Republic	31.3
4	Syria	27.6
5	Myanmar	20.5
6	South Sudan	20.1
7	Somalia	19.1
8	Burkina Faso	10.7
9	Mali	8.7
10	Ethiopia	7.5
11	Palestinian Territories	7.5
12	Iraq	6.5
13	Democratic Republic of the Congo	6.5
14	Niger	5.9
15	Nigeria	5.0
16	Chad	4.8
17	Colombia	4.2
18	Sudan	3.6
19	Burundi	2.4
20	Libya	1.7

Source: Small Arms Survey (2023)

atically include these in the global fatality counts,⁵ still poses a virtually insurmountable methodological and practical problem. The UN Office of the High Commissioner for Human Rights, the international custodian of the respective SDG indicator (16.1.2),⁶ focuses on civilian casualties—neglecting combatant deaths that in most conflicts make up the bulk of direct fatalities during hostilities. A harmonized UN monitoring facility for conflict deaths is not yet available.

In 2021, conflicts resulted in 131,000 direct conflict deaths due to injuries suffered during armed actions—about 27,000 more than in 2020. As shown in Figure 3 above, the intensity of conflict in Yemen and especially Syria has declined in recent years. The number of deaths in Somalia also crept down somewhat in 2021. Afghanistan, on the other hand, was subject to a bloody Taliban takeover after the United States withdrew from the country, resulting in a jump in

fatalities—reaching a level reminiscent of the 2018–19 Taliban insurgency. In Myanmar, conflict deaths surged to 11,000 in 2021, jumping from less than 700 in 2020. This escalation coincided with the military junta’s seizure of power through a coup d’état, and the resultant conflict after they replaced the elected political leadership.

Table 2 Evolution of homicide deaths, 2015–21

Evolution of homicide deaths in countries/territories	n	%
Increase of 25% or more	35	18.7%
Increase of 1–24%	59	31.6%
Decrease of 0–24%	40	21.4%
Decrease of 25% or more	53	28.3%
Total	187	100%

Note: Countries with more than ten homicides in either 2015 or 2021 are included.

Source: Small Arms Survey (2023)

Afghanistan not only experienced the highest body count in absolute numbers in 2021, but also recorded by far the highest conflict-related fatality rate of the year, with 106.3 deaths per 100,000 population (see Table 1). Yemen came second, with 55.8 deaths per 100,000 population. Besides the countries already mentioned, population-proportional conflict deaths were significant in Central African Republic (31.3 per 100,000), South Sudan (20.1), and Burkina Faso (10.7).

Intentional homicide

In contrast with conflict-related deaths, intentional homicides remained at the same level observed in 2020, making up about two-thirds of all violent deaths globally (64 per cent). The number of homicides recorded in the GVD data set worldwide is nominally more than the previous two years (2019: 363,000; 2020: 365,000; 2021: 371,000). Overall, however, the global rate of intentional homicides remained remarkably stable over the 2019–21 period, at about 4.7 per 100,000 population (2019: 4.70; 2020: 4.67; 2021: 4.70). Compared to the 2015 benchmark of Agenda 2030 (UNGA, 2015), the number of intentional homicides worldwide has only slightly reduced (2015: 381,000; 2021: 371,000, or by 2.6 per cent). Due to global population growth, the virtually unchanged number of homicides means a somewhat lower standardized rate per 100,000 population (2015: 5.17; 2021: 4.70, –9.1 per cent). In countries not currently undergoing armed conflict, the intentional homicide count—accounting for more than 80 per cent of non-conflict deaths globally—is the primary determinant of progress towards violence reduction goals of the SDG framework. Given the current rate of reduction at the halfway point in the process, a significant decrease in lethal violence—in terms of either rates

or, preferably, absolute numbers of victims—seems a bridge too far.

Looking back at trends since 2015, to match the period covered by Agenda 2030, a number of countries and territories appear to be on the right track towards reducing lethal violence. At the halfway mark, states that have achieved a 25 per cent reduction in homicidal violence may be considered to be ‘on track’ towards reaching the target they signed up for when committing to the SDGs at the beginning of the process.⁷ Fifty-three countries with more than ten homicides in either 2015 or 2021⁸ (28 per cent of this group) seem to be in line with the aspiration to reduce lethal violence by 50 per cent (see Table 2). Such countries include Brazil (18,100 fewer homicides in 2021 compared to 2015); Venezuela (8,200 fewer victims); the Russian Federation (6,000 fewer victims); El Salvador (5,500 fewer victims); and the Philippines (4,800 fewer victims).

On the contrary, the homicide rates in 35 countries increased sharply—by 25 per cent or more between 2015 and 2021. Despite fluctuations, countries such as Mexico (14,900 more victims in 2021 compared to 2015), the United States (7,100 more victims), South Africa (6,200 more victims), Nigeria (3,200 more victims), and Myanmar and Syria (both 3,100 more victims) were considerably worse off in 2021 than in 2015.

In the case of Mexico, the period 2020–21 saw a reduction in homicide rates (1,000 fewer victims). With its relatively large population and extreme levels of homicide, Mexico has had a strong influence on global violent death trends, accounting for nearly 10 per cent of global homicides (9.6 per cent) in 2021. Mexico continues to serve as a reminder that national policies and their implementation are important for reaching global prevention and reduction targets of crime and violence. The deterioration of security in one country, if it is populous and violent enough, is sufficient to move the needle in key regional or even global indicators. A single country can affect regional trends, from decrease to stagnation or from stagnation to increase, in not only the domain of armed conflict deaths, but also that of criminal deaths.

Other violent deaths

The estimate of violent deaths, based on the GVD database, is overwhelmingly built on the ‘conflict deaths’ and ‘intentional homicides’ categories discussed

“ In Southern Africa and Central America, nearly four out of every 100 deaths were directly attributable to violence.”

above. Deaths attributable to terrorism are also included, in either of the two categories—depending on the country’s juridical system. The estimate does not, however, include some categories that are responsible for a non-negligible portion of global violent deaths. While availability of such data has improved over time, the challenges posed by gaps in data provision and inconsistent definitions⁹ remain significant. As a result, for most countries, these categories are estimated based on the scarce data available globally.

Globally, in 2021, the GVD database reveals that an estimated 55,800 unintentional homicides—that is, deaths due to violent acts without murderous intent—took place. On average, one unintentional homicide occurs for every seven intentional homicides, though uncertainties remain around this figure due to the noted caveats. Additionally, an estimated 22,100 persons were killed in 2021 in the framework of legal interventions—through either the sanctioned use of lethal force or legal executions—or, potentially, illegally as an extrajudicial killing perpetrated by members of law enforcement or the armed services in their fight against criminal groups. The preceding years suggested a decrease in the number of violent deaths in this category: 24,900 in 2018; 24,000 in 2019; 22,600 in 2020; and 22,100 in 2021. Increasing limitations on freedom of information in some countries may, however, be contributing to this decreasing trend.

Regional trends

Lethal violence varies widely across the world, influenced by factors such as regional traditions, cultural norms, governance structures, socio-economic conditions, and political (in)stability—now exacerbated by the effects of climate change. These factors contribute to remarkable variations in annual fatal-

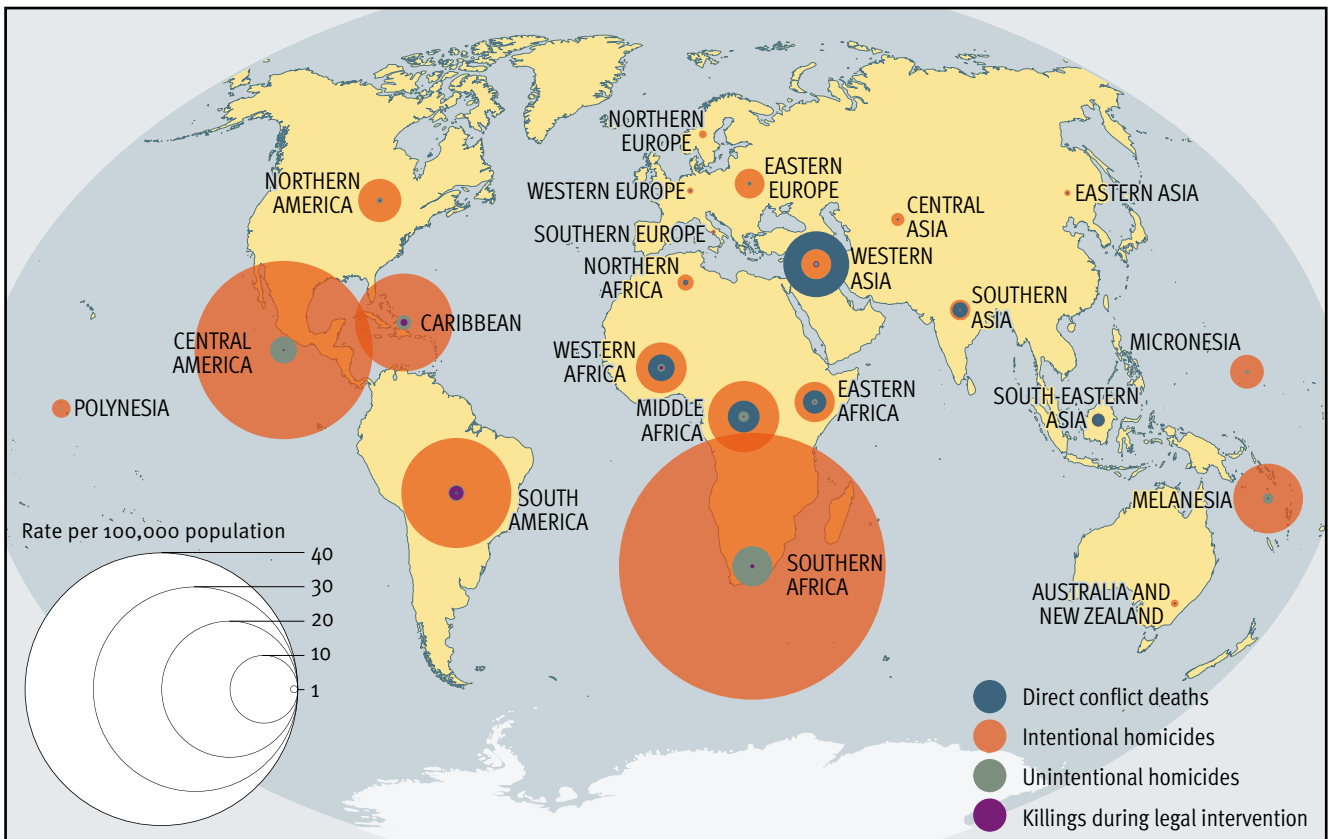
ities resulting from violent acts across different regions of the world. In 2021, approximately 0.84 per cent of global mortality¹⁰ could be attributed to violent causes, excluding suicide (which represents a distinct form of violence not covered by the GVD database). The prevalence of violence varied widely among regions, however. For instance, in Southern Africa and Central America, nearly four out of every 100 deaths were directly attributable to violence (3.98 per cent and 3.54 per cent, respectively), highlighting the acute impact of violence in these areas. In contrast, Southern Europe and Eastern Asia reported considerably lower rates, with violence accounting for only 0.07 per cent and 0.08 of total deaths, respectively.

Geographic patterns

Map 1 highlights the global regions, as defined by the UN,¹¹ with the most lethal violence relative to their population size. In nine of the 22 regions, armed conflicts caused substantial direct mortality in 2021. While conflict deaths made up the majority of violent deaths in Western Asia (62 per cent), in all other regions other types of violent deaths outweighed conflict fatalities: the share of direct conflict deaths was 43 per cent in South-eastern Asia, 39 per cent in Southern Asia, 33 per cent in Eastern Africa, 30 per cent in Western Africa, 28 per cent in Middle Africa, and 22 per cent in Northern Africa, while direct conflict deaths accounted for a very small proportion of violent deaths in Eastern Europe and South America. Regions with the highest rates of deadly violence were, however, free of armed conflict in 2021.

Standardized rates of violent deaths per 100,000 population underscore regional disparities in overall levels of violence. Southern Africa exhibited the highest rate at 45.45—more than 74 times greater than Eastern Asia’s rate of 0.61, where such violence is most contained

Map 1 Rates of direct conflict deaths, homicides, and killings during legal interventions, by subregion, 2021



Source: Small Arms Survey (2023)

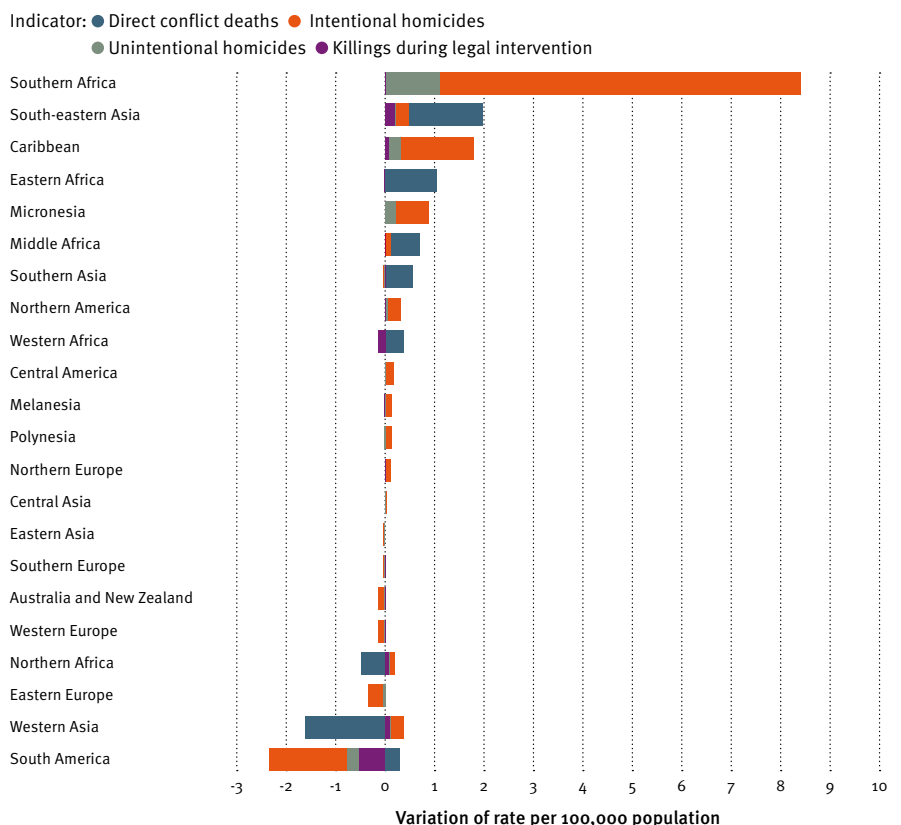
(see Table 3). Similarly, Central America demonstrated a disproportionately high rate of lethal violence, with individuals residing in this region being over four times more likely to be killed compared to the global average. Conversely, regions characterized by lower levels of lethal violence, such as Australia and New Zealand or Western and Southern Europe, reported significantly reduced risks of violent death, amounting to less than 15 per cent of the global average.

Changes between 2020 and 2021

Short-term trends from 2020 to 2021 in all categories of violent deaths also varied by region (see Figure 4). Many more regions saw an increase rather than a decrease in conflict death rates. The highest increase was, however, fuelled by increasing homicide rates in Southern Africa (in South Africa, the homicide rate jumped from 33.46 to 41.87 per 100,000 population over one year).

Between 2020 and 2021, violent deaths decreased most in South America, despite a small increase in conflict

Figure 4 Changes in homicides and direct conflict deaths between 2020 and 2021, standardized rates, by subregion



Source: Small Arms Survey (2023)

Table 3 Number of violent deaths by subregion, 2021

	Population (thousands)	Share of global population	Violent death count	Violent death rate	Share of global violent deaths	Odds of dying of violence compared to global average*
Southern Africa	67,985	0.86%	30,900	45.45	5.3%	6.20
Central America	177,662	2.25%	53,800	30.28	9.3%	4.14
South America	434,250	5.49%	91,400	21.05	15.7%	2.86
Caribbean	44,068	0.56%	7,700	17.47	1.3%	2.33
Middle Africa	187,927	2.38%	31,600	16.82	5.4%	2.27
Western Asia	289,733	3.66%	45,000	15.53	7.8%	2.13
G5 Sahel**	86,438	1.09%	13,500	15.62	2.3%	2.10
Melanesia***	13,333	0.17%	1,500	11.25	0.3%	1.78
Western Africa	420,880	5.32%	54,800	13.02	9.4%	1.77
Eastern Africa	461,142	5.83%	47,500	10.30	8.2%	1.41
Northern America	375,279	4.75%	28,400	7.57	4.9%	1.03
Southern Asia	1,996,878	25.25%	117,300	5.87	20.2%	0.80
Eastern Europe	291,464	3.69%	14,800	5.08	2.6%	0.71
South-eastern Asia	668,371	8.45%	29,100	4.35	5.0%	0.59
Northern Africa	255,172	3.23%	9,400	3.68	1.6%	0.50
Central Asia	75,898	0.96%	1,700	2.24	0.3%	0.31
Australia and New Zealand	31,051	0.39%	300	0.97	0.1%	0.25
Western Europe	195,382	2.47%	2,100	1.07	0.4%	0.16
Northern Europe	105,633	1.34%	1,400	1.33	0.2%	0.15
Southern Europe	152,097	1.92%	1,200	0.79	0.2%	0.10
Eastern Asia	1,663,697	21.04%	10,200	0.61	1.8%	0.09
World	7,907,901	100%	580,100	7.34	100%	1

Notes: Totals do not necessarily add up precisely due to rounding. * Odds ratios refer to the relative strength of association between two distinct events, with one representing 'no association'. Here, the odds ratio refers to the odds of encountering violence globally compared to the odds of encountering violence in the various subregions. Ratios below one represent a risk lower than the global average, while ratios above one represent a higher risk. ** G5 Sahel includes countries from Middle Africa and Western Africa and therefore overlaps with other regions. *** Micronesia and Polynesia are also included.

Source: Small Arms Survey (2023)

Box 2 Lethal violence in Northern Africa and the G5 Sahel

No countries in either Northern Africa or the G5 Sahel make data on lethal violence consistently accessible to the public. Some countries (Algeria, Burkina Faso, Egypt up until 2012, Morocco, and Tunisia) have reported data on homicides to the UN—through UNODC's annual Crime Trend Survey—but only Algeria and Morocco (and Egypt until it stopped providing data) offered statistics disaggregated by sex or the instrument with which lethal violence was inflicted. Violent mortality data by sex and lethal instrument is missing for all countries and years.¹²

The lack of data not only highlights the need to strengthen the capacity of national statistical structures to collect this data, but also underscores the importance of third-party and high-quality 'non-official' data providers. If such systems existed for registering violent deaths outside of conflict contexts, this would allow for much more clarity about the true extent of violent deaths in the Northern Africa and G5 Sahel regions (and for other notoriously under-reported global regions). In the absence of official or non-official data based on administrative records, however, analysis for these regions relies heavily on model-based homicide estimates provided by public health data sources,¹³ amended by third-party conflict death data. Conflict data is recorded from a wide range of sources, including news reports, humanitarian agencies, and local eyewitnesses. These sources show greater variance due to not only the more variable nature of conflict intensity, but also other factors such as accessibility and capacity. This data volatility is juxtaposed with the rigidity of model-based estimations of intentional homicides and other types of violent death, which remain at about the same levels for a decade or longer, until the models are updated.

Northern Africa and the G5 Sahel countries are, combined, home to about 346 million people, or about 4.4 per cent of the global population. As Figure 5 shows, the countries of these two regions jointly experienced an estimated 22,900 violent deaths as of 2021, about four per cent of the global toll.



→ Violent death rates in Northern Africa are below the global average, with individuals less than half as likely to fall victim to lethal violence—an odds ratio of 0.50—compared to the global average, designating it as the safest region on the African continent. On the other hand, rates are markedly higher in the G5 Sahel region, at 110 per cent above the global average (an odds ratio of 2.10) (see Table 3). In 2021, Northern Africa accounted for 9,400 fatalities due to violence, about 2,100 of which were conflict-related—fewer than in previous years (10,900 in 2019 and 9,800 in 2020). In the G5 Sahel countries, the opposite trend is observed: in 2021, the level of lethal violence remained roughly the same (13,500), following a peak in 2020 (13,600). These countries have therefore experienced a year-to-year increase in violent deaths since 2016, when this figure stood at 6,400—about half of the current number. Over the same period, the proportion of conflict deaths among all violent deaths increased from 13 per cent to 49 per cent in the G5 Sahel region.

Figure 5 illustrates trends in violent deaths since 1990, with a breakdown by country, across both regions. This part of Africa was severely affected by the post-2010 Arab uprisings and their aftermath. This is particularly evident in the increased lethal violence in Egypt and Libya. Sudan, following the secession of South Sudan in 2011, was marked by volatility and relatively high levels of violent deaths, particularly during the intensification of the civil war after the Darfur conflict. Nonetheless, 2021 was a relatively peaceful year for Northern Africa.

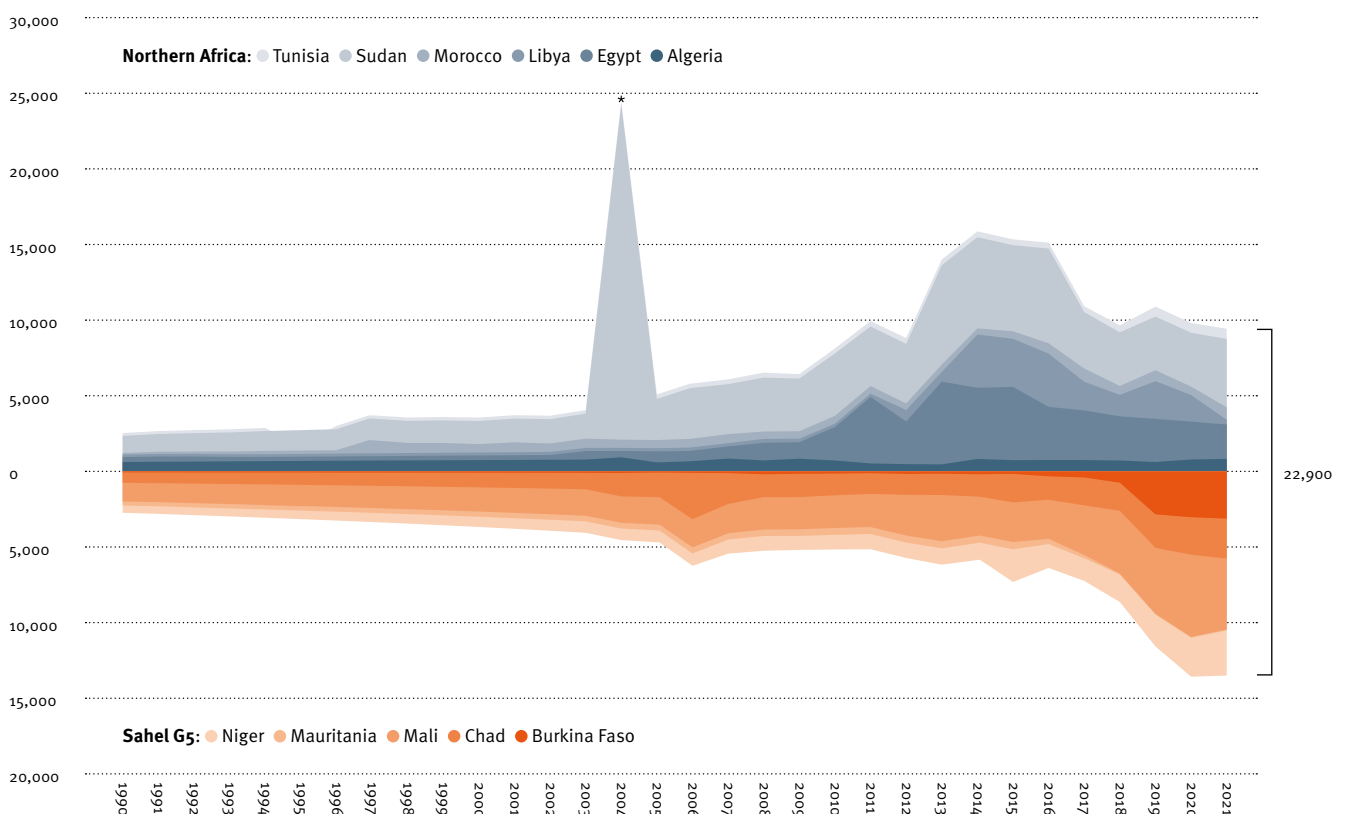
Although the G5 Sahel region had consistently experienced some degree of conflict, fatality rates remained relatively stable from 1990 to 2010, increasing in line with population growth. The only notable exception was the civil war in Chad, which began in 2005. Fighting claimed the most lives in 2006, illustrated by a ‘peak’ in Figure 5. The decline in the intensity of conflict, however, changed from 2011 onwards, when the drying up of Lake Chad and the accelerated desertification of the whole area resulted in severe famines and increasing intercommunal conflicts. This situation was exacerbated by the increased activity of Islamist militant groups, primarily in Mali. These conflicts have been intensifying ever since: 2015 saw a peak in fatalities in Niger, while escalating regional conflict from 2017 onwards resulted in increasing lethal violence, especially in Mali and Burkina Faso.¹⁴

Since 2019, the G5 Sahel region has suffered more violent deaths than the North African belt. When adjusted for population, data for 2021 shows that the rate of lethal violence experienced by the G5 Sahel region (14.83 per 100,000 population) is about four times that of Northern Africa (3.69). While violence levels are fairly low in several Northern African countries (in Algeria, Egypt, and Morocco), rates in Mali are very high—more than 20 violent deaths per 100,000 population; the results from Chad and Burkina Faso also signal a significantly elevated risk of violent mortality, in global as well as regional comparisons (see Figure 6).

Looking forward, the business-as-usual scenario projects an increase in violent deaths in the G5 Sahel region at about the current rate, from 13,500 in 2021 to 16,600 in 2030 (see Figure 7). Due to expected population growth, this would result in a slight reduction in violent death rates during the period 2020–30, from 14.82 to 14.03 per 100,000 population.

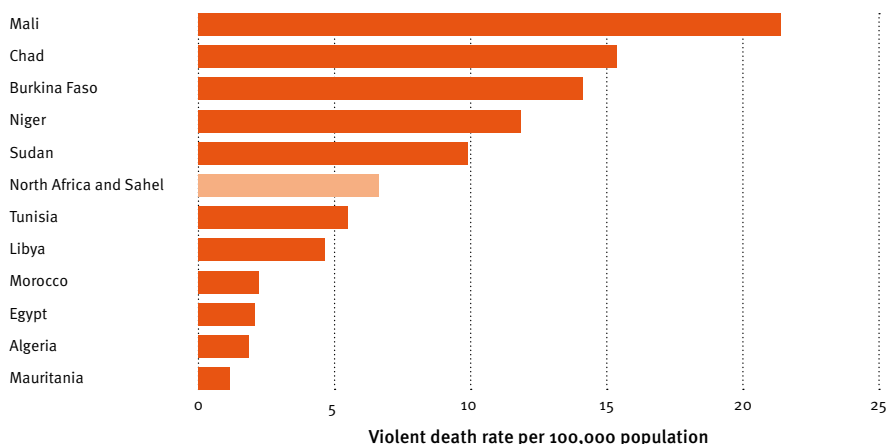
While Northern Africa is expected to remain less violent, the number of deaths is still projected to increase, from 9,400 to about 12,200, along with the death rate, from 3.70 to about 4.19.

Figure 5 Evolution of the number of violent deaths in Northern Africa and the G5 Sahel region, by country, 1990–2021



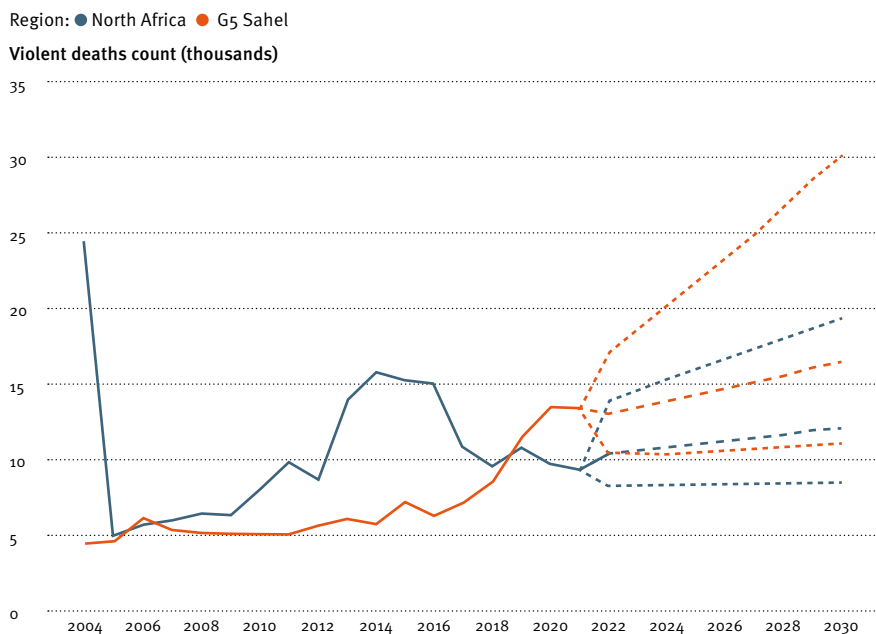
Note: * The Small Arms Survey estimates the number of violent deaths in Sudan in 2004 resulting from the Darfur conflict to be at 20,500. Other estimates vary widely.
Source: Small Arms Survey (2023)

Figure 6 Violent death rates in Northern Africa and the G5 Sahel region per 100,000 population, 2021



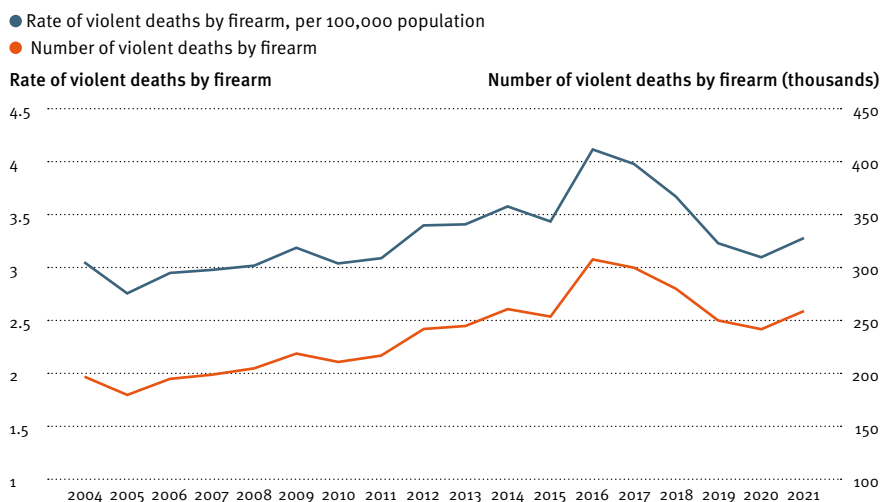
Source: Small Arms Survey (2023)

Figure 7 Violent deaths (2004–21) and projections (2022–30) for Northern Africa and the G5 Sahel region



Source: Small Arms Survey (2023)

Figure 8 Global rate and number of violent deaths by firearm, 2004–21



Source: Small Arms Survey (2023)

fatalities—a reduction in homicides was the main driving force behind this improvement. Remarkably, this decrease did not just reflect an improving situation in one of the dominant countries in the region (Brazil).

Additionally, eight out of the 13 countries in the region recorded a notable decrease in homicides between 2020 and 2021: Argentina, Bolivia, Brazil, Chile, Guyana, Suriname, Uruguay, and Venezuela all reduced their homicide rates by at least five per cent. In Western Asia, the other world region where violent death rates decreased meaningfully, the improvement was almost solely due to the reduction of conflict fatalities in Syria and Yemen.

Deaths caused by firearms

The number of deaths caused by firearms has been increasing over time. In 2004, firearms were used to perpetrate lethal violence in ‘only’ 38 per cent of cases. This percentage has gradually risen to current levels, with the highest shares recorded in 2016 and 2017 at 47 per cent and 46 per cent, respectively. As of 2021, an estimated 45 per cent of global lethal violence was committed using a firearm. While information on the types of weapons used in intentional homicides is becoming increasingly available, it remains extremely scarce for conflict-related deaths. It is therefore necessary to rely on estimations.¹⁵ In 2021, about 260,000 violent deaths were attributable to firearm-induced injuries, translating to about 3.29 firearm-related deaths per 100,000 population globally (see Figure 8). This rate is higher compared to 2020 (3.11) or 2019 (3.24), but remains below the levels recorded in the 2012–18 period.

Geographic patterns

The role of firearms in lethal violence varies greatly across the world’s regions. Well over half of violent deaths in the Americas are perpetrated by firearms, with North America—where gun violence accounts for the vast majority of lethal violence, with more than four in five deaths perpetrated by firearms—leading the pack. In the rest of the world, firearms remain important but are responsible for a minority of violent deaths (see Table 4). Besides the Americas, firearms have an above-average role in lethal violence in Western Asia as well as Western Africa (with 49 and 46 per cent of violent deaths

Table 4 Subregions with prominence of firearms in lethal violence

Subregion	Percentage of violent deaths perpetrated with firearms
Northern America	81.1%
South America	71.0%
Central America	67.8%
Caribbean	62.2%
Western Asia	48.6%
G5 Sahel*	47.2%
Western Africa	45.9%
Northern Africa	40.9%
Middle Africa	38.3%
South-eastern Asia	35.7%
Southern Asia	32.5%
World	44.8%

Note: * G5 Sahel overlaps with other regions as it includes countries from Middle Africa and Western Africa.

Source: Small Arms Survey (2023)

attributed to firearms, respectively). A significant portion of lethal violence is also perpetrated by firearms in the G5 Sahel region and Northern Africa (47 and 41 per cent, respectively). Conversely, firearms play almost no role in the limited lethal violence experienced in Central Asia.

When firearms are involved in violence, it increases the likelihood of lethal outcomes. This holds true not only at the individual level, for each incident, but also at the regional level, where there appears to be a positive association

between the violent death rate and the proportion of lethal violence attributed to firearms (see Figure 9). This correlation is mostly driven by the data recorded in the various subregions of the American continent, where both lethal violence and firearms involvement are above average.

Victims' sex

Violence overwhelmingly and disproportionately affects men, and lethal violence is the 'tip of the iceberg'. Data consist-

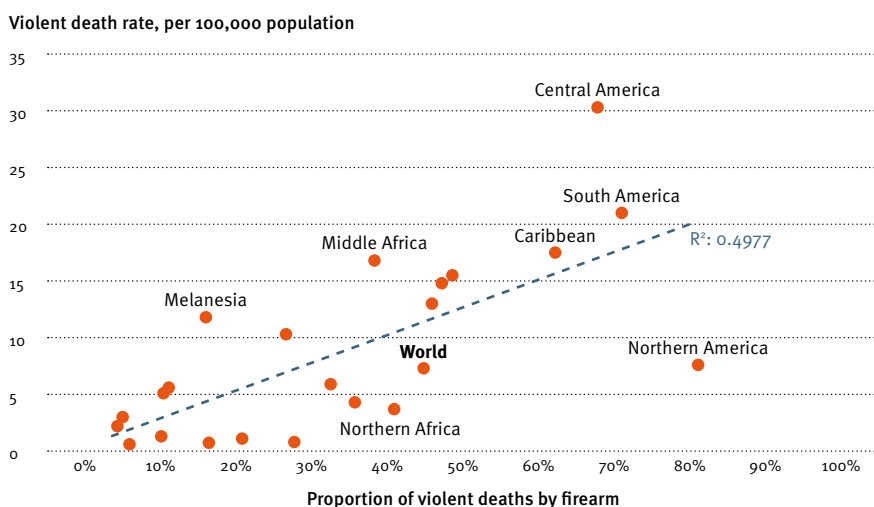
ently shows that men constitute the vast majority of victims of lethal violence across nearly every country worldwide. The victimization rate for men and boys stands at 12.27 per 100,000 population—more than five times higher than that of women and girls (2.33). Males are therefore significantly more likely to succumb to violence. In 2021, out of the 580,000 global violence victims, 91,600 were women or girls. Except for infanticides, males are also overwhelmingly responsible for committing lethal violence, as perpetrators (Kaye, 1990; UNODC and HEUNI, 2015).

Of the 190 countries and territories with at least 10 recorded violent deaths in the GVD database, men accounted for 80 per cent or more of violence victims in 94 countries—with the global average being 84 per cent. The countries with at least ten violent deaths where more females were killed in 2021 than males (Slovenia, Austria, Fiji, Latvia, Switzerland, Czechia, the British Virgin Islands, and Norway) are arguably among the safest countries in the world, in terms of their overall violent death rate.

Women and girls are disproportionately affected by lethal violence within the home: females make up over half (53 per cent) of all victims of killings in the home and two-thirds of all victims of intimate partner killings (UNODC, 2023). Consequently, in peaceful countries with low or mostly non-violent crime, women make up a higher share of victims, but their actual violent death rates (standardized for 100,000 women) remain well below the total global average.

As global averages change, male and female violent deaths follow very similar trajectories. Female victimization rates are less volatile, however, compared to males, as they are less directly affected by conflict intensity and peaks of criminal violence in any given year (see Figure 10). This is partly because the missing sex-disaggregated data points are estimated directly from the national trends using previously or independently established sex ratios among the victims. Direct conflict fatalities, for which data is systematically available worldwide, also disproportionately affect males (primarily as combatants). Data sources that allow for the estimation and inclusion of indirect conflict deaths are currently lacking, though both genders are likely affected similarly.¹⁶ As a result, estimates presented here may under-estimate the less visible female count, especially in countries experiencing acute conflict or its aftermath.

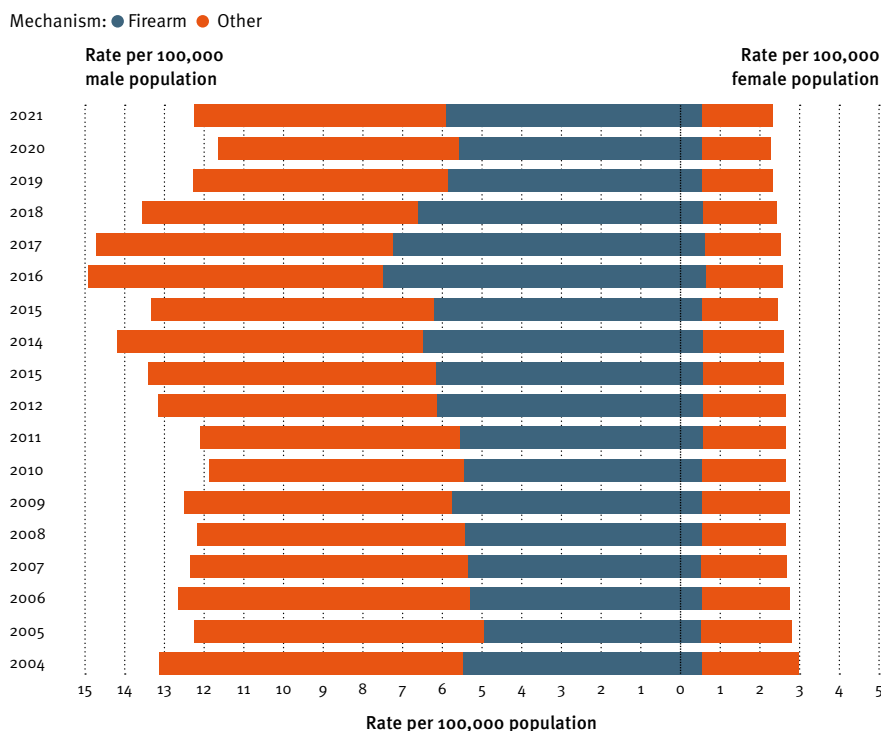
Figure 9 Violent death rates and proportion of violent deaths perpetrated by firearms



Note: Southern Africa excluded due to data uncertainties.

Source: Small Arms Survey (2023)

Figure 10 Global violent death rates by sex and killing mechanism, 2004–21



Source: Small Arms Survey (2023)

The overall number of female victims is remarkably stable over time, which—given the increasing global population—translates into a slight decline in the female victimization rate in terms of violent deaths. In fact, the female violent death rate in 2021 (2.33) is the second

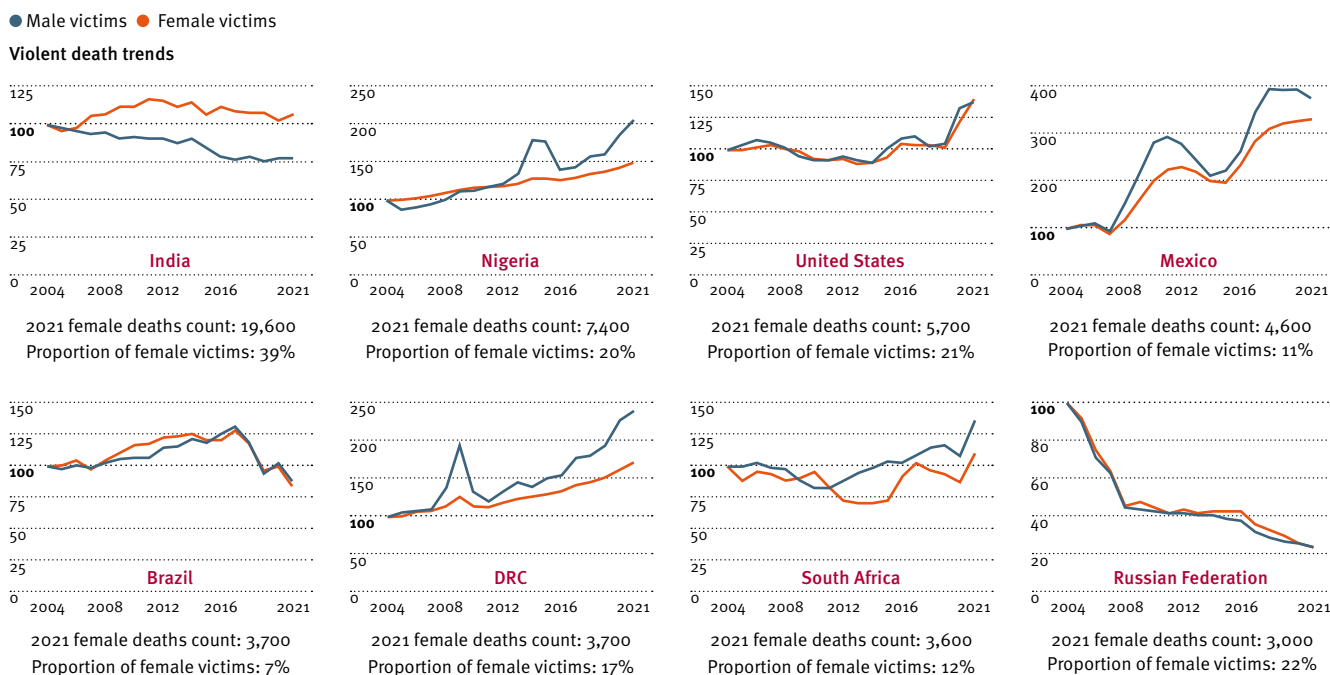
lowest since 2004 (2.98), with 2020 being the only year to feature a lower global rate (2.26). While the proportion of women and girls killed by firearms has increased in line with the general upward trend in firearm-related deaths, female violent deaths are much less

likely to be perpetrated by firearms: globally, 24 per cent of female victims were killed by firearms, compared to 48 per cent of men.

A closer look at the gendered trends in violent deaths in the eight countries with the highest number of female victims of violence—collectively responsible for 56 per cent of global violent deaths affecting women and girls—reveals divergent patterns. In some countries, male and female trends closely align (United States, Brazil, and the Russian Federation)—any increase or decrease in lethal violence seems to affect males and females almost equally (see Figure 11). In other countries, however, peaks of lethal violence disproportionately affect men, while women seem much less affected by such volatility. This pattern is observed in Nigeria, Mexico, and the Democratic Republic of the Congo (DRC). In South Africa, female victimization caught up with the generally deteriorating trend, after an initial period when the increase in violence primarily affected men.

Notably, in India, known for various types of femicide (such as dowry-related murders, honour killings, and other forms of lethal violence targeting women and girls),¹⁷ male victimization rates have generally decreased since 2004, while female rates have increased. India stands out as the country with the highest

Figure 11 Gendered victimization trends in countries with the highest number of female victims of lethal violence, 2004–21



Note: Trendlines are indexed to 2004 for comparability purposes (base 2004 = 100).

Source: Small Arms Survey (2023)

number of women and girls killed violently, with 19,600 deaths in 2021, representing an estimated 39 per cent of all violent deaths in the country.

Global violent death rates forecast, 2022–30

Scenarios for global violent death rates

In the past, the Survey has developed scenarios envisioning the future landscape of lethal violence up to the year 2030.¹⁸ The dual purpose of these exercises was to predict the global toll of violent deaths under ‘business-as-usual’, ‘positive’, and ‘negative’ scenarios, and to estimate potential lives saved through effective violence-prevention measures. As the most recent GVD database update includes data up to 2021, the current projections offer an important assessment of progress towards achieving Target 16.1 of the SDGs at the halfway mark.

While maintaining the designations previously used by the Survey, the scenarios presented below were developed using advanced statistical modelling techniques. Leveraging individual time-series data on conflict deaths, homicides, and killings during legal interventions for 222 countries and territories from 2004 to 2021—extracted from the latest GVD database update (Small Arms Survey, 2023)—Bayesian structural time series (BSTS) models (Harvey, 1990, pp. 1–15) were employed to forecast yearly rates between 2022 and 2030. This approach benefits from the increasing volume of data in the GVD database, which recently passed the cap of 100,000 data points with its latest update, with Bayesian methods providing probabilistic insights into forecasting time series uncertainties (Gelman, 2014, pp. 6–8). The forecasting framework comprises the following four key steps:

- extracting time series of conflict death, intentional homicide, and killing during legal intervention rates for each country and territory for the period 2004–21 from the GVD database;
- applying separate BSTS models, where fluctuations around the mean in the time series are used to estimate the model parameters through 50,000 iterations;¹⁹
- forecasting rates for each country and territory and indicators for the

period 2022–30, and deriving forecast counts by multiplying rates with country-level UN population projections (UNPD, 2022) for the same years; and

- aggregating the country-level forecast counts to the global level to compute rates for each year and indicator, and deriving summary statistics from the range of forecasted values produced in the 50,000 model iterations.

To ensure consistency with the previous scenarios developed by the Survey, three scenarios have been created based on the forecasts for the period 2022–30. The following three scenarios reflect the level of credibility about the predictions given the data and the model assumptions presented above:

- the **‘business-as-usual’ scenario** represents the middle estimate—the median of the 50,000 model iterations—of the violent deaths forecast for the 2030 horizon;
- the **‘positive’ scenario** represents the lowest estimate—the first quartile of the 50,000 model iterations—of the violent deaths forecast for the 2030 horizon; and
- the **‘negative’ scenario** represents the highest estimate—the third quartile of the 50,000 model iterations—of the violent deaths forecast for the 2030 horizon.

The projected violent death rates behind these scenarios have the advantage of allowing probabilistic

statements—since the positive and negative scenarios represent the lowest and highest bounds of the values forecast in the 50,000 model iterations—and thus complementing the conventional assessment of the effectiveness of current efforts to reduce lethal violence.²⁰ For example, the projected violent death rates for 2030 are 7.60 for the business-as-usual scenario, 5.80 for the positive scenario, and 10.76 for the negative scenario. This means that there is a 75 per cent probability that, even under the best-case scenario, violent death rates still will not decrease below 5.80 by 2030. Conversely, it also means that there is a 75 per cent probability that, under the worst-case scenario, violent death rates will not increase above 10.76 by 2030. This information offers limited optimism about the possibility of halving global violent deaths by 2030; even the positive scenario projects only a 27 per cent reduction compared to the 2015 rate.

Analysis of the scenarios for the period 2022–30

The global violent death scenarios presented in Figure 12 aggregate country- and territory-level projections of conflict deaths, homicides, and killings during legal interventions for the period 2022–30. These scenarios are examined in detail below, with a focus on conflict deaths and intentional homicides because they are the main targets of country- and state-level policies and programmes for violence reduction.

Figure 12 Violent death rates between 2004 and 2021 and projected rates between 2022 and 2030, globally

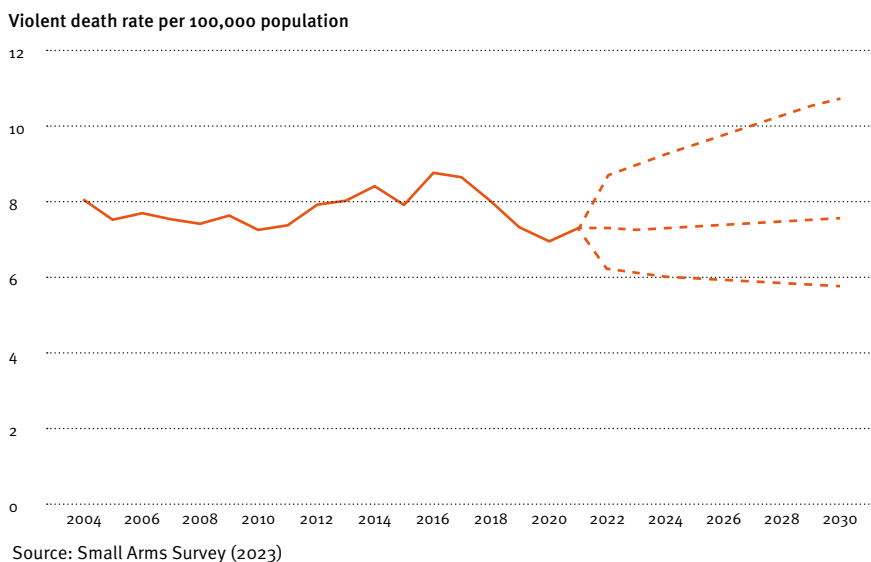


Figure 13 Conflict deaths, homicides, and killings during legal interventions between 2004 and 2021 and projected rates between 2022 and 2030, globally

Violent death rate (per 100,000 population)



Source: Small Arms Survey (2023)

Business-as-usual scenario

The business-as-usual scenario is based on a median estimate of the violent death rates forecast for the 2030 horizon. This scenario suggests that the tipping point of 7.0 violent deaths per 100,000 population observed in 2020 will indeed be the lowest level of violence observed in the foreseeable future (Boo and Hideg, 2023). The increased rate of 7.3 in 2021, observed in the GVD database, is projected to rise to 7.6 by 2030. Adjusting for expected population growth, this equates to an additional 67,000 violent deaths estimated in 2030 (about 647,000

violent deaths) compared to the latest counts observed in 2021 (580,000 violent deaths). This confirms the findings from previous scenarios developed by the Survey (Hideg and Alvazzi del Frate, 2021, pp. 10–14).

Similar to the trends observed in the GVD database for the period 2004–21 (Boo and Hideg, 2023), intentional homicide is projected to be the main cause of deadly violence in 2030, with a rate of 4.9 homicides per 100,000 population (see Figure 13). This would translate to 420,000 victims in 2030, an increase of 49,000 victims from the 371,000 observed

in 2021. Taking into account a projected reduction in direct conflict death rates for the period 2022–28—mainly associated with fewer spikes in deadly violence observed in Myanmar and Afghanistan in 2021—levels of violence directly associated with conflicts are projected to near the 2021 rate of 1.6 per 100,000 population in 2030. Adjusted for global population increase, this implies an additional 8,000 direct conflict victims in 2030 (139,000 direct conflict deaths), compared to the 131,000 direct conflict deaths recorded in 2021. These findings suggest that the continuation of country- and

Table 5 Violent death, direct conflict death, and intentional homicide counts and rates observed in 2021 and projected in 2030 according to the three scenarios, globally

Scenario	Indicator	Observed in 2021		Projected in 2030	
		Count	Rate (per 100,000 population)	Count	Rate (per 100,000 population)
Business-as-usual scenario	Violent deaths	580,097	7.31	646,736	7.60
	Intentional homicides	371,269	4.70	420,138	4.94
	Direct conflict deaths	130,955	1.66	138,991	1.63
Positive scenario	Violent deaths	580,097	7.31	493,494	5.80
	Intentional homicides	371,269	4.70	351,128	4.13
	Direct conflict deaths	130,955	1.66	70,276	0.83
Negative scenario	Violent deaths	580,097	7.31	916,261	10.76
	Intentional homicides	371,269	4.70	512,632	6.02
	Direct conflict deaths	130,955	1.66	293,514	3.45

Source: Small Arms Survey (2023)

“The recent intensification of several conflicts in Asia and Eastern Europe reported in the latest GVD database update underscores the potentially catastrophic consequences of conflict escalation.”

state-level policies and programmes to reduce or prevent violent deaths implemented between 2004 and 2021 is unlikely to substantially reduce global violent deaths for the 2030 horizon (see Table 5).

Positive scenario

The positive scenario builds on the assumption that the violent death rates projected for the 2030 horizon will be at their lowest level, with a 75 per cent credible interval. Under this scenario, a steady decrease in violent death rates is expected to reach 5.8 per 100,000 in 2030, involving a reduction of 86,000 violence victims between 2021 (580,000 victims) and 2030 (494,000 victims). This estimate paints a more pessimistic picture than that of previous scenarios by the Survey (Hideg and Alvazzi del Frate, 2021), possibly because of the increase in global violent deaths observed in 2021.

Similar to the business-as-usual scenario, intentional homicide is projected to be the main cause of death, with rates progressively decreasing to reach an all-time low of 4.1 victims per 100,000 population. This translates to a reduction of 20,000 homicide victims from 2021 to 351,000 victims in 2030. Individual conflicts are expected to decrease to their lowest levels recorded since 2012, gradually reducing their intensity to a rate of 0.8 victims per 100,000 population. Even in active conflict zones such as Afghanistan, Iraq, and Yemen, and scenario envisions that, if all countries and states consistently implement their most successful violence reduction and prevention policies and programmes, the level of global violence can be substantially reduced by 2030 compared to the 2015 reference violent death rates.

Negative scenario

The negative scenario hinges on the assumption that the violent death rates projected for the 2030 horizon will be at their highest level, with a 75 per cent credible interval. This alarming scenario forecasts a 47 per cent increase in violent death rates between 2021 and 2030, with 10.76 violent deaths per 100,000 population forecast for that year. Albeit based on a substantially different methodology, this figure partly confirms the concerning trend highlighted in previous negative scenarios developed by the Survey, which estimated 12.48 violent deaths per 100,000 population for the year 2030 (Hideg and Alvazzi del Frate, 2019).

The recent intensification of several conflicts in Asia and Eastern Europe reported in the latest GVD database update underscores the potentially catastrophic consequences of conflict escalation that could lead to a negative scenario. Indeed, under this scenario, conflicts would substantially increase their toll on global lethal violence, with a 108 per cent rate increase between 2021 and 2030, translating to a rate of 3.45 victims per 100,000 population. Adjusting for expected population growth, nearly 300,000 people are estimated to die in conflict in 2030, a figure substantially higher than in previous pessimistic scenarios published by the Survey (Hideg and Alvazzi del Frate, 2019). Furthermore, under this scenario of increased lethal violence, homicide rates are projected to increase by nearly 30 per cent between 2021 and 2030 to reach 6.02 that year, for an increased violent death toll of 141,000 between 2021 and 2030 to 513,000 homicide victims. This negative scenario sounds an alarm bell, stressing

the potential death toll resulting from the failure of concerted country- and state-level violence reduction and prevention policies and programmes, particularly in conflict settings.

While the latest GVD database update highlights an increasing regional polarization in violent death patterns (Boo and Hideg, 2023), the scenarios could be affected by unaccounted spill-over effects of conflicts in countries where there were no recorded conflicts in 2004–21. This analysis, however, offers the advantage of providing data-driven scenarios based on each one of the 76,272 data points on conflict deaths, homicides, and killings during legal interventions recorded in the GVD database between 2004 and 2021. While the probabilistic approach to the three analytical scenarios is conceptually different from the scenarios previously developed by the Survey, the analytical results are similar to those of previous scenarios. In particular, the striking similarity across business-as-usual scenarios offers a strong warning that unless there is a drastic shift of paradigm towards concerted country- and state-level violence reduction and prevention policies and programmes, the world is unlikely to achieve Target 16 of the SDGs.

Conclusion

This paper offers a comprehensive insight into global violent deaths, spanning from 2004 to 2021, and identifies potential scenarios for the period leading up to 2030. It illuminates nuanced trends, revealing a return to previous levels of violence in 2021 following a period of relative calm induced by pandemic-related restrictions in 2020. This regression manifested in an uptick in both intentional homicides and conflict-related deaths, underscoring the persistent challenge of violence worldwide.

The findings also highlight enduring gender disparities in violent victimization. Men continue to bear the brunt of lethal violence across nearly every country, while women are disproportionately affected within the confines of the home. These persisting trends emphasize the imperative for targeted interventions to address domestic violence and promote gender equality in violence prevention efforts.

Furthermore, the analysis underscores the significant role of firearms in global lethal violence. Firearms were implicated in more than 45 per cent of violent deaths in 2021, signalling the

necessity for policies aimed at reducing access to firearms and mitigating gun violence. Such measures are crucial components of comprehensive violence prevention strategies.

Geographic disparities in violent death rates persist, with certain regions, such as Southern Africa, exhibiting disproportionately high rates of violence compared to others. Targeted interventions tailored to the specific challenges faced by high-risk regions are essential for effective violence reduction strategies, alongside broader efforts to address social determinants of violence.

The paper's examination of Northern Africa and the G5 Sahel highlights the persisting lack of reliable data on lethal violence, with few countries providing comprehensive information. The analysis underscores, however, that the G5 Sahel region experiences notably higher levels of lethal violence compared to Northern Africa, and increasing conflict-related fatalities since 2016. While violent deaths have been on the rise in the Sahel since 2016, with conflict deaths constituting a substantial portion of all violent deaths, Northern Africa has experienced periods of increased violence following events such as the Arab uprisings and therefore fluctuations in violent death rates.

In conclusion, realizing the aspiration of significantly reducing all forms of violence and related death rates by 2030, as outlined in the SDGs, demands concerted action at global, national, and local levels. At the halfway point in the 2030 Agenda, the goal of halving global violent deaths appears increasingly out of reach. By prioritizing violence prevention and adopting evidence-based strategies, policymakers can reduce the potential death toll, however, and pave the way towards safer and more peaceful communities for all.

Policy observations

- Data-driven policy formulation: Policymakers should prioritize data-driven approaches to policy formulation and evaluation. Investing in robust data collection, analysis, and monitoring mechanisms can enhance the effectiveness of violence prevention strategies by identifying trends, evaluating the impact of interventions, and informing evidence-based policymaking.
- Investment in conflict resolution and peacebuilding: Increased investment

in conflict resolution and peacebuilding efforts, particularly in conflict-prone regions, can yield long-term dividends in reducing violent deaths. Supporting local mediation processes, facilitating dialogue between conflicting parties, and providing resources for post-conflict reconstruction can contribute to sustainable peace and security.

- Gender-sensitive violence prevention strategies: Developing gender-sensitive violence prevention strategies is essential, considering the disproportionate impact of violence on men and women. Policies should address the root causes of gender-based violence, enhance support services for victims, and promote gender equality to create safer communities for all individuals.
- Firearm regulation and control: Implementing stricter firearms regulation and control measures globally can significantly reduce firearm-related violence, given that firearms were involved in nearly half of all violent deaths in 2021. Enforcing comprehensive background checks, restricting access to high-capacity weapons, and promoting responsible gun ownership are crucial policy interventions. ●

Abbreviations and acronyms

Agenda 2030 Transforming Our World: The 2030 Agenda for Sustainable Development

BSTS Bayesian structural time series

DRC Democratic Republic of the Congo

G5 Sahel G5 Sahel Joint Force

GVD database Global violent deaths database

SDG Sustainable Development Goal

UNODC United Nations Office on Drugs and Crime

Notes

- 1 See UNDESA (2018).
- 2 The GVD database only refers to direct conflict deaths, in line with the type of data collected by databases such as the Uppsala Conflict Data Program (UCDP) and the Armed Conflict Location & Event Data (ACLED). Considering that the SDG Indicator 16.1.2 on 'conflict-related deaths' refers to 'direct and indirect deaths associated to armed conflict' (UNSD, n.d.a), in

the future it will be necessary to develop specific methodologies to estimate indirect conflict deaths to complete this indicator (Pavesi, 2017; Alda and Mc Evoy, 2017).

- 3 Trends in unintentional homicides depend largely on legal definitions and the codification of relevant indicators, which vary widely across states (Widmer and Pavesi, 2016, p. 8). The GVD database records the number of unintentional homicides when available, and uses global multipliers to estimate this number for remaining states.
- 4 The monitoring and reporting of deaths due to legal interventions is very uneven, and available figures are probably underestimated. This figure includes reported numbers of casualties of legitimate killings during law enforcement operations from administrative data, but also of extrajudicial killings in countries where these are tracked by NGOs or similar sources. The boundaries between legal intervention fatalities and extrajudicial killings by security forces are sometimes blurred, further complicating these estimations.
- 5 See the metadata description of SDG Indicator 16.1.2 in UNDESA (2018).
- 6 SDG Indicator 16.1.2 looks at 'conflict-related deaths per 100,000 population, by gender, age and cause'.
- 7 While the 25 per cent reduction threshold is arbitrary in the sense that progress towards the target can take any shape or form and is unlikely to follow a strictly linear process, it serves as a good benchmark for assessing overall progress towards the 50 per cent reduction target. Obviously, countries that are in severe conflict are not included in this count.
- 8 There are 187 such countries out of the 222 in the GVD database. Countries with very few homicides (and correspondingly low populations) are excluded from the database to discount random year-to-year variation in homicide counts, resulting in a high, but not 'systemic', percentage change (for example, while three homicide victims one year, compared with just one victim the previous year, represents a 300 per cent increase, this does not indicate a significant change unless the pattern is repeated year after year).
- 9 Some countries lump negligent or non-negligent homicides into this category—mixing, for example, fatal car accidents with deliberate violent acts resulting in death but having no deadly intent—while other countries do not. Internationally, unintentional homicides are focused, as much as possible, on the non-negligent type. See, for example, the definitions laid out in the UN Economic Commission for Europe Statistical Database (UNECE, n.d.).
- 10 According to the World Population Prospects 2022 data set of the UN Department of Economic and Social Affairs' Population Division, the annual global mortality (number of deaths) for 2021 is estimated at about 69.25 million (UNDESA Population Division, 2022).
- 11 The composition of subregions referred to in this Briefing Paper is based on the

- UN's standard country and area codes for statistical use (known as 'M49') (UNSD, n.d.b).
- 12 Libya is the only exception (Salama, 2018).
 - 13 Sources of public health data include the World Health Organization and the Institute for Health Metrics and Evaluation. Projections of data for any remaining gaps, after pooling all potential sources, were filled by projecting the last known rate for the particular indicator for the population size of the year estimated, in line with default practice in the GDV database.
 - 14 For a discussion on intercommunal violence in these countries, see Tubiana and Gramizzi (2017; 2018) with regard to Chad, Libya, and Sudan, and de Tessières (2018) with regard to Niger.
 - 15 For a thorough assessment of the GVD database's sources and gaps, see Hideg and Alvazzi del Frate (2020).
 - 16 See, for, example, Ghobarah, Huth, and Russett (2003, p. 199).
 - 17 See for, example, Karp, Marwah, and Manchanda (2015).
 - 18 See Mc Evoy and Hideg (2017, pp. 33–46); Hideg and Alvazzi del Frate (2019, pp. 5–10); and Hideg and Alvazzi del Frate (2021, pp. 10–14).
 - 19 The BSTS models are implemented with the R statistical language (R Core Team, 2023), using the BSTS package (Scott, 2024) as an univariate model with a local-level component (Durbin and Koopman, 2012, pp. 63–68). Non-informative priors on the distribution for the standard deviation parameter have been used in most cases. The model is estimated using Markov chain Monte Carlo (MCMC) methods, where 50,000 iterations were used to make statistical inferences about the parameters.
 - 20 This statement assumes both that the data is accurate and that the model specification is correct (Gelman, 2014, pp. 141–53). While data availability can impact the accuracy of the GVD database, only a handful of the 666 fitted country-level models displayed convergence issues.

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About the SANA project

The **Security Assessment in North Africa** is a multi-year project of the Small Arms Survey that supports those engaged in building a more secure environment in North Africa and the Sahel-Sahara region. The project produces timely, evidence-based research and analysis on the availability and circulation of small arms, the dynamics of emerging armed groups, and related insecurity. The research stresses the effects of uprisings and armed conflicts in the region on security-related issues.

The Security Assessment in North Africa receives ongoing funding from the Ministry of Foreign Affairs of the Netherlands. It has previously received grants from Global Affairs Canada, the Swiss Federal Department of Foreign Affairs, the Danish Ministry of Foreign Affairs, the German Federal Foreign Office, the Royal Norwegian Ministry of Foreign Affairs, and the US State Department.

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The Survey is an associated programme of the Geneva Graduate Institute, located in Switzerland, and has an international staff with expertise in security studies, political science, law, economics, development studies, sociology, criminology, and database and programme management. It collaborates with a network of researchers, practitioners, partner institutions, non-governmental organizations, and governments in more than 50 countries.

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