

A Review of Ambulance Terrorism on the African Continent

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Abbreviations:

ACLED: Armed Conflict Location and the Event Data Project
AWS: Aid Worker Security Database
EMS: Emergency Medical Services
GTD: Global Terrorism Database
ISIS: Islamic State of Iraq and Syria

Abstract

Background: In recent decades, an increasing number of terrorist attacks have been carried out against medical institutions, hospitals, and health care workers. These attacks, that often result in high numbers of casualties and impaired access to health services, have a more significant impact on people's sense of security than attacks against military and police targets. Attacks on ambulances – especially on the African continent – have been sparsely studied. This study examines attacks on ambulances on the African continent during the period from 1992–2022 (until December 31, 2021).

Methods: Reports of ambulance terrorism were extracted from the Global Terrorism Database (GTD), RAND Database of Worldwide Terrorism Incidents (RDWTI), United Nation's Safeguarding Health in Conflict Coalition (SHCC) database, Armed Conflict Location and Event Data Project (ACLED), Surveillance System for Attacks on Health Care (SSA) database, and Aid Worker Security Database (AWS). Furthermore, a grey literature search was performed. The date and location of the attacks, perpetrators, weapon and attack types, and the number of victims (dead and wounded) and hostages were collected. Results were exported into an Excel spreadsheet (Microsoft Corp.; Redmond, Washington USA) for analysis.

Results: During the 30-year study period, 166 attacks were observed in 18 African countries. The number of attacks significantly increased since 2016, with 81.3% of the attacks taking place from 2016 to 2022. In total, 193 people died and another 208 were injured. Attacks with firearms were most frequently noted (92 cases; 55.4%), followed by attacks with explosive devices (26 cases; 15.7%). A significant number of ambulances were hijacked (26 cases; 15.7%) and subsequently used for other terrorist attacks. In seven attacks, ambulances were used as vehicle-borne improvised explosive devices (VBIEDs).

Conclusion: In this database study on ambulance terrorism in Africa, it was found that the reported occurrence of attacks increased from 2013 onwards, including the rise of ambulances used as VBIEDs. These findings suggest that ambulance terrorism represents a real, significant risk that both governments and health care institutions must address.

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Introduction

In recent years, an increasing number of studies focused on terrorist attacks against patients, health care institutions, and health care workers with discussions around mitigation, preparation, and response strategies against such events.^{1–3} The open-access nature of health care

RDWTI: RAND Database of Worldwide Terrorism Incidents
SHCC: United Nation's Safeguarding Health in Conflict Coalition
SSA: Surveillance System for Attacks on Health Care
START: National Consortium for the Study of Terrorism and Responses to Terrorism
VBIED: vehicle-borne improvised explosive device

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facilities, coupled with budgetary constraints in investment into security and protection of the facilities, exposes a number of vulnerabilities of these critical infrastructures.

A successful attack on any critical infrastructure will likely attract significant media attention and has the potential to significantly disrupt day-to-day functioning of the society, as well as causing downstream impact on the financial and psycho-social well-being of communities, all of which are considered attractive end goals for terrorist groups.

There are several areas of health care that are particularly vulnerable. These include ambulances and Emergency Medical Services (EMS) that do not benefit from the relative boundaries of a health care facility.⁴ Only a few international publications have dealt with such attacks, either terrorism-related or not.

The first study on terrorist attacks against ambulances and their use for terrorism purposes was published by BA Turner in 1982.⁵ Although no actual attack was reported, the authors of a 2003 study from the United States scrutinized the behavior of 151 ambulance crews and found that there is a real risk of ambulances being acquired and used by certain groups and individuals for the purpose of terrorist attacks.⁶ An interview study with ambulance drivers in Kashmir in 2012 demonstrated that the atmosphere of conflict on the streets impacted the ambulance drivers adversely, both physically and mentally.⁷ According to another study, “Trojan ambulances,” ambulances which are hijacked and used to carry out terrorist attacks, represent a serious security challenge that all governments and health care organizations must take seriously.⁸ In Syria, there were 204 individual attacks involving 243 ambulances from 2016 to 2017.⁹ A study published in 2020, based on data from the Global Terrorism Database (GTD), examined 20 cases in which terrorist organizations used ambulances loaded with explosives (vehicle-borne improvised explosive devices [VBIEDs]) during their attacks. Of the 20 attacks, 15 were carried out in the Middle East (four of which took place in Egypt, a country in Africa and not in the Middle East), and the remaining five in Southeast Asia.¹⁰ Most recently, a GTD study published in 2022 focused on 184 terrorist attacks against EMS from 1970 through 2019. The majority of the attacks occurred in the Middle East and North African countries, but the involvement of Sub-Saharan African states was also significant.^{11,12}

Specific publications regarding attacks on the African continent were not available, although it appears that African countries are experiencing an increasing number of terrorist attacks of this type.¹³ There are several reasons that make emergency vehicles attractive targets for terrorists. First, they are increasingly used as targets for secondary attacks on first responders.¹¹ Second, ambulances are hard to defend as the available space does not readily allow the company of armed guards. Third, compared to Europe, there are significantly less ambulances in Africa and they are also less well-equipped. A successful attack on ambulances may result in a wide region suffering from impaired access to (basic) medical care. This may ultimately cause distrust by the local population in the state administration, forcing them to accept the rule of the terrorist organization and even cooperate with them in order to survive. Fourth, ambulances carry medical devices and equipment that terrorist organizations may want to use for their own militants. In addition, ambulances can be used for various transport purposes (ie, different kinds of tools, weapons, or terrorists). Finally, hijacked or stolen ambulances can be used in other terrorist attacks, taking advantage of their immunity.^{10,11}

The purpose of this study was to process and to evaluate documented attacks against ambulances in Africa using (gray) literature and multiple databases.

Methods

This study was a database review of multiple publicly available databases that collect data about terrorist incidents and attacks against health care. The sources used for the study were selected based on their public availability, reliability to the academic community, and global coverage. More specifically, data were extracted from five different datasets to provide the largest dataset possible. Firstly, it includes the GTD from the University of Maryland’s National Consortium for the Study of Terrorism and Responses to Terrorism (START; College Park, Maryland USA). The data include over 200,000 terrorist events from 1970 until 2020.¹⁴ Next, this study used data from the RAND Database of Worldwide Terrorism Incidents (RDWTI; Santa Monica, California USA). The data from RAND (an American nonprofit research organization, formed immediately after World War II) are coded slightly differently, for example using a different unique event identifier, but includes similar basic information with date, perpetrator, and target type. This dataset includes events from 1968 until 2009 but is incomplete for some periods.¹⁵ Both START and RAND do not include state-driven terrorism in their datasets.

Further, the United Nation’s Safeguarding Health in Conflict Coalition (SHCC; Baltimore, Maryland USA) was used, which is an open platform created by 40 organizations (health provider organizations, humanitarian groups, human rights organizations, and nongovernmental organizations). It was started in 2014 with the purpose of allowing organizations to share data about humanitarian crises. The SHCC primarily investigates attacks on humanitarian organizations (including those providing health services) and their workers.¹⁶ Then, this paper incorporated data from the Armed Conflict Location and the Event Data Project (ACLED; Wisconsin USA), which is a registered non-profit organization in the United States dealing with real-time data and analysis source on political violence and protest around the world. Data from ACLED varies by date. African events are collected from January 1, 1997 until present.¹⁷ Data from the Surveillance System for Attacks on Health Care (SSA) created by the World Health Organization (Geneva, Switzerland) in 2015 were also used. This database contains various types of attacks (not exclusively terrorist attacks) on health care facilities and workers.¹⁸ Although the Aid Worker Security Database (AWSD; Washington, DC USA) collects attacks on employees of non-profit organizations and aid organizations, it also includes those who work in the health care field (ambulance drivers, paramedics, and/or nurses). This database contains data on attacks from 1997 onwards.¹⁹

The search queries included: Africa, ambulance, ambulance driver, ambulance worker, ambulanceman, ambulance crew, paramedic, ambulance attendant, medical assistant, first responder, Emergency Medical Services (EMS), health worker, health care worker, doctor, nurse, hospital, medical facility, and terrorist.

Using these queries, two authors (JB and AG) independently extracted terrorist attacks against ambulances and EMS on the African continent from the abovementioned source databases. In parallel, the authors performed a grey literature search to collect additional information from online news articles and social media.

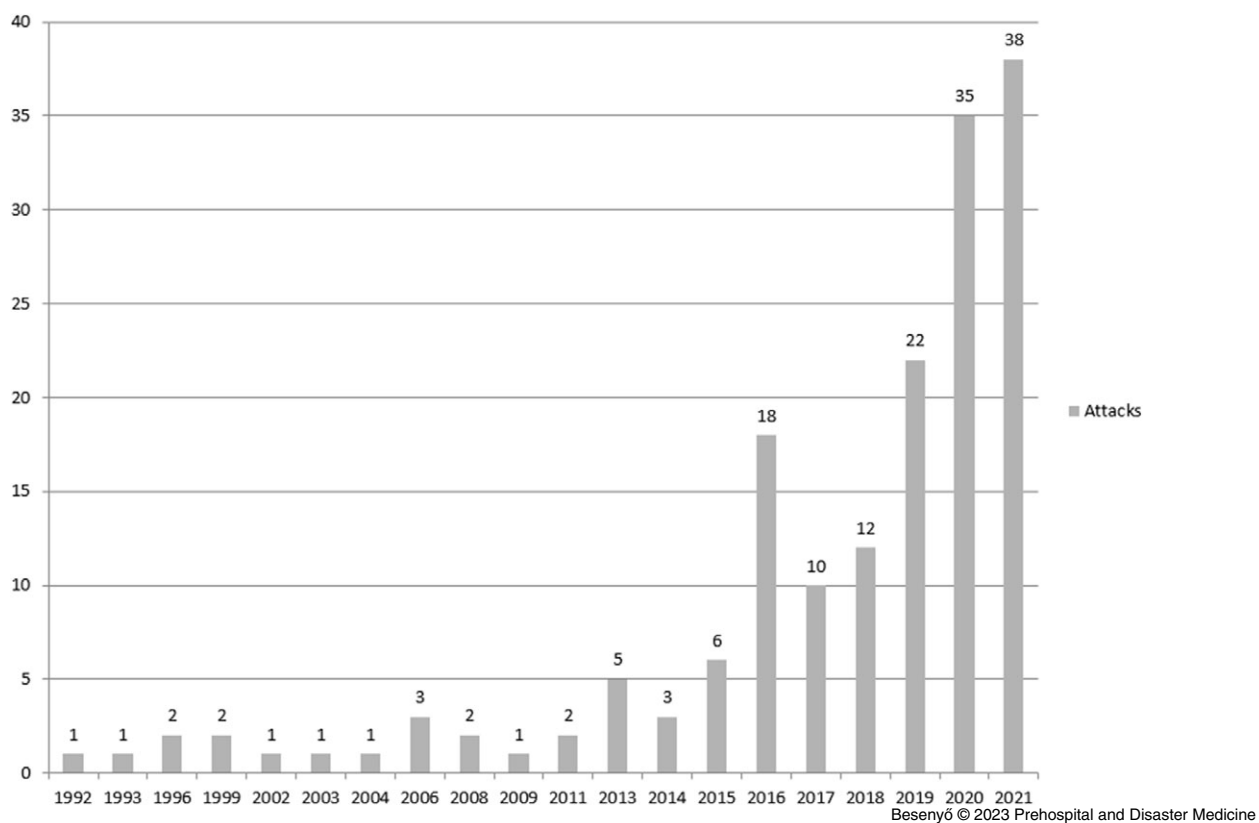


Figure 1. Annual Number of Attacks Against Ambulances.

A terrorist attack was defined as “the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation.” Attacks against non-EMS medical institutions and workers were excluded. Attacks were also excluded if they were perpetrated by family members, patients, hospital workers, or criminals with the intention of robbery. Finally, duplicates were excluded, as well as records that were related to a demonstration, strike, mob, barricade, or protest. The authors then compared and eventually merged the databases. In case of doubt or disagreement between the two researchers, or if there were missing (mandatory) fields, records were excluded. The Database Data Dictionary can be found in Supplement S1 (available online only).

Results were exported into an Excel spreadsheet (Microsoft Corp.; Redmond, Washington USA) for analysis. Because publicly available database sources were used without the presence of personal identifiers, medical ethical review was redundant. The study database is made publicly available (Supplement S1).

Results

In the period from 1992–2022 (until December 31, 2021), ambulance terrorism was responsible for 166 attacks in 18 African countries. A total of 193 people lost their lives and 208 were injured. Firearm attacks were most frequently observed (92 cases; 55.4%), followed by attacks with explosive devices (25 cases; 15.7%), including two suicide bombings. A significant number of ambulances were hijacked (26 cases; 15.7%), and some of them were later used in other terrorist attacks.

Terrorist attacks were perpetrated in 20 out of the 30 years in the study period. The annual number of attacks against

ambulances is depicted in Figure 1. The first attack was carried out in 1992. In 2013, the number of attacks started to increase with five attacks in 2013, three in 2014, and six in 2015. A further increase was observed from 2016 onwards. During this year, 18 attacks were carried out against ambulances. There were 10 attacks in 2017, 12 attacks in 2018, 22 in 2019, 35 in 2020, and 38 in 2021.

Table 1 shows the country distribution of attacks. Most attacks were carried out in Burkina Faso (30), Mali (29), and Egypt (26), representing 51.2% of attacks.

Figure 2 delineates the evolution of the number of the attacks' victims. Until 2014, the attacks caused relatively low numbers of victims, but from 2015 onwards, both the number of fatalities and wounded increased significantly. The deadliest attacks were carried out by the Armed Islamic Group (GIA), the Salafist Group for Preaching and Fighting (GSPC), the Lord's Resistance Army (LRA), Boko Haram, Al-Shabab, Jama'a Nusrat ul-Islam wa al-Muslimin (JNIM), and the Islamic State's West Africa Province (ISWAP).

The weapon and attack types are shown in Table 2. The largest number of attacks against ambulances was carried out with firearms (93.6%). In most cases, the data did not reveal the firearms type (82 cases; 88.2%).¹ There were nine cases (9.8%) where perpetrators used automatic weapons, and in a single case, a firearm and a knife were used. The hijacking of vehicles was largely carried out with firearms (26 cases; 15.7%), while in 26 cases (15.1%), attacks were conducted with explosives. In 16 of these cases, the attacks were carried out with homemade bombs (improvised/homemade bombs), and in three cases, with unknown explosive devices. Armed hostage-takings were observed in 14 cases (8.4%),

Attacks in Countries 1974-2021		Casualties per Country 1974-2021	
Countries	Attacks	Killed	Wounded
Algeria	10	25	24
Burkina Faso	30	45	48
Cameroon	4	0	5
Central African Republic	2	2	3
Chad	1	0	0
Democratic Republic of Congo	2	1	0
Egypt	26	12	19
Kenya	5	5	8
Libya	11	22	43
Mali	29	17	5
Mozambique	1	2	0
Niger	16	24	12
Nigeria	6	0	0
Somalia	8	30	23
South Africa	1	1	1
Sudan	7	2	10
South Sudan	5	1	4
Uganda	2	4	3
Sums	166	193	208

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Table 1. Ambulance-Based Terrorism per Country

assassinations in four cases (2.4%), and arson attacks in four cases (2.4%). There were two attempted, but unsuccessful, suicide attacks. In seven cases, an ambulance was used as a VBIED. In two cases, the rescue vehicles were attacked with rockets or grenade launchers. In two other cases, the ambulances were hit by landmines. One secondary attack was found, in which an ambulance was detonated at a terrorist attack site targeting the EMS response.

Discussion

Attacks on ambulances represent a real threat and risk in Africa, and their number has increased significantly since 2016. Most of the 166 attacks took place in Burkina Faso, Mali, and Egypt killing 193 people and injuring 206.

Ambulance terrorism is not without consequences: as a result of fear for armed attacks, ambulances were only available on a limited basis in Burundi and northern Uganda between the 1980s and 2000s.²⁰ On February 5, 2011, a terrorist group used a stolen ambulance to carry out an unsuccessful assassination attempt against the Vice President of Egypt, Omar Suleiman.²¹ Likewise, several terrorist attacks have later been carried out on the Egyptian Sinai Peninsula using previously stolen ambulances. Members of the Ansar Bayt al-Maqdis terrorist group hijacked an ambulance in March 2015, prompting Egyptian authorities to ban the use of ambulances in the region. How seriously the authorities feared a possible terrorist attack with the hijacked ambulance was clearly illustrated by the fact that an unidentified ambulance that violated the ban was destroyed by an Egyptian Air Force combat helicopter next to the city of Sheikh Zuweid.^{22,23} The Malian

government officially acknowledged in 2016 that the jihadists had acquired ambulances.²⁴ This trend has become dominant to such an extent that in 2018, the UN Secretary General's report on Mali specifically addressed terrorist attacks against ambulances.²⁵⁻²⁷ Furthermore, the American embassy in Niger warned on December 23, 2021 that unnamed militants could use a stolen ambulance to carry out a terrorist attack.

The use of hijacked/purchased ambulances as VBIEDs was commonly executed against military and civilian targets by several Middle Eastern terrorist organizations and the Islamic State of Iraq and Syria (ISIS). The free movement and immunity of ambulances ensures quick access to various health, governmental, and non-governmental objects.

Ambulances were used as VBIEDs by ISIS in Erbil, Iraq in 2013 and 2014.²⁸ In 2016 in the Iraqi cities of Tikrit and Samarra, suicide bombers drove two ambulances loaded with explosives into Shiite pilgrims and then detonated themselves.²⁹ Similar attacks were carried out in Libya by the local terrorist group "Tripoli Province of the Islamic State," which pledged allegiance to ISIS. The terror group also created a training center for African terrorist organizations in Libya, where African volunteers were trained to perpetrate such attacks. In Libya, there were three attacks where ambulances were used as VBIEDs from 2015-2016. The deadliest of these attacks was on February 20, 2015, in which an explosive-laden ambulance was detonated at a gas station in the city of Qubba. Forty-five (45) people lost their lives and another 70 were injured.³⁰ In May 2019, militants affiliated with the Islamic State in the Greater Sahara (ISGS) operating in Niger carried out an unsuccessful attack on the Koutoukale prison with an ambulance stolen from Medecins Sans Frontieres (MSF)³¹ in order to free their imprisoned comrades.³² Although - at the international level - a bomb attack against an ambulance in Sri Lanka was already carried out in 1985,³³ the first attack on the African continent only happened at the end of 1992.³⁴ In the following two decades, an average of one-to-three attacks per year were carried out against ambulances, but there were also ten individual years in this dataset where no single attack was observed. However, every year since 2013, the incidence of ambulance terrorism increased. This rise is likely related to the strengthening of ISIS in 2013, after which several African terrorist organizations pledged allegiance to ISIS, received training, and adopted "know-how," such as the use of ambulances during terrorist attacks.³⁵ Interestingly, the defeat of ISIS in 2019 contributed to the further strengthening of African terrorism, as African militants who had been fighting in Syria and Iraq returned to the continent.³⁵

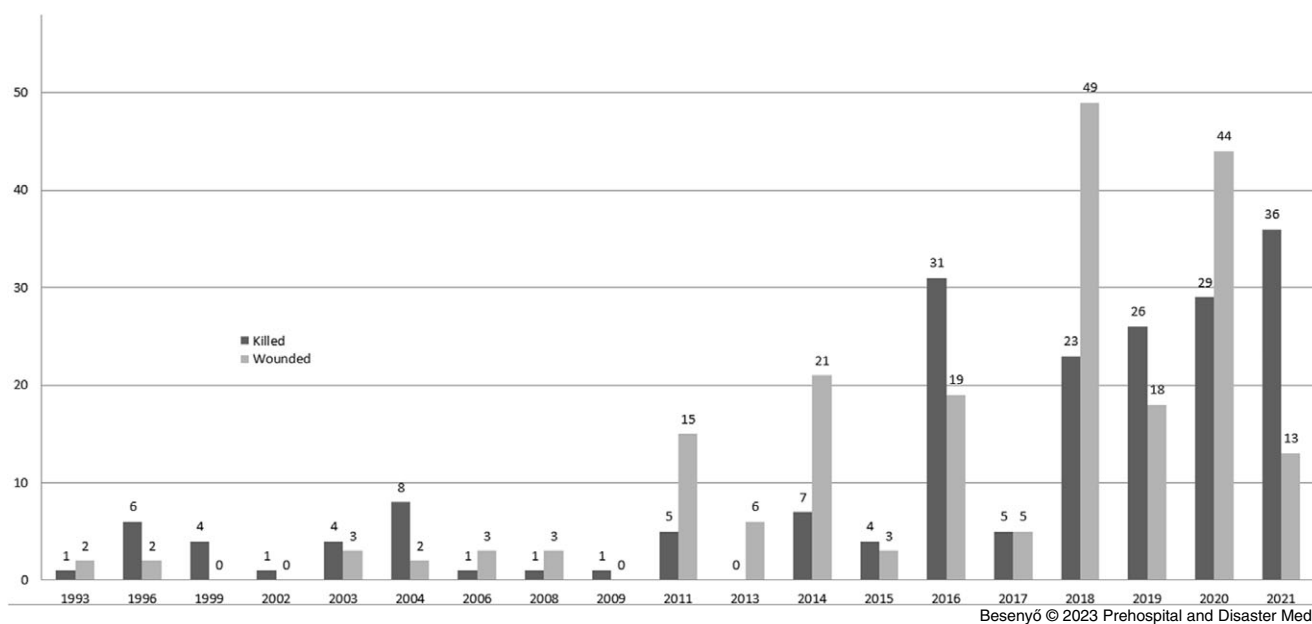
In the light of the above-mentioned developments, it is a serious risk that ambulances will lose their immunity. Consequences may be that they will not be able to move freely anymore and that they may not be longer allowed to pass through the checkpoints, which will deteriorate the life prospects and survival possibilities of the patients they carry. Furthermore, there is a risk that people do not view paramedics as "life savers" anymore, but as potential risk factors.

The prevention and mitigation of ambulance terrorism should be pursued without hampering emergency medical care. A first priority should be the prevention of ambulance theft, which can largely be accomplished by priming employees that they should not never leave ambulances unattended and lock all ambulance compartments when the vehicle is left alone, even in the ambulance bay. If there are multiple units responding, assign one person to stay with and monitor the vehicles. Second, several technical solutions

Kind of Attacks	Number of Attacks	Killed	Wounded
Armed Assault	92	112	103
Bombing	26	72	105
Hijacking	26	1	0
Hostage Taking	14	1	0
Assassination	4	7	0
Facility Attack	4	0	0
Unarmed Attack	0	0	0
Sum of Attacks	166	193	208

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Table 2. Attack Type of Ambulance Terrorism in Africa



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Figure 2. Evolution of the Attack Victims.

can be implemented, such as anti-theft systems and security glass. Also, GPS mapping/satellite tracking may contribute to the prevention of ambulance hijacking. Finally, the possibility of secondary attacks should be acknowledged by both health care providers and dispatch centers. Wearing protective gear, including bulletproof vests, may reduce the risk of sustaining injuries from a terrorist attack, but possible benefits and disadvantages are still zealously debated.¹¹

Limitations

A major limitation of this study is that the terrorist attacks of the period before the 1990s were not processed in sufficient detail and certain regions and countries were under-researched and under-published, so some attacks were not included in the databases or were only registered at a later time. Although the databases primarily obtained their information from news reports of various press organizations, the smaller local and regional newspapers may be incompletely represented so that there is a possibility of missed events. As an increasing number of these (local) news outlets are being digitalized, it is possible that numerous “unknown” attacks will be made publicly available, which may lead to future database updates. There also is a possibility that, due to security

or other reasons, terrorist attacks against ambulances either were not reported in the news or were classified in a different category. In the course of this study, successful attacks were only scrutinized and no potential attacks or failed attack plans. Using pre-existing databases such as the GTD as a data source also inherently introduces potential challenges such as miscoding errors or data entry errors. There may be differences in database accuracy between different African countries and between the different databases used. The data obtained were not subjected to an evaluation of accuracy. Furthermore, the lack of a universally agreed-upon definition of the term terrorism can create inconsistencies between databases in the labelling of such events.

Although the number of databases used in this study seems large, they were created based on different criteria and do not always cover the same period. The GTD processed attacks from 1970 to 2019, except for the year 1993, which is completely missing; from the RDWTI, from 1968 to 2009; and the SHCC, from 2014 to present. The ACLED and AWSD databases both cover 1997-present, while the SSA database includes data from 2015 to present. Although there are overlaps between the databases and there were several cases with conflicting data about the same attack (ie, number of victims or weapons used during the attacks), a

significant number of attacks were only found in one of the databases. As a result, this analysis represents a rather complete collection of unique events, which makes it a useful addition to the literature. Two researchers independently extracted data from the source databases and subsequently compared and merged their results, which probably improved database accuracy.

Conclusions

In this database study on ambulance terrorism in Africa, it was found that the reported occurrence of attacks increased from

2013 onwards, including the rise of ambulances used as VBIEDs. These findings suggest that ambulance terrorism represents a real, significant risk that both governments and health care institutions must address.

Supplementary Material

To view supplementary material for this article, please visit <https://doi.org/10.1017/S1049023X23000213>

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