Responsibility for protection of medical workers and facilities in armed conflict

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Assaults on patients and medical personnel, facilities, and transports, denial of access to medical services, and misuse of medical facilities and emblems have become a feature of armed conflict despite their prohibition by the laws of war. Strategies to improve compliance with these laws, protection, and accountability are lacking, and regular reporting of violations is absent. A systematic review of the frequency of reporting and types of violations has not been done for more than 15 years. To gain a better understanding of the scope and extent of the problem, we used uniform search criteria to review three global sources of human rights reports in armed conflicts for 2003–08, and in-depth reports on violations committed in armed conflict during 1989–2008. Findings from this review showed deficiencies in the extent and methods of reporting, but also identified three major trends in such assaults: attacks on medical functions seem to be part of a broad assault on civilians; assaults on medical functions are used to achieve a military advantage; and combatants do not respect the ethical duty of health professionals to provide care to patients irrespective of affiliation. WHO needs to lead robust and systematic documentation of these violations, and countries and the medical community need to take steps to improve compliance, protection, and accountability.

Lancet 2010; 375: 329–40

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Introduction

During the final months of the Sri Lankan military's campaign against the insurgency by the separatist Tamil Tigers in 2009, government forces reportedly engaged in 30 separate instances of shelling or aerial bombardment of more than ten hospitals, killing at least 260 people.[1,2] Moreover, in the aftermath of the Tamil Tigers' surrender, three government physicians were reportedly detained because they provided detailed information to the media about government shelling and civilian casualties in the conflict zone.[3] If confirmed, these actions would not be unusual. Assaults that have taken place in armed conflicts in the past 20 years include: attack, destruction, or looting of medical facilities; use of medical facilities for military purposes; obstruction of access to medical care; firing on ambulances; and threats, intimidation, and violence against health workers for seeking to fulfil their ethical duties to patients. Each of these acts violates the Geneva Conventions,[4–6] customary international law,[7] and various provisions of international human rights treaties, including the International Covenant on Civil and Political Rights[8] and the International Covenant on Economic, Social and Cultural Rights.[9] Additionally, these assaults have severe effects on health-care workers, often leading to departure from the country or war zone, on health systems, and on access to health services. Compared with other major human rights violations in war, however, these acts receive little attention. International laws are not respected, incidents are not systematically tracked and recorded, protection strategies are few, and when violations are identified, pressure on perpetrators to adhere to legal obligations is rarely generated.

Except for the work of the International Committee of the Red Cross (ICRC), no international organisation or consortium assumes responsibility for strategies to protect medical functions—medical personnel, facilities, and transports—in armed conflicts. The UN humanitarian system, under the direction of the Office of Coordination of Humanitarian Affairs and in conjunction with its Inter-Agency Standing Committee, has established 11 clusters for coordinated action, including one on health and one on civilian protection. But none of their mandates include protection of health workers and medical facilities and transports. In 2009, WHO launched an initiative to make hospitals safe in emergencies, but the programme does not include tracking of attacks on or interference with medical facilities and workers during conflict, or a strategy to restrict such acts through protective measures.[10]

Tracking and reporting of breaches of the Geneva Conventions, and other sources of international humanitarian law, have become key strategies to understand the scope and extent of violations, to provide knowledge to improve protection of human security, and to create a burden of responsibility on political leaders to respond.[11] In the past 20 years, governments and international organisations have tracked civilian mortality in conflict,[12,13] attacks on humanitarian aid workers[14] and journalists, and the effect of weapons (eg, anti-personnel landmines and cluster bombs) on civilian populations.[15–17] From this information, protection strategies have developed.

By contrast, no systematic reporting of assaults on medical functions in armed conflicts is in place, and no comprehensive review of the scope of the problem has been done for more than 15 years.[18] Médecins Sans Frontières (MSF) documents attacks in some cases, but it and other humanitarian organisations cannot be expected to report regularly on violence inflicted on and unjustifiable interference with patients and medical functions.[19] ICRC occasionally issues a press release about a particular incident and is reportedly exploring collection of data about violence inflicted on medical facilities and workers on the basis of inquiries to its offices in conflict zones. Human rights organisations sometimes publish reports about

> *Panel 1:* **Countries with active armed conflicts on their territory (2003–08)**
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> Afghanistan, Algeria, Angola, Azerbaijan, Burma, Burundi, Central African Republic, Chad, Chechnya, Colombia, Côte d'Ivoire, Democratic Republic of the Congo, Eritrea, Ethiopia, Georgia, Haiti, India, Indonesia, Iran, Iraq, Lebanon, Liberia, Mali, Nepal, Niger, Nigeria, occupied Palestinian territory, Pakistan, Peru, Philippines, Senegal, Somalia, Sri Lanka, Sudan, Thailand, Turkey, Uganda, Uzbekistan, and Yemen.

assaults on medical functions in a specific conflict, but even annual reports on global human rights lack a category for such violations; instead these violations are usually grouped by categories from human rights law (eg, torture, extrajudicial execution, violation of free expression).

The absence of focused reporting is matched by a lack of response to attacks by governments, the UN, other intergovernmental bodies, and medical associations. In response to the attacks in Sri Lanka, for example, the World Medical Association issued two statements: one encouraged compliance with principles of medical neutrality in times of armed conflict, and the other urged for appointment of lawyers for detained doctors, but neither statement identified violations or demanded that perpetrators stop and be held accountable.[20,21] Insights from available sources into the nature, extent, and patterns of assaults on medical functions in war are of the utmost importance. Proposed strategies are needed to promote increased respect for obligations, protection, and reporting of violations.

Protection framework

International legal standards for the protection of health in armed conflict have been in place for 150 years. The present standards derive from international humanitarian law, human rights law, and medical ethics; and include the Geneva Conventions (1949) and the two Additional Protocols to the Geneva Conventions (1977). Together, these standards offer protection in both international armed conflicts and non-international armed conflicts (eg, civil wars). These standards impose the duty on warring parties to not interfere with medical care for wounded or sick combatants and civilians, and not attack, threaten, or impede medical functions. Warring parties must also permit medical functions to have access to the sick and wounded, refrain from using medical facilities for military purposes, and spare patients from violence, intimidation, or harassment. When military operations take place, failure to discriminate between military and civilian objects, such as medical facilities, is prohibited. The Geneva Conventions—Convention IV (articles 16–23),[4] Protocol I (articles 8–18),[5] and Protocol II (articles 9–12)[6]—also define the authorised use of the Red Cross and Red Crescent emblems. When medical objects (facilities and transports) are used for military purposes or the medical emblem is misused, they lose their immunity from attack (Convention I, article 21;[22] Protocol I, article 13;[5] Protocol II, article 11[6]), but even then the parties have obligations to provide a warning before an attack and to keep harm to civilians to a minimum (Protocol I, articles 57 and 58;[5] customary international law[7]). The violation of international humanitarian law by one party does not justify violations by the other.

The Geneva Conventions also impose a duty of impartiality: individuals not in combat, including wounded soldiers, should be treated irrespective of their political affiliation or other status. The Additional Protocols (Protocol I, article 10, part 2;[5] Protocol II, article 7, part 2[6]) require that the wounded and sick "shall be treated humanely and shall receive, to the fullest extent practicable and with the least possible delay, the medical care and attention required by their condition. There shall be no distinction among them founded on any grounds other than medical ones". The Additional Protocols (Protocol I, article 16, parts 1 and 2;[5] Protocol II, article 10, parts 1 and 2[6]) also add the requirement that the parties respect principles of medical ethics; they forbid the punishment of medical personnel for adherence to ethical standards of the profession, and outlaw use of compulsion against health providers to engage in acts that are inconsistent with medical ethics.

ICRC, the leading authority on the Geneva Conventions, has interpreted these requirements to be customary international law, and therefore are binding on states and other combatants irrespective of whether the parties have ratified the conventions and protocols.[7] Violations can amount to war crimes to the extent that they are "wilfully causing great suffering or serious injury to body or health" (Convention IV, article 147[4]), use procedures that are not consistent with medical standards (Additional Protocol I, article 11[5]), or amount to intentional attacks on medical functions.[23] Human rights law adds to these requirements by prohibiting states from engaging in arbitrary arrest, detention, torture, extrajudicial execution, or other forms of deprivation of life or liberty without due process of law,[8] and demanding that medical ethics are adhered to.[24]

Data collection

We sought to use human rights reports to identify the overall extent of interference with and assaults on patients and medical functions, and the misuse of the medical emblem.

Phase one: availability of data

We searched for available data about interference and assaults during a 6-year period (January, 2003–December, 2008) that we judged to be sufficient to assess recent conflicts and yield patterns of reporting. The Uppsala Conflict Data Program[25,26] is recognised as a comprehensive and consistent dataset for armed conflicts from 1989 onwards, and includes intensity of conflict, date of conflict onset, and date of conflict termination.[27] These data were used to generate a list of 39 countries

with active armed conflicts on their territory during 2003–08 (panel 1). Conflicts in these countries ranged in intensity from minor (at least 25 battle deaths per year) to war (at least 1000 battle deaths per year).

For each of the 39 countries, for every year (2003–08) in which a conflict was present, we searched: reports published yearly about worldwide human rights violations by the US State Department, Human Rights Watch, and Amnesty International; and country-specific reports published in cases of conflict by Human Rights Watch and Amnesty International. We also did preliminary searches of press releases by the ICRC in countries in which conflicts were taking place, but they did not yield sufficient additional information to warrant inclusion as a data source.

Searches for country-specific reports by Human Rights Watch and Amnesty International depended on the search options available through the organisations' websites. Human Rights Watch reports were selected by country on the basis of the relevancy of titles, and, if available, abstracts. Amnesty International's website has a more robust search engine, which was used to specify country, date range, and search terms. None of the three organisations has a separate category for reporting attacks on medical functions in conflict, so we searched websites using the terms "medical", "doctor", "nurse", "health", "aid", "hospital", "clinic", "ambulance", "relief", "facility", "facilities", "ICRC", "MSF", "humanitarian", "block", "barrier", "bomb", "medicine", "physician", and "neutrality".

For reports in which a search term was identified, we reviewed the context to establish whether the acts in the report qualified as a violation of the provisions of international humanitarian law applicable to medical functions. Incidents were categorised into five targets of violations of international humanitarian law; these categories were derived and consolidated from previous classification schemes for violations of medical neutrality (panel 2).[28,29] We excluded reports that did not meet the criteria specified by one of our five categories of violations, or that had references to humanitarian or humanitarian aid workers without a specific reference to a health function. Enlistment or engagement of medical personnel to inflict harm on civilians (eg, participation in torture) were excluded because the review focused on attacks on or interference with medical functions or patients.

Panel 2: **Categorisation of acts against medical functions constituting violations of humanitarian law**

Attacks on wounded and sick individuals
Attacks on or interference with patients separate from other forms of attacks on and interference with medical facilities or personnel, including denial of impartial care to wounded civilians, assaults on patients within medical facilities, denial of access to health facilities, unreasonable obstructions of travel for medical care at checkpoints, discrimination, and interruption of medical care.

Attacks on medical personnel
Attacks on or interference with medical personnel in their efforts to provide ethical care to patients, including arrests, detention, assaults, torture, harassment, invasion of medical officers, kidnapping, killing, intimidation, prosecution for providing medical care, and disruption of training programmes.

Attacks on medical facilities
Attacks on or interference with medical facilities, including shelling, shooting, looting, bombing, deprivation of water or electricity, intrusion, encirclement, and other forms of assaults.

Attacks on medical transports
Obstruction of or assaults on medical transport (eg, ambulances), and obstruction of free transport of medical equipment and supplies. Other forms of obstruction of humanitarian relief, such as blockage of aid convoys, were excluded.

Improper use of facilities or emblems
Misuse of medical facilities and personnel for purposes inconsistent with the Geneva Conventions, including military use of civilian health facilities, use of patients or medical personnel as human shields, and misuse of the Red Cross emblem.

Phase two: pervasiveness and types of violations

Since we noted that the reporting of attacks on medical functions in phase one was infrequent and lacked detail, we tried to gain an in-depth understanding of the nature of the attacks. We did a second search of medical and human rights reports to identify published articles and reports from human rights groups (both domestic and international) and international organisations, which included a specific focus on assaults on medical functions. Few such reports were written during 2003–08, so we expanded the timeframe to include armed conflicts that were continuing or had ended after 1989 to yield specialised reports published in the past 20 years (January, 1989–December, 2008). Media sources were excluded.

We searched Google with the search terms mentioned previously, and included the terms "violation," "conflict", and "war". We searched PubMed for the words "violation" or "neutrality" that accompanied the words "conflict" or "war". The websites of Amnesty International and Human Rights Watch were searched with the term "medical neutrality", an umbrella term used by human rights organisations to describe attacks on medical functions. When we identified a relevant report, we searched other sources for information about the nature and extent of the attacks.

These searches yielded further information for some of the 39 countries searched in phase one, and information for other countries in which conflict had taken place before 2003: El Salvador, Kosovo, Bosnia, Croatia,

Rwanda, East Timor, and Sierra Leone. Statistical analysis of the results was not possible because the data were not of sufficient quality or consistency.

Outcomes

Table 1 shows whether violations on medical functions were reported for the 39 countries identified in phase one of data collection, and the percentage of years of conflict for which violations were reported by the US State Department, Human Rights Watch, and Amnesty International (2003–08). No reports were issued during conflicts for half the countries, which could be because no violations occurred, especially in some of the low-intensity conflicts, but is probably explained by lack of attention to attacks on medical functions by human rights organisations or by lack of access to countries in which violations occurred. This inference is reinforced by the existence of more reports in countries with good accessibility, such as the occupied Palestinian territory and Thailand.

See Online for webappendix

For the 22 countries in which violations were recorded, table 2 shows the number of incidents of violations on medical functions reported, and the percentage of these countries reporting each of the five categories of violations. The targets for which attacks were most frequently reported were medical personnel and facilities. Violations targeting wounded and sick individuals, proper use of medical facilities or emblems, and medical transport were less frequently reported overall, but high occurrences of violations against medical transport were recorded in Colombia, the occupied Palestinian territory, and Nepal.

	US State Department	Human Rights Watch	Amnesty International	Conflict years*	Conflict years of reporting†
Afghanistan	X	X	X	6	4 (67%)
CAR	X	X	0	4	3 (75%)
Chad	X	0	0	3	1 (33%)
Chechnya	X	X	0	5	2 (40%)
Colombia	X	X	0	6	6 (100%)
Côte d'Ivoire	X	X	0	2	1 (50%)
DR Congo	X	X	X	6	6 (100%)
Ethiopia	0	X	0	6	4 (67%)
Georgia	0	X	X	1	1 (100%)
India	X	X	X	6	2 (33%)
Iraq	X	X	X	6	6 (100%)
Occupied Palestinian territory	X	X	X	6	6 (100%)
Lebanon	0	X	0	1	1 (100%)
Liberia	X	0	0	1	1 (100%)
Nepal	X	X	X	4	2 (50%)
Nigeria	X	0	0	6	1 (17%)
Pakistan	X	X	X	4	2 (50%)
Somalia	X	X	0	6	3 (50%)
Sri Lanka	0	X	0	6	2 (33%)
Sudan	X	X	X	6	4 (67%)
Thailand	X	X	X	5	4 (80%)
Yemen	0	X	0	5	4 (80%)

X indicates that at least one report was issued. 17 countries had no reports of violations against medical functions: Algeria, Angola, Azerbaijan, Burma, Burundi, Eritrea, Haiti, Indonesia, Iran, Mali, Niger, Peru, Philippines, Senegal, Turkey, Uganda, and Uzbekistan. CAR=Central African Republic. DR Congo=Democratic Republic of the Congo. *Number of years during which conflict was occurring in a specific country (within 2003–08). †Number of years during which conflict was occurring in a specific country (within 2003–08) and reports were issued about attacks on medical functions (% of conflict years).

Table 1: **Reporting of incidents of violations on medical functions (2003–08)**

Despite inconsistencies in methods of documentation, or, in many cases, no reports being produced, existing human rights reports show that severe violations have occurred worldwide against patients and medical functions during armed conflict. Table 3 shows focused studies of the types of violations in 15 countries from reports that were identified from the second phase of data collection, and the sources for these studies are listed in webappendix pp 1–9. These studies, including two population-based studies from Kosovo and Chechnya, show that very different conflicts all have extensive occurrence of: arrest, killing, kidnapping, and intimidation of doctors and health workers; invasion, looting, or destruction of medical facilities; expulsion or killing of patients in clinics and hospitals; and gross interference with ambulances.

Together, the studies in table 3 indicate three trends. First, in certain conflicts, attacks on medical workers and facilities seem to be part of generalised violence directed towards civilians to achieve a political goal—eg, ethnic cleansing, government destabilisation, control or forced movement of populations, or demoralisation of a population sympathetic to an enemy.[30] Medical workers, clinics, and hospitals were among many civilian targets in Bosnia, Chechnya, Kosovo, Rwanda, El Salvador, and Sierra Leone. However, in some cases, destabilisation tactics included targeted attacks on physicians as community leaders or elites, exemplified by the murder and kidnapping of physicians in Iraq, and by assaults on Muslim medical professionals in Bosnia. In other cases in which violence is not generalised, control of access to medical aid seems to have been used to achieve a political objective or to diminish support for one party.

Second, certain attacks on medical facilities, personnel, or patients are specifically designed to gain a military advantage. In Kosovo, Nepal, Chechnya, East Timor, and Colombia, interference with medical functions seemed to be motivated, at least partly, to prevent enemy combatants from receiving care and re-entering battle. In Kosovo, Colombia, Bosnia, and Chechnya, some attacks on medical workers and facilities seem to have been designed with the military objective to force civilians to leave. In Sri Lanka, Gaza, Iraq, and Lebanon, even when the motive might not have been to destroy hospitals and clinics, military operations did not sufficiently discriminate medical and other civilian facilities from military objects.

Such occurrences could be a product of the gap in military capacity between non-state armed groups and

conventional armies. This asymmetry creates incentives for non-state actors to flout the restrictions of international humanitarian law, especially its core principles of distinction between civilian and military objects, proportionality in use of military force, and proper use of the medical emblem.[31] In turn, these tactics can trigger violations by conventional forces, especially in campaigns to destroy alleged terrorist groups or pursue counterinsurgency strategies (eg, El Salvador and the Philippines). For example, during fighting between rebel and Sri Lankan forces in 2009, the Tamil Tigers prevented civilians from leaving the occupied area, probably in anticipation of attacks from the Sri Lankan military. In response, Sri Lankan forces indiscriminately attacked hospitals and other civilian facilities, and denied entry of humanitarian aid. Similarly, in the first battle in Falluja, Iraq (April, 2004), credible reports indicated that coalition forces responded to insurgents' manipulation of civilians by blocking civilians from entering Falluja's main hospital, preventing medical staff from either working at the hospital or relocating medical supplies to an improvised health facility, occupying the hospital, preventing Red Cross and Red Crescent convoys from entering the city, and firing on ambulances.[32–36] In response to concerns that ambulances would be misused for military purposes, Israel denied or severely delayed access to ambulances for the wounded and sick in the occupied Palestinian territory, and shot at ambulances, ambulance drivers, and other emergency medical workers, even after ambulances passed an inspection for weapons by the ICRC.[37–39]

Third, medical workers are arrested, detained, prosecuted, and sometimes tortured or executed for known or alleged provision of medical services to wounded enemy combatants, as occurred in Colombia, the Philippines, El Salvador, Nepal, Kosovo, Chechnya, and East Timor. Such actions are sometimes specifically authorised under local anti-terrorism law, despite the fact that the practice violates international humanitarian law and medical ethics. These practices are part of a larger trend in which countries' anti-terrorism practices deem the provision of medical care to alleged terrorists to be a violation of criminal law or the basis for denial of political asylum.[40–43]

Limitations

The restricted nature of reporting of assaults on medical functions in war means that available reports do not provide a generalisable picture of the scope and extent of violations. For attacks that were reported, we were frequently unable to identify the precise nature of the act, the number of people affected, the perpetrator, and whether a full understanding of the circumstances would show that no violation had occurred. Country reports by the US State Department did not include violations committed by the USA in Iraq and Afghanistan.

	Attacks on wounded and sick individuals	Attacks on medical personnel	Attacks on medical facilities	Attacks on medical transport	Improper use of medical facilities or emblems
Afghanistan	··	4–24	1–3	NS	··
CAR	··	4–24	1–3	··	1–3
Chad	NS	1–3	1–3	··	··
Chechnya	1–3	1–3	NS	··	··
Colombia	NS	1–3	1–3	4–24	1–3
Côte d'Ivoire	··	··	1–3	··	··
DR Congo	1–3	1–3	>25	1–3	··
Ethiopia	NS	··	1–3	··	··
Georgia	··	1–3	1–3	··	··
India	··	··	1–3	··	··
Iraq	NS	NS	··	1–3	1–3
Occupied Palestinian territory	NS	>25	1–3	>25	1–3
Lebanon	··	1–3	4–24	1–3	1–3
Liberia	··	NS	NS	··	··
Nepal	NS	4–24	NS	4–24	··
Nigeria	··	··	1–3	··	··
Pakistan	··	NS	··	··	··
Somalia	··	4–24	NS	1–3	NS
Sri Lanka	NS	··	··	··	··
Sudan	··	>25	NS	1–3	··
Thailand	··	>25	4–24	··	1–3
Yemen	NS	NS	··	··	··
Number of countries affected (n=22)	10 (45%)	17 (77%)	18 (82%)	9 (41%)	7 (32%)

Data are the number of reported incidents, not the number of people, facilities, or transports affected in each reported incident. Data are based on reports about human rights practices from the US State Department, Human Rights Watch, and Amnesty International. 17 countries had no reports of violations against medical functions: Algeria, Angola, Azerbaijan, Burma, Burundi, Eritrea, Haiti, Indonesia, Iran, Mali, Niger, Peru, Philippines, Senegal, Turkey, Uganda, and Uzbekistan. ··=not reported. NS=incidents identified but count not specified. CAR=Central African Republic. DR Congo=Democratic Republic of the Congo.

Table 2: **Type and frequency of reported incidents of violations on medical functions per year (2003–08)**

Certain violations that were reported could have been missed because search criteria did not include words that would identify them. Violations that were reported in the media alone were excluded, as were human rights reports of attacks on aid workers that did not further identify the aid workers as health workers. Therefore, our data probably understate the number of attacks on medical functions in some conflicts, for example in Sudan and Afghanistan. Our searches in PubMed and the websites of Human Rights Watch and Amnesty International were more focused and probably identified many of the relevant reports. The results in tables 1 and 2 do not definitively establish that international humanitarian law was violated; reasonable precautions could have been taken to discriminate between civilian and military objects, and to keep harm to civilians to a minimum.

Table 3 might omit human rights reports focusing on attacks on medical functions since such reports were not routinely posted on organisations' websites during the 1990s. Moreover, the searches used for this review would

	Parties	Type of violation				
		Attacks on wounded and sick individuals	Attacks on medical personnel	Attacks on medical facilities	Attacks on medical transport	Improper use of medical facilities or emblems
El Salvador (1980–92)	Civil war; government forces *vs* rebel forces	Targeted by government and rebel forces. Two reports of abduction of a patient from hospital; 16 executions of patients; three incidents of discrimination of medical service for alleged collaboration with the opposition; evacuation of wounded individuals delayed	Government forces killed nine doctors, seven medical students, and one nurse; blocked medical services (nine incidents); detained or tortured medical workers (five incidents); and assaulted, harassed, and intimidated health workers. Rebel forces abducted medical personnel for medical services	Targeted by both parties. Six attacks on medical facilities and hospitals	Targeted by both parties. Nine attacks on medical transports; one death due to delayed ambulances; medical supplies delayed or confiscated; and medical access to certain areas blocked	Targeted by both parties. Misuse or no use of proper insignia; and recurring military incursions into medical facilities
Philippines (1986–89)	Civil war; government forces *vs* rebel forces	Two incidents of medical aid blocked by government forces	Targeted by both parties for alleged cooperation with the opposition. Seven medical workers killed; seven medical workers detained or harassed; and government compelled physicians to report injuries to the department of health, with penalties for failure to comply	Targeted by both parties for alleged collaboration of medical personnel with the opposition. Two medical facilities looted; and 472 community-based health programmes disrupted or closed	..	..
Sierra Leone (1991–2002)	Revolutionary United Front (RUF) *vs* government forces, and, at times, Economic Community of West African States Monitoring Group (ECOMOG)	Targeted by RUF and ECOMOG. At least 70 patients executed inside hospitals and patients robbed by RUF. ECOMOG executed wounded rebels in and around a hospital	Targeted by RUF. Medical staff executed and robbed inside hospitals; and forced to withhold care to wounded civilians resulting in 200 deaths	Hospitals looted and destroyed by RUF	Two ambulances destroyed by RUF	At least one hospital taken over by RUF
Bosnia (1992–95); Croatia (1991–95)	Yugoslav National Army and Serb paramilitary forces *vs* Bosnian and Croation forces	Targeted by all parties with Bosnian Serb forces responsible for most violations. Patients removed from hospitals; medical aid blocked; and patients discriminated against or abused. In Croatia, Yugoslav Army and Serb civilians removed 300 men from a hospital, including wounded individuals thought to be Croatian soldiers, and beat and killed 194 of them	Targeted by all parties with Bosnian Serb forces responsible for most violations. Health-care workers targeted by snipers in hospitals and in conflict zones. 119 Bosnian health workers killed, but the number killed in connection with medical activities was not established	Targeted by all parties with Bosnian Serb forces responsible for most violations. 11 known hospitals and clinics bombed; further facilities bombed but hospitals and clinics affected were not identified	Targeted by all parties with Bosnian Serb forces responsible for most violations. Ambulances and mobile hospitals targeted or destroyed	..
Rwanda (1994)	Genocide undertaken by Hutu paramilitary forces and presidential guard	140–170 Tutsi individuals (no record of how many were patients) killed in Butare university hospital over 2 days; further killing in Mugonero Hospital; Interahamwe militia sought out injured Tutsis in the capital's main hospital, Centre Hospitalier de Kigali	No record of how many individuals killed in Butare and Mugonero hospitals were medical staff; unknown number of doctors targeted and killed	Unknown number of hospitals and clinics serving Tutsis raided and looted; at least two hospitals attacked with grenades and other ordnance	For a time, attacks on ambulances were so common that ICRC suspended its service (number not known)	..
Colombia (1995–98)	Government armed forces *vs* rebel forces (mostly Colombian Revolutionary Armed Forces [FARC] and National Liberation Army [ELN])	Targeted by government and rebel parties. 21 wounded individuals killed; 13 incidents of restriction of delivery of medical aid; and 12 incidents of obstruction of delivery of medical services	Targeted by government and rebel parties, mostly for delivery of care to the opposition. 76 medical personnel killed; four incidents of forced disappearance of medical personnel; nine medical personnel injured; 114 threats against medical personnel; 57 incidents of forced displacement; 59 incidents of medical personnel retained to give preferred treatment; one detained medical worker; and nine incidents of personnel being forced to work under inadequate conditions and with disregard for medical priority	Targeted by government and rebel parties. 12 attacks on health units; and 17 incidents of looting of medicines and equipment	Targeted by government and rebel parties. 25 attacks on ambulances	Targeted by government and rebel parties. Seven incidents of military use of medical infrastructure; two incidents of improper use of medical identification; and 17 ambulances used for military purposes

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	Parties	Type of violation				
		Attacks on wounded and sick individuals	Attacks on medical personnel	Attacks on medical facilities	Attacks on medical transport	Improper use of medical facilities or emblems
(Continued from previous page)						
Kosovo (1998–99)	Serbian military, paramilitary, and police *vs* Kosovo Liberation Army	Targeted by Serbian forces. 74 patients reported fear of obtaining medical care; 24 patients denied access to medical care; and 23 patients physically abused	Targeted by Serbian forces and police. Kosovar Albanian physicians arrested, detained, tortured, and prosecuted for provision of medical care to wounded combatants affiliated with the Kosovo Liberation Army; three extrajudicial killings of doctors; 22 incidents of arbitrary detention or prosecution of health workers; 12 incidents of torture of health workers; 79 incidents of interference or intimidation; 54 health professionals fled or forced into hiding; 35 health professionals feared delivering ethically appropriate care; and ten threats of physical violence against health workers	Targeted by Serbian forces. 100 medical facilities destroyed	..	Targeted by Serbian forces. 58 incidents of military use of medical facilities
East Timor (1999)	Indonesian National Army (TNI) *vs* militias	Targeted by TNI. Severely wounded patients removed from a civilian hospital and placed in a military hospital; military presence caused patients and health professionals to leave or avoid the hospital	Targeted by all parties, partly for delivery of care to the opposition. Medical professionals threatened, harassed, and attacked, resulting in at least two known deaths; and homes of medical professionals raided	Rural government clinics attacked, looted, and threatened by militias	One medical convoy attacked by militias	Targeted by TNI. Main civilian hospital in Dili used for military purposes
Chechnya (1999–2000)	Russian forces *vs* Chechen rebal forces	Russian forces obstructed access to medical care through arbitrary practices at checkpoints; 5% of survey respondents witnessed patients expelled from medical facilities	Physicians targeted by both parties for provision of care to the opposition. Doctors intimidated and harassed. Russian forces searched, interrogated, and detained health workers in hospitals	Hospitals bombed by Russian forces; 32% of survey respondents witnessed Russian forces damaging facilities	..	Russian forces occupied health facilities; 4% of survey respondents witnessed misuse of medical facilities
Occupied Palestinian territory (2000–09)	Israeli Defense Force *vs* various Palestinian forces	Israeli military operations, separation barrier, Israeli blockade on Gaza, and more than 600 checkpoints and physical obstructions in the West Bank caused delay or denied access to medical care; more than 300 deaths due to denied access to medical care; patients executed in hospitals by Palestinian forces; more than 200 patients seeking medical care interrogated by Israeli general security services at border crossings; during fighting between Hamas and Fatah in 2007, both parties captured wounded fighters from inside hospitals and blocked medical aid; medical relief and rescue hindered during siege in Gaza in 2008	99 documented cases of medical personnel injured or killed	Almost half of 122 health facilities damaged by shelling in siege on Gaza in 2008	Israeli forces responsible for more than 2000 cases of denied access to or delay of ambulances, more than 100 cases of ambulances damaged or destroyed, and more than 275 attacks on ambulances and medical teams	A few cases of Palestinian forces using ambulances to transport weapons or fighters, or both
Nepal (2001–05)	Maoist insurgent forces *vs* government security forces	Blockades by insurgent forces restricted access to medical care	Targeted by both parties for provision of care to the opposition. Health workers intimidated, killed, or disappeared for giving care; government issued a directive in 2001 so doctors had to obtain permission before treatment of rebels, with prosecution of those who failed to comply	Targeted by insurgent forces. Health centres destroyed, looted, or forced to close; and medical supplies destroyed or confiscated	Targeted by insurgent forces. Six ambulances attacked or destroyed	..
Iraq (2003–09)	Coalition and government forces *vs* various insurgent and militia forces	Hundreds of Sunni patients and medical workers targeted in hospitals by officials from the ministry of health	Targeting of medical personnel resulted in more than a 50% reduction in medical workforce since outbreak of war; about 2000 doctors killed and 250 kidnapped (responsible parties unknown)	About 12% of hospitals destroyed during the invasion by fighting	Ambulances obstructed and fired upon by coalition and insurgent forces	Several incidents of Red Cross ambulances misused by fedayeen; ambulances received gun fire; gun fire received from ambulances by fedayeen; and five reports of hospitals taken over by military forces

(Continues on next page)

	Parties	Type of violation				
		Attacks on wounded and sick individuals	Attacks on medical personnel	Attacks on medical facilities	Attacks on medical transport	Improper use of medical facilities or emblems
(Continued from previous page)						
Lebanon (2006)	Israeli Defense Force *vs* Hezbollah	··	Medical teams attacked by Israeli Defense Force	Hospitals in at least eight cities shelled, 12 hospitals destroyed, and 38 damaged from attacks by Israeli Defense Force and Hezbollah	Three ambulances attacked by Israeli Defense Force	Israeli Defense Force attacked and took over a hospital used for military purposes by Hezbollah
Sri Lanka (2006–09)	Civil war; government forces *vs* rebel forces (Tamil Tigers)	During January–May, 2009, more than 260 people killed and more than 500 wounded when hospitals shelled—in some cases several times—mostly by the Sri Lankan Army. Medical aid blocked to Jaffna and Vanni regions by government and rebel forces	Health workers killed when hospitals and health facilities shelled; three doctors detained for alleged collaboration with rebels after they supplied information to the media about the humanitarian crisis; government forces intimidated, harassed, and detained aid and medical workers who might have criticised methods used to combat the Tamil Tigers	During January–May, 2009, more than ten hospitals and health facilities shelled—in some cases several times (at least 30 attacks)—mostly by the Sri Lankan Army	··	One case of Tamil Tigers firing from a hospital complex

References for the reports are listed in webappendix pp 1–9. ··=not reported.

***Table 3:* Studies of violations on medical functions from human rights reports for conflicts occurring during 1989–2008**

probably not identify reports of attacks on medical functions if these attacks were not the principal subject of the report. The sources for table 3 usually reported specific incidents rather than all violations during the conflicts. The review also omits arrests and prosecutions of physicians and other health workers for their engagement in political activities unrelated to medical functions or that were not within the context of an armed conflict.

Interpretation

To increase the protection of patients and medical functions during armed conflicts, three areas need improvement: documentation and reporting, adherence to international law, and strategies for protection and accountability.

Documentation and reporting

General human rights reports intermittently document attacks on medical functions, and no organisation has embraced regular and systematic reporting of such attacks. Reporting could be occasional because violations have not occurred. The more likely possibility, however, is that violations are not reported because they are not investigated. Indeed, in human rights reports published yearly, no category exists to record attacks on medical functions. Moreover, specific investigations of these violations show that such attacks do occur.

Comprehensive and routine data collection after attacks on medical functions is essential to identify the scope, origins, and causes of violations. Such information can then be used to deter violations, generate effective strategies to prevent violations, raise global awareness of the extent of violations, reinforce legal requirements to prohibit such assaults, and galvanise action by the international community. Human rights organisations need to expand their documentation of attacks on medical functions, and establish a separate category to record such attacks. During such reporting, these organisations can test methods to convert media accounts of armed violence into quantitative data.[44,45]

In view of the importance and long-term effects of attacks on medical functions for population health and health systems, WHO's wide reach, presence, and role in collection of data could be applied to the new function of documentation of such attacks. One of WHO's self-described core functions is to monitor health worldwide and to assess health trends by overseeing the gathering of key statistics that can inform policy making.[46] Towards that end, WHO publishes yearly statistics on human resources for health and health facilities. WHO could develop and implement uniform reporting standards and methods to compile and regularly distribute information about attacks on patients and medical functions.

However, tracking of assaults on medical functions differs from WHO's traditional reporting on mortality, disease, health services, resources, health risks, and inequities in access, for which data are mostly provided by local ministries via census data, household surveys, health-facility assessments, and administrative reporting systems.[47] Aside from the development of sound methods to identify and verify incidents, WHO would have to assure that the information could be gathered without endangering its staff, local health workers, patients seeking care, or others supporting the data collection, and without compromising the impartiality of health

workers.[48] To undertake such data collection, WHO would need to train health workers and others in the criteria for reporting, and engage in security assessments and take appropriate actions to assure personal security and the security of data and communications, including the possible destruction of data after transmission.

Such functions would be new for WHO, but the agency has experience working in environments in which access is compromised and safety is at risk. WHO's Health Action in Crises unit focuses on protection of health in emergencies, including wars, and is in the process of improving its methods for obtaining, managing, and disseminating essential health information in difficult circumstances.[49] Additionally, WHO has addressed the ethical and practical challenges of investigation of human rights violations of great sensitivity, including sexual violence, in war.[50]

In undertaking a mandate to gather information about attacks on medical functions, especially for cases in which the government is not the perpetrator, WHO could secure cooperation from the local ministry of health, which could receive reports of attacks from administrators or staff of health facilities and programmes. For cases in which the government is a perpetrator or has collapsed, WHO would have to rely on other sources—eg, local human rights and civil society organisations, and field offices of the UN High Commissioner for Human Rights. In some cases, WHO could also collaborate with health workers to take advantage of new technologies used both in health and human rights data collection—such as text messages and personal digital assistants—after appropriate assessment of security risks and steps have been taken to address these risks. These strategies could avoid putting the burden of reporting on humanitarian organisations, which are at risk of expulsion if they report violations of human rights.

To obtain buy-in from member states, and to assure that WHO has the authority to obtain information without interference from the host government, the World Health Assembly or UN Security Council should enact a resolution to mandate this function for the agency. In some particular instances—eg, when the state or its proxies are perpetrators—political pressure could lead to specific authorisation or agreements through UN mechanisms, such as the Security Council, for investigations in conflict zones, analogous to previous authorisation for the Office of the High Commissioner for Human Rights to undertake a major field investigation in Darfur.[51] These steps will not eliminate risks or obstacles to data collection in very difficult environments. But, with appropriate attention to access, security, and method of data collection, WHO could report on attacks on medical functions in many circumstances.

Adherence to international law

Governments and non-state actors need to make a more robust commitment to compliance. Such a commitment includes more intensive and consistent training of military forces in the medically related requirements of the Geneva Conventions, full investigation of all alleged violations, and, most importantly, articulation by command and political leadership of the importance of respect for medical functions and medical ethics in war, even when the enemy commits violations. For example, commanders should insist that troops comply with the duties under the Geneva Conventions to provide warning before an attack, and to keep harm to civilians to a minimum if a medical facility is used by the enemy for military purposes; and military persons should be held accountable if they do not comply.

Moreover, countries—including those such as the USA that have so far declined—should affirm that respect for medical ethics is incorporated into customary international humanitarian law, and to reject the notion, advanced by some academic bioethicists, that departure from medical ethics is permissable to advance national security.[52,53]

The UN Security Council affirmed that measures taken to fight terrorism must be consistent with law, including international humanitarian law.[54] Additionally, countries should make a renewed and explicit commitment to protection and respect for medical functions in war, as required by international humanitarian law, through a resolution from the UN Security Council.

Strategies for protection and accountability

ICRC seeks to induce combatants, including non-state actors, to adhere to duties under international humanitarian law, including health-protection obligations.[55] It also negotiates inspections of ambulances to assure that they are not used to transport weapons or combatants. Other organised efforts to negotiate with governments and rebel groups to allow for the coordination of humanitarian access and activities—eg, Operation Lifeline Sudan, ground rules, and codes of conduct[56] in other countries—have had some success but face many challenges.[57,58] These initiatives are few. Within the UN humanitarian structure, a protection cluster is devoted to the protection of civilians in emergency and humanitarian situations, but neither it nor the health cluster focuses on or develops strategies to address attacks on and interference with medical functions in armed conflicts. Moreover, placing the protection burden on humanitarian aid groups is misplaced: the responsibility rests primarily on governments and intergovernmental organisations.

The UN General Assembly and Security Council have enacted resolutions affirming the responsibility to protect civilians from war crimes and crimes against humanity, which includes the duty to use appropriate diplomatic, humanitarian, and other peaceful means to help protect populations.[59,60] Member states should end their abdication of this role. Additionally, the conduct of combat operations should include more robust protections strategies. In some circumstances, military

forces might need to provide security for civilian functions generally or for health facilities in particular, whereas in others, forces might need to restrict incentives for the enemy to commit violations. For example, military forces should not take actions that create the impression that medical services provided to civilians by humanitarian agencies and local providers are part of a military strategy, and thereby subject such services to risk of attack.[61]

However, real progress can only be achieved by countries and international organisations raising the political price paid by parties that violate international law. Much of the debate about the responsibility to protect civilians centres on when, if ever, military force will be used to stop crimes against humanity committed by a country. But action should begin with official condemnation of violations. Though hardly a panacea, in some circumstances such condemnation can put pressure on perpetrators, including non-state actors, to cease violations. Further, since many attacks on health facilities are war crimes, international criminal justice institutions could, in appropriate cases, include charges of such violations in prosecutions for war crimes.

The health community, along with human rights and civil society organisations, can advance protection by speaking out more vigorously. Medical associations have largely restricted their attention to individual cases of political persecution of individual physicians. Important as these protests are, they ignore systematic attacks on patients and medical functions. For example, the World Medical Association protested the arrest and detention of three Sri Lankan doctors but did not condemn attacks on medical facilities;[21] the British Medical Association, to its credit, took a broader approach.[62] The actions of doctors in Nepal provide a good example of a more vigorous stance: they documented human rights violations; protested the intimidation, threats, and attacks on doctors by insurgents; resisted the government's directive not to treat wounded rebels without permission from the government; and organised and solicited international support on behalf of doctors and medical students who had been arrested and tortured.[48]

Conclusions

Attacks on health workers and facilities have become a feature of modern war; they are not simply committed by rogue countries or forces. During the past 20 years, violations have been documented in varied conflicts—eg, in Kosovo, Nepal, Israel, the occupied Palestinian territory, Iraq, and Colombia—and shown extensive violence against medical functions. Such actions cause death and injury, and exacerbate the suffering of populations that have been devastated by war and deprived of medical workers and facilities. For far too long, violations have not been consistently or adequately reported, and are often perceived to be isolated incidents, resulting in little action. When violations are reported, protests are intermittent at best and perpetrators are rarely held accountable.

One response is to call on human rights organisations and ICRC for systematic documentation and political pressure, but such action is insufficient. States cannot simply honour the Geneva Conventions in the breach, and international commitments to health that are expressed by WHO's charter cannot be ignored in times of crisis. Protection begins with adherence to international law and commitments, and can be reinforced with rigorous collection and reporting of data, and demands for compliance. Robust documentation can also help to clarify the reasons for attacks and lead to strategies to reduce them. Despite some limitations, WHO is best positioned to provide leadership to undertake the task of documentation. Once evidence is available, states can and should demand adherence to international law, both individually and through UN organisations. The medical community has a responsibility to speak out collectively to protect health workers in fulfilment of their ethical duties to the people in their care without risk of arrest or attack on themselves or medical facilities. Governments and non-state actors should be held accountable for abiding by obligations to respect medical functions in war.

Contributors
MDB searched for published reports and information, and generated data tables, all in close consultation with, and review by, LSR. LSR conceptualised the project and was the lead writer, with substantive contributions and editing by MDB. LSR had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Conflicts of interest
We declare that we have no conflicts of interest.

Acknowledgments
The US Institute of Peace provided a fellowship to LSR that enabled this study to be done. The Institute exercised no editorial control whatsoever over the content.

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